MARINE FISHERIES COMMISSION BUSINESS MEETING
Doubletree by Hilton University Brownstone, Raleigh, N.C.
Aug. 19-21, 2015

N.C.G.S. 138A-15(e) mandates at the beginning of any meeting of a board, the chair shall remind all members of their duty to avoid conflicts of interest under Chapter 138. The chair also shall inquire as to whether there is any known conflict of interest with respect to any matters coming before the board at that time.

N.C.G.S. 143B-289.54.(g)(2) states a member of the Marine Fisheries Commission shall not vote on any issue before the Commission that would have a "significant and predictable effect" on the member's financial interest. For purposes of this subdivision, "significant and predictable effect" means there is or may be a close causal link between the decision of the Commission and an expected disproportionate financial benefit to the member that is shared only by a minority of persons within the same industry sector or gear group. A member of the Commission shall also abstain from voting on any petition submitted by an advocacy group of which the member is an officer or sits as a member of the advocacy group's board of directors. A member of the Commission shall not use the member's official position as a member of the Commission to secure any special privilege or exemption of substantial value for any person. No member of the Commission shall, by the member's conduct, create an appearance that any person could improperly influence the member in the performance of the member's official duties.

Commissioners having questions about a conflict of interest or appearance of conflict should consult with counsel to the Marine Fisheries Commission or the secretary's ethics liaison. Upon discovering a conflict, the commissioner should inform the chair of the commission in accordance with N.C.G.S. 138A-15(e).

Aug. 19

6 p.m. Public Meeting
Receive public comment relative to any fisheries management issues

Aug. 20

9 a.m. Call to Order*/Invocation
Conflict of Interest Reminder
Roll Call
Vote on Approval of Agenda**
Vote on Approval of Meeting Minutes**

9:15 a.m. Public Comment
Receive public comment relative to any fisheries management issues

11:15 a.m. Chairman's Report
Review administrative actions and issues from the chair

- Letters
- Ethics Training Reminder
- 2015 Meeting Schedule Reminder
- 2016 Proposed Meeting Schedule
- **Election of Vice Chair****

11:30 a.m. Issues from Commissioners

11:45 a.m. Committee Reports
Review and consideration of action items from committee meetings

- Sea Turtle
- Habitat and Water Quality
- Oyster and Hard Clam Fishery Management Plans

11:50 a.m. SCFL Eligibility Report/Set Eligibility Pool Cap – Jack Holland
Each year the commission must set a cap on the number of Standard Commercial Fishing Licenses in the License Eligibility Pool.

- **Set Eligibility Pool Cap****

Noon Lunch Recess

1:30 p.m. Tagging Program – Mike Loeffler and Amy Comer (Presentation)

2:15 p.m. Division of Marine Fisheries Annual Stock Status Report – Lee Paramore

2:30 p.m. Fishery Management Plans – Catherine Blum

- Annual Fishery Management Plan Update

2:45 p.m. Blue Crab Traffic Light Assessment Update – Jason Rock (Presentation)
Receive information on second year of traffic light assessment update

3:45 p.m. Interjurisdictional Fishery Management Plan Information Update – Michelle Duval and Katy West (Presentation)
Receive presentation of draft information update and public review processes
- **Vote on public review of information update****

4:15 p.m. Kingfish Fishery Management Plan Information Update – Beth Egbert and Kevin Brown (Presentation)
Receive presentation of draft information update and public review processes
- **Vote on public review of information update****

5 p.m. Recess

Aug. 21

8:30 a.m. Supplement A to the Southern Flounder Fishery Management Plan Amendment 1 – Tom Wadsworth and Chris Stewart
- Public Comment Summary
- Review of Supplement Proposals
- **Vote to select preferred management options and give approval of Supplement A****

10 a.m. Fishery Management Plan Schedule – Catherine Blum
- **Vote on five-year schedule****

10:15 a.m. Rulemaking – Catherine Blum
- 2015/2016 Rulemaking Cycle Update

10:25a.m. Rule Suspensions – Kathy Rawls
The commission must vote to continue suspension of the following rule(s):
- **Vote on Rule Suspension for Portions of 15A NCAC 03M .0301 Spanish Mackerel****

10:30 a.m. Director's Report
Reports and updates on recent Division of Marine Fisheries activities
- Legislative Update
- Budget Update
- Atlantic States Marine Fisheries Commission
- Informational Materials (No Verbal Updates)
  - Rule Suspension Notices/No Action Required
  - Fishery Management Plan Review
  - Budget report/sales update on Standard Commercial Fishing License Fee Increase
  - Quota Update
  - Protected Resources Update
    - Observer Program
    - Incidental Take Permits
  - Mid-Atlantic Fishery Management Council Update
  - South Atlantic Fishery Management Council Update
  - Highly Migratory Species
  - Landings Update
    - Southern Flounder
    - Red Drum

11:30 a.m. Issues from Commissioners

11:45 a.m. Meeting Assignments and Preview of Agenda Items for November Meeting – Nancy Fish

Noon Adjourn

2015 Meeting Dates

Feb. 18-20 Hilton Riverside, Wilmington
May 20-22 Hilton Riverfront, New Bern
Aug. 19-21 Hilton Brownstone, Raleigh
Nov. 18-20 Jennette's Pier, Nags Head

**** Times indicated are merely for guidance. The commission will proceed through the agenda until completed.***
*****Potential Action Items***

Minutes

THE MFC ADVISER
Marine Fisheries Commission Business Meeting
Hilton Riverfront, New Bern North Carolina
May 20-22, 2015

The commission held a public meeting on the evening of May 20, followed by a business meeting May 21-22, at the Hilton Riverfront in New Bern, North Carolina.

The briefing book, presentations and audio from this meeting can be found at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

PUBLIC MEETING – May 18

Chairman Sammy Corbett called the meeting to order at 6 p.m.; the following individuals spoke:

Michael Peele, from Hatteras Island, talked about flounder reductions coinciding with the cost of licenses increasing, gear restrictions and now more possible reductions at the peak of the season. He said fishermen want to work; they don't want to stay home.

Mark Needum, from Atlantic, didn't know what needed to be done, but asked what has been accomplished over the last 20 years. He said fishermen have to work; they have to eat.

Forest Oakes said an 18-inch size limit is ridiculous. The Division of Marine Fisheries says there is a problem with the southern flounder stock, but that's not true; there were more flounders caught last year and in less time.

Jan Willis, from Carteret County, agreed with recent comments made by Ken Seigler at a Finfish Advisory Committee meeting about too many crab pots being set in a small area. She said that's how recreational fishermen feel about gill nets in small creeks and that all gill nets in creeks should be eliminated.

Warren Judge, a Dare County commissioner, talked about access and over regulation and advocated for the right of commercial fishermen to work, asking for the commission to take a new direction on flounder.

Doug Cross, with Pamlico Packing Company, talked about recent stock assessments that said menhaden and speckled trout were overfished and then a short time later it was determined those stocks were okay. He said the southern flounder stock assessment did not pass peer review and questioned the validity of the data the commission was using to justify the need for a flounder supplement.

Rick Scroggs, from Swansboro, said fishing is not as good as it used to be and asked the commission to do what is in the best interest of the science to have fish like we used to have.

Robert McBride, from Frisco, questioned the science being used for southern flounder and said there had been a decrease in the numbers of pound nets and gill nets over the years. He encouraged the commission to have clean motives and wisdom regarding its actions.

Bob Lorenz, from Wilmington and member of the Southern and Sea Turtle advisory committees, said aggressive action was needed to restore southern flounder and that we can no longer rely on the sea turtle incidental take permit to control flounder fishing. He cautioned the commission not to let southern flounder go the way of winter flounder in New England.

Ron McCoy, from Hampstead, said that North Carolina needed to get user groups together to create a vision of how to grow our fishery like Louisiana had successfully done.

Donald Willis, from New Bern, said he's watched fisheries management for a long time and the commission now seems more interested in saving jobs than saving fish. He urged the commission to err on the side of the resource, because if we take care of the resource, we all win.

Cole Harmon, from Wrightsville Beach, gigs flounder and said the season was already closed in December, and if the commission closes more, he will be out of a job. He said there was not a problem with the flounder stock and there were plenty of fish.

Wheeler Balance, a 14-year-old from Hatteras, said fishing was his heritage and that he believes in managing fisheries on sound science. He asked the commission to find a solution by working together with the fishermen.

Dave Stewart talked about declines he's seen in the Neuse River and Pamlico Sound in the last 35 years and that weather, overfishing, pollution, and water quality all played a role in the decline. He said if the commission made a decision to close or reduce flounder catch, it needs to be across the board for both user groups.

Mike Dennis, from Cape Fear Guide Service, said a recreational reduction in flounder will destroy the inshore for-hire fishery business.

John Hudnall, a pound netter, talked about the history in increased size limits with southern flounder and the decrease in the number of pound nets. He said pound netters cannot stand any more reductions.

Perry Wood Beasley, Sr., with N.C. Watermen United, said he was there to fight for people to have the freedom to fish. He said all the counties surrounding the sounds support the commercial fishermen. He said N.C. Watermen United opposed the flounder supplement.

Reed Jarvis said it seems the science is not complete with the southern flounder stock assessment. He advised that if the commission makes a decision without peer reviewed science, it would be making a bad decision. He supported reducing the recreational size limit to 14 inches and reducing bycatch.

Ken Eiler, from Carteret County, said science should drive the commission's decision, but that heritage and influence seems to drive fisheries management. He said North Carolina is the only state that allows netting in creeks and that the future is in recreational fishing, regardless of what your heritage is. He closed by saying the buffalo hunters thought there was plenty of buffalo until they killed the last two and that North Carolina has been eating the seed corn for years.

Glenn Skinner, from Carteret County, asked if it could be said with surety that any of the flounder options being considered would have a 50 percent chance of rebuilding the stock. Division Director Louis Daniel responded not without a stock assessment. Skinner said the spotted seatrout assessment was wrong and encouraged the commission to wait for the stock assessment on flounder to be completed before taking action, saying flounder couldn't be effectively managed without knowing the data from other states. He also said managers needed to stop using fishery management as a weapon instead of a tool to build better fisheries.

David Peters talked about how fishing has declined over the years and told the commission to not let politics make the decision, but to do what is right for the fish.

David Bush, fisheries biologist for the N.C. Fisheries Association, said the proposals being considered are very conservative when we do not know if a problem exists. He said southern flounder has cycles with peaks and valleys and the commercial sector is already impacted by the measures in the incidental take permit. He said he supports initiating an amendment to the Southern Flounder Fishery Management Plan rather than moving forward with a supplement.

Commissioner Laughridge asked if Mr. Bush was and employee of the N.C. Fisheries Association, or if he was under contract and wanted to know about his background and education and said he could provide that information at a late date if necessary.

William Kelly Todd, from Brunswick County, said that if the commission increased the size limit for southern flounder we would be catching more of the big, breeding females. He said the current recreational size limit was fine.

Commissioner Mike Wicker asked to say a few words and said he did not want to hear any more comments questioning if he knew the science or if he was telling the truth. He said people who wanted to discuss these issues could come see him after the meeting.

Colton Robinson, from Varnamtown, said in the past five years he has seen an increase in the numbers of flounder.

Keith Bruno, from Pamlico County Fishermen's Association and a member of the Northern Advisory Committee, said he fishes both commercially and recreationally. He said a supplement should be used as an emergency measure and there is no emergency with southern flounder.

Phillip Goodwin, from Carteret County, said pound nets have been doing very good the past couple of years. He said some people have been saying not to worry about the jobs that would be impacted by some of these proposals, but Goodwin said he was worried about it. He said the pound net fishery was a good clean fishery.

Bill Rich, Hyde County manager, read a resolution from the Hyde County Commission, which did not support use of supplement process for flounder management management.

Lee Morris, from Washington County, said he depends on flounder, that the stocks are healthy and that pound nets had the best fall this last year that they had had in a long time. He talked about concerns he had with the time and the places the division does its sampling and encouraged the division to work with fishermen to have more effective sampling.

Bert Owens, from Beaufort, asked if the fishery management plan has been based on science to this point. Director Louis Daniel said the initial Southern Flounder Fishery Management Plan should have had a larger reduction than the Marine Fisheries Commission implemented and then the gear restrictions in the sea turtle settlement agreement and the incidental take permit did not have as large an impact as was anticipated. Owens told the commission to make hard decisions needed for the short term so that the jobs will be there for the long term. He then asked about closing speckled trout season because of cold stuns.

Bob Dillard, from Pamlico County, said he was there defending the fish and that he doesn't want to see flounder and speckled trout get to where gray trout are today. He talked about the economic impact of recreational fishermen in North Carolina and talked about other states having higher bag limits.

Greg Judy said if more protective measures are needed for flounder they should be addressed through the fishery management plan amendment process. He cautioned the commission not to be hasty in pursuing a supplement.

Birdie Potter, from Pamlico County, said she would rather speak the following day but then asked how many commercial fishermen are on the board. Chairman Corbett responded there were three commercial fishing seats on the commission.

Billy Ray Lucas, Jr., with Carolina Fishers of Men Inshore Trail, said North Carolina's greatest asset should be protected but it was being trampled and raped by gill nets and trawlers. He supported the N.C. Wildlife Federation's recommendations in its Sound Solutions campaign and said change was needed.

Dennis Durham, from Wilmington, said a lot of people fish different areas, and some are seeing better catches and some are not. He felt there were already enough harvest restrictions and cuts and it was not fair to any recreational fisherman that pays to fish in this state.

Buzz Frederick, from Queens Creek, said the biggest stock declining is the commercial fishermen. He told the commission that people think we will be walking on fish if we get rid of gill nets, but that has not been the case in other states.

Ken Seigler, from Hubert, said in reference to earlier comments regarding to crab pots, that there is a vast difference between crab pots and gill nets and the times those gears could be used. In regards to flounder, he said changing biological reference points created problems that don't exist. Reality is, when there is an increase in the size limit, there is an increase or a target on the most productive fish. Director Daniel responded it was unfair to characterize modifications to reference points as trying to create a problem and that the reference points were changed to ensure sustainability and give a better age structure.

Jimmie Goodwin, Jr., said the problem with flounder and other fisheries is water quality and that hatcheries could produce the needed fish. He said the increase in license fees should be used to help enhance our fisheries and that the Cedar Island WAMI site is perfect place for a flounder hatchery.

Paul Rudenshauser said for flounder the commission should increase size limits to give more reproductive success, increase the mesh size in gill nets and require use of circle hooks when fishing with natural bait.

BUSINESS MEETING - MOTIONS AND ACTIONS – May 21-22

Chairman Sammy Corbett convened the Marine Fisheries Commission business meeting at 9 a.m. and reminded commissioners of their ethics requirements.

The following commission members were in attendance: Sammy Corbett-Chairman, Anna Beckwith-Vice Chair, Mikey Daniels, Kelly Darden, Mark Gorges, Chuck Laughridge, Joe Shute, Mike Wicker and Alison Willis.

Chairman Corbett announced he was adding a report and request for funding from the Conservation Fund Committee to the agenda and was tabling the discussion of commission initiatives.

The modified agenda was approved by consensus.

Motion by Chuck Laughridge to approve the meeting minutes. Motion seconded by Mark Gorges.
Motion passes unanimously.

Public Comment

Tom Roller, with the N.C. Guides Association, asked for a complete closure of the large mesh flounder fishery, increase the commercial size limit to 15 inches, require 6-inch escape panels in pound nets, a moratorium on new pound net permits until the southern flounder stock is recovered, cap the pound net harvest at the current level and no further restrictions on recreational fishermen. Roller also encouraged the commission to take only written comments on the supplement rather than having a contentious public meeting.

Mike Pedersen, with the N.C. Guides Association, said North Carolina is the only state that still maintains a gill net fishery and that is why the IFA refuses to have a tournament here. He said he was from a commercial fishing family, but realized that commercial fishing was no longer a viable trade and that is why he went into the charter business. He called for a complete closure of the large mesh flounder fishery, increase the commercial size limit to 15 inches, require 6-inch escape panels in pound nets, a moratorium on new pound net permits until the southern flounder stock is recovered, cap the pound net harvest at the current level and no further restrictions on recreational fishermen.

Chad Davis, with the N.C. Guides Association, said the recreational sector had to endure all the cuts over the years with flounder and that the commission needed to remove large mesh gill nets because there is better, less destructive gear available. He said a total allowable catch was needed for the commercial sector and he did not support any reductions to recreational fishery.

Allen Jernigan, with the N.C. Guides Association, asked the commission to manage for the resource and not for maximum commercial extraction. He said the easiest solution for flounder

was to get rid of large mesh gill nets and put a moratorium on pound nets, and that the recreational sector has given all it can give.

Capt. Charlie Schoonmaker, from Carolina Beach, said he just wanted what is best for the resource, and if we take care of the resource, it can then take care of all the fishermen.

Dave Timpy, with the Recreational Fishing Alliance, thanked staff for the work they had done putting together information for the flounder supplement. He said there was an inequity in the harvest that is not fair, and because of that, he does not support any further cuts in the recreational sector. He said he would like to modify the supplement to include options from Recreational Fishing Alliance, including elimination of large-mesh gill nets.

Bob Woodard, chair of the Dare County Commission, said N.C. watermen are struggling to survive against regulations and imports. He asked the commission to consider social and economic impacts and to make decisions based on peer-reviewed science. On every issue that arises, he encouraged the commission to get input from watermen. He closed by saying he was against mandatory logbooks and opposed the use of a supplement to reduce flounder catch.

Bud Abbott, with the Coastal Conservation Association-N.C., referenced a letter from Tim Nifong and said he did not think the options presented by the Division of Marine Fisheries for the flounder supplement go far enough to ensure the continued viability of the stock. He encouraged the commission to use its full statutory authority to regulate overfishing and in his opinion, nothing is off limits. He closed by saying that allocation of the resource should be for all citizens and the commission should set aside a reasonable allocation of flounder in a non-harvest conservation pool for non-fishing citizens.

Chris Elkins, with the Coastal Conservation Association-N.C., spoke regarding the southern flounder supplement saying his organization does not think any of the options presented by Division of Marine Fisheries would restore southern flounder stocks and the commission is not limited in actions it deems necessary. He called for the closure of large-mesh gill net fisheries, or at a minimum of April 15 through Feb. 15 closure; a total allowable catch that would achieve a 50 percent reduction; increasing the commercial size limit to 15 inches and increasing escape panels in pound nets to 6 inches; a moratorium on pound nets; and no changes to recreational regulations. He said once the fishery is recovered, based on a coast wide assessment, the allocation should be split 50-50 between the two sectors.

Fred Walker, from Pender County, was concerned about how few fish there are in coastal waters, especially flounder. He said the southern flounder supplement should include a total closure of commercial gill nets, a closure all commercial fishing for flounder from Nov. 16-Dec. 21 and an increase in the commercial size limit to 15 inches. He said there should be no additional restrictions for the recreational sector.

Mike Blanton, from the Albemarle Sound area, said he was concerned the commission was making knee-jerk reactions regarding flounder. He said the division says there is no flounder, but his trip tickets don't say that. He said nine counties were against the supplement and those counties have lots of tourists that want to eat fresh flounder. He felt growing more fish in hatcheries could improve stocks and he asked the commission to make wise decisions for everyone, not just recreational fishermen.

Jason White is a commercial flounder fishermen who says he's got trip tickets to prove there is no depletion in flounder and that the only depletion he's had comes from restrictions taking a third of his net.

Robert Schoonmaker, with the Recreational Fishing Alliance, supports the flounder supplement with modifications in the letter he submitted. He did not want to have a reduction in the recreational bag limit, saying he had customers going to Virginia because they can keep more flounder there. He asked the commission to make a motion to do away with the for-hire logbook at this meeting that would send a clear message to the for-hire sector that you want to work with us.

Terry Pratt, with the Albemarle Fishermen's Association, said the amendment is a better process and it would give time for people to find a solution for southern flounder and that stakeholders should have opportunity to provide input. He then read a resolution from Bertie County that did not support the use of the supplement process.

Butch Martin, with the Carolina Beach Fishing Club, asked the commission not to make any changes with flounder and leave it alone for now.

Jerry Schill, with the N.C. Fisheries Association, said the supplement process was enacted by the N.C. General Assembly to allow the commission to address issues needing immediate action. He understands the need to address critical or emergency situations, but said it was important for the commission to choose wisely. He knows there are areas of concern with southern founder, but that an amendment was the appropriate course to take. Based upon the science, there is no crisis or emergency for southern flounder that would require a supplement.

David Hilton, with the Ocracoke Working Watermen's Association, said the commission should proceed with the amendment process for flounder and that fishermen are willing to work with the Division of Marine Fisheries to provide needed comment and input.

Jonathan Weeks said North Carolina needs to get rid of the damaging gear and that a lot of recreational fishermen hold a commercial license to circumvent the bag limits - that they don't sell their fish.

Jerry James, member of the Finfish Advisory Committee, and former co-chair of the committee that helped develop the last amendment on southern flounder, talked about how challenging it was coming up with management options and trying to determine the impacts of the sea turtle settlement agreement. He said he supported the supplement process and that the commission needed to provide for escapement to allow flounder to get offshore and spawn. If we don't do something, he said, we will not have a problem with southern flounder because there won't be any.

Rick Sasser says he submitted nine pages of public comment that clearly shows there is a problem with southern flounder. He said the commission should put the resource first, and be conservative and that the recreational sector had given all the blood to date. Future cuts, he said, must come from the sector taking 80 percent of the fish and that a total allowable catch or a quota is needed.

Mark Cogdell, from Wilmington, said he supported a modified supplement, that a lot of public input and comment was needed.

Brent Fulcher, with the N.C. Fisheries Association, requested the commission vote to begin an amendment for southern flounder as soon as possible. He said the long term viability of the flounder fishery is not threatened, so a supplement is not needed. He also said not one recreational fisherman has spoken about their discard mortality and he thinks the recreational size limit should be lowered and bag limit increased.

Lauren Morris, with the N.C. Fisheries Association, said the law requires guidance criteria. The fishery management plan guidelines say a supplement is to be conducted only if an amendment is impossible. They are guidelines not law, but are intended to be predictable for the people you are managing. She was surprised to hear Dr. Daniel said a 40 percent reduction was needed because she doesn't see it in writing in any of the division options. Think amendment could be done in six to eight months if the internal Division of Marine Fisheries fat in the process was cut and that public input is vitally important.

Wally Overman, vice chair of the Dare County Commission, said he was trying to prevent loss of jobs, heritage and a public resource and trying to sustain the economic vitality of fishing communities as a result of an over regulating, over reaching and overzealous group intent on trying to change rules on a whim with a complete lack of science. He said he had yet to attend a fisheries meeting where the industry was supported and that was making the commercial fisherman an endangered species. He said the data shows there is more fish.

Jeff Wolfe, from the Cape Fear area, wants to keep recreational limits as they are. He said if you keep cutting recreational flounder fishermen, people will go to other states.

Dennis Barbour, from Carolina Beach, opposed any new flounder restrictions on recreational fishermen, especially when they harvest such a small percentage of the overall catch.

David Sneed, with the Coastal Conservation Association – N.C., supported the comments of other pro-resource groups and said there were resolutions from eight local government entities in support of going forward with the flounder supplement process. He also felt the commission should only take written comment on the supplement proposals to avoid intimidation and mob mentality that he felt would occur at a public meeting.

John Gjertsen, from New Bern, said he doesn't fish, but eats locally caught seafood. He said this is a repeat of what he has seen for years and that one industry is using their right to petition government to strangle another. He supported moving forward with an amendment for flounder, and not a supplement.

David Knight, with the N.C. Wildlife Federation, talked about that organization's Sound Solutions campaign and said at least a 40 percent reduction was needed in southern flounder harvest until an amendment is in place. He encouraged the commission to put all reasonable options for a supplement on the table for public comment and the main reduction must come from gill nets.

Jeffery Aiken, from Hatteras, said people love flounder and we need to protect them. He was always troubled by "best available science" because it may be bad science. He encouraged the commission to take the time to analyze and improve the data and was troubled that the scientist said he wished he had better science. He did not support the supplement process because it lacks public input.

Matt Wirtt, from Wilmington, supported the supplement process for southern flounder, wanting a 15-inch size limit for everyone and to close all fisheries in December. He wanted the commission to vote to do away with the for-hire logbook requirement at this meeting and he said most recreational fishermen hold a commercial license to get tax breaks.

Kenneth Register said there had previously been comments about undersized gigged fish being a problem, but that was not true - giggers could see how big a flounder was. He didn't understand why some fish markets had undersized flounder.

Jonathan Robinson, a Carteret County Commissioner, did not support the supplement process for flounder and talked about the Fisheries Reform Act.

Pam Morris, with Carteret Catch and member of the Southern Advisory Committee, said consumers are the largest user group of flounder and the only way they have access, is to catch one themselves, or through a commercial fishermen. She feels the supplement process being considered is reactionary and not based on sound science and that gill nets are being vilified and they are just as selective as hook-and-line and other gears. She said she has been commenting at commission meetings for years and has never seen a situation where people should feel afraid.

Chairman's Report

Chairman Corbett asked commission liaison Nancy Fish to review letters that were received and sent on various issues since the last commission meeting last meeting. Fish also reminded the commission of its ethics training requirements.

The commission was reminded of its 2015 business meeting schedule:

Feb. 18-20	Hilton Riverside, Wilmington
May 20-22	Hilton Riverfront, New Bern
Aug. 19-21	Hilton Brownstone, Raleigh
Nov. 18-20	Jennette's Pier, Nags Head

Issues from Commissioners

Commissioner Chuck Laughridge talked about inaccuracies in public comment and talked about economics and no science. He said if local government representatives wanted the commission to manage for economics he would be happy to do that. The General Assembly would need to change statutes to say we would manage for maximum economic yield. He pointed out that the economic impact of southern flounder for the commercial industry was $17.482 million, while the recreational impact was $42.009 million. He also said that two out of three peer reviewers said the data in the stock assessment was appropriate to be used for management for the next five years and that if anyone says there is not a problem with southern flounder, he is not sure what type of crazy you actually have, but he admires your commitment to it.

Chairman Corbett said that in the school he went to, that two out of three was a little more that 66 percent, and that was not a passing grade. Commissioner Laughridge said we could apply another set of data, which is a flip of a coin, which is how we manage fisheries in North Carolina by statute.

Commissioner Joe Shute said he was on the first two Southern Flounder Fishery Management Plan Advisory Committees and that those committees put forward recommendations to help end overfishing, but the commission did not act on those recommendations and that more should have been done at that time to address problems. We are in a bad situation now because we have not done anything to reduce harvesting southern flounder before they have had the chance to spawn.

Commissioner Laughridge asked Director Daniel if we had the data to show a supplement was needed.

Director Daniel said there had been a lot of discussion about the division position and that the division does not have a position on southern flounder, that it was up to the commission and it was the commission's supplement. He explained that the stock assessment did not pass peer review because it was determined that southern flounder was a Southeast Atlantic regional stock and not a stock that was solely contained in North Carolina waters. However, the peer reviewers did say the data could be used for management purposes.

Chairman Corbett asked everyone to hold their discussion about southern flounder until later in the meeting.

Commissioner Laughridge said the largest user group is the public and if everyone wanted to know how this largest user group felt this issue should be handled by a referendum.

Commissioner Alison Willis requested that staff provide copies of presentations earlier and that charts either needed to be printed in color or be able to be read in black and white. She also said with the references made to mob mentality were upsetting; that people on both sides have issues and it was okay to respectfully disagree. She encouraged people to put negativity aside and sit down together and have positive conversations. She also was concerned that people kept implying there were no commercial fishermen on the board – she said there were three commercial members – herself, Chairman Corbett and Commissioner Mikey Daniels.

Committee Reports

The commission received minutes from all of the advisory committees that had met since the last commission meeting and received the following reports from advisory committees that had action items:

Director Daniel reported that the Coastal Recreational Fishing License Committee had approved funding for 11 ongoing Coastal Recreational Fishing License Grant projects in the amount of $1,148,427 and they also approved the 2015 Request for Proposals for the upcoming grant cycle that will be released June 1, 2015.

Commission Liaison Nancy Fish reported on a recommendation from the commission's Conservation Fund Committee to provide up to $10,000 from the Conservation Fund for the James Francesconi Memorial Artificial Reef project.

Motion by Chuck Laughridge to fund up to $10,000 from the Conservation Fund for the James Francesconi Memorial Artificial Reef project. Motion seconded by Anna Beckwith. Motion passes unanimously.

2014 Landings

The commission received presentation on both the commercial and recreational catch and effort for 2014. These presentations can be accessed on the N.C. Division of Marine Fisheries website at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

Fishery Management Plan Update

Catherine Blum, the division's fishery management plan coordinator, reviewed the status of various state and interjurisdictional fishery management plans and reviewed changes to the timeline for the Oyster and Clam fishery management plans.

Southern Flounder

The commission received a presentation from division biologists Tom Wadsworth and Chris Stewart on data and options to be considered for a supplement to the Southern Flounder Fishery Management Plan Amendment 1. The commission chose six potential management proposals to include in a draft supplement that the commission will put out for public review.

The presentation and the options can be found on the N.C. Division of Marine Fisheries website at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

The commission decided to hold a public comment period from June 10 to July 10 and include a public meeting during that timeframe as well.

Motion by Alison Willis to terminate the supplement process and request the secretary of the Department of Environment and Natural Resources to immediately modify the existing Fishery Management Plan Schedule to move forward with an expedited amendment process based on the regionality and complexity of the fishery. Motion seconded by Mikey Daniels.
Motion fails 2-6.

Amended motion offered by Chuck Laughridge to replace "to terminate the supplement process" with "and request the secretary of the Department of Environment and Natural Resources to immediately modify the existing Fishery Management Plan Schedule to move forward with an expedited amendment process based on regionality and complexity of the fishery." Motion seconded by Mikey Daniels.
Motion withdrawn.

Motion by Chuck Laughridge to proceed with a supplement, presenting the six options, and ask the secretary of the Department of Environment and Natural Resources to proceed with an amendment. Motion seconded by Kelly Darden.
Motion passes 8-0.

Motion by Alison Willis to direct the Division of Marine Fisheries to hold three public meetings (northern, central, southern) on the draft Southern Flounder Supplement and

direct the division and its staff to present the draft supplement. Motion seconded by Mikey Daniels.
Motion withdrawn.

Friendly amendment by Chuck Laughridge to direct the Division of Marine Fisheries to hold one Marine Fisheries Commission meeting at a central location to receive public comment on the draft Southern Flounder Supplement.
Motion postponed.
Motion withdrawn.

Spotted Seatrout
The commission received a presentation from the division biologists Laura Lee and Mike Loeffler on the most recent stock assessment that showed that the stock is not overfished and overfishing is not occurring. Based on the positive stock assessment, the commission decided to review the N.C. Spotted Seatrout Fishery Management Plan in 2017 instead of this year, aligning the review with a statutorily required five-year review schedule.

The presentation can be found on the N.C. Division of Marine Fisheries website at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

Motion by Anna Beckwith to direct the Division of Marine Fisheries to prepare the Marine Fisheries Commission's annual Fishery Management Plan Schedule for its August 2015 business meeting to reflect the review of the Spotted Seatrout Fishery Management Plan to begin in 2017. Motion seconded by Chuck Laughridge.
Motion passes 7-0.

Kingfish
The commission received a presentation from division biologists Beth Egbert and Kevin Brown on the N.C. Kingfish Fishery Management Plan. The commission decided to proceed with an information update to the plan, which means no management changes are proposed.

The presentation can be found on the N.C. Division of Marine Fisheries website at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

Motion by Chuck Laughridge to proceed with the Kingfish Fishery Management Plan review as an information update. Motion seconded by Alison Willis.
Motion passes 8-0.

Brad Scott Timeline
Director Daniel and Shellfish Sanitation Section Chief Patti Fowler presented the commission with a timeline and information on interactions the division and the commission have had with Mr. Brad Scott related to his desire to culture or grow shellfish in prohibited areas.

The presentation can be found on the N.C. Division of Marine Fisheries website at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

Sheepshead

Division biologist supervisor Stephen Taylor reviewed the input received from the Northern, Southern and Finfish advisory committees on several management options for sheepshead.

Sheepshead is a highly sought recreational fish and is caught in a variety of commercial fisheries. Until 2012, sheepshead was managed under the South Atlantic Fishery Management Council Snapper-Grouper Fishery Management Plan, and was included in a 20-fish snapper-grouper recreational bag limit aggregate. When sheepshead was removed from the South Atlantic plan, management of the fishery was left up to the state.

The presentation can be found on the N.C. Division of Marine Fisheries website at http://portal.ncdenr.org/web/mf/may-2015-briefing-book.

The commission chose the following management measures for sheepshead:

- 10-inch fork length minimum size limit (all commercial and recreational fisheries)
- 10-fish bag limit (recreational)
- 10-fish per person per day limit or per trip limit if multi-day trip (commercial spears and gigs)
- 300-pound trip limit (all other commercial gears, except pound nets)

Motion by Mike Wicker to implement a 10-fish recreational bag limit for sheepshead and 10-fish bag limit for all spearing or gigging of sheepshead. Motion seconded by Mikey Daniels.
Motion withdrawn.

Motion by Anna Beckwith to support the Division of Marine Fisheries' position for sheepshead of a 10-inch fork length minimum size limit for both the recreational and commercial sectors; a 10-fish bag limit for recreational sector; a 10-fish limit for commercial spears and gigs, per person per day or per trip if a trip occurs over more than one calendar day; and a 300-pound commercial trip limit for all other gears, exempting pound nets from the commercial trip limit. Motion seconded by Chuck Laughridge.
Motion passes 4-2, with one abstention.

Motion by Alison Willis to amend the motion by Anna Beckwith and strike commercial trip limits, except for spearfishing and gigging. Motion seconded by Mikey Daniels.
Motion fails 3-4.

Substitute motion by Chuck Laughridge to Allison Willis' motion that accepts the Division of Marine Fisheries' position.
Motion fails for lack of second.

Rulemaking

Catherine Blum, the division's rulemaking coordinator, provided an overview of the 2014/2015 rulemaking cycle and reviewed the text of three proposed rules and associated fiscal analyses for proposed rules for adoption of an amendment to the N.C. Striped Mullet Fishery Management Plan and clarification of a rule for dredges and mechanical methods prohibited areas for harvesting shellfish in internal coastal waters.

The commission approved the notice of text and fiscal impact analysis to go to public hearing later this year.

Motion by Chuck Laughridge to approve notice of text for rulemaking and the associated regulatory impact analysis for the N.C. Striped Mullet Fishery Management Plan Amendment 1. Motion seconded by Kelly Darden.
Motion passes 6-1.

Motion by Chuck Laughridge to approve notice of text for rulemaking and the associated regulatory impact analysis for 15A NCAC 03R .0108. Motion seconded by Kelly Darden.
Motion passes 6-1.

Issues from Commissioners

Commissioner Kelly Darden announced he would not seek reappointment to the commission once his term expired on June 30, 2015, because he was planning on moving out-of-state.

The meeting adjourned.

Chairman's Report

August 3, 2015

Mr. Alexander B. Rich
1614 Forrest Drive
Elizabeth City, N.C. 27909

Dear Alexander:

Congratulations, I am pleased to welcome you as an adviser to the Marine Fisheries Commission's Coastal Recreational Fishing License Committee. This committee makes funding decisions for a grant program established to help manage, protect, restore, develop, cultivate and enhance the state's marine resources. The program is funded from proceeds from the sale of Coastal Recreational Fishing Licenses that are deposited in to the N.C Marine Resources Fund.

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On June 1, the N.C. Division of Marine Fisheries released the request for proposals for the 2016-2017 funding cycle. Only universities and local and state governmental entities in North Carolina are eligible to apply. Others must partner with one of these eligible entities.

Projects should fall under one of three programmatic areas:

Fish – Projects that estimate recreational fishing effort, harvest and mortality of important coastal recreational fish species, the socio-economic attributes of coastal recreational fisheries or the characterization of catch and release mortality;

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Proposals are evaluated based on the Coastal Recreational Fishing License Strategic Plan for the Conservation and Improvement of North Carolina's Marine Resources. The plan considers priority research needs identified in fishery management plans approved by the N.C. Marine Fisheries Commission, issues identified in the N.C. Coastal Habitat Protection Plan and research needs identified with other agencies. A copy of the strategic plan is attached for your convenience, but is can also found online at http://portal.ncdenr.org/c/document_library/get_file?uuid=8989a7aa-f1d2-4fce-aacd-1142daecf3ab&groupId=38337.

Additionally, an adviser orientation package is included; please carefully review these materials. If you have any questions concerning your appointment or regarding your role as an adviser, feel free to contact Marine Fisheries Commission Liaison Nancy Fish at 252-808-8021 or nancy.fish@ncdenr.gov.

I want to personally thank you for your interest in advising the commission on the management of our state's coastal fisheries and I look forward to seeing you at a meeting in the near future.

Sincerely,

Sammy Corbett

Sammy Corbett, Chairman
N. C. Marine Fisheries Commission

cc: Marine Fisheries Commission
Wayne Johannessen, CRFL Coordinator

NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

COMMISSIONERS

PAT MCCRORY
Governor

DONALD VAN DER VAART
Secretary

SAMMY CORBETT
Chairman

ANNA BECKWITH
Morehead City
MIKEY DANIELS
Wanchese
KELLY DARDEN
Greenville
MARK GORGES
Wrightsville Beach

CHUCK LAUGHRIDGE
Harkers Island
JOE SHUTE
Morehead City
MIKE WICKER
Raleigh
ALISON WILLIS
Harkers Island

August 3, 2015

Mr. Galen Maxwell
426 N.C. 581 Highway South
Goldsboro, N.C. 27530

Dear Galen:

Congratulations, I am pleased to welcome you as an adviser to the Marine Fisheries Commission's Coastal Recreational Fishing License Committee. This committee makes funding decisions for a grant program established to help manage, protect, restore, develop, cultivate and enhance the state's marine resources. The program is funded from proceeds from the sale of Coastal Recreational Fishing Licenses that are deposited in to the N.C Marine Resources Fund.

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Sincerely,

Sammy Corbett

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N. C. Marine Fisheries Commission

cc: Marine Fisheries Commission
Wayne Johannessen, CRFL Coordinator

August 3, 2015

Ms. Jan Willis
4915 Holly Lane
Morehead City, N.C. 28557

Dear Jan:

Congratulations, I am pleased to welcome you as an adviser to the Marine Fisheries Commission's Coastal Recreational Fishing License Committee. This committee makes funding decisions for a grant program established to help manage, protect, restore, develop, cultivate and enhance the state's marine resources. The program is funded from proceeds from the sale of Coastal Recreational Fishing Licenses that are deposited in to the N.C Marine Resources Fund.

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Wayne Johannessen, CRFL Coordinator

August 3, 2015

Mr. Robert Schoonmaker
P.O. Box 1328
Carolina Beach, N.C. 28428

Dear Robert:

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August 3, 2015

Mr. Richard Sear
191 Howards Lane
Hampstead, N.C. 28443

Dear Richard:

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NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. Christopher K. Behm
7020 Finian Drive
Wilmington, N.C. 28409

Dear Christopher:

Thank you for your application to serve as an adviser to the N.C. Marine Fisheries Commission's Coastal Recreational Advisory Committee. It was difficult to select advisers because we received so many excellent applications. Unfortunately, I was not able to appoint you to as an adviser to this committee, but I encourage you to apply for other advisory committee vacancies in the future and to participate in our fisheries management process by attending committee and commission meetings and offering your input.

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Again, thank you for your interest in the conservation of our state's resources.

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NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. Chad Davis
617 Vale Drive
Wilmington, N.C. 28411

Dear Chad:

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NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. David Glenn
212 Morada Bay Drive
Newport, N.C. 28570

Dear David:

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NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. Jim Hardin
107 Excaliber Drive
Greenville, N.C. 27858

Dear Jim:

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NORTH CAROLINA MARINE FISHERIES COMMISSION
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August 3, 2015

Mr. Allen Jernigan
P.O. Box 1181
Sneads Ferry, N.C. 28460

Dear Allen:

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NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. Denny Lanier
316 South Graham Street
Wallace, N.C. 28466

Dear Denny:

Thank you for your application to serve as an adviser to the N.C. Marine Fisheries Commission's Coastal Recreational Advisory Committee. It was difficult to select advisers because we received so many excellent applications. Unfortunately, I was not able to appoint you to as an adviser to this committee, but I encourage you to apply for other advisory committee vacancies in the future and to participate in our fisheries management process by attending committee and commission meetings and offering your input.

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August 3, 2015

Mr. Warren Martin, Jr.
P.O. Box 13
Rodanthe, N.C. 27968

Dear Warren:

Thank you for your application to serve as an adviser to the N.C. Marine Fisheries Commission's Coastal Recreational Advisory Committee. It was difficult to select advisers because we received so many excellent applications. Unfortunately, I was not able to appoint you to as an adviser to this committee, but I encourage you to apply for other advisory committee vacancies in the future and to participate in our fisheries management process by attending committee and commission meetings and offering your input.

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NORTH CAROLINA MARINE FISHERIES COMMISSION
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August 3, 2015

Mr. Ron McPherson
221 Moonlight Drive
Atlantic Beach, N.C. 28512

Dear Ron:

Thank you for your application to serve as an adviser to the N.C. Marine Fisheries Commission's Coastal Recreational Advisory Committee. It was difficult to select advisers because we received so many excellent applications. Unfortunately, I was not able to appoint you to as an adviser to this committee, but I encourage you to apply for other advisory committee vacancies in the future and to participate in our fisheries management process by attending committee and commission meetings and offering your input.

Please visit the Division of Marine Fisheries website at www.ncfisheries.net for meeting schedules, proclamations, fisheries hot topics, and various fishing information. You may also contact Nancy Fish at 800-682-2632 or 252-808-8021 if you have questions about any of the commission's processes or issues.

Again, thank you for your interest in the conservation of our state's resources.

Sincerely,

Sammy Corbett

Sammy Corbett, Chairman
N. C. Marine Fisheries Commission

NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. Chris Medlin
2421 Highway 210 East
Hampstead, N.C. 28443

Dear Chris:

Thank you for your application to serve as an adviser to the N.C. Marine Fisheries Commission's Coastal Recreational Advisory Committee. It was difficult to select advisers because we received so many excellent applications. Unfortunately, I was not able to appoint you to as an adviser to this committee, but I encourage you to apply for other advisory committee vacancies in the future and to participate in our fisheries management process by attending committee and commission meetings and offering your input.

Please visit the Division of Marine Fisheries website at www.ncfisheries.net for meeting schedules, proclamations, fisheries hot topics, and various fishing information. You may also contact Nancy Fish at 800-682-2632 or 252-808-8021 if you have questions about any of the commission's processes or issues.

Again, thank you for your interest in the conservation of our state's resources.

Sincerely,

Sammy Corbett

Sammy Corbett, Chairman
N. C. Marine Fisheries Commission

NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

August 3, 2015

Mr. Kurt Tressler
226 Saint Luke Ct.
Wilmington, N.C. 28409

Dear Kurt:

Thank you for your application to serve as an adviser to the N.C. Marine Fisheries Commission's Coastal Recreational Advisory Committee. It was difficult to select advisers because we received so many excellent applications. Unfortunately, I was not able to appoint you to as an adviser to this committee, but I encourage you to apply for other advisory committee vacancies in the future and to participate in our fisheries management process by attending committee and commission meetings and offering your input.

Please visit the Division of Marine Fisheries website at www.ncfisheries.net for meeting schedules, proclamations, fisheries hot topics, and various fishing information. You may also contact Nancy Fish at 800-682-2632 or 252-808-8021 if you have questions about any of the commission's processes or issues.

Again, thank you for your interest in the conservation of our state's resources.

Sincerely,

Sammy Corbett

Sammy Corbett, Chairman
N. C. Marine Fisheries Commission

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Nancy Fish
Commission Liaison

DATE: Aug. 20, 2015

SUBJECT: Southern Flounder Resolutions and Correspondence Received Outside of the Formal Comment Period

Following are two groups of correspondence the commission has received related to southern flounder:

- First are resolutions received this past spring and early summer from various counties, towns and villages regarding the use of the supplement to implement harvest reductions with southern flounder.

- The second set of information is correspondence the commission has received outside of the formal June 10-July 10 public comment period for the southern flounder supplement proposals.

Alamance County

BOARD OF COMMISSIONERS
124 West Elm Street
Graham, NC 27253-2865

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

Whereas, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

Whereas, the southern flounder fishery is a traditional recreational target of thousands of Alamance County residents; and

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of Alamance County have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Alamance County businesses including motels, gas stations, tackle shops, restaurants, and boat dealers provide goods and services to many local citizens as well as traveling fishermen on I-85/40 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997;

NOW, THEREFORE, BE IT RESOLVED, that the Alamance County Board of Commissioners asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

ADOPTED this the 20th day of April, 2015.

Dan Ingle, Chairman
Alamance County Board of Commissioners

ATTEST:

Tory M. Frink, Clerk to the Board

BERTIE COUNTY
106 DUNDEE STREET
POST OFFICE BOX 530
WINDSOR, NORTH CAROLINA 27983
(252) 794-5300
FAX: (252) 794-5327
WWW.CO.BERTIE.NC.US

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC) TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (DCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHER FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Bertie County and statewide with regards to gear, timing of harvest, and size of fish harvested; and,

WHEREAS, the southern flounder fishery is $5.6 million fishery for NC commercial fishermen and the economic impact to the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and,

WHEREAS, recent ~~MC~~NCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and,

WHEREAS, the supplement process disenfranchises stakeholders because of lack of public input; and,

WHEREAS, Bertie County's commercial fishermen have already made their investments for the fall 2015 season that will not be recovered, which subjects them to a double economic hit that will be catastrophic for these small businesses; and,

WHEREAS, there is need for thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate stakeholder input.

NOW, THEREFORE, BE IT RESOLVED that the Bertie County Board of Commissioners asks the NC Marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reductions of southern flounder and that any proposal to limit the fishery be subjected to comprehensive review that includes stakeholder input.

This adopted the **18th** day of **May**, 2015.

Ronald D. Wesson

Ronald D. Wesson, Chairman
Bertie County Board of Commissioners

Sarah S. Tinkham

Sarah S. Tinkham, Clerk to the Board

County of Brunswick

Office of the County Commissioners

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT ADJUSTMENTS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

WHEREAS, the southern flounder fishery is a source of income for the livelihood of commercial fishermen and is a traditional target by recreational fishermen in Brunswick County; and

WHEREAS, the southern flounder population stocks in NC are classified as "declining" and there is need to implement a regional management plan that adjusts accordingly; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is questionable; and

WHEREAS, the citizens of Brunswick County have representation through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Brunswick County businesses including commercial fishermen, seafood retailers, seafood wholesalers, guides, tackle shops, restaurants, lodging and boat dealers provide goods and services to many local citizens as well as tourists in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in the perpetuity as required by the NC Fishery Reform Act of 1997;

NOW, THEREFORE, BE IT RESOLVED, that the Brunswick County Board of Commissioners asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to fairly implement necessary adjustments of southern flounder harvest and those adjustments are made so that the fishery is maintained for a viable future in order to serve all of NC's citizen fishermen.

This the 18th day of May, 2015.

Scott Phillips

Scott Phillips, Chairman
Brunswick County Commissioners

ATTEST:.

Margie Stephenson

Margie Stephenson, Clerk to the Board

CAMDENCOUNTY
new energy. new vision.

Resolution No. 2015-05-02

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC) TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (NCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Eastern North Carolina communities with regards to gear, timing of harvest and size of fish harvested;
And

WHEREAS, the southern flounder fishery is a $5.6 million fishery for NC commercial fisherman and the economic impact to the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and

WHEREAS, recent NCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and

WHEREAS, the supplement process disenfranchises stakeholder because of lack of public input; and

WHEREAS, Camden County's commercial fishermen have made their fishing gear investments for the 2015 fishing season that will not be able to be recovered, which subjects them to a double economic hit that will be catastrophic for these small businesses; and

WHEREAS, there is need for thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate local stakeholder input.

NOW, THEREFORE, BE IT RESOLVED, that the Camden County Board of Commissioners asks the NC Marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reduction of Southern Flounder and that any proposal to limit the fishery be subjected to comprehensive review that includes stakeholder input.

ADOPTED, this the 19th day of May, 2015, in Camden County, North Carolina.

ATTEST: Angela Wooten
Clerk to the Board

COUNTY OF CAMDEN * NORTH CAROLINA * UNIFIED GOVERNMENT JULY 1, 2006

Chairman of County Commissioners

County Manager
W. Russell Overman
russello@carteretcountync.gov

Office: (252) 728-8450
Fax: (252) 728-2092

A RESOLUTION ASKING THE NC DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (NCDENR) AND THE NC MARINE FISHERIES COMMISSION (NCMFC) TO OPPOSE THE NC DIVISION OF MARINE FISHERIES (NCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is important to North Carolina counties throughout the coastal area; and

WHEREAS, the southern flounder population has been able to sustain itself at levels allowing substantial harvest for over 30 years, landing millions of pounds annually; and

WHEREAS, the latest southern flounder stock assessment did not pass peer review and has been deemed unable to assess the status of the southern flounder population in North Carolina, and thus the status of the population is unknown; and

WHEREAS, the supplement process allows for limited stakeholder and public input; and

WHEREAS, when there is need for an amendment, a thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, it should allow ample opportunity for stakeholder and public input; and

WHEREAS, North Carolina began requiring substantial conservation measures on southern flounder to provide for a sustainable population and viable fisheries in 1979 and has continued to responsibly manage the fishery until the present; and

WHEREAS, effort in the gill net fishery and pound net fishery, the largest fisheries harvesting southern flounder in North Carolina, has been drastically reduced in recent years.

NOW, THEREFORE, BE IT RESOLVED, that the Carteret County Board of Commissioners asks the Secretary of the North Carolina Department of the Environment and Natural Resources and the North Carolina Marine Fisheries Commission to oppose the development of a supplement to the Southern Flounder Fishery Management Plan.

ADOPTED, this day the 20th day of April 2015

Attest:

W. Russell Overman

Russell Overman,
Interim Clerk to the Board

Robin V. Comer

Robin V. Comer, Chairman
Carteret County Board of Commissioners

COUNTY OF CURRITUCK

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC) TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (NCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Currituck County and statewide with regard to gear, timing of harvest and size of fish harvested; and

WHEREAS, the southern flounder fishery is a $5.6 million fishery for NC commercial fishermen and the economic impact of the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and

WHEREAS, recent NCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and

WHEREAS, the supplement process disenfranchises stakeholders because of lack of public input; and

WHEREAS, Currituck County's commercial fishermen have already made their investments for the fall 2015 season that will not be able to be recovered, which subjects them to a double economic hit that will be catastrophic for these small businesses; and

WHEREAS, there is need for thoughtful, arid, comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate stakeholder input.

NOW, THEREFORE BE IT RESOLVED, that the Currituck County Board of Commissioners asks the NC Marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reductions of southern flounder and that any proposal to limit the fishery be subjected to comprehensive review that includes stakeholder input.

This the 18th day of May, 2015.

S. Paul O'Neal, Chairman

ATTEST:

Leeann Walton, Clerk to the Board

(SEAL)

A RESOLUTION
ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC)
TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (DCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Dare County and statewide with regards to gear, timing of harvest and size of fish harvested; and

WHEREAS, the southern flounder fishery is a $5.6 million fishery for NC commercial fisherman and the economic impact to the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and

WHEREAS, Recent NCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and

WHEREAS, the supplement process disenfranchises stakeholders because of lack of public input; and

WHEREAS, Dare County's commercial fishermen have already made their investments for the fall 2015 season that will not be able to be recovered, which subjects them to a double economic hit that will be catastrophic for these small businesses; and

WHEREAS, there is need for thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate stakeholder input.

NOW, THEREFORE, BE IT RESOLVED, that the Dare County Board of Commissioners asks the NC Marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reductions of southern flounder and that any proposal to limit the fishery be subjected to comprehensive review that includes stakeholder input.

This the 6th day of April, 2015

Robert Woodard, Chairman

Attest:

Gary Gross, Clerk to the Board

COUNTY OF HYDE

30 Oyster Creek Road
PO Box 188
SWAN QUARTER, NORTH CAROLINA 27885
252-926-4400
252-926-3701 Fax

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC) TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (DCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Hyde County and statewide with regards to gear, timing of harvest and size of fish harvested; and,

WHEREAS, the southern flounder fishery is a $5.6 million fishery for NC commercial fishermen and the economic impact to the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and,

WHEREAS, recent MCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and,

WHEREAS, the supplement process disenfranchises stakeholders because of lack of public input; and,

WHEREAS, Hyde County's commercial fishermen have already made their investments for the fall 2015 season that will not be recovered, which subjects them to a double economic hit that will be catastrophic for these small business; and,

WHEREAS, there is need for thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate stakeholder input.

NOW, THEREFORE, BE IT RESOLVED, that the Hyde County Board of Commissioners asks the NC Marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reductions of southern flounder and that any proposal to limit the fishery by subjected to comprehensive review that includes stakeholder input.

This the 6th day of April, 2015.

Barry Swindell, Chairman

ATTEST:

Lois Stotesberry, Clerk to the Board

Office of
County Commissioners
(919) 989-5100
FAX (919) 989-5179

Paula G. Woodard, Clerk

Johnston County
POST OFFICE BOX 1049
SMITHFIELD, N.C. 27577

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of North Carolina regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of many Johnston County residents; and

WHEREAS, the southern flounder population stocks in North Carolina are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, there is a need for absolute and focused management of these fish to attain and then maintain a viable stock of not only southern flounder but all traditional estuarine stocks for our citizenry in perpetuity as required by the North Carolina Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED, that the Johnston County Board of Commissioners does hereby ask the North Carolina Marine Fisheries Commission to support the North Carolina Division of Marine Fisheries use of the supplement process to implement reduction of the southern flounder harvest and that such reductions be made so that the fishery is revived to serve all of North Carolina citizens and not just ones who fish for profit.

Adopted this the 4th day of May, 2015.

Tony Braswell, Chairman

Attest:

Paula G. Woodard
Clerk to the Board

County of Lenoir

Lenoir County Courthouse
Post Office Box 3289
130 South Queen Street
Kinston, NC 28502

Telephone: (252) 559-6450
Fax: (252) 559-6454

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of thousands of Lenoir County residents; and

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of Lenoir County have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Lenoir County businesses including tackles shops, restaurants, and boat dealers provide goods and services to many local citizens as well as traveling fishermen on US 70 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED, that the Lenoir County Board of Commissioners asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

April 20, 2015

Craig Hill, Chairman

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE USE BY THE NC DIVISION OF MARINE FISHERIES (DMF) OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON THE FISHING OF SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of North Carolina regardless of residency; and,

WHEREAS, the southern flounder fishery is a traditional recreational target of many Nash County residents; and,

WHEREAS, the southern flounder population stocks in North Carolina are classified as "depleted"; and,

WHEREAS, a recent stock assessment conducted by the NC Division of Marine Fisheries (DMF), as well as the peer reviewers, agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and,

WHEREAS, the NC Division of Marine Fisheries (DMF) reports that in 2013 in Nash County 12 individuals held a commercial fishing license, with one of those selling, and 8,700 individuals held a recreational saltwater fishing license; and,

WHEREAS, many Nash County businesses, including fuel stations, restaurants, boat dealers, tackle shops, etc., provide goods and services to local citizens as well as travelling fishermen in the pursuit of southern flounder; and,

WHEREAS, there is a need for absolute and focused management of these fish to attain and then maintain a viable stock of not only southern flounder by all traditional estuarine stocks for our citizenry in perpetuity as required by the North Carolina Fishery Reform Act of 1997;

NOW, THEREFORE, BE IT RESOLVED that the Nash County Board of Commissioners adopts this resolution to hereby ask the North Carolina Marine Fisheries Commission (MFC) to support the use of the supplement process by the North Carolina Division of Marine Fisheries (DMF) to implement reduction of the southern flounder harvest and that such reductions be made so that the fishery is revived for not only those who fish for profit, but also for those who fish for recreation, as well as the businesses supported by fishing.

ADOPTED THIS 6th DAY OF JULY 2015.

NASH COUNTY BOARD OF COMMISSIONERS

By: _____
Fred Belfield, Jr., Chairman

ATTEST:

_____
Janice Evans, Clerk to the Board

(OFFICIAL SEAL)

COUNTY OF PAMLICO
P.O. BOX 776
BAYBORO, N.C. 28515
(252) 745-3133 / 745-5195
FAX (252) 745-5514
Email:tim.buck@pamlicocounty.org

A RESOLUTION ASKING THE NC DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (NCDENR) AND THE NC MARINE FISHERIES COMMISSION (NCMFC) TO OPPOSE THE NC DIVISION OF MARINE FISHERIES (NCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is important to North Carolina counties throughout the coastal area; and

WHEREAS, the southern flounder population has been able to sustain itself at levels allowing substantial harvest for over 30years, landing millions of pounds annually; and

WHEREAS, the latest southern flounder stock assessment did not pass peer review and has been deemed unable to assess the status of the southern flounder population in North Carolina, and thus the status of the population is unknown; and

WHEREAS, the supplement process allows for limited stakeholder and public input; and

WHEREAS, when there is need for an amendment, a thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, it should allow ample opportunity for stakeholder and public input; and

WHEREAS, North Carolina began requiring substantial conservation measures on southern flounder to provide for a sustainable population and viable fisheries in 1979 and has continued to responsibly manage the fishery until the present; and

WHEREAS, effort in the gill net fishery and pound net fishery, the largest fisheries harvesting southern flounder in North Carolina, has been drastically reduced in recent years.

NOW, THEREFORE, BE IT RESOLVED, that the Pamlico County Board of Commissioners asks the Secretary of the North Carolina Department of the Environment and Natural Resources and the North Carolina Marine Fisheries Commission to oppose the development of a supplement to the Southern Flounder Fishery Management Plan.

ADOPTED,this day the 6th day of July 2015

Attest

Kathy P Cayton
Clerk to the Board

Pat Prescott, Chairman
Pamlico County Board of Commissioners

A RESOLUTION
ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC)
TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (DCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Eastern North Carolina communities with regards to gear, timing of harvest and size of fish harvested; and

WHEREAS, the southern flounder fishery is a $5.6 million fishery for NC commercial fisherman and the economic impact to the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and

WHEREAS, recent NCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and

WHEREAS, the supplement process disenfranchises stakeholder because of lack of public input; and

WHEREAS, Pasquotank County's commercial fishermen have made their fishing gear investments for the 2015 fishing season that will not be able to be recovered, which subjects them to a double economic hit that will be catastrophic for these small businesses; and

WHEREAS, there is need for thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate local stakeholder input.

NOW, THEREFORE, BE IT RESOLVED, that the Pasquotank County Board of Commissioners asks the NC marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder and that any proposal to limit the fishery be subjected to comprehensive review that includes stakeholder input.

Adopted this 20th day of April, 2015

Asst. Clerk to the Board

Joseph S. Winslow, Jr., Chairman
Pasquotank County Board of Commissioners

Resolution Asking the NC Marine Fisheries Commission (MFC) to Support the NC Division of Marine Fisheries (DMF) Use of the Supplement Process to Implement Reductions on Southern Flounder

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of North Carolina regardless of residency; and,

WHEREAS, the southern flounder fishery is a traditional recreational target of thousands of Pitt County residents; and,

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent North Carolina Division of Marine Fisheries stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and,

WHEREAS, the citizens of Pitt County have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and,

WHEREAS, many Pitt County businesses including tackles shops, restaurants, and boat dealers provide goods and services to many local citizens as well as traveling fishermen on the Highway 64 & Highway 264 corridor in the pursuit of southern flounder; and,

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED, that the Pitt County Board of Commissioners asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

Adopted this 4th day of May, 2015.

Glen Webb, Chairman

Kimberly W. Hines

Kimberly W. Hines, Clerk to the Board

PITT COUNTY NORTH CAROLINA
Agriculture Education Health Care Industry
est. 1760

TOWN OF BEULAVILLE

PO BOX 130 • 111 W. QUINN STREET
BEULAVILLE, NC 28518-0130

Phone: 910-298-4647
Fax: 910-298-3481

May 13, 2015

North Carolina Division of Marine Fisheries
North Carolina Marine Fisheries Commission
3441 Arendell Street
Morehead City, NC 28557

SUBJECT: Letter of Support for Town of Wallace Resolution

Ladies and Gentlemen:

Please allow this letter of support to serve as my wholehearted endorsement of the Town of Wallace's RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER. I agree with Wallace's request that action should be taken to reverse depleted southern flounder population stocks in North Carolina, as stated in their Resolution.

Regards,

Kenneth L. Smith
Mayor

Enclosure

Town of Wallace

316 EAST MURRAY STREET • WALLACE, NORTH CAROLINA 28466 • PHONE: 910-285-4136

MAYOR
Charles C. Farrior, Jr.

TOWN MANAGER
Matthew S. Livingston

TOWN COUNCIL
David E. Jordan, Mayor Pro-Tem
Frank Brinkley
William Jeffrey Carter
Greg S. Cave
David Warren Hepler

TOWN CLERK
Jackie Nicholson

TAX COLLECTOR
Kathy B. Hubbard

FINANCE OFFICER
Tracy Chestnutt

TOWN ATTORNEY
Richard E. Farrows

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of Town of Wallace residents; and

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of the Town of Wallace have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Town of Wallace businesses provide goods and services to many local citizens as well as traveling fishermen on interstate 40 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED, that the Town of Wallace Town Council asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such

reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

April 23, 2015

Charles C. Farrior, Jr., Mayor

Attest

TOWN OF CAROLINA BEACH
1121 N. Lake Park Boulevard
Carolina Beach, North Carolina 28428

RESOLUTION REQUESTING THE NORTH CAROLINA MARINE FISHERIES COMMISSION TO SUPPORT THE NORTH CAROLINA DIVISION OF MARINE FISHERIES (NCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER HARVESTS

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of North Carolina regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of the citizens of the Town of Carolina Beach; and

WHEREAS, the southern flounder population stocks in North Carolina are classified as "depleted"; and

WHEREAS, a recent North Carolina Division of Marine Fisheries assessment, as well as peer reviewers, agreed that the stocks are showing no signs of improvement, and the harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of the Town of Carolina Beach have no representation except through the North Carolina Marine Fisheries Commission to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Town of Carolina Beach businesses provide goods and services to local citizens as well as visiting fishermen in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain and then maintain a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the North Carolina Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOVLED, that the Town of Carolina Beach Council requests the North Carolina Marine Fisheries Commission to support the North Carolina Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so the fishery is revived in order to serve all of North Carolina's citizen fishermen and not just ones who fish for profit.

Adopted this 9th day of June, 2015.

Dan Wilcox, Mayor

TOWN OF CAROLINA BEACH OFFICIAL SEAL NORTH CAROLINA

Attest:

Kimberlee Ward, Town Clerk

ROSE HILL
Incorporated 1875

TOWN OF ROSE HILL

NORTH CAROLINA

Home of the World's Largest Frying Pan

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of Town of Rose Hill residents; and

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of the Town of Rose Hill have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Town of Rose Hill businesses provide goods and services to many local citizens as well as traveling fishermen on interstate 40 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED, that the Town of Rose Hill Board of Commissioners asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

This the 12th day of May, 2015.

Gary L. Boney
Mayor

Attest:

Linda Merry
Town Clerk

TOWN OF ROSE HILL CORPORATE SEAL 1875 DUPLIN COUNTY, N.C.

Post Office Box 8, Rose Hill, North Carolina 28458
Telephone (910) 289-3159 • Fax (910) 289-4461
Email: rosehill@embarqmail.com • website: www.rosehill-nc.org/

Town of Wallace

316 EAST MURRAY STREET • WALLACE, NORTH CAROLINA 28466 • PHONE: 910-285-4136

MAYOR
Charles C. Farrior, Jr.

TOWN MANAGER
Matthew S. Livingston

TOWN COUNCIL
David E. Jordan, Mayor Pro-Tem
Frank Brinkley
William Jeffrey Carter
Greg S. Cave
David Warren Hepler

TOWN CLERK
Jackie Nicholson

TAX COLLECTOR
Kathy B. Hubbard

FINANCE OFFICER
Tracy Chestnutt

TOWN ATTORNEY
Richard L. Burrows

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of Town of Wallace residents; and

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of the Town of Wallace have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Town of Wallace businesses provide goods and services to many local citizens as well as traveling fishermen on interstate 40 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED, that the Town of Wallace Town Council asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such

reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

April 23, 2015

Charles C. Farrior, Jr., Mayor

Attest

RESOLUTION OF THE BOARD OF COMMISSIONERS
OF THE TOWN OF WARSAW

Resolution No. 2015-

RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of Town of Warsaw residents; and

WHEREAS, the southern flounder population stocks in NC are classified as "depleted"; and

WHEREAS, a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of the Town of Warsaw have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Town of Warsaw businesses provide goods and services to many local citizens as well as traveling fishermen on Interstate 40 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the NC Fishery Reform Act of 1997.

NOW, THEREFORE BE IT RESOLVED, that the Warsaw Board of Commissioners asks the NC Marine Fisheries Commission to support the NC Division of Marin Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so that the fishery is revived in order to serve all of NC's citizen fishermen and not just ones who fish for profit.

Adopted by the Board of Commissioners of the Town of Warsaw this 11th day of May, 2015.

Russell Eason, Mayor

ATTEST:

Lea Futrell, Town Clerk

Tyrrell County Board of Commissioners

Post Office Box 449
Columbia, North Carolina 27925
Telephone (252) 796-1371

Leroy Spivey, Chairman
Carl Willis, Vice Chairman
Nathan T. Everett
Nina Griswell
Larry G. Hill

David L. Clegg, County Manager
Penny Rhodes Owens, Clerk to the Board
David Gadd, County Attorney

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (NCMFC) TO NOT SUPPORT THE NC DIVISION OF MARINE FISHERIES (NCDMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS OF SOUTHERN FLOUNDER

WHEREAS, the southern flounder fishery is regionally diverse throughout Tyrrell County and statewide with regards to gear, timing of harvest and size of fish harvested; and,

WHEREAS, the southern flounder fishery is a $5.6 million fishery for NC commercial fishermen and the economic impact to the region would be devastating if harvest cuts of 25% to 60% are implemented by NCMFC; and

WHEREAS, recent NCDMF stock assessment report did not pass peer review and the harvest reduction parameters are arbitrary and subjective and not based on stakeholder input; and,

WHEREAS, the supplement process disenfranchises stakeholders because of lack of public input; and,

WHEREAS, Tyrrell County's commercial fishermen have already made their investments for the fall 2015 season that will not be recovered, which subjects them to a double economic hit that will be catastrophic for these small businesses; and,

WHEREAS, there is need for thoughtful and comprehensive review of any proposed measure to assess the long-term viability of the fishery, and that review must incorporate stakeholder input.

NOW, THEREFORE, BE IT RESOLVED, that the Tyrrell County Board of Commissioners asks the NC Marine Fisheries Commission to not support the NC Division of Marine Fisheries use of the supplement process to implement reductions of southern flounder and that any proposal to limit the fishery be subjected to comprehensive review that includes stakeholder input.

This the 19th day of May, 2015

Leroy Spivey, Chairman
Tyrrell County Board of Commissioners

Attest:

Penny Rhodes Owens, CMC, NCCCC
Clerk to the Board

A RESOLUTION FOR BOARD ADOPTION
THE VILLAGE OF WALNUT CREEK

A RESOLUTION ASKING THE NC MARINE FISHERIES COMMISSION (MFC) TO SUPPORT THE NC DIVISION OF MARINE FISHERIES (DMF) USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

Whereas, all marine creatures are public trust resources owned equally by all citizens of NC regardless of residency; and

Whereas, the southern flounder fishery is a traditional recreational target of thousands of Wayne County residents; and

Whereas, the southern flounder population stocks in NC are classified as "depleted"; and

Whereas a recent NCDMF stock assessment as well as the peer reviewers agreed that the stocks are showing no signs of improvement and that harvest of juvenile fish within the population is alarming; and

Whereas, the citizens of Wayne County have no representation except through the MFC to manage these public trust resources conservatively and for all citizens; and

Whereas, many Wayne County restaurants and other businesses including tackles shops and boat dealerships provide goods and services to many local citizens as well as traveling fishermen on US 70 in the pursuit of southern flounder; and

Whereas, there is a need for absolute and focused management of these fish to attain, and then maintain, a viable stock of not only southern flounder but all traditional estuarine stocks for our citizenry in perpetuity as required by the NC Fishery Reform Act of 1997;

Now, Therefore, Be It Resolved, that the Village Council of the Village of Walnut Creek asks the NC Marine Fisheries Commission to support the NC Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so that the fishery is revived to serve all of NC citizens and not just ones who fish for profit.

Adopted this 29th day of April, 2015.

Attest:

Sharon Geelen, Village Clerk
Village of Walnut Creek

Danny Jackson, Mayor
Village Of Walnut Creek

NORTH CAROLINA
WAYNE COUNTY

A RESOLUTION REQUESTING THE NORTH CAROLINA MARINE FISHERIES COMMISSION TO SUPPORT THE NORTH CAROLINA DIVISION OF MARINE FISHERIES USE OF THE SUPPLEMENT PROCESS TO IMPLEMENT REDUCTIONS ON SOUTHERN FLOUNDER

WHEREAS, all marine creatures are public trust resources owned equally by all citizens of North Carolina regardless of residency; and

WHEREAS, the southern flounder fishery is a traditional recreational target of thousands of Wayne County residents; and

WHEREAS, the southern flounder population stocks in North Carolina are classified as "depleted;" and

WHEREAS, a recent North Carolina Department of Marine Fisheries stock assessment, as well as the peer reviewers, agreed the stocks are showing no signs of improvement and the harvest of juvenile fish within the population is alarming; and

WHEREAS, the citizens of Wayne County have no representation except through the North Carolina Marine Fisheries Commission to manage these public trust resources conservatively and for all citizens; and

WHEREAS, many Wayne County restaurants and other businesses including tackle shops, restaurants and boat dealers provide goods and services to many local citizens as well as traveling fishermen on US Highway 70 in the pursuit of southern flounder; and

WHEREAS, there is need for absolute and focused management of these fish to attain and then maintain a viable stock of not only southern flounder, but all traditional estuarine fish stocks for our citizenry to enjoy in perpetuity as required by the North Carolina Fishery Reform Act of 1997.

NOW, THEREFORE, BE IT RESOLVED that the Wayne County Board of Commissioners requests the North Carolina Marine Fisheries Commission support the North Carolina Division of Marine Fisheries use of the supplement process to implement reduction of southern flounder harvest and that such reductions be made so the fishery is revived in order to serve all of North Carolina's citizen fishermen and not just ones who fish for profit.

Adopted this the 21st day of April, 2015.

George Wayne Aycock, Jr., Chairman
Wayne County Board of Commissioners

Attest:

Marcia R. Wilson, Clerk to the Board

Fish, Nancy

From: Hensley, Michelle L
Sent: Thursday, May 07, 2015 7:34 AM
To: Fish, Nancy
Subject: FW: Flounder Regulation Changes

FYI, I passed this on to Louis but just wanted to you see as well

Michelle Hensley, Executive Assistant
Director's Office
NC Division of Marine Fisheries
3441 Arendell Street/Post Office Box 769
Morehead City, NC 28557-0769
Phone: (252) 808-8013
Fax: (252) 726-0254
michelle.hensley@ncdenr.gov

From: nancy neeley [mailto:nancy22221@live.com]
Sent: Thursday, May 07, 2015 7:06 AM
To: Hensley, Michelle L
Subject: Flounder Regulation Changes

Dear Michelle, would you kindly pass this onto Director Daniel please. Thank you.

Dear Director Daniel,

Rumors have been circulating about an upcoming change to our flounder fishery; we thank you!

I have been polling many folks, both commercial and recreational and I confirmed that the majority of us fully support a complete shutdown of the flounder fishery for a few years to allow our fish stocks to grow and replenish. As you already know, our flounder fishery takes a big hit every year as everyone likes flounder fishing and enjoys flounder at the dinner table; however over the past few years, finding sizable ones has been difficult at best. Thus, confirming our depleted status.

Moreover, while most of us understand the impact this would have, everyone agrees that this would be best not only for our fishery, but also for the many businesses that cater to fishing in the long run. With a few years to grow and replenish, we can have a fantastic flounder fishery. Everyone wins.

I/we know you must make many difficult decisions in your position with arguments and data coming from all directions, but I am hopeful that you will agree that closing the fishery for awhile will be a long-term benefit. It takes a strong leader to make difficult decisions like this, but this argument, if you choose to do this will certainly prove itself in the long run.

Thank you in advance for taking our input into consideration.

Best regards,
Tom Neeley

Fish, Nancy

From: Hensley, Michelle L
Sent: Tuesday, May 12, 2015 7:28 AM
To: Fish, Nancy
Subject: FW: Flounder management comments - Marine Fisheries Commission

I assume that you want these for the comments for the meeting next week?

Michelle Hensley, Executive Assistant
Director's Office
NC Division of Marine Fisheries
3441 Arendell Street/Post Office Box 769 Morehead City, NC 28557-0769
Phone: (252) 808-8013
Fax: (252) 726-0254
michelle.hensley@ncdenr.gov

-----Original Message-----
From: Rodger Lentz [mailto:rlentz@wilsonnc.org]
Sent: Monday, May 11, 2015 8:09 PM
To: Hensley, Michelle L
Cc: Rep. Susan Martin; Senator Buck Newton; Rep. Jean Farmer-Butterfield; Senator Angela Bryant
Subject: Flounder management comments - Marine Fisheries Commission

Hello, my name is Rodger Lentz, I am a recreational fisherman from Wilson, NC.

I would like to offer these comments to the Marine Fisheries Commission on proposed changes to southern flounder management and bag limits.

Recreational fishermen are a small percentage of the overall catch of southern flounder. Commercial fishermen account for approximately 80% of the total catch. While I understand flounder is popular table fare, our current management techniques are failing.

While I applaud the review of this important fishery, the proposals I am aware of are focused squarely on the backs of recreational fishermen. This has been the case for years. If flounder is diminished, the Marine Fisheries Commission reduces bag limits for recreational fishermen and increases minimum size requirements. However little is done to curtail commercial take. This approach has not worked. Reducing recreational bag limits won't work this time either.

In recent years, recreational fishermen have had reductions in bag limits for the popular inshore fish, speckled trout, flounder and red drum. Essentially, we are becoming a catch and release only state for recreational fishermen given the bag limits for these fish. It's hard to justify spending $150-300 per day trip when you get to keep 5 or less fish. It's hard to justify spending the night, going out for meals, purchasing equipment, bait, etc. for trips like this. I bought an SUV, Boat, boat equipment (trolling motor, electronics, batteries, etc.), and fishing equipment with the express purpose of fishing in coastal waters. These purchases have had a positive economic impact on this state and our state tax coffers.

While recreational fishermen have a tremendous economic impact, the largest cause of destruction to our fisheries, Gil nets, is allowed to continue unchecked. Unfortunately, the Marine Fisheries Commission won't even consider reducing

commercial Gil netting. While most other states have banned inshore Gil nets, we continue on and stand on the sidelines as our fisheries continue to be depleted.

I urge the Commission to consider a ban on commercial Gil netting or at least severe restrictions in line with their destructive nature. Gil nets account for well over 50% of the total commercial take of southern flounder. Shouldn't their take be reduced? This would have a positive impact on southern flounder. Let's follow the example of states like virginia, South Carolina, Louisiana, Texas, Florida and others who have banned or severely restricted the inshore Gil net. Those states have built coastal economies around recreational fishing and their economic impact. North Carolina can do the same and truly help communities like Washington, Swan Quarter and others thrive as fishing destinations.

Thank you for allowing me to be heard.

Rodger Lentz
rhlentz@mac.com

Sent from my iPad

May 14, 2015

I am a resident of Craven County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.

Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.

Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.

Accordingly, I support:

* No further reductions in the recreational harvest
* A moratorium on the large mesh gill net fishery
* Have a spawning season closure for pound nets to facilitate a more equitable allocation
* Adjust the commercial size limit to 15 inches
* Institute an immediate moratorium on new pound net applications
* If large mesh gill nets are retained, institute a moratorium on all new gill net applications
* Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
* Balance the recreational/commercial split under a TAC to 50/50.

Sincerely,

Art Thinguldstad
906 Hawksbill Ct
New Bern NC 28560
252-675-3766

-----Original Message-----
From: Paul Nancy Miller [mailto:nette33@earthlink.net]
Sent: Thursday, May 14, 2015 12:40 PM
To: Fish, Nancy
Cc: gbobdillard@gmail.com
Subject: Harvesting of fish in NC waters

May 14, 2015
I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.
Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.
Sincerely,

Paul Miller
252-249-1443

NC Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557

May 14, 2015

Dr Daniel,

This letter is to help you understand that there is no depletion in North Carolina's southern flounder stocks. I want to insure that there are no changes to the southern flounder fishery that is so important to our NC economy and to our state's coastal communities. The value of the southern flounder fishery is one of the highest of any seafood that is available to the consumer in our state.

I am providing facts and figures below that will help you understand that there is no need for further restrictions or a closure. The commercial southern flounder fishery is not "trending downward" -

- From 2004 through 2013, the 10-year average landings of southern flounder were just over 2 million pounds.
- From 2004 to 2009, fishermen were allowed to catch and set flounder nets 365 days per year.
- Beginning in 2009-2010, a new regulation restricted large mesh nets to 40 hours per week. Over half the state is restricted to 4 days per week with night time soaks only.
- In 2011, there were only 1.2 million pounds caught by commercial fishermen.
- In 2013 there were close to 2.2 million pounds caught by commercial fishermen.
- In 2013, southern flounder landings in Dare County were 1.3 million pounds.
- In 2013, from June 1 to November 30, there were only 70 days in which large mesh nets were able to be used from Oregon Inlet down to South Carolina. Fishermen could only set nets 4 days per week. Plus, there was a 2-month closure during this time frame to all large mesh nets.
- The point being, the largest body of water in the state had only 70 days that allowed fishermen to use nets for southern flounder in 2013, and still the commercial landings exceeded the 10-year average by 200,000 pounds, even though half of the 10-year average allowed flounder fishing with nets 365 days per year.

- In 2014, southern flounder landings went down to 1.66 million pounds because the state shut down fishing with large mesh nets during peak flounder fishing times, in peak areas.
- In 2014, from Currituck and Albemarle Sounds south to the SC line, there were only 82 days open to set large mesh gill nets for flounder.

In summary, more southern flounder are being caught with much less fishing time.

The southern flounder fishery management plan cannot compare landings from years ago when fishermen could 365 days a day, and now only about half of the state's coastal areas allow flounder nets to be used 70 days per year. Even the NC State Biologist disagrees with the MFC about a depletion of southern flounder.

All of the above information came from the NCDMF statistics office and from NCDMF Proclamations that show a marked decrease in fishing time. By proof from NCDMF Proclamations, southern flounder are underfished now more than ever, NOT overfished. Southern flounder are considered a depleted stock by the NCDMF, but there is not one bit of scientific data to back up this myth.

Thank you for your time and consideration in this matter.

Yours truly,

Andrew Berry

Andrew Berry
NCWU Board Member
252-722-4293
Bowhunterab14@gmail.com

AB: mm
Cc: MFC
Nancy Fish, Liaison
NCDENR Secretary van der Vaart
NCGA Senators and Representatives

NC Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557

May 14, 2015

Dr Daniel,

The North Carolina Watermen United (NCWU) would like to comment on the southern flounder fishery.

In 2013, NCWU requested that the minimum size for flounder be reduced to 14 inches for the recreational and charter/headboat sectors. Many of our non-commercial fishermen are being disenfranchised because of the large number of flounder just under the minimum retention size. Reducing the size by merely an inch would take the pressure off, as anglers would more quickly catch their limit - or enough to eat – and stop targeting flounder.

In February 2015, we asked that no action be taken in the flounder fishery, because two of three assessors in the Peer Review for the stock assessment rejected it. Then the Division issued a Flounder FMP Supplement process including a 25 – 60% reduction for the fishery.

NC scientists and biologists believe that the 2007-2008 model does not take into account the migration of the southern flounder and should not have been used for the 2014 assessment. Neither the state nor the stakeholders know the flounder population status. Many of the scientists and biologists also believe that the 25 – 60% reduction was selected arbitrarily with an explanation that the catch/efforts are "trending downward." There is also concern by scientists, biologists and NCWU that the supplement process is too quick, does not require an FMP Advisory Committee for the MFC, does not require MRC Regional Advisory Committee review and does not require a report to an appropriate Committee of the NC General Assembly. We would like an independent review of the supplemental (temporary) management measures and a "new" stock assessment.

We have joined with many fishermen and other groups, including the North Carolina Fisheries Association (NCFA), the Ocracoke Working Waterman's Association (OWWA) and the Carteret County Fishing Association (CCFA) on this issue. Our members have been working with many Boards of

Commissioners including Carteret, Currituck, Dare, Hyde, Pasquotank, Perquimans and Tyrrell Counties that have issued Proclamations against the supplement process and the 25 – 60% reduction because of the economic impact to each County.

One of our NCWU Board members, Andrew Berry, has compiled data showing that the landings of southern flounder by the commercial fleet have remained consistent from 2004 – 2013, in spite of the limitations imposed, mostly because of the ITP for Sea Turtles, to reduce the fishery from 365 days per year to about 70 days per year. Because of severe restrictions and closures, the 2014 landings were less.

We believe that no action should be taken until a new stock assessment is available.

We have all of the cited materials on file and are willing to discuss this issue further at any time.

Yours truly,

Britt Shackelford

Britt Shackelford
President, NCWU
brittonshack@gmail.com
252-473-8078

BTS: mm

Cc: MFC
Nancy Fish, Liaison
NCDENR Secretary Van der Vaart
NCGA Senators and Representatives

May 14, 2015

Sammy Corbett, Chair
North Carolina Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557

RE: Southern Flounder Draft Supplemental Comments

Dear Chairman Corbett:

Please accept the following comments on behalf of the North Carolina Chapter of the Recreational Fishing Alliance (RFA-NC) in regards to pending action for the Southern Flounder fishery. The comments were developed with input gathered from members of RFA-NC who include private anglers, for-hire owners/operators, scientists and others closely involved with the fishery. In addition, the comments were prepared after careful and thorough review of the support materials provided by North Carolina Division of Marine Fisheries (NCDMF) in regards to southern flounder. Our comments reflect the chapter's desire to see the southern flounder fishery managed in a responsible manner that also provides reasonable and equitable opportunities for the recreational fishing community to access this important fishery.

Please reference the document entitled "Draft Supplement A to Amendment 1 of the N.C. Southern Flounder Fishery Management Plan, Implement Short-Term Measures to Address Stock Concerns" dated May 4, 2015. The purpose of the referenced document is to present short term management options to remedy our depleted southern flounder stock. The N.C. Marine Fisheries Commission (MFC) will decide at its May meeting to reject the draft supplement, approve the draft supplement as presented for public comment, or modify the draft supplement and approved the modified version for public comment (p.2).

Based on the referenced supplement (p. 4) the NCDMF determined the southern flounder stock assessment could not be used to define the stock status due to mixing of the stock on a regional scale. Due to concerns of southern flounder stock status, the MFC at its February 2015 meeting decided to pursue a supplement to reduce catch of southern flounder by no less than 25% and no greater than 60%.
RFA-NC agrees with the division's decision regarding the draft 2015 southern flounder stock assessment. However, it is recommended that the division pursue development of a valid stock assessment to determine if the stock is overfished or overfishing is occurring. The referenced supplement states that the NCDMF cannot quantify levels of sustainable harvest without a valid stock assessment; however, certain patterns in the southern flounder fishery and population are concerning and may warrant further management action (p.4). The RFA-NC concurs and requests that immediate action be taken. The supplement further states that the 2014 Southern Flounder Stock Assessment was not accepted for management use by the NCDMF due to legitimate and substantial concerns raised by three external peer reviewers, selected by the NCDMF. The RFA-NC requests that the 2014 draft stock assessment undergo additional peer review by reviewers selected by the NCDMF in collaboration with the RFA-NC and other stakeholders.

In addition, the RFA-NC requests that the MFC take **immediate** action to prevent further depletion of the southern flounder stock. Thus, the RFA-NC recommends that the MFC approve to modify the draft supplement and approve the modified version for public comment. The importance of allowing a public process to move forward cannot be over emphasized. Further, consideration of all public comment by the MFC for its August 19-21 meeting is extremely important in this case. Public comments would greatly assist the MFC in its selection of the preferred management option and final approval of the supplement. The RFA-NC overwhelmingly supports a public transparent process whereby the public is provided an opportunity to comment on a modified draft supplement. Our recommendations on this document are provided below. Please note that many recreational fisherman and RFA members work during the day or live far from New Bern and will not be able to attend the MFC May meeting. Thus, providing those fishermen an opportunity to comment on southern flounder, including our recommended options, is even more important.

The RFA-NC also concurs with resolutions to support the NC DMF use of the supplement process to implement reduction of southern flounder harvest recently adopted by Alamance County, Lenoir County, Town of Wallace, and Wayne County (see Directors report).

Since approximately 1989, the recreational sector has been subject to increased restrictions on southern flounder that have included increased minimum size limits and decreased bag limits. The recreational sector has endured six size limit increases from 13" in 1989 to the current 15" and two bag limit decreases from unlimited to the current bag limit of 6 fish per person/day (p.47). The commercial sector has and is allowed to catch an unlimited amount (i.e. no quota or Total Allowable Catch (TAC)) of flounder 11 months a year with a minimum size limit of 14" (p.48-51). Based on Table 1 (p.9) and Table 2 (p.11), the total recreational and commercial catch for 2011-2013 was 2,148,822 lbs as shown in Table 1 below. Of this total, the recreational industry caught 21.4% (459,177 lbs of the total 2,148,822 lbs) and the commercial industry caught 78.6% (1,689,645 lbs of the total 2,148,822lbs). The inequity in flounder harvest between recreational and commercial fishing is astounding. Further reductions to the recreational flounder catch would not be equitable, reasonable, or fair. The RFA-NC firmly believes that flounder reduction must be taken from the 79% side of the equation.

Table 1. Total landings (lbs) 2011-2013*

Sector	Landings (lbs)	Reference	Percent of Total
Commercial	1,689,645	Table 2, p.11	78.6
Recreational	459,177	Table 1, p.9	21.4
Total	2,148,822		100

*based on Table 1(p.9) and Table 2 (p.11) of draft supplement.

The referenced supplement provides five management options for MFC consideration which would be made available for public comment (p.1). These include:

1. Implement a season closure;
2. Increase the minimum size limit;
3. Decrease the recreational bag limit;
4. Implement a season closure and also increase the minimum size limit;
5. Implement a season closure, increase the minimum size limit, and decrease the recreational bag limit.

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PO Box 98263 Washington, DC 20090
888 JOINRFA, www.joinrfa.org

Our comments on each of these options, as presented in the referenced document, are as follows:

1. Season Closure (p.17). This option considers season closures of both commercial and recreational fisheries. NCDMF tagging data clearly indicate that southern flounder begin spawning migration to ocean waters in fall months. This time period is critical for spawning flounder. Should this option be selected, the RFA-NC recommends a commercial seasonal closure from October 1-December 31 resulting in an estimated reduction of 50% (see Table 4, p.19) which would **reduce the minimum catch reduction as requested by the MFC**. If option 1 is approved, RFA-NC suggests the development of effort controls to prevent a reattribution of commercial effort to which could potential negate or reduce the estimated 50% reduction. The RFA-NC strongly opposes any recreational closure from May through November in any year since it would adversely affect the ability of the for-hire industry to work within the tourism season and allow recreational fisherman to enjoy the fall fishing season.
2. Minimum Size Increase (p.23). Increasing the minimum size limit is a management tool that has always been used by the NCDMF to help end overfishing. Data provided in the referenced document and other NCDMF documents clearly indicate this management measure applied to the recreational industry is not successful (Table A1.1, p.47). However, the referenced document (p. 26 and Table 11) states that "increasing the minimum size limit to 16" would reduce commercial catch by an estimated 32% which would **reduce the minimum catch reduction as requested by the MFC** (p.28). The RFA-NC therefore recommends that the commercial minimum size limit be increased to 16". The recreational minimum size limit must remain at 15".
3. Decrease the recreational bag limit (p.31). According to the referenced document the hook and line recreational fishery contributed the most to reductions from recreational bag limit decreases because of the greater harvest from this gear. Based on estimated catch reductions shown in Table 17 (p.32), the reduction from decreasing to a one-fish recreational bag limit is less than 23% and **does not meet the minimum catch reduction requested by the MFC**. Therefore, the RFA-NC does not support this option. Moreover, we feel that increasing the recreational bag limit to 8 fish per person/day would not adversely impact the southern flounder stock.
4. Season closure and increase the minimum size limit (p.32). This option proposes to combine a season closure with a minimum size limit increase. For reasons described above, the RFA-NC supports a commercial fishing season closure from November 16-December 31and increasing the commercial minimum size limit to 16" resulting in a commercial reduction by 36% to meet **the minimum catch reduction as requested by the MFC** (Table 18, p.33). Consistent with RFA-NC's comment in regards to Option 1, effort controls should be developed to prevent redistribution of commercial effort in response to a seasonal closure. As stated above, we cannot support any recreational closure or recreational minimum size limit reduction. ***This is the preferred option of the RFA-NC.***
5. Season closure, increase the minimum size limit, and decrease the recreational bag limit (p.37). As stated above, the recreational industry has taken the biggest reduction in southern flounder since 1989. The RFA-NC cannot support any further reductions in bag limits in order to allow the commercial industry to harvest more southern flounder. We request that this option be eliminated from further consideration.

The RFA-NC recommends the MFC approve the draft supplement with modifications that would help prevent further depletion of the stock in a fair and equitable manner. It is highly recommended that the MFC approve a modified supplement that allows public comment on the

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options below. As stated above, public comment on all options would greatly help the MFC with its selection of a preferred southern flounder management option.

1. Total closure of commercial gill nets (used for southern flounder). According to the referenced document, page 10, gill nets are used in most estuarine waters where regulations allow. Based on Table 2 (p.11) and Table 1 (p.9), Gill nets accounted for roughly 55.2% (932,792 lbs/1,689,6451lbs) of the commercial harvest and 43.4% (932,792/2,148,822) of the total recreational and commercial fishery harvest. **This single option would fully meet the catch reduction as requested by the MFC.** The RFA-NC recommends this option be given serious consideration in the modified supplement.
2. Prohibition of the issuance of future pound net permits. This motion failed to be approved at the February 2015 MFC meeting. Since that time, there have been numerous pound net permit applications submitted, as expected. Therefore, the RFA-NC recommends that issuance of new pound permits be immediately prohibited until southern flounder management decisions based on a new flounder stock assessment can be made.
3. A quota based fishery management option must be implemented for southern flounder similar to that used for summer flounder. Several issues regarding equal opportunity to land summer flounder and dealer reporting frequencies need to be resolved. The RFA-NC recommends the NCDMF pursue commercial and recreational quotas for southern flounder using a public process that includes an advisory panel. In the absence of the valid stock assessment and amended FMP, it is recommended the NCDMF **immediately** implement a total cap for commercial fishing of southern flounder. It is recommended that a commercial flounder harvest cap of 40% of the 2011-2013 commercial landings (see Table 2, p.11) be used until a science based commercial and recreational quota can be determined. The recommended cap on commercial landings that the NCDMF should consider are as follows:

Table 2. Proposed caps on commercial landings for southern flounder (40% reduction).*

Gear	2011-2013 landings (lbs)*	Proposed Landings Cap (lbs)
Gill Net	932,792	559,675
Pound Net	614,899	368,939
Gig	127,413	76,454

*based on Table 2, p.11 of draft supplement.

4. A valid southern flounder assessment is essential to ensuring sustainable southern flounder stocks. The RFA-NC requests that the 2014 stock assessment undergo additional peer review by reviewers selected by the NCDMF in collaboration with the RFA-NC and other stakeholders.
5. Recreational Commercial Gear Licenses (RCGL) holders are allowed to use limited amounts of commercial gears such as gill nets, trawls, pots and seines. The RFA-NC recommends a moratorium on all gear permitted by RCGL's.
6. Develop and implement species specific reporting for all commercial fisherman and dealers in the southern flounder and summer flounder fisheries. RFA-NC suggest that this program should be implemented over 2 fishing seasons with NCDMF providing mandatory workshops on proper species identification. A forthcoming southern flounder stock assessment will require highquality fisheries dependent information to properly assess the stock. NCMFC should move away from using the location of commercial fishing activity as the determining factor for flounder species identification and instead rely on using accepted identifying features to distinguish between the two species.

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Thank you for reading our comments. To iterate, the RFA-NC recommends that the MFC approve to modify the draft supplement and approve the modified version for public comment. The RFA-NC overwhelmingly supports a public process whereby the public is provided an opportunity to comment on a modified draft supplement for southern flounder.

Sincerely,

Capt. Robert Schoonmaker
RFA-NC Chairman

cc: Ms. Anna Beckwith, MFC
Mr. Mikey Daniels, MFC
Mr. Kelly Darden, MFC
Mr. Mark Gorges, MFC
Mr. Chuck Laughridge, MFC
Mr. Joe Shute, MFC
Mr. Mike Wicker, MFC
Ms. Alison Willis, MFC
Mr. Donald van der Vaart, NC DENR

RECREATIONAL FISHING ALLIANCE
PO Box 98263 Washington, DC 20090
888 JOINRFA, www.joinrfa.org

From: abobdillard [mailto:gbobdillard@gmail.com]
Sent: Thursday, May 14, 2015 9:16 AM
To: Fish, Nancy
Subject: Flounder stock management

May 14, 2015

I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries. Too many of our most sought after fish, namely the red drum, speckled trout and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.

Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications. Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.

Sincerely,
Bob Dillard
1202 Neuse Drive
Oriental, NC 28571
gbobdillard@gmail.com

From: Robert Berger [mailto:bergermansemail@yahoo.com]
Sent: Thursday, May 14, 2015 9:26 AM
To: Fish, Nancy
Subject: Current Legislation

May 14, 2015
I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.
Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation. You need to reduce the area that these nets are allowed. Consider moving back boundaries below Oriental.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.
Sincerely,

Robert Berger
6110 Horton road
Oriental

-----Original Message-----
From: Paul Nancy Miller [mailto:nette33@earthlink.net]
Sent: Thursday, May 14, 2015 12:40 PM
To: Fish, Nancy
Cc: gbobdillard@gmail.com
Subject: Harvesting of fish in NC waters

May 14, 2015
I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.
Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.
Sincerely,

Paul Miller
252-249-1443

From: Randy [mailto:mrbookend@yahoo.com]
Sent: Thursday, May 14, 2015 9:40 AM
To: Fish, Nancy
Subject: Southern Flounder

Hello Nancy,

My name is Randy Smith. For years I dreamed of owning a property on the water so I could go fishing and shrimping and crabbing. In the mid 1980's, I bought a boat but used it 3 times in 2 years so sold it due to my heavy work load and not being home.

Now I am retired and bought a beautiful place on Pierce Creek with access to the Neuse River in a wonderful little town of Oriental. Also bought a small 14 foot boat. But now I hear that fish populations are dwindling especially flounder not due to recreational fishing but rather to over harvesting by commercial fishing and allowing harvesting during spawning season.

Please support the following suggestions by a local Pamlico County club so that I do not feel that I may have made a mistake in choosing this area as my retirement spot. Plus I am sure that the better the recreational fishing, the more revenue is generated by people coming to this area to fish and spend their money in so many ways at many commercial businesses.

Please support the following:

I am a resident of Pamlico County in Oriental, I will vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.

Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.

Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.

Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.

Balance the recreational/commercial split under a TAC to 50/50.

Sincerely,

Randy

-----Original Message-----
From: Cliff & Nancy Hill [mailto:chill6@embarqmail.com]
Sent: Thursday, May 14, 2015 10:00 AM
To: Fish, Nancy
Subject: recreational fishermen input to the DMV

May 14, 2015
I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am very concerned with the state of our fisheries.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.
Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery.
In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.
Sincerely,
Cliff Hill
PO Box 866
Oriental NC

May 15, 2015

I am a resident of Pamlico County; I live here, I own property here, I pay taxes here. I am also a recreational fishermen who believes the current state of our southern flounder fishery reflects a lack of vision and leadership from our state's fisheries managers....that encompasses the last 30 years!

The DMF/MFC for the last 23 years, think about that, 23 years, nearly a quarter of a century have developed rules and regulations, have drawn on the wisdom of advisory committees, have gone through who knows how many members of the MFC and staff members of the DMF and what has been the result for southern flounder....over fished. In short failure.

Now, you the MFC are involved in the supplemental process that creates an opportunity to develop a new strategy for resource management and conservation that produces an equitable distribution of the harvest, or you can choose status quo that locks us in to the present situation of an over capitalized large mesh gill net fishery at the expense of all other user groups, including commercial as well as recreational fishermen.

At the same time, this over capitalized large mesh gill net fishery sucks up dwindling funds from the DMF for observers and staff time and energy required to keep the mesh in the water. A mindset that plagues the DMF....gear management rather than resource management. This approach also results in the by catch of red drum, turtles and now sturgeon and controversy.

The DMF has one proposal that would reduce recreational harvest to one fish per day! At a time when already the commercial sector takes nearly 79 percent of the flounder, recreational around 21 percent. And they want to penalize those of us taking less than a quarter of the fish. Enlightened leadership, indeed.

Recreational fishermen statewide are hard pressed to catch a legal southern flounder for a meal. Yet, hundreds of thousands of pounds of these prize fish are shipped to markets elsewhere for the profits of a few. The tax paying citizens of North Carolina, the recreational fishermen, are left holding the bag and it more often than not it doesn't include a legal sized flounder.

No more reductions on recreational fishermen.

Here are my non scientific proposals for southern flounder (I don't believe the DMF staff recommendations are based upon science either, by the way)

1. Institute an immediate moratorium on large mesh gill nets. Develop

season closures from north to south that fairly distributes the catch of flounder to the pound nets. But, more importantly, allows the spawning females to escape.

2. Commercial size limit of 15 inches, same as recreational.

3. Immediate moratorium on all new pound net applications. If, you cannot or refuse to adopt a moratorium on large mesh gill nets, institute a moratorium on all new applications for large mesh license.

4. Manage flounder under a TAC. The DMF staff claim they cannot manage this fishery under a TAC. They manage the red drum and striped bass under a TAC (CAP), they can manage this fishery under a TAC. Just another excuse to keep the gear in the water. Indicates the mind set of the DMF, gear management rather than resource management.

5. Currently, recreational harvest is 21.4 percent and commercial harvest is 78.6 percent. Ensure the TAC allocates a 50/50 split.

6. If you refuse to adopt a moratorium on large mesh gill nets, and a 15 inch size limit, set a season closure of October 15th.

Thank you and good luck in your efforts to finally succeed where so many of your predecessors have failed.

Tim Hergenrader
106 Black Horse Run S.
New Bern, NC 28560
252-571-2615

Original Message-----
From: Mike [mailto:mcshannon@suddenlink.net]
Sent: Friday, May 15, 2015 11:35 AM
To: Fish, Nancy
Subject: Recreational limits on Southern Flounder

I am a resident of Craven County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.

Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.

Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.

Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.

Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.

Balance the recreational/commercial split under a TAC to 50/50.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.

Sincerely,
--
Mike Shannon
1033 Barkentine Dr
New Bern, NC 28560
252-636-2529

From: anna@downeastguideservice.com [mailto:anna@downeastguideservice.com]
Sent: Saturday, May 16, 2015 10:31 AM
To: Fish, Nancy
Subject: FW: NCDMF Proposed Changes

Please share with others

From: info@downeastguideservice.com
Sent: Friday, May 15, 2015 9:12 PM
To: anna@downeastguideservice.com
Subject: FW: NCDMF Proposed Changes

From: Triad Saltwater Anglers [mailto:triadncwaterman@gmail.com]
Sent: Friday, May 15, 2015 4:40 PM
To: annabarriosbeckwith@yahoo.com; info@downeastguideservice.com
Cc: Steve Craven; John Cranford; Dieter Cardwell; Bob Miller
Subject: NCDMF Proposed Changes

Mrs. Beckwith,

Please share this message with anyone you feel is pertinent regarding this matter.

I am writing this message on behalf of Triad Saltwater Anglers. We are an organization of primarily recreational fishermen located in the Winston-Salem area. We are extremely concerned at how saltwater fishery management in North Carolina is being handled. We fully understand this resource is designated to be shared between all people of our State. With that in mind we are strongly of the opinion the NCDMF has for 25+ years has demonstrated a heavy handed, highly political bias in the favor of the commercial industry. This is demonstrated by the extreme reductions in catch limits placed on recreational fishermen while making minimal cuts to commercial limits and allowing the continued the use of highly destructive poorly managed gear.

To say we are highly concerned with the potential reduction in catch limits for summer flounder would be an understatement. Recreational fishermen played little if any role in causing the depletion of this stock and the thought the NCDMF is even considering placing the bulk of the burden on them is unconscionable. The commercial industry catches 80% of this species. It is statistically highly unlikely that reducing the recreational limit will have any significant effect on restoring the stock.

Let us all not forget this is a shared resource for the people of this State. That sharing goes far beyond the counting of who can keep the most fish and who can shout the loudest in meetings regarding these issues. Sharing also includes the total economic impact for the people in this State. It is common knowledge that the total economic impact of the recreational industry far

exceeds that of the commercial industry. Let us do all we can to promote fishing and tourism of all types to make a positive impact on all involved.

The Coastal Conservation Association of North Carolina has put together a good set of recommendations that will help get this species back on course. They are included below for your review and consideration.

May 13, 2015
Southern Flounder FMP Supplement Options The Coastal Conservation Association of North Carolina believes the current state of our southern flounder fishery reflects a lack of vision and leadership from our state's fisheries managers over the last thirty years. Now North Carolina's most valuable commercial and recreational finfish, southern flounder, is a shadow of its former abundance. Decades of non-action have ultimately resulted in a majority allocation of harvest and de facto prioritization to the destructive large mesh gill net fishery. To use today's fishery as a template for future management does nothing but preserve the trends and factors that led us to the situation where we are now: a collapsed fishery that demands the majority of the Division's time and resources while falling far short of its real potential. CCANC believes this supplement process creates an opportunity to create a new strategy where the resource is conserved and its economic potential realized. If the MFC chooses to remain with status quo they are locking in the source of all of our problems, an over-capitalized large mesh gill net fishery, at the expense of all other user groups: pound nets, gigs, recreational fishermen, the For-Hire industry and the public. Instead of focusing on "being equitable among users" we must concentrate on the source of the fisheries main problems and ask, what is best for the fishery and our coastal economy? That must start with placing the majority of the reductions on the large mesh gill net fishery. CCANC asks that no further reductions be placed upon the recreational fishery. All past cuts have been placed upon the backs of recreational anglers and have virtually eliminated the viability of NC's most popular recreational fishery. As documented in the supplement paper, reductions in recreational catch will result in minimal reductions in harvest, yet come at massive economic and social costs to recreational fishermen and the recreational fishing industry. While the stock assessment cannot determine what cuts should be, it is very clear that the stock is in dire shape and reductions must be made. As cuts will likely either be "fished around" by commercial gears or be less than modeled due to undocumented catches – CCANC believes that harvest of southern flounder must be cut by at least 40%. CCANC requests that NCMFC approve the following management options to be sent out for public comment:
Preferred Options
1. No reductions to the recreational bag limit and no changes to the recreational size limit. 2. Moratorium on the large mesh gill net fishery. 2.1. In conjunction with a large mesh moratorium, have a spawning season closure that differs for north of Hatteras (Oct 1) and south of Hatteras (Nov 1) so pound net allocation will be more equitable. 3. Adjust the commercial size limit to 15" 3.1. Require 6" escape panels on pound nets. 3.2. If large mesh gill nets are to be retained, CCANC requests that we require a minimum mesh size of 6" transitioning to 6.25" by 2016 to reduce what is already an inappropriate number of discard.
4. Immediate moratorium on all new pound net applications.

5. If large-mesh gill nets are to be retained, CCANC requests an immediate moratorium on all new gill net permits to prevent continued over-capitalization of that gear.
6. Management of southern flounder under a TAC 6.1. While NCDMF leadership has raised concerns regarding the viability of managing with a TAC in the short term, CCANC believes if the NCDMF can manage our commercial red drum and striped bass fisheries with a TAC (CAP) then the same management option can be considered for Southern flounder.
6.2. Currently recreational harvest is 21.4% and commercial harvest is 78.6%. We request that a TAC allocate a 50/50 split between the recreational and commercial sectors.
7. Seasonal Closures
7.1. If the MFC is unwilling to place a moratorium on large mesh gill nets or manage under a TAC, we request that, in conjunction with raising the commercial size limit to 15," that the state-wide commercial season be closed by October 15th.

Thank you for your consideration in this matter. Working together we can rebuild this and other depleted fish stocks...working one sided we can watch as our precious resource is further depleted.

Sincerely,
Bob Miller
Triad Saltwater Anglers

Comments to share

Sent from my iPhone

Begin forwarded message:

From: steven j craven <oakisl@aol.com>
Date: May 16, 2015 at 7:58:30 AM EDT
To: "annabarriosbeckwith@yahoo.com" <annabarriosbeckwith@yahoo.com>
Subject: Triad Saltwater Anglers

You recently received a email from one of our members Mr. Bob Miller. I just wanted to to let you know that I totally agree with him. We really need common sense along with the science to regulate our fisheries. Recreational fishermen are a asset to our state and we need to protect their rights to enjoy their experiences fishing in our state. All the research I have done tells me that we are the only coastal state that even allows gill nets. I have long wondered why.

Steve Craven
President Triad Saltwater Anglers

May 17, 2015

Dear Marine Fisheries Commissioners,

As a recreational fishermen, I have followed the downward slide of North Carolina's southern flounder for the last several years. These fish need a break and you can give it to them.

I would like to see you do what is necessary to have the following three items occur:

1. at least a 50% reduction in the harvest of southern flounder by commercial fishermen.

2. a yearly Total Allowable Catch (TAC) for southern flounder. Without a TAC, you can not have a harvest reduction that will work. An unlimited harvest has gotten us into this situation and we will not correct our problems until a TAC is in place.

3. suspend the harvest of southern flounder by gillnets. Doing this will achieve most of the 50% reduction requested above and solve many, many problems for our inshore marine fisheries.

Please support these three simple changes and help our southern flounder begin the recovery that we all so desperately want.

Thank you,

Everett Pesci
Greenville, NC 27858
ebpesci@gmail.com

From: Harriett Blood [mailto:hblood@embarqmail.com]
Sent: Sunday, May 17, 2015 9:09 PM
To: Fish, Nancy
Subject: NC Anglers

May 14, 2015

I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.
Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.

Sincerely,

Matthew Bolyard
Oriental, NC

From: Michelle Speckine [mailto:michellespeckine@gmail.com]
Sent: Monday, May 18, 2015 10:23 PM
To: Fish, Nancy
Subject: Marine Fisheries

To whom it may concern,

My name is Michelle Speckine, I am a resident of Frisco, North Carolina on the Outer Banks and I am writing to express my complete and total opposition to the proposed 25% to 60% reduction of Southern Flounder harvests that is currently being discussed on your legislature. My reasons for opposing said bill are that it will have a devastating economic impact on the island and region in which I live, there is little or no concrete evidence to support your claim of a shortage of flounders in North Carolina waters, and you will be depriving the state of a vital resource that is part of the heritage of our great state,

First and foremost if you follow through with your proposal of a 25% to 60% reduction of flounder harvests you will be inflicting a devastating blow to fishing communities and tourist destinations throughout the state. Thousands of individuals in North Carolina rely on the founder as a means to make a living weather it is through commercial harvests, recreational charters, or serving the delicacy in their restaurants or retail storefronts. This is particularly so in the fall months. Many rely on the flounder as a primary target species to harvest during the fall no matter if they are commercial or recreational charter fishermen. By enacting the proposal you will be removing this vital economic resource from the fall months and as a result removing countless business revenue and tax dollars from the community. Less money will be spent at local businesses as a result, in turn taking money out of the pockets of those local business owners who count on the fishermen and restaurant owners to spend money in their establishment after the tourists have gone home for the winter. In addition, you will be causing a hefty burden for restaurant owners and retail owners and workers, who rely on the flounder to draw hungry guests to their tables and storefronts, who will be forced to raise prices considerably, or worse take flounder from their menu as supplies are sure to be less resulting in prices potentially too high to justify continuing to feature flounder on their menu. Tourists come to North Carolina to eat and catch flounder and may choose to vacation closer to home if they cannot come harvest and dine on flounders in the same fashion they have enjoyed for many years passed. Also, individuals who work in the infrastructure that supports our commercial and recreational fisheries will also be impacted as there could be more than half of their work removed as a result of your proposed reduction. So many will be impacted economically in our state that the true impact cannot even be put into words here.

In addition to opposing the reduction because of the economic impact that will surely come as a result, I also oppose to reduction because I believe there is little or no evidence to support your claims that there is a shortage of Southern Flounders. Every region is different, and every year is completely different. Some years are better than others, and every year teaches you something new. I fished commercially full time for more than five years and I can tell you that no two years are the same and catches vary from year to year,

and are often heavily impacted by weather events, temperatures, and timing for seasonal changes. There is no way true scientific data backing your claims of a shortage of flounders can be credible without looking at ten to twenty years of data minimal and I know there is no way a study backing your claims has been in place for that extended period. My request and proposal would be at the very least the DMF leave regulations as they currently stand and begin a study to back your claims and look at multiple years, five to ten years minimal, and not just one or two because there is no way you can accurately access stocks with ANY less than five to ten years. I believe if you are honest with your data and look at the situation in its entirety you will see that the stocks of flounder are as stable as ever.

Finally, I believe the proposed reduction of flounder harvests is wrong and should be abandoned is that, by enacting said such a reduction would surely significantly remove the importance of one of our states great symbols of heritage, the Flounder. North Carolina has many coastal communities that rely on the flounder as a fish to harvest, serve, sell, and represent their economy and community. My home of Frisco and to a greater extent Hatteras Island, fits this description perfectly. Flounder is synonymous with Hatteras, as tourists flock here to eat and catch flounders and enjoy the traditional heritage of a local fishing community. We are a fishing and tourist community who has always relied on the flounder in the spring summer and fall. Past gill net restrictions have lessened this in the spring and summer and the new proposed reduction will all but eradicate the flounder from the economy and heritage my community and those like mine. We need the flounder in the fall to help us keep food on our tables and roofs over our heads. I beg you not to penalize hard working honest individuals who rely on this great fish for our livelihoods.

I thank you for your time in reading my letter. Please understand that there is no way I can fully express in this letter how bad of an idea the proposal is or how severe the impact will be for my community and those like mine if the proposed reduction is carried out. Nor can I fully explain the extent of those impacted by the proposed legislation without composing pages upon pages upon pages, and I believe in doing so my plea would be lost. So please reconsider and abandon the proposed reduction of Flounder, and take more time to accurately access stocks, economic impact, and regional differences in harvest methods, numbers of fishermen, and economic reliance on the flounder. Thousands stand to lose or be displaced if you carry out your proposed reduction. In a position of power and authority comes great responsibility and I beg you to consider the weight of your decision and act wisely and consider all of those who will be harmed as result of the wrong decision.

Sincerely,

Michelle Speckine

PO Box 581

Frisco, NC 27936

From: Bryan [mailto:stanton8922@gmail.com]
Sent: Monday, May 18, 2015 1:08 PM
To: Smith, Tricia
Subject: Concerned fisherman

My name is Bryan Stanton and I am a concerned recreational fisherman and I strongly disagree with the proposed regulations for southern flounder. I think the intentions are good but are being taken from the wrong angle. I fish all salt waters from Brunswick too pender county. And I can tell you from first hand experience that there are plenty of flounder in the icw and all of its creeks and bays but the problem here is length of fish due too being over fished by giggers. Recreational and commercial it is way over fished. The study's that you have proposed on the data of gigged fish commercially and recreationally are way underestimated. And as for the hook and line harvest folks around here aren't doing much damage because of that. When talking too a friend or stranger on how there fishing trips have been I hear the same thing everytime which is usually 1-3 keepers per vessel. And most say plenty of under regulation. What I am trying too say is the regulations should not be altered too much for the recreational fisher man we are the ones who work our tails off all week long just too be able too go out fishing for one day most of the time and that is all that can be afforded for most of the people who go out and target these fish. It really is not fair too us. If you want too close a season do it too the gigging crowd. It would most certainly have great effect on this species. And I mean commercially as well. I would support an 3 fish bag limit at 16-17 inches for hook and line..and an 18 to 20" for giggers. But would much rather see gigging closed too recreational fisherman and a big time reduction for commercial such as reducing the bag limit and certain days of the week. If you truly care about the fisheries and are not being tied up in the politics that go's with it.. The commercial industry should in no way dictate how the fisheries are managed. And should not have a bigger voice than the recreational fishing industries. Your proposals will cripple man many businesses. From the tackle stores too local restaurants gas stations , hotels any many more local small businesses will suffer because people from near and far will travel elsewhere..we need too think about the economy as well as the fisheries. And as for the nets I personally don't know what too say except that there are many folks with commercial licenses using these nets who don't depend on them for their livelihood and something needs too be done about that in some way or another. I am an 28 year old recreational fisherman who wants things to be done right and I am saying I do not agree with all of your data and proposed amendments.. I want the future too be bright for everyone and I think that the commercial fishing industry is mostly too blame for the so called depleted southern flounder. They must be regulated much much more than the hook and line guys if this species is too flourish!!!!

May 2015 NC Marine Fisheries Commission Meeting Public Comments

Lord willing we will be fishing during this meeting, so I am submitting my written comments before the deadline. Please keep an open heart and mind as you consider these solutions for enhancing our fisheries, freedom, and food supply.

Uncertainty about Southern Flounder populations seems to be the latest management crisis that threatens our freedom to fish and eat them. It looks as if forcing fishermen to only target the female breeding stock is one of the preferred management options. Does it really make sense to discard almost every male flounder when one male can fertilize the eggs of multiple females?

Rather than continuing down the failed path of restricting access and creating more regulatory discards, why don't we focus on enhancing our flounder fishery? We should follow existing models of successful stocking programs and establish Hatchery Supported Quotas. Stocking efforts could be funded with our license fees along with existing taxes that are already earmarked for promoting recreational fishing and domestic seafood production. Stocked fish should be marked for easy identification and should not have a size limit to preserve genetic diversity. This would promote tourism by increasing angling and culinary opportunities.

Licensed fishermen should be allowed to decide how our license fees will be used and quotas will be managed within certain guidelines. Separate recreational and commercial online forums should be set up to facilitate discussions and hold votes. Our votes should be binding when a 2/3 majority of those interested enough in an issue to participate agree on something.

I'll close by asking the commission to allow NC's River Herring fishery to resume next spring. Allowing some harvest would provide valuable data and food while preserving an ancient spring tradition as we work to rebuild this iconic fishery. Hatcheries could quickly boost herring stocks to historically high levels.

Sincerely,

Chris McCaffity

From: Don & Betty CALLAHAN [mailto:donjcal@embarqmail.com]
Sent: Monday, May 18, 2015 9:38 AM
To: Fish, Nancy
Subject:

nancy
I am a resident of Pamlico County, I vote here and own property in the county. I am also a recreational fisherman and am concerned with the state of our fisheries.
Too many of our most sought after fish, namely the red drum, specs and flounder populations reflect a lack of vision and leadership from our state's fisheries managers It is time to change the way we manage these fish.
Presently, you are in the process of reviewing the supplement process for the southern flounder. The DMF has proposed reducing the recreational harvest on these fish to one fish per day. I find this proposal lacking especially when you consider the recreational harvest of these fish comprises around 21.4 percent of the total harvest. The commercial harvest comprises 78.6 percent. It is time to balance the equation.
Accordingly, I support no further reductions in the recreational harvest. I also support a moratorium on the large mesh gill net fishery. In conjunction with the moratorium have a spawning season closure for pound nets to facilitate a more equitable allocation.
Adjust the commercial size limit to 15 inches. Institute an immediate moratorium on new pound net applications. If large mesh gill nets are retained, institute a moratorium on all new gill net applications.
Manage the southern flounder under a TAC. DMF leadership has raised concerns about managing these fish under a TAC. They already manage the red drum and striped bass under a TAC (CAP) and the same can apply to flounder.
Balance the recreational/commercial split under a TAC to 50/50.
Sincerely,
Donald Callahan
donjcal@embarqmail.com

Mary Carolan
P.O. Box 272
Frisco, NC 27936
May 18, 2015

To whom it may concern,

My name is Mary Carolan, I am a native of Frisco, North Carolina on the Outer Banks and I am writing to express my complete and total opposition to the proposed 25% to 60% reduction of Southern Flounder harvests that is currently being discussed on your legislature. My reasons for opposing said bill are that it will have a devastating economic impact on the island and region in which I live, there is little or no concrete evidence to support your claim of a shortage of flounders in North Carolina waters, and you will be depriving the state of a vital resource that is part of the heritage of our great state,

First and foremost if you follow through with your proposal of a 25% to 60% reduction of flounder harvests you will be inflicting a devastating blow to fishing communities and tourist destinations throughout the state. Thousands of individuals in North Carolina rely on the founder as a means to make a living weather it is through commercial harvests, recreational charters, or serving the delicacy in their restaurants or retail storefronts. This is particularly so in the fall months. Many rely on the flounder as a primary target species to harvest during the fall no matter if they are commercial or recreational charter fishermen. By enacting the proposal you will be removing this vital economic resource from the fall months and as a result removing countless business revenue and tax dollars from the community. Less money will be spent at local businesses as a result, in turn taking money out of the pockets of those local business owners who count on the fishermen and restaurant owners to spend money in their establishment after the tourists have gone home for the winter. In addition, you will be causing a hefty burden for restaurant owners and retail owners and workers, who rely on the flounder to draw hungry guests to their tables and storefronts, who will be forced to raise prices considerably, or worse take flounder from their menu as supplies are sure to be less resulting in prices potentially too high to justify continuing to feature flounder on their menu. Tourists come to North Carolina to eat and catch flounder and may choose to vacation closer to home if they cannot come harvest and dine on flounders in the same fashion they have enjoyed for many years passed. Also, individuals who work in the infrastructure that supports our commercial and recreational fisheries will also be impacted as there could be more than half of their work removed as a result of your proposed reduction. So many will be impacted economically in our state that the true impact cannot even be put into words here.

In addition to opposing the reduction because of the economic impact that will surely come as a result, I also oppose to reduction because I believe there is little or no evidence to support your claims that there is a shortage of Southern Flounders. Every

region is different, and every year is completely different. Some years are better than others, and every year teaches you something new. I fished commercially full time for more than five years and I can tell you that no two years are the same and catches vary from year to year, and are often heavily impacted by weather events, temperatures, and timing for seasonal changes. There is no way true scientific data backing your claims of a shortage of flounders can be credible without looking at ten to twenty years of data minimal and I know there is no way a study backing your claims has been in place for that extended period. My request and proposal would be at the very least the DMF leave regulations as they currently stand and begin a study to back your claims and look at multiple years, five to ten years minimal, and not just one or two because there is no way you can accurately access stocks with ANY less than five to ten years. I believe if you are honest with your data and look at the situation in its entirety you will see that the stocks of flounder are as stable as ever.

Finally, I believe the proposed reduction of flounder harvests is wrong and should be abandoned is that, by enacting said such a reduction would surely significantly remove the importance of one of our states great symbols of heritage, the Flounder. North Carolina has many coastal communities that rely on the flounder as a fish to harvest, serve, sell, and represent their economy and community. My home of Frisco and to a greater extent Hatteras Island, fits this description perfectly. Flounder is synonymous with Hatteras, as tourists flock here to eat and catch flounders and enjoy the traditional heritage of a local fishing community. We are a fishing and tourist community who has always relied on the flounder in the spring summer and fall. Past gill net restrictions have lessened this in the spring and summer and the new proposed reduction will all but eradicate the flounder from the economy and heritage my community and those like mine. We need the flounder in the fall to help us keep food on our tables and roofs over our heads. I beg you not to penalize hard working honest individuals who rely on this great fish for our livelihoods.

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Sincerely,

To whom it may concern,

My name is stephen heinz, Im from buxton, North Carolina on the Outer Banks and I am writing to express my complete and total opposition to the proposed 25% to 60% reduction of Southern Flounder harvests that is currently being discussed on your legislature. My reasons for opposing said bill are that it will have a devastating economic impact on the island and region in which I live, there is little or no concrete evidence to support your claim of a shortage of flounders in North Carolina waters, and you will be depriving the state of a vital resource that is part of the heritage of our great state,

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Sincerely, Stephen Heinz

-----Original Message-----
From: Gaither Midgette [mailto:gaithermidgette@yahoo.com]
Sent: Monday, May 18, 2015 6:49 PM
To: Fish, Nancy
Subject: Flounder reduction

I'm Gaither Midgette a pound netter in alb sound I oppose to any flounder reduction plan I don't even know why this has come up we'll I do know why it just another nail in the coffin! Flounders are not in distress any flounder fisherman can tell u that I can show u all the juvenile fish you want to see if I could close my panels. When they went to a 14in min I took It upon my self after the first year to take out the 5 1/2 in panel and put in 5 3/4 in panels this let more of the small fish out so I didn't have to handle them. I've heard talk of going to a bigger fish/ shorting the season any of these will put me out of business I realize that is the goal. It has nothing to do with fish stocks! I'm 4th gen commercial fisherman my grandfather and great grandfather fished pound nets in the same general area I'm in I'm the last of my family fishing when I go that's it I have 2 girls I'd like to put through school.Its sad what's being done to the fisherman in N.C! Nancy please send this to whoever needs to see it I might not make the meeting I need to work every day I can to support my girls. Thank you Gaither

Good Morning

I'm Rick Sasser. You have nine pages of my public comment in your package that includes Division data and clearly shows that there is a big problem with southern flounder. which

I have faith in the Commission that not only do you have complete authority to do so, but that you will address the problem with adequate measures.

Last night in a reply to Ken Seigler's comments, Dr. Daniel said "be careful what you ask for, Indexes of abundance and length frequencies coming out of NC, SC, GA and FLA do not bode well..." That's not the first time I've heard Dr. Daniel make a similar statement.

On April 20, I had a personal conversation with the Director in which I specifically asked Dr. Daniel if a 40% catch reduction was needed. He replied that all indications are that at least a 40% catch reduction is needed. Dr. Daniel said that the 2005 FMP required a 38% reduction and that was never met. Dr. Daniel further stated that since 2005 NC, SC, GA and FLA landings are down and the age structure is shrinking. Today we are fishing with ~~75%~~ 80% to 90% of landings consisting of juvenile fish.

It's clear that the fishery is in trouble and has been for decades. Measures have failed. It's time to do something for this fishery and I urge you to let past Commissions retain the titles of complacency and ~~defeat~~ delay.

What needs to be done?
Number 1-
Put the resource first above all else. Until it is fully recovered, be conservative in what you allow to be taken from this fishery.

Number2-
The recreational sector has given all of the blood to date and we are anemic. Cuts to this fishery have to come from the sector that is catching 80% of the fish.

Number3-
The pound net and gig fisheries are clean. Pounds and gigs don't have ESA, bycatch or discard issues associated with the gill net fishery. NC should not be supporting unsustainable gear that makes the fishery unmanageable. Today's pound net and gig fisheries can harvest every single pound that the southern flounder stock can afford to give.

Number4-
No measure will be successful without a TAC or quota. Commercial gear is very efficient, that is why reductions dependent on turtle restrictions failed. Dr. Daniel was clear in his comments last night as to his opinion on why landings in the pound net fishery could have increased, ITP restrictions left fish in the water over the summer to be harvested during fall escapement. A flounder's fall travel path is predictable and over-capitalized gear will make short-order of overfishing without a TAC.

By nature of the statutory provisions, the Secretary's authorization of this supplement is an extraordinary management tool which is invoked only when there is a need for new management measures. The provision says nothing about heritage, income, scripture giving man rein over fish or personal wants and perceived needs. It is about the resource.

Again, I have faith in today's seated Commission that you will err on the side of the resource. A 45% to 55% catch reduction is needed.

Thank you, I greatly appreciate your service to proper management of our coastal resources.

CCA North Carolina

By electronic transmission to samjcorbett3@gmail.com

May 19, 2015

Mr. Sammy Corbett, Chair
North Carolina Marine Fisheries Commission
3441 Arendell Street
Morehead City, NC 28557

Dear Commissioner Corbett,

As General Counsel for the Coastal Conservation Association North Carolina (CCANC), I was asked by its leadership to write this letter on the law underlying coastal fisheries management by way of the Fisheries Management Plan, or FMP, process., with the understanding that it would become a part of the public record at your May 20-22, 2015 Commission meeting.

As you know, the primary law governing fisheries management since the 1997 passage of the Fisheries Reform Act is found at G.S. § 113-182.1, entitled "Fishery Management Plans." Under that statute, the Division of Marine Fisheries, or Division, must prepare an FMP for "all commercially or recreationally significant species." The goal of each FMP is "to ensure the long-term viability of the State's commercially and recreationally significant species or fisheries." When a new plan is presented to it, the Commission must implement it through appropriate use of its rulemaking authority. Each FMP must be reviewed and appropriately revised to meet the basic goal for every FMP as well as other statutory FMP requirements at least every 5 years.

You may or may not know that the word "Amendment" appears nowhere in the state fisheries management statutes, but since the inception of the state FMP process the Division has, by fisheries management convention, termed each 5-year update of an existing FMP an "Amendment." By contrast to an original FMP or an Amendment of that FMP, an FMP "Supplement" is a much less common occurrence by design. Under the statutory provision governing Supplements [G.S. § 113-182.1(e1)], only the Secretary of the Department of Environment and Natural Resources, or Secretary, may authorize a Supplement to an existing FMP, and may do so only if he determines that new management measures supplemental to an existing FMP are "in the interest of the long-term viability of a fishery." By approving an FMP Supplement, the Secretary authorizes the Commission to develop supplemental, temporary management measures for the fishery under consideration. Supplements are exempt from the usual FMP requirements of being

subject to input by both the Commission FMP Advisory and Regional Advisory Committees, and from the prohibition against the Commission altering the FMP development schedule. The rules implemented under a Supplement remain in effect until "the next review period for" the supplemented FMP, at which time the Commission may either incorporate those management measures into the FMP Amendment or allow them to expire.

In the case of Southern flounder, the Division informed the Commission by letter just prior to the Commission's February 2015 meeting that the Division had determined it could not accept the 2014 Southern flounder stock assessment, and as a result that the Division would not be recommending any new management measures for Southern flounder over and above those contained in the 2013 Southern flounder FMP Amendment 1. In response to the Division's declaration, the Commission passed a motion requesting that the Division present to it at this meeting new management measures that would reduce catch of Southern flounder between 25 and 60 percent. CCANC again thanks the Commission for having the courage and foresight to exercise its statutory duty to conserve and protect North Carolina's Southern flounder fishery by passing that motion. Under state law the Commission's motion was tantamount to a request that the Secretary approve a Supplement to the Southern flounder FMP Amendment 1. The Secretary subsequently approved the Commission's request, and CCANC also wishes to thank Secretary van der Vaart for his wisdom in approving the Supplement.

In approving the Commission's request for a Supplement, the Secretary necessarily made a determination, under state law, that additional management measures are needed in order for the North Carolina Southern flounder fishery to remain viable. The Division has prepared a draft Supplement for this meeting that presents several Southern flounder management options to the Commission which the Division believes will reduce the catch of Southern flounder by 25 to 60 percent. CCANC does not believe that any of the options presented by the Division would, even if successful, ensure the continued viability of the North Carolina Southern flounder fishery, and therefore believes that state law demands more.

The questions presently before the Commission are these. First, what additional regulatory measures for Southern flounder are necessary to ensure the continued viability of that fishery in North Carolina? And secondly, what regulatory options are available to the Commission in meeting that mandate? It would be clearest to answer the second question first.

As to the latter question, it is my learned opinion as former counsel for both the Division and the Commission that the Commission may use the full breadth of its statutory authority in the Southern Flounder FMP Supplement to regulate the fishery as necessary to end or prevent overfishing and ensure the fishery's continued viability. Nothing is off limits. That means that the Commission is not restricted to either the management measures suggested to it by the Division in the Supplement it has prepared, nor by the Commission's original request to the Division for prospective management measures that reduce catch between 25 and 60 percent. That is to say that the Commission could choose to end harvest on Southern flounder altogether through the current Supplement process should the Commission find such action necessary to ensure the continued viability of the Southern flounder fishery. Obviously then, potential Commission action under the Supplement includes proscribing the use of any or all gears or fisheries practices that present a significant threat of continued overfishing and/or stock depletion for Southern flounder.

CCANC has been informed that some within the Division maintain that the Commission's regulatory powers are limited under a Supplement to an FMP. CCANC has asked for a reference to the statutory authority for such an interpretation, but none has been forthcoming. I wish to specifically address that point here. First, it is up to the Commission—and not the Division—to interpret the statutory provisions the Commission applies in regulating coastal fisheries insofar as the statutes may be ambiguous or interpretable. Secondly, I am aware of nothing in either the Fishery Management Plan statute—G.S. § 113-182.1—or the Commission's organic statute—G.S. §§ 143B-289.50 *et seq.*—that could reasonably be interpreted to limit the Commission's regulatory powers under a Supplement. And such a limitation inherently makes no sense at all. As I previously stated, an FMP Supplement is an extraordinary fisheries management tool that is invoked to augment an existing FMP only where supplemental measures are needed "to ensure the continued viability of the fishery" under consideration. It is entirely inconsistent with the statutory supplement process, and patently unreasonable, to maintain that the Commission is somehow precluded as a matter of law from doing whatever is necessary to ensure that viability.

So what additional regulatory measures for Southern flounder are necessary to ensure the continued viability of that fishery in North Carolina? To answer that question, I direct the Commission to what each of you already know: The Commission's primary statutory duty in fisheries management is to conserve and protect the state's public trust marine and estuarine resources. That is why the express statutory goal of each state FMP is "to ensure the long-term viability of the State's commercially and recreationally significant species or fisheries." [G.S. § 113-182.1(b).] If the Commission takes this primary duty to heart, allocation of the resource becomes almost inconsequential, because there are plenty of fish for everyone. However, where the Commission fails to meet that mandate, allocation of fisheries resources becomes extremely problematical, because there are simply too few fish to go around. In such a case—as here—the likelihood of both overfishing and continual stock depletion is almost guaranteed.

That is precisely the situation in which North Carolina increasingly finds itself in managing its coastal fisheries resources. And I would add that the Commission's duty in conserving public trust resources is not just to fishermen, be they recreational or commercial, because each of North Carolina's almost 10 million citizens also has a stake in publicly owned resources. That means that it would be entirely reasonable for the Commission to set aside a significant portion of every species stock in a non-harvestable conservation pool reserved to all non-fishing citizens.

CCANC stated the following in its February 10, 2015 letter to the Commission regarding Southern flounder:

> What was once a robust fishery and strong economic driver has been in decline for decades now. As reflected in the North Carolina Division of Marine Fisheries relevant stock status reports and stock assessments, Southern flounder were classified as "overfished" from 2002-2005, and depleted from 2006-2013. In 2005…a Fisheries Management Plan was adopted by the…Commission to end overfishing of Southern flounder and achieve a sustainable harvest. **Ten years later, there are no data indicating the purposes of the FMP—to end overfishing and get back to a sustainable harvest—have been met.** To the contrary, the recent 2014 stock assessment

indicates that overfishing continued unabated, and to make matters worse, much of the overfishing is "recruitment overfishing"—due in large part to the fact that the current North Carolina Southern flounder stock now consists primarily of younger fish.

Those facts are why the Commission finds itself in the position of managing Southern flounder through the extraordinary occurrence of an FMP Supplement. Consequently, in making your decision as to what measures are required to implement the Supplement and thereby ensure the continued viability of Southern flounder *I urge the Commission to ignore the voices of self-interest and "business as usual" that too often rule fisheries management and instead err, if at all, on the side of resource conservation.*

Let me close by saying that I have sat where you sit. Consequently, I fully understand the practical difficulties the Commission faces in meeting its statutory mandate to conserve and protect the state's coastal fisheries resources, and in choosing the more difficult management path when the loudest voices are telling you how wrong and unfair you would be in doing so. But protest volume is too often not correlated with just decision-making, and I ask each of you to put on your blinders by forgetting politics, and do what is best for the resource and its entire complement of citizen owners. My biggest regret of my time as a Commissioner was that as a body we failed to do what I am suggesting, and instead allowed the full and imminent collapse of the state river herring fishery. Please do not allow Southern flounder to follow suit.

I thank you for you for the opportunity to address the Commission by way of this letter, and for your careful consideration of my comments.

Sincerely,

Timothy D. Nifong

Timothy D. Nifong, Ph.D., J.D.
General Counsel, CCANC

cc: Ms. Anna Barrios Beckwith, annabarriosbeckwith@yahoo.com, MFC
Mr. Mikey Daniels, nccroakerjoe@yahoo.com, MFC
Mr. Kelly Darden, Jr., kdarden@embarqmail.com, MFC
Mr. Mark Gorges, captgorgesmfc@gmail.com, MFC
Mr. Chuck Laughridge, sobxl1@gmail.com, MFC
Mr. Joe Shute, 6111captjoemfc@yahoo.com, MFC
Mr. Mike Wicker, amikewicker@gmail.com, MFC
Ms. Alison Willis, awillis.mfc@gmail.com, MFC
Dr. Louis Daniel, louis.daniel@ncdenr.gov, DMF
Mary Joan Pugh, maryjoan.pugh@nczoo.org, Assistant Secretary, NC DENR
Donald R. van der Vaart, donald.vandervaart@ncdenr.gov, Secretary, NC DENR
The Honorable Pat McCrory, governor.office@governor.ncmail.net, Governor, NC

CCA North Carolina

By electronic transmission to samjcorbett3@gmail.com

Mr. Sammy Corbett, Chair
North Carolina Marine Fisheries Commission
3441 Arendell Street
Morehead City, NC 28557

Dear Commissioner Corbett,

The Coastal Conservation Association North Carolina (CCA NC) has joined its voice with that of hundreds of thousands of recreational fishermen in North Carolina to express our continued concern for the fate of Southern flounder in North Carolina. What was once a robust fishery and strong economic driver has been in decline for decades now, and immediate action is needed. In a letter submitted by CCA NC to the NC Marine Fisheries Commission (Commission) on February 10, 2015, we reminded the Commission of their duty and responsibility to represent both private sector interests and the overall public interest in the management of its coastal fisheries resources, and when necessary to do so independently and beyond any recommendations it receives from the NC Division of Marine Fisheries (Division).

We applaud the Commission for the nearly unanimous action it took in February, asking the Division to identify management options for reducing the annual catch of Southern flounder by 25% to 60% and increase escapement, essentially requesting the Secretary of DENR approve a Supplement to the Southern Flounder FMP Amendment 1. To his credit, the Secretary subsequently authorized short-term management measures to address stock concerns via such a Supplement.

Per the Commission's request in February, the Division then presented the Commission with five management options in a "draft Supplement." (May 4, 2015). Having reviewed those management options, CCA NC respectfully submits the following comments.

CCA NC does not believe any of the options presented by the Division would, even if successful, restore Southern flounder stocks and ensure their continued viability. We therefore first want to remind the Commission that, in formulating a Supplement, it is not limited by the management options presented by the Division, and has the authority and indeed a duty to independently take under consideration options other than those proposed by the Division in doing so. CCA NC accordingly urges the Commission to appropriately modify the draft Supplement and approve a modified version for public comment at its May meeting. To that end, we asked Dr. Tim Nifong to write the enclosed letter addressing the legal context of the FMP Supplement process under the 1997 Fisheries Reform Act, and the Commission's

Commission to do what is look is best for the fishery and our coastal economy. That must start with placing the majority of the additional, needed reductions in harvest on the large mesh gill net fishery.

Finally, we encourage you and your fellow Commissioners to insist on civility and equality in the public comment process for all interested NC citizens. By its very nature, the process of public involvement in NC fisheries management is not conducive to producing candid and fair comments. With meetings held only at the coast, it serves to disenfranchise the greater public. The most contentious issues, such as the one we are facing here, inflame many passions and facilitate a mob mentality to ensure those who have the most numbers and the loudest voices get their way. These public meetings create a venue of intimidation that not only discourages citizen involvement in open government, but also prevent public servants from performing their duties. We urge the Commission to consider means of public involvement in fisheries management that is not designed to disenfranchise the pro-resource citizens and recreational anglers who support rule changes to revive our fisheries, goals that serve all of NC's citizens and not just the ones who fish for profit. We recommend, due to the highly contentious nature of southern flounder, that the Commission pursue only accepting written comments in lieu of any public forum.

Thank you for your consideration of these comments.

Sincerely,

Bud Abbott DAS

Bud Abbott, President CCANC

cc: Ms. Anna Barrios Beckwith, annabarriosbeckwith@yahoo.com, MFC
Mr. Mikey Daniels, nccroakerjoe@yahoo.com, MFC
Mr. Kelly Darden, Jr., kdarden@embarqmail.com, MFC
Mr. Mark Gorges, captgorgesmfc@gmail.com, MFC
Mr. Chuck Laughridge, sobx11@gmail.com, MFC
Mr. Joe Shute, 6111captjoemfc@yahoo.com, MFC
Mr. Mike Wicker, amikewicker@gmail.com, MFC
Ms. Alison Willis, awillis.mfc@gmail.com, MFC
Dr. Louis Daniel, louis.daniel@ncdenr.gov, DMF
Mary Joan Pugh, maryjoan.pugh@nczoo.org, Assistant Secretary, NC DENR
Donald R. van der Vaart, donald.vandervaart@ncdenr.gov, Secretary, NC DENR
The Honorable Pat McCrory, governor.office@governor.ncmail.net, Governor, NC

COMMENTS ON SOUTHERN FLOUNDER MANAGEMENT
made to the
North Carolina Marine Fisheries Commission
May 21, 2015
by Jerry Schill, President
North Carolina Fisheries Association, Inc.

Chairman Corbett and Commission members:

My name is Jerry Schill and I am speaking on behalf of the North Carolina Fisheries Association on the subject of Southern Flounder management.

While I have been involved with fishery management plans at the state and federal levels for quite some time, the supplement process is new to me since I was not involved in fisheries work for a period of time. Actually, it's new to most of you too, relatively speaking. So in doing a little background work on that process I found that it was proposed to the General Assembly so that the MFC could address issues of a critical or emergency nature that needed immediate attention, as a fishery management plan takes up to 2 years from start to finish.

There are costs involved in choosing a supplement over amending a fishery management plan. One is a much minimized public input. Another is oversight or review by the Rules Review Commission. History has shown that both are important to legislators. The amendment process requires the Commission to do its due diligence in allowing the public to review and comment, while the supplemental process is minimal in that regard. In addition, an amendment requires the RRC to assure that the Commission fulfilled its statutory obligations in public notice and comment. The RRC does not look at all of the merits of the proposed changes, only the process.

It's understandable to have some sort of procedure outside of the amendment process to address fishery management issues through something like a supplement to address critical or emergency situations. But based upon the importance the legislators put on going through the proper hoops with ALL regulatory agencies, it is very important to make sure you choose wisely.

Considering what is known about the Southern Flounder stocks, we know there are some areas of concern. Enough concern to warrant an amendment on a fast track. An amendment will not threaten the long term viability of Southern Flounder if the Commission implements an amendment, and that is the legal key for requiring a supplement.

The law does not give priority of one particular fishery over another when it comes to fulfilling the mandates of the process. But given the economic importance of Southern Flounder to this state and in particular to commercial fishing families, the political and legal realities of doing the right thing are magnified immensely.

Based upon the science, there is no crisis with Southern Flounder. And the science certainly does not indicate an emergency situation. However, there is a POTENTIAL for a crisis in this situation.....and that is the credibility of the Commission and this process.

NO SCIENCE, NO SUPPLEMENT!

We urge you to begin an amendment to the Southern Flounder Fishery Management Plan, and put it on the fast track to be completed as soon as possible.

Thank you for the opportunity to comment.

102 Gull Circle
Oriental N.C.
May, 19 2015

Greetings to all in the NCDMF / NCMFC,

Please consider these comments when discussing the future rules and regulations for managing the N.C. southern flounder.

Reviewing the NCDMF web site stock assessments it was revealed that in 2002 southern flounder were overfished with " indications of a 32% decline in population biomass over the past decade" Since the status of this fish has not left the depleted category. As one would expect the recreational and commercial landings have declined. Surveys show about 75% of commercial take consists of pre-spawn juveniles due to the 14" minimum size allowance.

Trying to correct the depleted status of this flounder the NCDMF has only reduced the recreational take without success in beneficially increasing the bio mass.

My requests for consideration are as follows:

1. A TAC cap should be in place, similar to what's been enacted for striped bass and red drum, with at least a 40% to 50% reduction in total yearly take, divided between commercial and recreational sectors with a higher reduction in the commercial allowance since the recreational catch limits have been reduced in the past.

2. The minimum commercial size limit should be 15", thus allowing more fish below the recommended 15" to spawn. If a reduction in large gill nets needs to be enacted and an increase in pound nets allowed it would benefit the southern flounder. This would enable undersized flounder to be released to spawn and reduce by- catch mortality.

My requests are geared to correct the depleted southern flounder status, share the responsibility between the recreational and commercial groups, and open new windows to be considered for the other effected fish in our local waters that have been declining steadily within the past decade, i.e.—croaker, menhaden, spotted trout, spot, weakfish, and river herring.

The combined North Carolinas fisheries is a multi-billion dollar yearly asset to the economy. This dictates the need for serious steps to be taken to safeguard and improve the biomass of our fragile marine life.

Respectfully,

Ron Zielinski

Thomas N. Roller
Beaufort, NC
Commenting on behalf of the North Carolina Guide Association.

TODAY is different. Today is the day you CAN step up as leaders and choose a brighter future for our southern flounder fishery.

My name is Thomas N. Roller. I am a full time working waterman and I am the president of the North Carolina Guides Association. We are an organization of professional guides and small business owners. Above all we are advocates for a healthy southern flounder fishery.

A healthy southern flounder fishery is a vision of the past. If you hold a SCFL, if you run gillnets, and if you enjoy a 14" size limit you may choose to think differently. I could offer a personal view too. I could tell you about younger friends, who think flounder just don't get bigger than 15 inches and that a good day is catching 2 keepers. We have a new generation of fishermen who are willing to settle for remnants because they don't know any better. At 34 I am now old enough to remember "the way things were."

Let's talk facts. The science may not be adequate to determine exact cuts. But the science does tell us there is a problem. That over-fishing has been occurring for 23 years. There are fewer big fish. Most fish never have the opportunity to spawn.

The fate of our southern flounder fishery is not a recreational vs. commercial issue. The question is whether we are willing to take a hard look at this fishery and address its problems before we reach a point of no return.

The southern flounder fishery is managed for preferential access for the large mesh gillnet fishery. This is under the false premise of "managing for all user groups." We devote the majority of our limited resources to keeping large mesh gillnets in the water, to the detriment of all other user groups.

- Commercial pound netters
- Commercial giggers
- Recreational anglers
- For hire guides.
- The public.
- Consumers.
- Everyone who stands to benefit from a rebuilt southern flounder fishery.

Addressing these problems through "equal cuts" is a recipe for failure. This will simply preserve the same problems that have led us down a 30-year road of decline.

Consider these facts. Over the last five years, reducing effort in the large mesh gillnet fishery has had little or no impact in reducing harvest. Now all of you who hold

SCFLs will see your license fees increase to cover the costs of an observer program that we don't need. We spend more to manage the large mesh fishery than it generates in income. We all lose.

As they are so ruthlessly efficient and indiscriminate, large mesh gillnets prosper on the remnants of a fishery in decline.

Our recommendation is as follows:

- Approve a supplement with modifications for public comment
- Consider a closure of large mesh gillnet fishery
- Place a TAC on harvest
- Not apply further reductions to the rec fishery. We have so little to give.

Fishermen are optimists by nature. To our own detriment. Today, instead of asking how LITTLE we can do, we need to ask: how MUCH are we willing to do. Our future is on the line.

Thank you for your time.

I understand that yesterday evening my name was submitted and called for public comment. I was not in attendance. The false submission of a name for comment whether to intimidate, embarrass, or eliminate the opportunity for comment, should not be tolerated. Unfortunately this harassment is common when there are controversial issues at stake. For this reason we encourage you to accept only written comments if you chose to send forward a supplement.

But if there is another Tom Roller in the audience I look forward to buying you a beer.

May 21, 2015

COMMENTS TO N.C.M.F.C. RE: SOUTHERN FLOUNDER
by TERRY PRATT, PRES. ALBEMARLE FISHERMENS ASSOC.

THE ALBEMARLE FISHERMEN'S ASSOC. does not support the use of a supplement process for management of southern flounder. There are no data that indicates a problem.

The approiate way to revise management of southern flounder would be through an amendment process. Supplements are emergency measures. An amendment process is a more complete way to ~~stove~~ solve management problems with better stakeholder input and public review.

I would strongly urge the Commission To recomend following the amendment process.

Terry Pratt pres
Albemarle Fishermen's Assoc.

Rember - the only way for N.C. citizens to purchase N.C. Seafood is if N.C. Fishermen catch it!

Fish, Nancy

From: Herrmann, Nathan <nlherrmann0329@email.campbell.edu>
Sent: Wednesday, May 20, 2015 8:45 AM
To: Daniel, Louis
Subject: DMF Meeting in New Bern

Good Morning,

I am unable to attend the meeting tonight in New Bern, but wanted to take the time to write you a note with my thoughts. I am located in the greater Raleigh area and frequently travel to the coast to fish the Carolina coast. I am asking you to please get gill nets out of the water. The time is now. Every other state in the Southeast took this step years ago to protect the fishery in their state.

It simply does not make sense any more from a economic or conservation stand point. One flounder per day rec. limit is crazy. We will lose recreational anglers to South Carolina and Virginia all day because of the strong rec. restrictions in North Carolina.

Please make the right decision for North Carolina and protect our fishery.

Nathan Herrmann

Fish, Nancy

From: Jeff Sampson <jrsampson@fedex.com>
Sent: Wednesday, May 20, 2015 9:06 AM
To: Vandervaart, Donald; 'captgorgesmfc@gmail.com'; 'annabarriosbeckwith@yahoo.com'; 'sobxl1@gmail.com'; 'captjoemfc@yahoo.com'; 'kdarden@embarqmail.com'; 'amikewicker@gmail.com'; Daniel, Louis; Fish, Nancy; 'awillis.mfc@gmail.com'; 'preynolds@ncdoj.gov'; 'samjcorbett3@gmail.com'; 'ccroakerjoe@yahoo.com'
Subject: Public comment

I have written this email to ask this commission to start managing for the public resource and not the interests of a small group of profit driven users. I have grown up fishing and enjoying the coastal resources of NC for 40 plus years. I have watched the species decline and resource being abused. I have family who works as waterman and profit from the public resource. They acknowledge the damage being done by destructive gear and improper reporting. But they also are fearful that as the public gains knowledge of abuses finally coming out will hurt them as well because that's what the unions are telling them, give nothing because they will shut down all comm fishing. I have learned to live with the disappointments from this and past administrations, failing to protect for the many(public of NC) over the few. I will back a reduction in recreation catch on the flounder if it will help this specifies recover, but as we all know this will not fix the problem. The large mesh gill nets and bottom trawlers are the root causes of the issue. they have failed to reduce the harvest while rec harvest is reduced over and over and will never fix the problem. More information is reaching the people of all NC not just the coastal counties as in the past, and I'm optimistic the curtain will be pulled back and we will see the real wizard of failed fisheries management. Remove destructive gears from our waters and recovery our fish populations…

Thank you for time.

Fish, Nancy

From: john evenson <john.evenson@yahoo.com>
Sent: Wednesday, May 20, 2015 8:46 AM
To: Fish, Nancy
Subject: MFC Thoughts

Dear Ms. Fish,

My name is John Evenson and I am a recreational fisherman who was born and raised in North Carolina. My Father taught me how to saltwater fish at an early age and instilled a love and a passion for fishing and our great state at an early age.

I am writing to request that you PLEASE take the necessary steps to get the GILL NETS out of our inshore waters! While I respect, love, and am proud of our fishing heritage in North Carolina, we are doing ourselves and my children a huge disservice by allowing these nets in our water. The fishery in North Carolina is leaps and bounds behind other southeastern states. Our fish stocks are depleted and there is no excuse to continue to allow gill netting while taking from recreational fisherman (who spend more to catch less fish!).

Please take the necessary steps to get rid of GILL NETS in our waters. Thank you for your service and for protecting our resources.

Sincerely,

John Evenson

Fuquay-Varina, NC
919-337-3331

Fish, Nancy

From: Hensley, Michelle L
Sent: Wednesday, May 20, 2015 7:46 AM
To: Fish, Nancy
Subject: FW: Gill nets

??

Michelle Hensley, Executive Assistant
Director's Office
NC Division of Marine Fisheries
3441 Arendell Street/Post Office Box 769 Morehead City, NC 28557-0769
Phone: (252) 808-8013
Fax: (252) 726-0254
michelle.hensley@ncdenr.gov

-----Original Message-----
From: Robert [mailto:rlcherry@suddenlink.net]
Sent: Tuesday, May 19, 2015 6:40 PM
To: Hensley, Michelle L
Subject: Gill nets

Please use common sense and remove gills nets from our hater hoed. Politics should have no say so in doing what is right. I have fished all my life and obeyed the law, but nothing is turning around in our stock management program. One grey trout per person, and nothing had changed since this regulation has been put in place. Stop putting restrictions on the recreational fisherman and take some pride in banning the gill nets, then see what happens. Politics should not play a roll in fisheries management program.

Sent from my iPhone

Fish, Nancy

From: john@rakoci.com
Sent: Wednesday, May 20, 2015 12:21 PM
To: samjcorbett3@gmail.com
Cc: Pugh, Maryjoan; Vandervaart, Donald; captgorgesmfc@gmail.com; annabarriosbeckwith@yahoo.com; sobxl1@gmail.com; captjoemfc@yahoo.com; kdarden@embarqmail.com; amikewicker@gmail.com; Daniel, Louis; Fish, Nancy; awillis.mfc@gmail.com; preynolds@ncdoj.gov; ccroakerjoe@yahoo.com
Subject: Comment on southern flounder

Good morning,

The Commission has received a lot of information and statistics from NCDMF. The latest suggestions from NCDMF are geared for continued failure. The resource has suffered through more than two decades of failure and it is now time to consider the resource and the majority of citizens of North Carolina. The answer is the elimination of the large mesh gill nets throughout state waters. Your position carries the responsibility to the resource and not a vocal minority.

Suggestions have also been sent by CCANC, NCWF, and RFA NC. The suggestions by those organizations are suggestions for success.

Should the Commission decide to retain gillnets they must be severely restricted with a TAC and long season closures.

Previous attempts to bring southern flounder back have failed as it cannot be done by curtailing recreational fishermen mostly or completely. Recreational fishermen have been cut severely over the years and deserve to see no farther creel restrictions. Size limits of both commercial fishermen and recreational fishermen need to be the same. The following numbers are simply a reminder: **Commercial Average Catch for the period: 2011 - 2014**
Gill Nets = 477,984
Pound Nets = 306,565
Gig = 71,753
Other = 10,249
Total = 866,551

Recreational Average Catch for the period: 2011 - 2014
Hook and Line = 210,491
Gig = 53,661
Total = 264,152

North Carolina can again have a great southern flounder fishery to match or exceed that of our neighbors. Our neighbors made the difficult decisions long ago with success.

I will not repeat what others with a concern for the resource have stated. It is time for North Carolina history to be made with tough decisions made for the resource.

Respectfully,

John Rakoci
Ocean Isle Beach NC 28469

Fish, Nancy

From: Al Raynor <alraynor@bellsouth.net>
Sent: Wednesday, May 20, 2015 10:24 AM
To: captgorgesmfc@gmail.com; annabarriosbeckwith@yahoo.com; sobxl1@gmail.com; captjoemfc@yahoo.com; kdarden@embarqmail.com; amikewicker@gmail.com; awillis.mfc@gmail.com; samjcorbett3@gmail.com; nccroakerjoe@yahoo.com; ccroakerjoe@yahoo.com
Cc: Fish, Nancy; Daniel, Louis; Vandervaart, Donald; Pugh, Maryjoan; preynolds@ncdoj.gov
Subject: RE: Management Measures to Address Southern Flounder Stock Concerns

Sammy Corbett, Chairman
North Carolina Marine
Fisheries Commission
NC Division of Marine
Fisheries
3441 Arendell Street
Morehead City, NC 28557

RE: Management Measures to Address Southern Flounder Stock Concerns

Dear Chairman Corbett,
Please accept the following comments as my personal concerns and recommendations in regards to the upcoming discussions and actions for the southern flounder fishery.

I would like to by thanking each of you for taking the time out of your busy lives to dedicate towards managing our state's marine fisheries. As an avid recreational fishermen who spent countless hours over the years immersed in the advocacy and non-profit efforts to bring science based, common sense solutions to light as a methodology for dealing with a dwindling public trust resource, I completely understand the sacrifice each of you are making. It is not an easy task, nor is there a 100% guaranteed chance of success of any plan or action. Coupled with an ever growing number of users and other environmental and bureaucratic factors, managing this resource effectively is like trying to hang wallpaper with your hands tied behind your back. No matter the decision, people will be unhappy and users feel disenfranchised.

I would like to remind the commission that our marine fisheries are a public trust resource, that belong to all of the people of the Old North State, and not just one user group. This is an issue that we must put the resource first and foremost, and not user groups. take care of the resource, and the resource, in return, will take care of the user groups. In regards to the management of southern flounder over the last 20 years, that has not been the case. Southern flounder, in my honest, humble opinion, has been managed solely for maximum commercial extraction, at the expense of recreational fishermen having to shoulder the a majority of the burden in management philosophies. As many of you know full well, you can manage for yield, and you can manage for quality, but the two management philosophies are not very compatible. We have also have had a tendency to manage for gear use too. We have done everything possible to ensure non-selective, destructive gear (gill nets) stays in the water, when nearly every state north and south of us have either banned, or severely restricted this gear. I find it disturbing that we work diligently to export our seafood out of state, for pennies on the dollar, to places that protect their own, at the expense to our resource and its beneficiaries.

I find the proposals to address the southern flounder issue extremely disappointing, but not surprising. Again, as in the last 20 years, we choose to kick the can down the road and ignore the science, in order to keep one user group fishing with no limits/reductions on catch or gear, and effectively disenfranchising one user group completely out of a public trust resource. With a one fish limit on southern flounder, most recreational fishermen, especially giggers, won't even

bother going out. The science tells us that we must reduce harvest by somewhere between 40%-60%. If you completely shut down the recreational fishery, it would effectively only reduce the harvest by only 12%. Considering that the recreational fishermen account for only around 20% of the total harvest, why are they being asked to shoulder a majority of the reduction in reducing the bag limit from six to one fish a day?

I highly suggest that the Marine Fisheries Commission consider and move to implement some of, if not all of the proposals already outlined by the Recreational Fishing Alliance - North Carolina and the Coastal Conservation Association - North Carolina. Considering those proposals and their subtle differences, I would personally like to suggest the following:

1. Reduction of daily recreational bag limit to four fish a day.

2. Minimum size limit of 16" length for both recreational and commercialfishery.

3. Seasonal closure for both recreational and commercial fishery by October 1st for north of Hatteras, and November 1st for south of Hatteras, to ensure escapement if TAC (mentioned in note 4) is not met.

4. A hard TAC, with paybacks, is implemented for the commercial industry that is 40% less than the yearly commercial harvest average between 2011 & 2103.

5. An immediate moratorium on all large mesh gill nets. (this option alone would completely meet the catch reduction requested by the MFC)

6. Immediate moratorium on all new pound net applications.

7. Implement required reporting of all commercial gear catches kept above and beyond recreational limits, that is not sold. This is to be able to gauge impact of fish kept for personal consumption/use while using an SCFL to avoid recreational limits.

8. Implement circle hook requirement for all hook & line southern flounder fishermen using live bait, to reduce undersized discard mortality.

We simply cannot kick the can down the road another time. Please consider these recommendations for implementation. Put the public trust resource, and its balanced use ahead of profits and personal politics. I have two teenage sons who would love to continue fishing, and have a quality fishery that benefits both recreational and commercial fishermen alike. We can do better. We must do better.

Yours In Service,

Alton L. Raynor, Jr.
7004 Long Boat Circle
Wilmington, NC 28405

alraynor@bellsouth.net

Fish, Nancy

From: Jeff Sampson <jrsampson@fedex.com>
Sent: Wednesday, May 20, 2015 9:06 AM
To: Vandervaart, Donald; 'captgorgesmfc@gmail.com'; 'annabarriosbeckwith@yahoo.com'; 'sobxl1@gmail.com'; 'captjoemfc@yahoo.com'; 'kdarden@embarqmail.com'; 'amikewicker@gmail.com'; Daniel, Louis; Fish, Nancy; 'awillis.mfc@gmail.com'; 'preynolds@ncdoj.gov'; 'samjcorbett3@gmail.com'; 'ccroakerjoe@yahoo.com'
Subject: Public comment

I have written this email to ask this commission to start managing for the public resource and not the interests of a small group of profit driven users. I have grown up fishing and enjoying the coastal resources of NC for 40 plus years. I have watched the species decline and resource being abused. I have family who works as waterman and profit from the public resource. They acknowledge the damage being done by destructive gear and improper reporting. But they also are fearful that as the public gains knowledge of abuses finally coming out will hurt them as well because that's what the unions are telling them, give nothing because they will shut down all comm fishing. I have learned to live with the disappointments from this and past administrations, failing to protect for the many(public of NC) over the few. I will back a reduction in recreation catch on the flounder if it will help this specifies recover, but as we all know this will not fix the problem. The large mesh gill nets and bottom trawlers are the root causes of the issue. they have failed to reduce the harvest while rec harvest is reduced over and over and will never fix the problem. More information is reaching the people of all NC not just the coastal counties as in the past, and I'm optimistic the curtain will be pulled back and we will see the real wizard of failed fisheries management. Remove destructive gears from our waters and recovery our fish populations…

Thank you for time.

Fish, Nancy

From: john evenson <john.evenson@yahoo.com>
Sent: Wednesday, May 20, 2015 8:46 AM
To: Fish, Nancy
Subject: MFC Thoughts

Dear Ms. Fish,

My name is John Evenson and I am a recreational fisherman who was born and raised in North Carolina. My Father taught me how to saltwater fish at an early age and instilled a love and a passion for fishing and our great state at an early age.

I am writing to request that you PLEASE take the necessary steps to get the GILL NETS out of our inshore waters! While I respect, love, and am proud of our fishing heritage in North Carolina, we are doing ourselves and my children a huge disservice by allowing these nets in our water. The fishery in North Carolina is leaps and bounds behind other southeastern states. Our fish stocks are depleted and there is no excuse to continue to allow gill netting while taking from recreational fisherman (who spend more to catch less fish!).

Please take the necessary steps to get rid of GILL NETS in our waters. Thank you for your service and for protecting our resources.

Sincerely,

John Evenson

Fuquay-Varina, NC
919-337-3331

Fish, Nancy

From: Herrmann, Nathan <nlherrmann0329@email.campbell.edu>
Sent: Wednesday, May 20, 2015 8:45 AM
To: Daniel, Louis
Subject: DMF Meeting in New Bern

Good Morning,

I am unable to attend the meeting tonight in New Bern, but wanted to take the time to write you a note with my thoughts. I am located in the greater Raleigh area and frequently travel to the coast to fish the Carolina coast. I am asking you to please get gill nets out of the water. The time is now. Every other state in the Southeast took this step years ago to protect the fishery in their state.

It simply does not make sense any more from a economic or conservation stand point. One flounder per day rec. limit is crazy. We will lose recreational anglers to South Carolina and Virginia all day because of the strong rec. restrictions in North Carolina.

Please make the right decision for North Carolina and protect our fishery.

Nathan Herrmann

Fish, Nancy

From: Hensley, Michelle L
Sent: Wednesday, May 20, 2015 7:46 AM
To: Fish, Nancy
Subject: FW: Gill nets

??

Michelle Hensley, Executive Assistant
Director's Office
NC Division of Marine Fisheries
3441 Arendell Street/Post Office Box 769 Morehead City, NC 28557-0769
Phone: (252) 808-8013
Fax: (252) 726-0254
michelle.hensley@ncdenr.gov

-----Original Message-----
From: Robert [mailto:rlcherry@suddenlink.net]
Sent: Tuesday, May 19, 2015 6:40 PM
To: Hensley, Michelle L
Subject: Gill nets

Please use common sense and remove gills nets from our hater hoed. Politics should have no say so in doing what is right. I have fished all my life and obeyed the law, but nothing is turning around in our stock management program. One grey trout per person, and nothing had changed since this regulation has been put in place. Stop putting restrictions on the recreational fisherman and take some pride in banning the gill nets, then see what happens. Politics should not play a roll in fisheries management program.

Sent from my iPhone

COUNTY OF HYDE

Board of Commissioners
Barry Swindell, Chair
Earl Pugh, Jr., Vice-chair
Benjamin Simmons, III
John Fletcher
Dick Tunnell

30 Oyster Creek Road
PO Box 188
SWAN QUARTER, NORTH CAROLINA 27885
252-926-4400
252-926-3701 Fax

Bill Rich
County Manager

Fred Holscher
County Attorney

Dr. Louis Daniel
N.C. Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557

Re: Draft supplement to the N.C. Southern Flounder Fishery Management Plan

Dear Dr. Daniel,

The people of Hyde County have depended upon its vast fishery resources for over 300 years. Mainland Hyde wraps itself around the Pamlico Sound with its many tributaries reaching far into the mainland and the county extends across the broad Pamlico to Ocracoke Island only to be met by the Atlantic Ocean. Our mainland villages have traditionally and currently been supported by the commercial fishermen and seafood businesses that line our harbors while Ocracoke is supported by a strong commercial presence and a healthy tourism industry supported by recreational fishermen.

When managing such a critical fishery, decisions should be scientifically based and should take into account the views of all stakeholders. In Hyde County, our stakeholders include: commercial fishermen, for-hire charter fishermen and recreational fishermen along with the many business owners and residents that earn their livelihood in related businesses. The input of these stakeholders when changes are made to NC Fishery Management Plans should be considered comprehensively with scientific data that leads us to smart decisions.

Adopting a supplement to the N.C. Southern Flounder Fishery Management Plan without going through the full fishery management plan process will allow the commission to adopt temporary management measures that are not scientifically based, lack proper public input and will have adverse economic impacts to Hyde County and the state of N.C. that have not been thoroughly examined.

Hyde County encourages the N.C. DMF to take a more holistic view of the situation and reevaluate its decision to pursue this supplement until proper procedure including a thorough regional stock assessment can be completed. Reduction of catch of southern flounder by between 25 percent and 60 percent will have a significant adverse impact on our fishermen, supporting

businesses and the county itself and such a decision should not be entered into lightly but with the upmost care and due diligence that takes into account all stakeholders of the fishery.

It is with great appreciation that we thank the N.C. Division of Marine Fisheries Commission for considering our request.

Sincerely,

Bill Rich,
Hyde County Manager

Cc: N.C. Marine Fisheries Commission Members
Hyde County Board of Commissioners

Fish, Nancy

From: Thomas Roller <capttom@ncguidesassociation.com>
Sent: Wednesday, May 20, 2015 4:38 PM
To: samjcorbett3@gmail.com
Cc: annabarriosbeckwith@yahoo.com; nccroakerjoe@yahoo.com; kdarden@embarqmail.com; captgorgesmfc@gmail.com; sobxl1@gmail.com; 6111captjoemfc@yahoo.com; amikewicker@gmail.com; awillis.mfc@gmail.com; Hensley, Michelle L; Fish, Nancy; Pugh, Maryjoan; Vandervaart, Donald
Subject: North Carolina Guides Association Position Letter
Attachments: NCGAflounderposition.pdf

Capt. Tom Roller, President
capttom@ncguidesassociation.com

Capt. Jeff Cronk, Vice President
captjeff@ncguidesassociation.com

Capt. Mike Pedersen, Secretary/Treasurer
captmike@ncguidesassociation.com

Dear Commissioner Corbett,

I'm writing on behalf of the North Carolina Guides Association (NCGA) to provide our recommendations for rebuilding southern flounder, and to express our great concern for the status of the resource. As a member of the commission, your decisions this week could shape the future of our southern flounder fishery. Now is the time for leadership, and to chart a more sustainable path forward.

The North Carolina Guides Association (NCGA), a 501(c)6 trade-organization, is compromised of for-hire captains united by our concern for the sustainable future of our state-managed finfish stocks. The NCGA aims to represent the interests of the for-hire industry through informed involvement by our members.

The NCGA formed out of concern that the interests of the inshore for-hire industry are not adequately represented in the management process. Our interests are often aligned with but different from those of other recreational voices, including the offshore for-hire industry. Our members and their business models are diverse. Many of our members belong to conservation groups, including the Coastal Conservation Association (CCA) and Recreational Fishing Alliance (RFA), and many also fish commercially using sustainable gear types. The positions of the NCGA are solely intended to represent the perspectives of the inshore for-hire industry.

The NCGA is very concerned about the future of North Carolina's southern flounder stock. Southern flounder are, without question, one of our state's most valuable recreational species. Their viability is crucial to the long-term economic health of the for-hire industry, and for providing North Carolina citizens and visitors with access to a public resource. **It is clear to recreational fishermen that the quality of the recreational fishery has steadily declined since the early 90s during which time, as stated by the division, "the North Carolina southern flounder stock appears to have been overfished in all years, 1991 – 2013."**

Current challenges

The NCGA believes the current state of our southern flounder fishery reflects a lack of vision and could be improved using a comprehensive management approach. For decades, past commissions have failed to take the necessary actions to rebuild our declining stock and transition our fishery to one that is modern and sustainable. The end result is that we are left with a fishery that has been, by default, allocated to the source of most of our management problems: the large mesh gill net fishery.

The problems facing our southern flounder fishery stem from a failure to curb overfishing, and from the inequities that exist in managing southern flounder primarily for preferential access by the large mesh gillnet fishery. The southern flounder large mesh gill net fishery, which is unique to North Carolina, has proven to be an exceptionally difficult fishery to manage. The fishery's interactions with threatened and endangered sea turtles, and Atlantic sturgeon have created the need for expensive observing programs. This fishery costs nearly as much, or more, to observe than it produces in income, and in some regions observing costs exceed total ex-vessel landings. This is not a sustainable financial decision.

The costs of the observer program are also financially taxing to other unrelated commercial fisheries, and result in a disparity in management focus. NCGA members who commercially fish are very unhappy that their SCFL license fees will be increasing solely to fund observing for the large mesh fishery. The NCGA believes that these funds could be better used to support other initiatives that enhance the productivity of our fisheries and provide greater recreational and commercial opportunities.

The problems facing our southern flounder fishery are further perpetuated by the extraordinary inequity that exists in current southern flounder management. Extremely efficient and mobile commercial gear types like large mesh gill nets put the public and the for-hire industry at a severe disadvantage. The commercial industry enjoys an approximately 78.6% allocation and a 14" size limit that gives commercial gear types several months of exclusive harvest access, while failing to adequately reduce commercial fishing mortality.

It is time for the Commission to make the bold changes that will shape the future of this fishery. To use today's fishery as a template for future management will condemn us to the same cycle of problems that have plagued us for decades: a declining fishery increasingly and unnecessarily dominated by gear that is expensive and complicated to manage. The overcapitalized large mesh gill net fishery diverts the Division's valuable time and resources to the detriment of all other users who would benefit from a healthy southern flounder fishery: the pound net fishery, the commercial gig fishery, the for-hire industry, recreational fishermen, and the public.

NCGA Recommendations

The NCGA commends the Commission for requesting management options, at the February 2015 meeting, to reduce catch by 25 to 60%. We also commend the DENR Secretary in authorizing the use of the supplement to implement short-term management measures.

The NCGA believes the supplement offers a tremendous opportunity to look forward and create a new management strategy. **We ask the Commission to consider the long-term benefits of a rebuilt southern flounder stock.** While rebuilding the stock will clearly result in hard choices, we ask that you also recognize that the costs of no action will be much greater. The decline of our southern flounder stock has already impacted our recreational and commercial fisheries, and the loss of this stock would be simply devastating to our coastal communities. The long-term viability of any fish stock or marine resources should take precedence over any stakeholder or user group no matter how loud their voice.

The NCGA fully supports *sustainable* commercial fishing and wants to recognize the importance of commercial fishing, and the local seafood it provides our coastal communities and tourism-based economy. The NCGA encourages the commission to focus on our sustainable commercial flounder fisheries: pound nets and gigs. These sustainable gears can supply the entirety of the catch to our communities at less biological and financial cost.

The NCGA does not support any further reductions to recreational catch Since the adoption of the first southern flounder FMP, all reductions have come upon the backs of the recreational community. Commercial harvest has rebounded to the levels seen prior to the sea turtle settlement, primarily due to the efficiency of large mesh gear. Meanwhile, the recreational fishery has seen considerably less abundance and opportunity. Lack of availability resulted in a recreational harvest reduction of 60% in 2014.

The draft supplement clearly demonstrates that reductions to the recreational bag limit will result in minimal harvest reductions and will come at a massive economic and social cost to the for-hire recreational industry and the public. NCGA members are specifically concerned that a bag limit reduction will unfairly penalize fishermen who primarily catch summer and gulf flounder in the ocean. With the depressed state of our southern flounder, gulf and summer flounder is a very important fishery to the for-hire industry.

The NCGA does not believe the options in the draft supplement are adequate. These options do not address needed gear modifications and are too focused on "equal cuts." Proportional reductions by user group and gear type will continue to perpetuate the same cycle or problems. Moreover, experience has proven the difficulty of achieving mortality reductions given the overcapitalized state of the large mesh fishery, and the efficiency of this gear.

The NCGA believes the concept of "equal reductions" is flawed. Our management history clearly demonstrates that effort reduction in the gill net fishery has ultimately had little effect on harvest. We do not believe that further effort reductions through mesh size increases, seasons or yardage allowances can or will have any measurable effect. The NCGA is of the opinion that as long as the southern flounder fishery has a gill net fishery that it may be nearly impossible to manage for sustainable harvest. The recent NCDMF personal consumption survey also indicated that commercial catches could be much higher than reported. We are also of the opinion that past inability to decrease commercial gill net harvest should require us to make larger cuts as estimated cuts will likely be less effective than intended.

The NCGA strongly urges the Commission to modify the draft supplement and pass a modified version for public comment. The NCGA asks that total reductions be, at a minimum 50%. Such a reduction will both bring equality in harvest and reduce mortality to recover the stock and safeguard long term economic viability. The NCGA strongly urges that the unsustainable large mesh gill net fishery should bear the bulk of the reductions.

The NCGA asks that the following modifications be considered.

1. Complete closure of the large mesh flounder fishery (both recreational and commercial).
2. Raise the commercial size limit to 15"
3. Require that all pound nets modify escape panels to 6" to minimize discards
4. Suspend the issuance of any new pound net applications until the fishery has been deemed recovered
5. Cap pound net harvest at the current level and manage the fishery under a TAC or cap in the immediate season.

6. No further restrictions to recreational fishermen.

If the Commission chooses to pass a supplement, we request that the Commission consider only accepting written comments. Those of us who are experienced participants in the fisheries management process are very concerned with the public comment process when issues of particular controversy are addressed. These public hearings inflame passions and create an environment that is intimidating for members of the public. We believe that such tense public meetings prevent fair and equitable public comment from taking place and in no way accurately represent the opinions of the public. Past experiences have only served to disenfranchise many from participating in the management process and voicing their concerns on fisheries issues.

Clearly southern flounder management is one of these unfortunate contentious issues, and the NCGA believes public hearings on the subject will not be conducive to productive comment.

We thank you for the opportunity to present our concerns and encourage you to be leaders and take a stand in shaping this fishery for the future.

Sincerely,

Tom Roller, President North Carolina Guides Association

cc: Ms. Anna Barrios Beckwith, annabarriosbeckwith@yahoo.com, MFC
Mr. Mikey Daniels, nccroakerjoe@yahoo.com, MFC
Mr. Kelly Darden, Jr., kdarden@embarqmail.com, MFC
Mr. Mark Gorges, captgorgesmfc@gmail.com, MFC
Mr. Chuck Laughridge, sobxl1@gmail.com, MFC
Mr. Joe Shute, 6111captjoemfc@yahoo.com, MFC
Mr. Mike Wicker, amikewicker@gmail.com, MFC
Ms. Alison Willis, awillis.mfc@gmail.com, MFC
Dr. Louis Daniel, louis.daniel@ncdenr.gov, DMF
Mary Joan Pugh, maryjoan.pugh@nczoo.org, Assistant Secretary, NC DENR
Donald R. van der Vaart, donald.vandervaart@ncdenr.gov, Secretary, NC DENR

Fish, Nancy

From: DOM SCOTT <domscott15@gmail.com>
Sent: Thursday, May 21, 2015 6:21 PM
To: Pugh, Maryjoan; Vandervaart, Donald; captgorgesmfc@gmail.com; annabarriosbeckwith@yahoo.com; sobxl1@gmail.com; captjoemfc@yahoo.com; kdarden@embarqmail.com; amikewicker@gmail.com; Daniel, Louis; Fish, Nancy; awillis.mfc@gmail.com; preynolds@ncdoj.gov; samjcorbett3@gmail.com; ccroakerjoe@yahoo.com
Subject: Flounder Fishing

Hello,
We are Dominic and Scott. We fish with our grandfather every chance we can. We fish from the boat around Sunset Beach and Ocean Isle Beach. We are twins. Grandpa has pictures of fish from when our mother was young with more flounder in a day than we can catch in many days. Grandpa and grandmas friends told us the problem is gillnets. Stuff on Google says NC is the only state with them. We can catch more when we go to Georgetown. nets are not allowed there. Grandpa says you can take the nets out and soon we can catch more fish.
Dominic
Scott
Jimison

Fish, Nancy

From: busterg@atmc.net
Sent: Friday, May 22, 2015 11:35 AM
To: Smith, Tricia; Hensley, Michelle L; Clark, Brenda; Greg.Bodnar@ncdenr.gov; Bianchi, Alan; Fish, Nancy; Mumford, Doug; Duval, Michelle; Batsavage, Chris; Rawls, Kathy; Schmidt, Al; Mroch, Raymond M; Smith, William E; Lee, Laura
Subject: Proposed New Flounder Regulations
Attachments: fishing charter 5-20-15 003 (Small).JPG; fishing charter 5-14-15-Lee 003 (Small).JPG; fishing trip - Lee- 5-5-15 005 (Small).JPG

My name is Charles Gillis. I have had a charter business in Brunswick County for 43 years. I ran offshore fishing trips until 2010. I put up with the unreal regulations the NMFC came up with through the 90's and until 2010. Then I became so tired of cuts and stops on fishing I sold my offshore boat and went to the backwater trout, flounder and drum fishing, like so many other captains did.

I flounder fished the last season and caught more flounder than ever and ending up catching a total of 507 for the season. Now there is talk of cutting the number and raising the size of flounder when there is plenty of flounder out there.

I do not know where your information is coming from but you have not got log books on catches. I do not know where are you getting your information from, but where ever it is coming from, is definitely not accurate.

Your are not only hurting my business but the tackle shops, marinas, house rentals, motels, restaurants, etc. When you make these decisions you hurt the entire economy along the coast. I am for log books to see where stiffer regulations are needed and some to be loosen up. For instance, sea bass off our coast are very plentiful and more sea bass than all other fish combined and we are stuck with a restriction of only 5 sea bass per person. A person can not go sea bass fishing and get enough for a fish fry for a family of 3. Also the shark limit of 1 shark per person is nonsense. I ran an average of 40 trips shark fishing per season when I was ocean chartering and the regulation was one shark per person on the boat. When the regulations changed to one shark per boat I lost those 40 trips a season. When I lose the marinas lose, the tackle shops loss along with all other businesses in the area

As of now, flounder is our best fishery as we can catch 6 per person, 15 inches or more. We can only catch 1 gray trout per person, and I can't depend on red drum at 1 per person 18-27 inches. Our trout that was 10 per person dropped to 4 per person and size went from 12 to 14 inches. To top this off, you closed the trout season last year for four months because of a one day ice storm. These trout were never stunned or whatever you all called it. Anyway, it cost me 21 trips I had already booked for the spring season.

What I am getting down to is we need less government from the top Obama down to the National Marine Fisheries. We don't need useless regulations when there is no evidence as to the need. No one wants to hurt the fisheries or hunting that participate in these sports. We want what is best, not what unnecessary regulations just pulled out of the sky.

I was raised hunting and fishing and I like to get young children started as young as I can. However, with the strict rules and laws people are going to quit buying fishing licenses or hunting licenses. When this happens we will not need North Carolina Marine Fisheries or Wildlife Officers.

Open your eyes and realize that we are over regulated already and our economy needs a boost not destroyed.

I am sending pictures of my 4 flounder trips this season so far. You can see the keepers we caught, not counting the under 15 inchers we put back. We averaged over 10 keepers per trip last season when we were flounder fishing. This is guiding the one to three people.

The reason people are not catching flounder is 80% who are flounder fishing do not fish the right bait, the right places or use the right tackle. Your flounder tournaments 85% of the fish are caught by 10% who know how and where to fish.

I ask that you give this email serious thought and if you have more questions please feel free to contact me at 910-754-6169 or 910-231-8909.
Thank you for you time and consideration of this important decision.

Captain Buster Gillis
Busters Outdoors Guide Service
1217 Riverview Drive, SW
Shallotte, NC 28470
www.bustersoutdoorsguideservice.com
<http://www.bustersoutdoorsguideservice.com>

Fish, Nancy

From: rick sasser <rick.sasser@hotmail.com>
Sent: Thursday, June 04, 2015 12:04 PM
To: Pugh, Maryjoan; Vandervaart, Donald; captgorgesmfc@gmail.com; annabarriosbeckwith@yahoo.com; sobxl1@gmail.com; captjoemfc@yahoo.com; kdarden@embarqmail.com; amikewicker@gmail.com; Daniel, Louis; Fish, Nancy; awillis.mfc@gmail.com; preynolds@ncdoj.gov; samjcorbett3@gmail.com; nccroakerjoe@yahoo.com
Subject: Public Comment on the Southern Flounder Supplement Management Options

June 4, 2015

Sammy Corbett, Chair
North Carolina Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557

RE: Public Comment Period for Southern Flounder Management Options

Dear Chairman Corbett,

In regards to your recent decision to set a public meeting from 1-5 p.m. June 17 at the New Bern Riverfront Convention Center, 203 South Front St., New Bern to hear comments under the southern flounder supplement process, I respectfully ask that you reconsider both the day, time and place.

In my May 18th written comments to you, the Commission and NCDENR staff, I wrote the following-

"There is one last issue that I would like to address. It is my opinion and that of others with whom I have spoken, that the process of public involvement in fisheries management issues is tailored to produce an environment of intimidation. There is no better example than the Hergenrader petition hearing in New Bern. These types of gatherings serve no useful purpose in resource management other than to facilitate a mob mentality and ensure those who have the most numbers and the loudest voices get their way. That is no way to manage our public trust resources. Not only is it discouraging citizen involvement in open government, it is preventing public servants from performing their duties. I have personally experienced such intimidation, talked to other citizens who have also experienced intimidation and been told by members of the MFC and Division staff that intimidation, the fear of threats and violence against them or their personal property, has

and is effecting decisions they are making on behalf of the resource. I urge the MFC to consider means of public involvement in fisheries management that is not designed to disenfranchise pro-resource citizens and recreational anglers who support rule change to revive our fisheries and protect our marine resources from exploitation, goals that serve all of NC's citizens and not just the ones who fish for profit."

Your decision to hold the June 17 meeting, a Wednesday, from 1-5pm at the New Bern Convention Center is a continued disenfranchisement of pro-resource citizens and recreational anglers with what many will perceive as a deliberate attempt as such. I ask that you reconsider your decision.

The public trust resources of NC belong to ALL her citizens and as such, a proper venue should be provided that allows equitable participation for all who wish to participate. May I suggest that this venue be move to Raleigh to be scheduled on August 19th as part of the public comment period for the August 19-21 MFC meeting. A full day of comments should be allowed with the ending time running into the night time hours.

I ask that you review the letter from Mr. Tim Hergenrader dated April 23, 2015 in which Tim clearly stated his personal experience and concerns about public involvement in venues like the one scheduled for June 17th. If history repeats its self, is the Director going to be able to provide an armed escort for every individual who would like to speak on behalf of the resource at the June 17th meeting like he felt necessary to do for Tim on July 30, 2013 in the same venue?

When considering my request, please consider the importance of open, fair and transparent rule making and those obligations to the people of NC for public comment is an important part of the ruling making process.

Respectfully Submitted with Best Regards,

Rick Sasser

Goldsboro

Fish, Nancy

From: Marian Parker <marip1028@yahoo.com>
Sent: Friday, June 05, 2015 8:09 PM
To: Fish, Nancy
Subject: Southern flounder proposals

In regards to southern flounder proposals, I am very concerned about the proposal that states that commerical giggers will only be able to fish monday thru thurs. I work a public job and can only gig on weekends to supplement my income. Also if commerical giggers have a limit per trip, I feel that recreational should have a boat limit also as they can put numerous passengers in their boat and catch as many as commerical giggers without paying the commericl license fee.
I hope that you will give my concerns consideration.

Regards,
Elton Parker

Sent from Samsung tablet

Fish, Nancy

From: Michael Bannan <drbannan@att.net>
Sent: Monday, July 13, 2015 3:27 PM
To: Pugh, Maryjoan; Vandervaart, Donald; captgorgesmfc@gmail.com; annabarriosbeckwith@yahoo.com; sobxl1@gmail.com; captjoemfc@yahoo.com; kdarden@embarqmail.com; amikewicker@gmail.com; Daniel, Louis; Fish, Nancy; awillis.mfc@gmail.com; preynolds@ncdoj.gov; samjcorbett3@gmail.com; nccroakerjoe@yahoo.com
Subject: Southern Flounder

Dear Commissioners,

As a concerned citizen, I am aware of the continued downward slide of North Carolina's depleted southern flounder stock. It is well past time to reverse this slide and you now have a real opportunity to make that happen at the Marine Fisheries Commission meeting in August.

I would like to see you do everything necessary to place into temporary rule under the supplement process to the Southern Flounder Fishery Management Plan measures that will support and ensure the following:

1. Reduce the harvest of southern flounder by commercial fishermen by at least 50%.

2. Implement a yearly Total Allowable Catch (TAC) for commercially harvested southern flounder. This TAC should be at least 50% lower than the average commercial southern flounder harvest of the last 3 years.

Without a TAC, you cannot have a harvest reduction that will work. An unlimited harvest has led to our depleted fish stock and these fish will not recover until a TAC is in place.

3. Suspend the harvest of southern flounder by any and all gill nets.

Doing this will achieve most of the 50% reduction requested above and solve many problems for our inshore marine fisheries. The management costs, conflicts, bycatch issues and unsustainable harvest associated with the use of gill nets has created an unmanageable situation for marine fisheries in North Carolina. It's time to stop the use of this highly destructive gear.

Please support these three simple changes and help our southern flounder stock begin the recovery that it deserves and many citizens expect.

Thank you,

--
Michael J Bannan DDS, FAGD
Accredited Member of the American Academy of Cosmetic Dentistry
Member American Academy of Dental Sleep Medicine
www.drbannan.com

8001-201 Creedmoor Rd
Raleigh, NC 27613
(919) 870-7104

803 South Walker Street
PO Box 1209
Burgaw, NC 28425
910-259-1503

7/14/15

Recreational Fishing Alliance of North Carolina Southern Flounder Public Comment

North Carolina Division of Marine Fisheries Commissioners and Division Staff,

My name is Joe Robbins

I live and vote in Pender County.

My address is 321 Batson Rd.,
Hampstead, N.C. 28443

Email oddball883@gmail

Phone 910-685-1711

Thank you for allowing me to participate in the public comment on the management of Southern Flounder. Based on options given to the public by NCDMF staff and commissioners, I believe option:

1 is the best for management of Southern flounder. I appreciate the opportunity to participate in the management of North Carolina's fisheries.

Thank you,

You can email this form: flounder.supplement@ncdenr.gov

You can mail this form:

Southern Flounder Comments
c/o Nancy Fish
P.O. Box 769
Morehead City, N.C. 28557

RFA-NC recommends Option 1, based on data provided by the NCDMF staff and scientist in the document "NC Southern Flounder Draft Supplement. Option 1 will allow the southern flounder population to recover the quickest out of all the options presented.

The deadline for public comment is July 10th, so have your comments sent by

July 15, 2015

To: Nancy Fish, Southern Flounder Comments
PO Box 769, Morehead City, NC 28557

From: Doug Elliott, Recreational Fisherman

Hello Nancy,
I have reviewed the proposals regarding managing the Flounder fishery. The statistics bear out that the lion share of damage is being done by the commercial industry. I rarely keep any recreational catch of any species. Few recreational fisherman "feed' their family with catch so I believe that Proposal 1 plus a total ban for the appropriate portion of this season is the right approach. It allows for a good kick start followed by a longer term solution.
The commercial guys are flirting with their long term well being that cannot be fixed by only slowing down the recreational catch. I grew up on Great South Bay on Long Island and put myself through college digging clams. I watched first hand as the commercial clammer's destroyed the bay through over harvest. I bet if given the opportunity to do it all over, they would now choose taking small short term hits than to lose it all. I believe it is fair for all parties to take a hit for the good of the fishery.

Thanks for your efforts to protect our waters.

Douglas Elliott
7034 Ascension Drive
OIB, NC 28469
e: 140thnyvi@gmail.com
Cell; (585) 313-1655

REMINDER

MANDATORY EDUCATION REQUIREMENTS

MANDATORY EDUCATION.

Public Servants and Ethics Liaisons. The State Government Ethics Act ***requires*** that every public servant and ethics liaison complete an ethics and lobbying education presentation/program approved by the State Ethics Commission ***within 6 months*** of the person's election, reelection, appointment, or employment **and** complete a refresher ethics presentation ***at least every two years thereafter***.

The willful failure of a public servant serving on a board to comply with the education requirements may subject the person to removal from the board. The willful failure of a public servant who is a State employee to comply with the education requirement may be considered a violation of a written work order permitting disciplinary action. Therefore, if there are public servants in your agency or on your covered state board or commission who are past due for completing their ethics education requirements, **those individuals should attend a live presentation, distance video-streamed presentation *or* complete the online education as soon as possible.**

Legislators. The State Government Ethics Act ***requires*** that every legislator complete an ethics and lobbying education presentation/program approved by the State Ethics Commission and the Legislative Ethics Committee ***within 2 months*** of either the convening of the General Assembly to which the legislator is elected or the legislator's appointment, whichever is later, **and** complete a refresher ethics education presentation ***at least every two years thereafter***.

The willful failure of a legislator to comply with these education requirements may subject the legislator to sanctions under the Legislative Ethics Act.

Legislative Employees. The State Government Ethics Act ***requires*** that every legislative employee complete an ethics and lobbying education presentation/program approved by the State Ethics Commission and the Legislative Ethics Committee ***within 3 months*** of the person's employment **and** complete a refresher ethics education presentation ***at least every two years thereafter***.

The willful failure of a legislative employee to comply with these education requirements may subject the person to disciplinary action by their hiring authority.

Legislators and Legislative Employees may check the status of their ethics education by going to the General Assembly intra-net page. Legislators and legislative employees who are past due for completing their ethics education requirements should contact Denise Adams with the Research Division of the General Assembly at denise.adams@ncleg.net or 919-301-1991 to coordinate/schedule their ethics education training.

ETHICS AND LOBBYING EDUCATION TRAINING.

Public Servants and Ethics Liaisons may complete the required basic or refresher ethics and lobbying education training by either attending a live presentation, a distance video streamed presentation or completing the online education modules.

- **Live and Distance Video-Streamed Presentation Dates.** The State Ethics Commission has scheduled live ethics and lobbying education presentations and distance video-streamlined presentations for the remainder of 2014. Dates, locations, and registration information are on the Commission's website at: www.ethicscommission.nc.gov/education/eduSchedule.aspx.

- **Online Education.** The State Ethics Commission also offers online ethics and lobbying education. The education modules and instructions are on the Commission's website at: www.ethicscommission.nc.gov/education/eduOnline.aspx.

Legislators may complete the required basic or refresher ethics and lobbying education training by attending a live presentation at the beginning of the legislative session jointly provided by the Ethic Commission and the Research Division of the General Assembly.

Legislative Employees may complete the required basic or refresher ethics and lobbying education training by going online to the General Assembly intra-net page.

REGISTRATION AND QUESTIONS.

- **Public Servants and Ethics Liaisons** please contact Sue Lundberg at (919) 715-2071 or by e-mail at Education.Ethics@doa.nc.gov to register for ethics and lobbying education training or if you have ethics education questions.

- **Legislators and Legislative Employees** please contact the General Assembly ethics hotline at 919-301-1991 or email Denise Adams at denise.adams@ncleg.net if you have questions about the ethics and lobbying education training or have ethics education questions.

Thank you for giving this matter your immediate attention and for sharing this information with all members of your covered board, commission or committee, all staff and employees covered under the State Government Ethics Act, and all legislators and legislative employees.

2015 Meeting Planning Calendar

January

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- MFC
- ASMFC
- SAFMC
- MAFMC
- State Holiday
- Sea Turtle AC
- Meeting Cancelled
- Southern Regional AC
- Northern Regional AC
- Finfish AC
- Habitat and Water Quality AC
- Shellfish/Crustacean AC

2016 Meeting Planning Calendar

January

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- MFC
- ASMFC
- SAFMC
- MAFMC
- State Holiday
- Sea Turtle AC
- Southern Regional AC
- Northern Regional AC
- Finfish AC
- Habitat and Water Quality AC
- Shellfish/Crustacean AC

Committee Reports

MEMORANDUM

TO: N.C. Marine Fisheries Commission
Sea Turtle Advisory Committee

FROM: Chris Batsavage
Division of Marine Fisheries, NCDENR

DATE: July 15, 2015

SUBJECT: Sea Turtle Advisory Committee Meeting

The Sea Turtle Advisory Committee met at 6 pm on Thursday, June 18, 2015 at the Department of Environment and Natural Resources Regional Office at 943 Washington Square Mall, Washington, NC. The following attended:

Advisers: Bob Lorenz (Chair), Adam Tyler (Vice Chair), Matthew Godfrey, Craig Harms, Tricia Kimmel, Brent Fulcher, Chris Hickman, and Troy Outland

Absent: Richard Peterson and Charles Aycock

Staff: Chris Batsavage, Jacob Boyd, John McConnaughey, Jeff Dobbs, Daniel Ipock, and Garland Yopp,

Public: James Coulbourn

Bob Lorenz, serving as chair, called the meeting to order. He provided some opening remarks and welcomed Troy Outland to the Advisory Committee since he was unable to attend the meeting on March 19, 2015. Outland clarified that he came to the last meeting but was unable to get access to the building. Outland is a pound netter from Manteo and his interest in sea turtles comes from the impacts sea turtle management has had on his family and friends.

MODIFICATIONS TO THE AGENDA

Lorenz asked the committee if there were any modifications to the agenda were needed. Craig Harms brought up the following issues and comments he wanted to discuss at the meeting:

- Learn more about the leatherback sea turtle entanglement in the ocean off Topsail Island.
- Questions about how sea turtle interactions are recorded during research, if gillnet attendance is required for research nets, and what sort of mitigation takes places when researchers have interactions.

- Pier education outreach discussion. Several outside groups are doing outreach programs at Jennettes Pier.
- The National Oceanographic and Atmospheric Administration (NOAA) is planning a sea turtle meeting in the future for post-release mortality that Harms will be attending.

Lorenz said these issues can be discussed later in the meeting. As such, no modifications were made to the agenda.

APPROVAL OF MINUTES

Brent Fulcher motioned to approve the minutes of the March 19, 2015 Sea Turtle Advisory Committee meeting and was seconded by Adam Tyler—motion passes.

OBSERVER PROGRAM UPDATE

Jacob Boyd presented updated information on observer coverage estimates in 2014, as requested by the committee at their March 19, 2015 meeting. Final observer coverage estimates were not available for the last meeting because commercial gill net trip data from the North Carolina Trip Ticket Program is finalized in April. Boyd provided tables comparing the estimated observer coverage and final observer coverage for the large mesh gill net fishery by month and management unit. The overall observer coverage in 2014 based on finalized trip numbers was 8.8 percent; the 2014 overall observer coverage based on estimated trip numbers was 5.4 percent. Fewer large mesh gill net trips occurred in 2014 compared to previous years because of closures due to sea turtle interactions and to prevent red drum discards while the commercial red drum season was closed.

Brent Fulcher asked how the observer coverage is calculated to ensure the minimum observer coverage is met, and Boyd responded that it is calculated by management unit and season for large and small mesh gill nets. Chris Batsavage added that the Observer Program continues to collect observer trips after the estimated coverage (based on previous years) is met in case the number of gill net trips in a given management unit or season is higher than expected.

Fulcher suggested that a call-in system where fishermen notify the division's Observer Program before they go fishing would ensure observer coverage is met.

Boyd explained changes in observer coverage estimates. The program now uses the average annual fishing trips per management unit and season from multiple years instead of just the previous year. Boyd also discussed the recent closures of Management units A and B because of sea turtle takes.

Matthew Godfrey asked why there is such variability in yards per trip observed, and Boyd explained that alternative platform trips may only observe a portion of a trip, and yardage fished is variable between management unit and season.

Godfrey expressed concern that the Sea Turtle Incidental Take Permit (ITP) states that management units must close when take limits are approached, not exceeded, and he asked if

there should be some closures in fall to avoid the overage in Management Unit A. Boyd and Batsavage explained that they have spoken with National Marine Fisheries Service staff on how to avoid overages in the future.

Outland asked if the takes in Management Unit A were all around Oregon inlet and Batsavage explained that most occurred south of the US Highway 64/264 bridges over Croatan and Roanoke sounds—the portion of Management Unit A closest to Oregon Inlet. He added that the division may request moving the boundary line between Management units A and B up to the bridges (the boundary is located at Oregon Inlet).

Fulcher asked if there is a way to move the boundaries so smaller areas close when takes occur, and Boyd explained that the allowed sea turtle takes are already allocated to each management unit and cannot be changed under the current ITP.

Boyd also informed the committee that the division has placed instructional signs about sea turtle interactions on every ocean fishing pier in the state and plans are being made for training fishing pier staff on proper handling of sea turtles that interact with hook-and-line gear on the piers.

OBSERVER PROGRAM DATA VERIFICATION DISCUSSION

Boyd explained the Observer Program data sheets provided for visual aid examples to the committee, and he explained the process of how data is recorded, transcribed, coded, and verified. The purpose was to show the committee the type of data recorded on an observer trip to determine the best method for fulfilling fishermen's requests for a way to verify the data recorded on their boat is accurate. Fishermen have always been able to request copies of the data from observer trips on their boats, but some in the industry do not trust the observers and they would not trust information provided two weeks after their trip.

Fulcher asked how long data recording and transcription takes, and Boyd replied that it usually takes two hours to complete the data coding, but it may not be completed until the end of the week due to other duties of the observer.

Fulcher stated he believed there is a disconnect between the industry's perception of how the data is recorded, and what actually happens. He also believed data issues are occurring dockside by observers recording incorrectly. Boyd explained the system and provided an example of a form the division proposes to provide fishermen with the data from the trip that they had an observer along with them, if requested. The system includes the fishermen signing the form to request their data in electronic form, hard copy, or both. This option could include the observers taking pictures of the data sheets to be sent to the fisherman. The data would be sent to the fisherman as soon as it was complete with the completion time depending on the workload at the time of the request. The fishermen also have the option of taking pictures of the field data sheets with their camera or cell phone at the end of the trip.

Fulcher did not believe that fisherman would have a use for the coded data. He thought the simplest form possible would be best, and Chris Hickman agreed. The form Fulcher was referring to is the Field Collection Sheet that observers fill out upon completion of trips.

Lorenz questioned whether a summary report of only commercially important catch would better suit the data requests, but Tyler said that the existing longhand form would be adequate.

Based on the discussion by the committee, the division will revise the proposed data request form, and the data provided to the fishermen will include the field data sheets and the observer trip information sheets; both provide information on the catch, gear parameters, location, and time of day fished for the observed gill net sets.

PUBLIC COMMENT

No public comment

OTHER BUSINESS

Lorenz opened discussion on topics discussed at the March 19, 2015 meeting and by Harms at the beginning of this meeting. He began with the call-in system Fulcher discussed at the March 19, 2015 meeting. Batsavage explained that due to a busy schedule and other priorities, the division has made very little progress on this.

Fulcher asked about the status of the memorandum of understanding for the N.C. Commercial Fishing Resources Fund board, and Batsavage replied that he would need to check on the progress.

Sergeant Garland Yopp provided the committee with information about the leatherback sea turtle entanglement Harms asked about at the beginning of the meeting. Sergeant Yopp was one of the officers who responded to the stranding. The sea turtle was entangled in a sink gill net offshore of the Jolly Roger Fishing Pier on Topsail Island. Yopp and other Marine Patrol officers successfully removed the sea turtle from the net and the sea turtle swam away. Harms commended Yopp and Marine Patrol for responding so quickly and for disentangling a very large sea turtle from a gill net.

Harms explained his concerns with research gill nets that had multiple sea turtle takes. Batsavage explained that this has been discussed by staff, and they are planning a meeting with the division's Fisheries Management section chief to discuss the issue in the near future.

Batsavage addressed Harm's interest in outside groups putting similar signs as the division about sea turtle interactions on ocean fishing piers. He plans on looking in to it further.

FUTURE MEETING TOPICS AND PLAN AGENDA ITEMS FOR NEXT MEETING

Lorenz asked the committee if there were any items they would like to discuss at the next meeting.

Fulcher requested a report for the number of fishing days each area was open during the previous fishing year, and Batsavage agreed to provide this.

Outland asked why the incidental take permit fishing year begins in September and not January. Batsavage explained the fishing year was aligned with the beginning of the peak gill net fishing season. This helps prevent closures that would adversely affect peak fishing effort.

Batsavage said the committee will review and make recommendations on potential amendment items for the Sea Turtle Incidental Take Permit at their next meeting.

MEETING ARRANGEMENTS

The next meeting is scheduled for Thursday September 17, 2015 at the Department of Environment and Natural Resources Regional Office in Washington, NC.

The meeting adjourned at approximately 7:40 pm.

/cb

Cc:

Catherine Blum	Jess Hawkins	Jerry Schill
Mike Bulleri	Brad Knott	Gerry Smith
Scott Conklin	Dee Lupton	District Managers
Dick Brame	Nancy Marlette	Committee Staff Members
Louis Daniel	Lauren Morris	Marine Patrol Captains
Charlotte Dexter	Phillip Reynolds	Section Chiefs
Kristy Long		

INFORMATION WILL BE PROVIDED AT THE MEETING.

MEMORANDUM

TO: N.C. Marine Fisheries Commission
Oyster and Hard Clam Advisory Committee

FROM: Tina Moore
Stephen Taylor
Division of Marine Fisheries, NCDENR

DATE: May 11, 2015

SUBJECT: Oyster and Hard Clam Fishery Management Plan Advisory Committee Meeting

The Oyster and Hard Clam Fishery Management Plan Advisory Committee met Monday, May 4, 2015 at the Department of Environment and Natural Resources Regional Office, 943 Washington Square Mall, Hwy. 17, Washington, N.C. The following attended:

Advisers: Joey Daniels, Nancy Edens, Niels Lindquist, Stephen Swanson, Adam Tyler, Ted Wilgis, Jeff Taylor, Ami Wilbur

Absent: Dell Newman, Bob Cummings, Lee Setkowsky

Staff: Joe Facendola, Garry Wright, Trish Murphey, Dean Nelson, Tina Moore, Stephen Taylor, Clay Caroon, Jason Peters, Curtis Weychert, Alan Saunders, Steve Murphey, Brian Conrad

Public: None

Ted Wilgis serving as chair, called the meeting to order.

MODIFICATIONS TO THE AGENDA

Adam Tyler made a motion to approve the agenda. Jeff Taylor seconded the motion. The motion passed unanimously.

APPROVAL OF MINUTES FROM March 9, 2015

Ami Wilbur made a motion to approve the minutes. Adam Tyler seconded the motion. The motion passed unanimously.

Ted Wilgis gave an update on the Oyster Summit which had taken place on the 10th and 11th of March in Raleigh. Over 150 people attended the summit, which included discussion panels and a legislative reception. Wilgis outlined the goal of the summit to discuss and coordinate the major efforts to restore oysters in North Carolina. The goal of the summit was to promote

oysters and oyster restoration as a driver of economic development in Eastern NC. The summit highlighted the links between water quality, oyster habitat, and economics. Major topics of discussion included promoting mariculture, as well as techniques to help sustain the wild fishery. The Blueprint for Action Oyster Plan was commented upon as the engine driving restoration, and as a document to help coordinate key actions across all participating groups. Wilgis suggested visiting the Coastal Federation website or contacting him directly for more information on the summit or Oyster Steering Committee.

PUBLIC COMMENT

None.

OVERVIEW OF OYSTER AND HARD CLAM HABITAT ENHANCEMENT

Curt Weychert, plan development team member, presented an overview of the oyster and hard clam habitat enhancement sections. Weychert reviewed the history of both the oyster sanctuary and cultch planting programs. He highlighted that 8.5 million bushels of material has been planted over 1,600 sites since 1981, and that the oyster sanctuary program has been active since 1996. Niels Lindquist asked the location of the oyster sanctuary located in Bogue Sound. Weychert replied that it was near the old red tide relay site. Steve Murphey added that after a series of storms that sanctuary was buried due to being located in a high energy environment. Wilgis asked if the amount of oyster relayed onto private leases was tracked. Brian Conrad replied that he would be discussing this during his presentation. Lindquist asked about the current status of the remainder of the oyster sanctuaries, and commented that some sanctuaries are not located in appropriate locations. Weychert replied that site selections in the past have been informed by spat set on planted cultch. Lindquist commented that cultch sites may show boom and bust trends, and there is no long term monitoring to asses sanctuary viability. Lindquist added that in subtidal areas with high salinity oyster reefs would not establish, and in moderate salinity areas oysters may last for two years before declining. Lindquist elaborated that boring sponge is a real problem, and the use of concrete or granite may help. Weychert commented that there is a current review of site selection criteria and suitable materials within the sanctuary program. Lindquist encouraged staff to review the data he has sent to the Division when considering future sanctuary placement and design. Ami Wilbur commented that there is a benefit to locating sanctuaries in high salinity areas for the developing disease resistance. Lindquist emphasized that in high salinity areas the only reefs that would establish would be intertidal. Garry Wright commented that with present resources it is not possible to sample all sanctuaries intensively. Wilgis then asked if monitoring was funded through APNEP. Wright replied that there was not funding to perform monitoring. Wilgis asked if there was anything as an advisory committee could do to support monitoring efforts. Tina Moore responded that this could be incorporated into the amendment as research recommendations.

OVERVIEW OF THE OYSTER AND HARD CLAM PRIVATE CULTURE FISHERY

Brian Conrad, plan development team member, gave an overview and an extensive historical timeline of the lease program and shellfish aquaculture in the state of NC. Lindquist asked for a clarification on the meaning of artificially propagated. Conrad defined this as “hatchery raised”, however pointed out that this term is not currently formally defined in statute. Wilbur made a clarification to a point in the historical timeline as presented by Conrad. She stated that 4.3 million dollars was spent on the UNCW hatchery, and the 8 million dollars cited by Conrad for

this was intended to fund all the proposed facilities. Wilgis asked if an individual with a submerged lands claim automatically receives a shellfish lease. Conrad replied that there is currently a list of submerged lands claims that are recognized as valid by the state Attorney General. He added that he has only has had one lease issued through a submerged lands claim.

OTHER BUSINESS

Adam Tyler discussed questions he had regarding shellfish relay. He asked the committee members and attending division staff if the relay of oysters out of polluted areas was contributing to the downstream movement of polluted area boundaries. Wilgis replied that he was not aware of anyone looking at that question specifically. Stephen Taylor commented that during the 1990's significant bushel amounts were relayed in Brunswick Co. and the lines were not moving at that time. Steve Murphey added that permanent shellfish closures is correlated with the percentage of impervious surface within the watershed, with amounts of 10% or greater impervious surface in a drainage leading to closures. Stephen Swanson questioned if current relay practices which are taking the oysters functioning as a filter out of polluted areas is just washing the problem downstream. Lindquist commented that historically relay was done from areas of high salinity towards the ocean, to areas of low salinity in the upper tidal creeks. He also added that some thought should be given to a reversal in the direction of current relay practices. Wilgis commented on the current potential function of polluted areas in the southern region as sanctuaries. Steve Murphey commented that Virginia does open areas with high spat set that are not polluted to serve as source areas for relay into other open areas with low spat set. Lindquist remarked that they have experienced low mortality when moving oysters from areas of high to low salinity. Tyler remarked that this topic is something to think further about.

PLAN AGENDA ITEMS FOR THE NEXT MEETING

Moore reviewed topics for the next meeting to be held June 15th. She highlighted the change in meeting dates and locations, with the July meeting occurring at the Central District Office in Morehead City. The Marine Fisheries Commission chairman requested that this meeting be held in the southern region, as the issues to be presented directly impact this area. This meeting will have a call in option for Advisory Committee members. Moore informed the group that once all issues and sections were presented to the committee, the draft of the entire document will be presented in October for their final input on issues at this stage. The first draft will then be presented to the MFC in November, then go out for public comment and the MFC standing and regional committees to gain their input. The Advisory Committee will be able to give the final document a last review at the January 2016 meeting and provide final recommendations on issues.

Chairman Wilgis adjourned the meeting.

/jf

Cc:

Catherine Blum	Jess Hawkins	Gerry Smith
Mike Bulleri	Jennie Hauser	District Managers
Scott Conklin	Dee Lupton	Committee Staff Members
Dick Brame	Jessica Marlies	Marine Patrol Captains
Louis Daniel	Nancy Marlette	Section Chiefs
Charlotte Dexter	Jerry Schill	

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission
Oyster and Hard Clam Advisory Committee

FROM: Tina Moore
Stephen Taylor
Division of Marine Fisheries, NCDENR

DATE: June 22, 2015

SUBJECT: Oyster and Hard Clam Fishery Management Plan Advisory Committee Meeting

The Oyster and Hard Clam Fishery Management Plan Advisory Committee met Monday, June 15, 2015 at the Department of Environment and Natural Resources Regional Office, 943 Washington Square Mall, Hwy. 17, Washington, N.C. The following attended:

Advisers: Nancy Edens, Niels Lindquist, Adam Tyler, Bob Cummings, Jeff Taylor

Absent: Dell Newman, Lee Setkowsky Joey Daniels, Ami Wilbur, Ted Wilgis, Joey Daniels, Stephen Swanson,

Staff: Trish Murphey, Tina Moore, Stephen Taylor, Joe Facendola, Garry Wright, Jason Peters, Curtis Weychert, Jacob Boyd, Steve Murphey, Greg Allen, Carter Witten

Public: Chuck Weirich

Bob Cummings serving as chair, called the meeting to order. The Advisory Committee did not have a quorum for this meeting.

MODIFICATIONS TO THE AGENDA
The agenda was approved by consensus.

APPROVAL OF MINUTES FROM May 4, 2015
The minutes were approved by consensus.

PUBLIC COMMENT
None.

OVERVIEW OF THE ISSUE PAPER; RE-DEFINING OFF-BOTTOM CULTURE

Steve Murphey, DMF Habitat and Enhancement Section Chief, reviewed this issue paper which discussed the current definitions, regulations, and practices in the bottom and water column culture of shellfish in NC. This issue was brought to the attention of the Oyster and Hard Clam Plan Development Team (PDT) in March of 2013 by the Shellfish Growers Association (SGA). The SGA requested clarification of current definitions and added flexibility in bottom lease practices. Cummings questioned if an individual with a water column lease was also required to have an aquaculture operation permit (AOP). S. Murphey replied, that an AOP was required if any structures were to be placed in the water column lease. Neils Lindquist asked about the current definition of "cultch". Garry Wright, PDT member, responded that the Division of Coastal Management (DCM) has defined it as natural material such as dead shell or marl, and does not currently include processed recycled concrete in that definition. Lindquist then questioned if that definition would apply to leases. Wright replied that there may be some uncertainty regarding that issue, but currently non-natural materials such as concrete would be considered fill by DCM. S. Murphey added that he would look into this issue to see if this materials restriction applied to leases, or just division cultch planting efforts. Lindquist then asked about what the Army Corps of Engineers allows in other states. S. Murphey directed him to the table on page 3 of the issue paper for a full overview. Cummings then proposed a scenario where an individual has a bottom lease with cages less than 12" from the bottom (per the PDT recommendation) and someone runs a boat through this lease damaging both the cages and the boat. He then questioned who would be held responsible, would the boater be liable for damage to the cages, or would the lease owner be liable to the damage to the boat. S. Murphey replied that this situation would be similar to a boater hitting cultch materials currently allowed on leases. He added that if the lease was properly marked, he was not sure how Marine Patrol or the Army Corps would handle the situation. Cummings also added that he personally owns a lease that if 12" cages were placed on the bottom they would at low tide be out of the water, and take up the majority of the water column at other times. He suggested that in a situation like this it seems a water column lease would be appropriate. Carter Witten, a Marine Patrol officer, added that even with a properly marked water column lease, boaters often do not know to stay out of that area. Cummings replied that the water column lease gives the lease holder rights to the area, and would place the boater at fault even if they were unaware of what the markings and yellow poles meant. Cummings then asked what the cost difference between a bottom and water column lease. S. Murphey responded that a water column lease is $100 per acre versus the $10 per acre of a bottom lease. Adam Tyler commented that in his region it is not an issue of people running over and damaging leases, as they are aware of what is there. Cummings suggested that in other areas with more people who are not familiar with the water, this may be an issue.

Cummings questioned why anybody who was intending to put out cages off the bottom would not want a water column lease for the added protection it affords. S. Murphey replied that there are also four times greater production requirements for water column leases when compared to standard bottom leases. Tyler asked what regulation is there currently in place to stop an individual from layering 24" of natural cultch material on the bottom of a lease. Witten responded that there is no way to enforce lease cultch plantings for vertical profile. S. Murphey added that in some of the oldest leases, oyster rocks with vertical profiles have actually developed from planted cultch material. Wright commented that DCM is responsible for monitoring and enforcing height restrictions for cultch plantings, but they do not currently have

the manpower to perform inspections. S. Murphey added that DMF currently only has marking, payment, and production enforcement options for leased bottom. Lindquist questioned why the PDT chose 12" as the height limit in their recommendation. Murphey explained that decision was made based on mirroring current regulations in Virginia, as their lease program is often cited as an example for NC to strive to follow. Niels then asked why the SGA is asking for 18". Moore replied for the allowance of three 4" cages stacked on each other and additional height needed for legs on the cages. Tyler asked the committee if they should consider recommending an 18" maximum height from the bottom. Lindquist agreed and suggested 18" to allow for the three cage stack with legs. Both Cummings and Lindquist commented that it seems that anybody who intends to place cages on the bottom would benefit from obtaining a water column lease to protect their monetary investment in gear.

The committee agreed by consensus to recommend defining on bottom culture as any structure that extends no higher than eighteen inches attached to or resting on the bottom.

OTHER BUSINESS

Bob Cummings led a discussion regarding the marking requirements for proposed leases. Cummings presented the group with several photographs of how a proposed lease was marked in the New River, and the amount of shellfish he was able to collect in a small area within the proposed lease. Cummings expressed concern with the method the lease applicant used to for signs sent from DMF that must be displayed on a proposed lease site. Cummings discussed the photographs which showed small diameter PVC pipe with the signs rolled around the pipe, making impossible to read, or even see at a distance. Cummings also explained that local individuals who utilize this area frequently were not aware that this was a proposed lease site, and confusion surrounded the marked area. S. Murphey commented that the proposed lease is currently approved, requiring a survey and approval from the director to be finalized. Cummings suggested that the marking during the application period was not adequate according to rule. Curt Weychert, PDT member, added that there is a 3" diameter requirement for poles marking leases. S. Murphey clarified that this rule is not applicable during the lease application process, however this issue could be corrected by providing a rigid plastic sign to lease applicants in place of waterproof paper. Cummings then commented that he encountered significant shellfish resource within this area, and he was able to collect the amount of oysters and clams in the photographs he presented within 20 minutes. Cummings added that during the winter when the sampling was done by DMF staff, the clams may have been deeper and inaccessible to the sampling equipment used. S. Murphey replied that he reviewed the sampling that was performed and that the proper protocol was used. He explained that the sampling was performed with patent tongs in an "X" shape across the proposed area, with random samples collected in the area. This sampling design does not focus on defining small areas of high shellfish concentrations, so the densities of shellfish Cummings found may not have been represented in the sample. S. Murphey listed that DMF staff captured 380 oysters, and 1 scallop during their sampling efforts. He added that for a lease of 5 acres in size over approximately 5,000 shellfish would have to be captured during the sampling to deny the lease application. Cummings commented that using tongs as opposed to a bull rake, and the time of year when the sample was collected may have missed a significant number of clams. S. Murphey added that additional methods to advertise potential leases may have to be explored, such as posting signs in local fish houses. Lindquist commented that he believed that the lease under discussion did not adequately

notify the public, and that some follow up may be required in the future to insure signs are posted properly during the application process.

Moore provided the committee an update of the new regional district structure of DMF, reducing districts to a northern and southern. She also informed the group of the new positions held by PDT members, Steve Murphey serving as the section chief of habitat and enhancement, Trish Murphey serving as the southern region district manager, and herself as the biologist supervisor in the central district office.

PLAN AGENDA ITEMS FOR THE NEXT MEETING

Moore reviewed topics for the next meeting to be held July 13th. The shellfish license issue paper and effort impacts to oyster resources in the southern region issue paper will be presented. She highlighted the change in meeting location, with the upcoming July meeting occurring at the Central District Office in Morehead City. This change in location was made at the request of the Marine Fisheries Commission Chair, to provide a closer venue for members of the public from the southern district to attend. This meeting will have a call in option for Advisory Committee members only.

Chairman Cummings adjourned the meeting.

/jf

Cc:

Catherine Blum	Jess Hawkins	Gerry Smith
Mike Bulleri	Jennie Hauser	District Managers
Scott Conklin	Dee Lupton	Committee Staff Members
Dick Brame	Jessica Marlies	Marine Patrol Captains
Louis Daniel	Nancy Marlette	Section Chiefs
Charlotte Dexter	Jerry Schill	

MEMORANDUM

TO: N.C. Marine Fisheries Commission
Oyster and Hard Clam Advisory Committee

FROM: Tina Moore
Stephen Taylor
Division of Marine Fisheries, NCDENR

DATE: July. 13, 2015

SUBJECT: Oyster and Hard Clam Fishery Management Plan Advisory Committee Meeting

The Oyster and Hard Clam Fishery Management Plan Advisory Committee met Monday, February 2, 2015 at the Department of Environment and Natural Resources Regional Office, 943 Washington Square Mall, Hwy. 17, Washington, N.C. The following attended:

Advisers: Bob Cummings, Ami Wilbur, Niels Lindquist, Adam Tyler, Lee Setkowsky, Ted Wilgis, Jeff Taylor, Joey Daniels(on call)

Absent: Dell Newman, Stephen Swanson, Nancy Edens

Staff: Joe Facendola, Garry Wright, Trish Murphey, Dean Nelson, Tina Moore, Stephen Taylor, Patti Fowler, Catherine Blum, Steve Murphey, Catherine Blum, Jason Peters, John Hadley

Public: Henry Whitney, John Russell, Louis Midgett Jr., William Russell, Eugene Bullock

Bob Cummings, serving as chair, called the meeting to order.

MODIFICATIONS TO THE AGENDA

Jeff Daniels made a motion to approve the agenda. Niels Lindquist seconded the motion. The motion passed unanimously.

APPROVAL OF MINUTES FROM January 5, 2015

Niels Lindquist made a motion to approve the minutes. Adam Tyler seconded the motion. The motion passed unanimously.

PUBLIC COMMENT

Henry Whitney opened the public comment voicing his concerns with the condition of the oyster resources in the southern region of the state. Whitney stated that he has been oystering in this region of the state since 1982 and it is his opinion that the recent and current depletion of the

oyster stock was due to the creation of the $25 shellfish license. Whitney asserted that the North Carolina Division of Marine Fisheries was not protecting or restoring the oyster resource as required by the Fisheries Reform Act. He then stated that it was not fair for those who hold commercial licenses to allow unlimited shellfish license holders the same harvest limits for a small fee. Whitney suggested that a significant amount of undocumented and unlawful sale of shellfish was occurring from the shellfish license holders. He suggested that shellfish license holders be required to produce trip tickets, and that the income be verified on tax returns. Whitney then commented that due to the depletion of shell stock and unknown landings by recreational harvesters, a coastal recreational fishing license should be required to harvest oysters in NC. He then gave examples of his previous years landings noting a severe decline in the most recent two oyster seasons. Whitney proposed the elimination of the shellfish commercial license, however allowing those individuals who did show landings to enter a lottery system where they would be eligible to purchase a standard commercial fishing license (SCFL).

William Russell commented that he did not agree that people who work hard to make a living only harvesting clams should have to pay the higher amount for a SCFL. Whitney responded that clams are getting harder to get, but that aquaculture was responsible for killing the hard clam market.

Eugene Bullock stated that he has been clamming since he was 14 years old, and is currently 34. He remarked that he works hard to harvest clams, and does not agree that the shellfish license holders do not work hard to harvest 5 bushels of oysters. Bullock added that he would be willing to spend more money on a shellfish license, however he would like to see more done with that money to replenish stocks. He does not feel much is currently being done in Carteret County, and cited failed efforts around Carrot Island. Bullock suggested that the shellfish license be only available to residents of coastal counties.

Louis Midgett commented that he feels Marine Patrol is not doing an adequate job of enforcing current rules, citing issues of individuals culling undersize shellfish onto private gardens from public bottom in the New River. Midgett added that he felt it was not fair to make someone who only shellfishes purchase a SCFL, especially when the price recently increased to fund turtle observers for gill nets. Adam Tyler responded that the SCFL cost was increased as the legislature needed help from the industry to pay for the necessary percentage of observer coverage required for incidental take permit (ITP) compliance. He added that if NC went out of ITP compliance the entire flounder net fishery would have been shut down

REVIEW OF THE ISSUE PAPER; ASSESSING AND MITIGATING HARVEST EFFORT IMPACTS ON OYSTER RESOURCES IN THE SOUTHERN REGION

Joe Facendola, plan co-lead, presented the background and origination of this issue. Facendola highlighted that landings from the intertidal oyster fishery in the southern part of the state comprises a significant portion of the statewide oyster landing totals, despite only being a small portion of the water open to shellfishing. He then described the fishery, participation, and decreasing amounts of bushels landed per trip across waterbodies in the region. Ted Wilgis, noting that this may be a question for Patti Fowler, asked if there was in increase in percentage of closed area in the southern region from since 1994. Patti Fowler responded that this is likely the case, however most of this area is managed as conditional waters which close to shellfish

harvest after certain rain events. Niels Lindquist asked how cultch planting efforts compared with harvest. Facendola replied that the total bushels of material planted in the southern region were 131% of what was harvested since 2003. He also noted that the cultch plantings are patchy, while the harvest is widespread through the region. Lindquist then asked if it is know how well these planted areas preform, and if there is any long term monitoring. Facendola answered that current yield per bushel of cultch material is unknown but likely varies by location, and that monitoring occurs for 3 years post planting for each site. Lindquist commented that long term monitoring was needed for cultch planting sites. Facendola replied that there is no current long term monitoring, however intertidal planting locations tend to be successful at producing legal oysters and some have lasted for decades. Wilgis asked what the bushels per effort of the trips 1994 to 2000 looked like, and if it followed the trends presented in the paper. Facendola replied that differences in the way landings data was recorded prior to 2000 prevented an accurate estimation of effort or comparison with bushels per trip in the years after 1999. Facendola added that lacking any fisheries independent estimates of abundance trends in bushels landed per unit effort, or how easy it is for people to get their limit, can be interpreted as trends in abundance for the waterbodies presented. Bob Cummings asked when calculating bushels per trip if any trip ticket with any oysters on it was used, giving an example of someone targeting clams and landing a few incidental oysters. Facendola replied that all trip tickets with oyster landings were used in this analysis. Lindquist questioned the impact of the unknown amount of recreational harvest. Dean Nelson replied that from his observations in the field, recreational harvest effort is minimal when compared to that of commercial. Nelson added that many of the individuals oystering recreationally on the weekend are commercial license holders harvesting a recreational 1 bushel limit. Henry Whitney commented that many recreational harvesters purchase a shellfish license to harvest the commercial 5 bushel limit. Cummings asked how many shellfish license holders do not show landings. Facendola replied that information would be covered during the next issue paper presentation. Wilgis asked if the landings data presented in this issue included those from leases. Facendola responded that the data presented was only landings from public bottom. Louis Midgett commented that individuals are commercially harvesting oysters on the weekend around Snead's Ferry and there is a lack of a law enforcement presence on the New River. Wilgis commented that DMF is currently planting approximately 140% of what is harvested in cultch material into the southern region, and questioned what effect increasing material to a level like 200% would have. Lindquist wanted clarification on the depth of cultch material planted in intertidal areas. Facendola responded that it is typically one meter or less in thickness. Stephen Taylor added that thickness depends on the substrate of the planting area, with softer substrate receiving only a thin veneer of shell. Tyler commented that state cultch planting efforts require funding, and shrinking open bottom and increasing amounts of people harvesting would require more cultch planting to keep up. Stephen Taylor commented that we currently are not able to plant enough cultch to produce enough oysters to keep up with harvest in the southern region. Garry Wright added that the 131% rate of bushel cultch planted to bushel harvested, is only for commercial harvest and assumes a 100% landings reporting rate. Eugene Bullock stated that oysters in New River are currently limited to only one area, and there is an issue of individuals not culling in the same location where they were harvesting. Whitney agreed with this statement. Tyler suggested that this is a harvester ethics issue. William Russell questioned where Virginia gets all of their oyster restoration funding. Steve Murphey responded that Virginia has an extensive oyster use fee which applies to harvesters, shucking houses, truckers, and anybody else involved in the oyster harvesting industry.

The Advisory Committee held discussion on management options for this issue until both scheduled presentations were complete as indicated on the agenda.

REVIEW OF THE ISSUE PAPER; CONSIDER THE ELIMINATION OF THE SHELLFISH LICENSE AND REQUIRE ALL HARVESTERS TO HOLD A STANDARD COMMERCIAL FISHING LICENSE OR A RETIRED STANDARD COMMERCIAL FISHING LICENSE

Trish Murphey, plan co-lead, presented the issue of eliminating the shellfish license. She highlighted the current low price of the license, no cap to the amount of licenses available to NC residents, and the amount of shellfish license holders who do not have a record for landings. She also presented that the overall number of shellfish license holders is decreasing statewide. Wilgis commented that if the shellfish license was eliminated a SCFL would be required to harvest shellfish commercially. Lindquist commented that many of the people who buy the shellfish license do not have landings. Cummings commented that there are many people who commercially clam with this license but do not have oyster landings. He then questioned if they would be denied the opportunity to get a license. Trish responded that currently the only requirement for a shellfish license is to be a NC resident. Whitney commented that having shellfish sales makes one a commercial fisherman. Trish Murphey added that this discussion is getting into the issue of defining what constitutes a commercial fisherman. Cummings responded that a commercial fisherman in this instance is someone who catches oysters or clams and sells them. He added that he does not want to eliminate the shellfish license, stating the SCFL fee is currently so high to pay for observers, which are not needed for shellfish harvesting. Cummings remarked that the intention should be to weed out the recreational harvesters who hold the commercial shellfish license without making landings. Tyler stated that there are hundreds of people fishing commercially and selling their catch on the side of the road who don't show trip tickets for that sale. He cited individuals catching and selling shrimp that he had recently observed. Midgett asked if the legislature was informed enough to make decisions regarding licensing. Trish Murphey replied that recommendations are provided by the Marine Fisheries Commission through this process. Whitney stated that he is concerned that the shellfish commercial license does not have a cap, and added that it would be possible for 5000 people to show up to an area with a shellfish license and each harvest a limit. He then re-stated his suggestion to limit the availability of a commercial license to individuals who have established landings in the past. Eugene Bullock agreed that the license should be limited to those who sell their catch. Joey Daniels stated that he believes anybody who is selling their catch should be required to have a SCFL, and believes it is a matter of consumer safety. Cummings added that selling shellfish out of a truck on the side of the road is an enforcement issue, which falls under marine patrol and shellfish sanitation. Tyler suggested that these sales are a major problem, and there is no landings record produced for this catch. Wilgis requested clarification on the impacts to lease holders, aquaculture operations, and their employees if the shellfish license was eliminated. Trish Murphey replied that any changes to licensing will require statutory changes. Daniels commented that there is current legislation being considered that would allow employees of lease holders to be covered by the lease holder's license. He then stated that he is required to have a SCFL to have a lease. Trish Murphey replied that currently only a shellfish license is required to harvest from a lease. Nelson added that a SCFL is only

required for mechanical harvest off a lease. Daniels responded that this is not the information he was previously told.

Tyler discussed his proposed motion of limiting commercial harvest of oysters on a shellfish license south of the highway 58 bridge to 2 bushels, and allowing shellfish license holders to obtain a SCFL if they showed a history of sale. Cummings commented that obtaining a SCFL is not a quick or easy process, and that this proposed option may restrict individuals with previous oyster landings to a limit of 2 bushels of oysters who harvest shellfish full time. Bullock commented that if people who previously only had shellfish licenses are granted a SCFL, there will be an increase in effort in other gears such as gill netting.

Wilgis discussed his proposed motion of supporting the PDT recommendations for the effort impacts issues, adding some additional wording to pursue the use of alternate materials. Lindquist suggested that serious effort was needed to consider locations for cultch planting, especially in sub-tidal areas, and long term monitoring should be required. Ami Wilbur recommended changing the wording in the proposed motion to include monitoring of cultch plantings. Lindquist cited problems with past siting of cultch planting efforts in Carteret County. Trish Murphey responded that significant effort and consideration is currently put into locating appropriate cultch planting sites. Lindquist replied that there is no monitoring after the plantings. Stephen Taylor replied that all plantings are monitored for 3 years for spat fall, and oyster growth and mortality. Wright added that with limited resources available, data for mortality rates over time may be lacking.

Adam Tyler made a motion to establish a daily trip limit of 2 bushels of oysters per person with a maximum of 4 bushels of oysters per vessel off public bottom from Highway 58 Bridge south only for holders of the Shellfish License. The daily trip limit of 5 bushels of oysters per person for SCFL and RSCFL holders will be maintained in this area. Shellfish License holders will be eligible to acquire a SCFL after they show a history of sale of shellfish. Niels Lindquist seconded the motion. The motion passed 5-2.

Ted Wilgis made a motion to increase efforts to plant and monitor available cultch materials in the southern region and to emphasize the review and approval by regulatory agencies the use of alternative cultch material. Explore a preliminary fishery independent index of oyster abundance to inform future management action. Ami Wilbur seconded the motion. The motion passed unanimously.

OTHER BUSINESS

Tyler asked for an explanation of who was at fault for an individual who drove a boat through a water column lease and damaged bags of product. Nelson replied that it would have to be proved a willful act of destruction of gear for it to be unlawful. Nelson added that leases cannot exclude the public. Steve Murphey commented that during the lease siting process, we are currently trying to find ways to make proposed leases more public to help avoid some of these issues.

PLAN AGENDA ITEMS FOR THE NEXT MEETING

Moore reviewed topics for the next meeting to be held August 10 at the Washington Regional office. The final issue regarding modifications to shellfish lease provisions will be presented. Two more meetings are scheduled for September 14 and October 12. These meetings will be used to review and prioritize research recommendations, and review the entire document. She added that any of the remaining issues that require rules changes need to be reviewed by the Rules Advisory Team, and may need to be revisited by the Advisory Committee with modified management options. Moore anticipates that in November this document will be presented to the Marine Fisheries Commission, and will go out for public comment in December and January. There will be one more chance for both the Advisory Committee and Plan Development team to modify recommendations considering any public comment received. Wilgis asked if a summary of pertinent legislation would be provided. Moore replied that legislative activity is not included in any of the issues or documents, however a verbal update can be provided at the committee meetings. She then reviewed the current status of the Senate and House bills, and stated that not much has changed since the last committee meeting.

Chairman Cummings adjourned the meeting.

/jjf

Cc:
Catherine Blum
Mike Bulleri
Scott Conklin
Dick Brame
Louis Daniel
Charlotte Dexter
Jess Hawkins
Jennie Hauser
Dee Lupton
Jessica Marlies
Nancy Marlette
Jerry Schill
Gerry Smith
District Managers
Committee Staff
Members
Marine Patrol Captains
Section Chiefs

Issues/Reports

Eligibility Pool
Commission Report for 2015-2016
August 19-21, 2015

How the Pool Number is Determined:

Chapter 225, 1998 Session Laws, Section 5.2(f).

(f) Adjustment of SCFL's. The number of SCFL's in the pool of available SCFL's in license years beginning with the 2000-2001 license year is the temporary cap less the number of SCFL's that were issued and renewed during the previous year…

Role of the Marine Fisheries Commission:

Chapter 225, 1998 Session Laws, Section 5.2(f).

(f).... The Commission may increase or decrease the number of SCFL's that are issued from the pool of available SCFL's. The Commission may increase the number of SCFL's that are issued from the pool of available SCFL's up to the temporary cap. The Commission may decrease the number of SCFL's but may not refuse to renew a SCFL that is issued during the previous license year and that has not been suspended or revoked. The Commission shall increase or decrease the number of SCFL's that are issued to reflect its determination as to the effort that the fishery can support, based on the best available scientific evidence.

Temporary Cap:

The maximum number of SCFL's that can be issued is the number of valid Endorsements to Sell as of June 30, 1999 plus 500 for the first eligibility pool, for a total of 8,896.

Eligibility Board Pool Determination 2015-2016:

There are 1,244 SCFL's available through the Eligibility Board for the 2015-2016 license year.

Attachments:

2015-2016 Eligibility Pool Determination Calculations

2014-2015 License Sales Report

Licenses Available and Approved Summaries

Eligibility Board Meeting Summary

Eligibility Open Files

Eligibility Pool Determination Calculations
For
2015-2016 License Year

Determine Total Number of SCFL's Available in 2015-2016 License Year

Total original SCFL's available (Cap)…….8,896
Less total number of SCFL's issued in 2014-2015……..….-6,632
Total number of SCFL's available in the pool for 2015-2016…….. 2,264
Plus the number of SCFL's not renewed in 2013-2014…….. .+ 118
Total number of SCFL's available in the pool for 2015-2016……. ……...2,382
Less total number of approvals through Eligibility Pool (July 1, 1999-June 30, 2015)……..- 1,142
Total number of SCFL's available in the pool for 2015-2016…….. 1,240
Plus total number approved Eligibility applications that were not purchased by June 30, 2015… + 4
Total SCFL's available for the 2015-2016 license year…… 1,244

North Carolina Division of Marine Fisheries
Licenses Sold Year to Date by License Type
FY2015 License Year

Data Run Date : 7/9/2015

Blanket For-Hire Captain's Coastal Recreational Fi 106

Blanket For-Hire Vessel Coastal Recreational Fishi 420

Commercial Fishing Vessel Registration 8,103

Fish Dealer License 737

Land or Sell License 114

License to Land Flounder from Atlantic Ocean 157

NC Resident Shellfish License without SCFL 1,319

Non-Blanket For-Hire Vessel License 113

Ocean Pier License 20

Recreational Fishing Tournament License 17

Retired Standard Commercial Fishing License 1,230

Standard Commercial Fishing License 5,402

TOTAL LICENSES FOR ALL LICENSE TYPES 17,738

5402	SCFL
+1230	RSCFL
6632	Total Number of SCFL's issued for FY2015

Licenses Available from the Eligibility Pool
Annual Summary

License Year	Number of Licenses Available
1999-2000	500
2000-2001	1,314
2001-2002	1,423
2002-2003	1,458
2003-2004	1,421
2004-2005	1,423
2005-2006	1,536
2006-2007	1,596
2007-2008	1,562
2008-2009	1,557
2009-2010	1,507
2010-2011	1,420
2011-2012	1,375
2012-2013	1,358
2013-2014	1,368
2014-2015	1,257
2015-2016	1,244

Licenses Approved and Denied by the Eligibility Pool Board
Annual Summary

License Year	Approved	Denied
1999-2000	166	133
2000-2001	110	75
2001-2002	46	37
2002-2003	38	23
2003-2004	56	11
2004-2005	35	13
2005-2006	31	9
2006-2007	32	4
2007-2008	49	7
2008-2009	83	5
2009-2010	109	11
2010-2011	63	2
2011-2012	68	17
2012-2013	99	9
2013-2014	96	14
2014-2015	61	13
Totals	**1142**	**383**

Eligibility Pool Board Meeting Summary

HEARING	APPRVLS	DENIALS	TABLED	TOTALS	INCOMP.	NON-	RESIDENTS	
DATE			**	REVIEWED	***	TABLED	APPRV'D	DENIED
5/5/1999	2	0	2	4		0	0	0
5/19/1999	5	0	1	6		0	1	0
6/17/1999	2	5	3	10		0	0	0
7/1/98-6/30/99	**9**	**5**	**6**	**20**		**0**	**1**	**0**
7/7/1999	12	10	0	22		0	3	0
7/8/1999	23	25	0	48		0	7	0
07/15/1999 MFC	N/A	N/A	N/A	N/A		N/A	N/A	N/A
8/11/1999	18	20	4	42		0	3	0
8/27/1999	17	33	0	50		0	0	1
09/09/1999 MFC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9/29/1999	18	11	1	30		0	0	0
11/3/1999	13	12	4	29		1	2	0
11/08/1999 MFC	N/A	N/A	N/A	N/A		N/A	N/A	N/A
1/26/2000	9	5	5	19		1	1	0
02/18/2000 MFC	N/A	N/A	N/A	N/A		N/A	N/A	N/A
4/19/2000	19	6	8	33		2	1	0
5/18/2000	18	3	9	30		2	0	1
6/7/2000	10	3	2	15		1	0	0
7/1/99-6/30/00	**157**	**128**	**33**	**318**		**7**	**17**	**2**
7/12/2000	11	1	4	16		0	2	0
7/21/2000 MFC	N/A	N/A	N/A	N/A		N/A	N/A	N/A
9/20/2000	24	15	7	46		0	1	0
10/27/2000	16	8	3	27		0	1	0
12/1/2000	5	16	2	23		0	0	0
1/24/2001	10	14	3	27		0	0	2
3/9/2001	12	12	8	32		0	0	0
4/4/2001	32	9	1	42		0	0	1
7/1/00-6/30/01	**110**	**75**	**28**	**213**		**0**	**4**	**3**
7/26/2001	18	10	2	30		1	3	0
08/21/2002 MFC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/14/2002	12	15	3	30		0	2	1
2/21/2002	16	12	2	30		0	1	0
7/1/01-6/30/02	**46**	**37**	**7**	**90**		**1**	**6**	**1**
9/11/2002	28	14	6	48		1	2	0
08/19/2003 MFC	N/A	N/A	N/A	N/A		N/A	N/A	N/A
3/5/2003	10	9	1	20		0	2	0
7/1/02-6/30/03	**38**	**23**	**7**	**68**		**1**	**4**	**0**
08/19/2003 MFC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/9/2003	16	3	1	20		0	2	0
11/4/2003	17	2	0	19		0	3	0
3/19/2004	22	6	0	28		0	2	0
6/22/2004 *	1	0	0	1				
7/1/03-06/30/04	**56**	**11**	**1**	**68**		**0**	**7**	**0**
11/1/2004	22	4	1	27				
2/28/2005	11	2	0	13		0	0	1
4/18/2005	2	7	0	9		0	0	0
7/1/04-6/30/05	**35**	**13**	**1**	**49**		**0**	**0**	**1**
9/27/2005	17	7	1	25		0	1	0
3/15/2006	14	2	2	18		0	1	0
7/1/05-6/30/06	**31**	**9**	**3**	**43**		**0**	**2**	**0**

HEARING DATE	APPRVLS	DENIALS	TABLED **	TOTALS REVIEWED	INCOMP. ***	NON-TABLED	RESIDENTS APPRV'D	RESIDENTS DENIED
10/4/2006	16	**3**	**2**	21		**0**	1	**0**
3/14/2007	16	1	**2**	19		**0**	1	**0**
7/1/06-6/30/07	**32**	**4**	**4**	**40**		0	**2**	**0**
9/10/2007	26	2	4	32		0	**0**	**0**
3/19/2008	23	**5**	**3**	31		**0**	**0**	**0**
7/1/07-6/30/08	**49**	**7**	**7**	**63**		**0**	**0**	**0**
9/30/2008	39	0	3	42		0	4	0
3/24/2009	44	5	1	50		0	3	0
7/1/08-6/30-09	**83**	**5**	**4**	**92**		**0**	**7**	**0**
10/6/2009	52	6	1	59		0	2	1
3/10/2010	36	2	1	39		0	1	0
6/2/2010	21	3	0	24		0	0	0
7/1/09-6/30/10	**109**	**11**	**2**	**122**		**0**	**3**	**1**
9/21/2010	40	2	1	43		0	2	0
3/24/2011	23	0	0	23		0	4	0
7/1/10-6/30/11	**63**	**2**	**1**	**66**		**0**	**6**	**0**
10/4/2011	39	7	0	46		0	2	0
3/15/2012	28	10	0	38		0	2	0
1/13/2012* **	1	0	0	0		0	0	0
7/1/11-6/30/12	**68**	**17**	**0**	**85**		**0**	**4**	**0**
9/12/2012	53	7	3	63		0	1	1
3/19/2013	46	2	4	52		0	2	0
7/1/12-6/30/13	**99**	**9**	**7**	**115**		**0**	**3**	**1**
9/18/2013	**56**	**7**	**0**	**63**		**0**	**2**	**0**
3/19/2014	**40**	**7**	**1**	**48**		**0**	**0**	**0**
7/1/13-6/30/14	**96**	**14**	**1**	**111**		**0**	**2**	**0**
09/17/14	**32**	**9**	**0**	**41**		**0**	**1**	**0**
03/18/15	**25**	**3**	**5**	**33**		**1**	**0**	**0**
05/12/15	**4**	**1**	**0**	**5**		**0**	**1**	**0**
7/1/14 – 6/30/15	**61**	**13**	**5**	**74**		**1**	**1**	**0**
TOTALS ALL	**1142**	**383**	**117**	**1531**		**10**	**70**	**9**

**TABLED files are presented again at the next Board meeting for a final decision of approval or denial and are then accounted for in the Approved or Denied categories.
TOTALS REVIEWED do not equal total approved or denied because some files are reviewed in multiple meetings (tabled, etc.).
***Special consideration was given for a license that had been revoked and the license was reinstated by the Director.

Standard Commercial Fishing License Eligibility Pool Office
Summary of Open Files beginning July 1, 2015

File Description	Total Number of Files
To be researched/ready for the next board meeting	7
New/being processed	0
Pending responses to letters mailed requesting more information	1
Incomplete – no response to letters	0
Total Open/Pending Applications	**8**

N.C. Division of Marine Fisheries Multi Species Tagging Program

N.C. Marine Fisheries Commission

Aug 20, 2015

Why Conduct a Tagging Program?

- Fulfills high priority research needs for red drum, southern flounder, spotted seatrout and striped bass.

- New design improves on prior work to address tag-return model assumptions and estimate population rates from tag-return data.

Why Conduct a Tagging Program?

Tagging addresses issues specific to red drum, spotted seatrout, southern flounder and striped bass.

- Stock delineation and migration patterns
- Direct estimates of fishing mortality
- Estimates of natural mortality
- Information on capture ability and size of harvested and released fish

Historical and Current Species

Red Drum
Southern Flounder
Atlantic Sturgeon
White Perch
Dolphin
Snapper

Striped Bass
Spotted Seatrout
Shortnose Sturgeon
Yellow Perch
Mackerel
Grouper

Striped Bass

- Dr. Hassler began tagging on the Roanoke River in 1956.
- N.C. Division of Marine Fisheries began tagging in 1973 and improved methodology in 1990.

Striped Bass

- Data used in various ways.
  - Since 1995 provide an estimate of total mortality in the Albemarle/Roanoke stock.
  - Providing probability at age of Albemarle/Roanoke stock leaving Albemarle Sound Management Area
  - Providing mortality estimates at age for fish that left the Albemarle Sound Management Area
- Estimates were uncertain as tag return rates, tag retention, and tag mortality were unknown.

Striped Bass

Additional data needs identified through Amendment 1 to the N.C. North Carolina Estuarine Striped Bass Fishery Management Pan

- Research need for the Albemarle/Roanoke stock since 2000, as tagging data are necessary to separate natural mortality from fishing mortality.

Southern Flounder

Previous N.C. Division of Marine Fisheries tagging studies were from 1980 -1982 and from 1988-1995.

Southern Flounder

N.C. State University and the University of North Carolina at Wilmington projects in New and Neuse rivers from 2005-2007.

- Included auxiliary studies to address model assumptions (reporting rates, retention rates, and mortality).
- Limited in area and seasonal coverage.

Southern Flounder

Additional data needs identified through Amendment 1 to the N.C. Southern Flounder Fishery Management Plan and the 2009 N.C. Division of Marine Fisheries Southern Flounder Stock Assessment

- Tagging of southern flounder to gain a better understanding of the unit stock and migration patterns.

Red Drum

Tagging began in 1983.

Red Drum

- Bacheler estimated age specific F and selectivity patterns for harvested and released red drum.
- Tagging results were incorporated in stock assessment.
  - Input of age-specific F estimates from tagging into traditional statistical catch-at-age model greatly improved precision.
  - Provided information on size of caught and released fish.
  - Tagging provided direct estimates of selectivity at age.

Red Drum

Additional data needs

- Bacheler Research - Auxiliary studies to address tag reporting rate and tag retention.
- Southeast Data Assessment and Review – need for a better statistical design.
- Atlantic States Marine Fisheries Commission – (1) continue to determine stock identity, inshore/offshore migration patterns, abundance, and mortality (2) explore use of direct estimates of fishing mortality from tagging data.

Spotted Seatrout

Two prior studies both completed by Tim Ellis at N.C. State University, 2008-2014.

Spotted Seatrout

Data use

- Ellis data provided fishing and natural mortality rates for each year of the study.
- Data were incorporated into a new stock assessment.

Spotted Seatrout

Additional data needs.

- 2009 N.C. Division of Marine Fisheries stock assessment identified (1) the need for a tagging program to determine if North Carolina and Virginia were one unit stock (2) to quantify migration between northern and southern N.C. populations (3) to verify indirect, catch-at-age estimates of F and M.
- Estimates are valid only for year of studies.

Where does our tagging program stand today?

- Needs identified through the southern flounder, striped bass, red drum, and spotted seatrout fishery management plans for tagging program to estimate migration and mortality rates.
- Summer 2013 staff developed a Coastal Recreational Fishing License proposal for a multi species tagging program to address tagging needs.

Where does our tagging program stand today?

July 1, 2014 N.C. Division of Marine Fisheries received three years of Coastal Recreational Fishing License funds for a multi species tagging program.

Where does our tagging program stand today?

- Multi-species study will maximize tagging opportunities and minimize cost.
- Follow consistent, valid study protocol.
- Assure all elements are included for each species where tagging methods are employed.

Where does our tagging program stand today?

Four main components for each species

- Tag a minimum 1,000 – 1,500 individuals per year with standard reward tags (low reward).
- Double tag a calculated percentage to assess tag loss.
- Conduct high reward ($100) tagging to assess reporting rates.
- Conduct field experiments to estimate mortality related to tagging and capture.

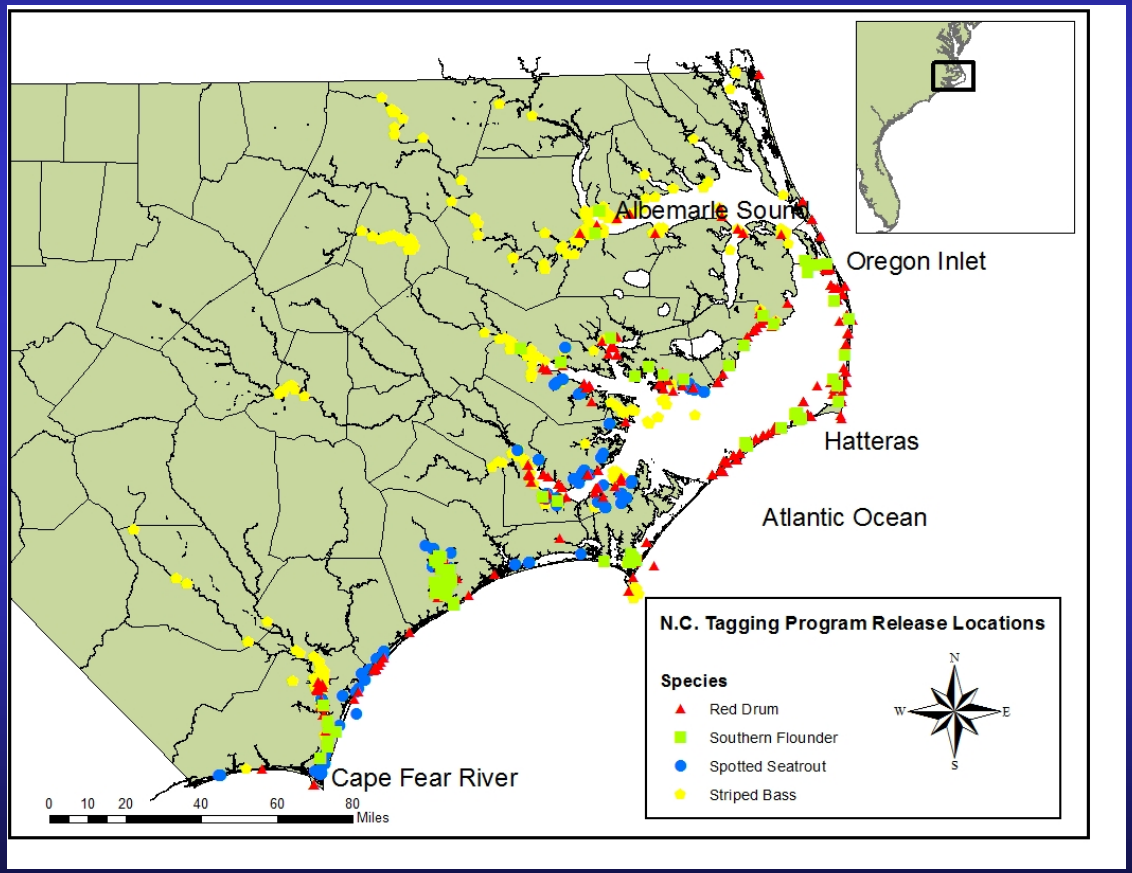
Current Return Rate

- 215,000 striped bass tagged
  - 11,500 tag returns for a tag return rate of 5 percent.
- 62,000 red drum tagged
  - 7,200 tag returns for a tag return rate of 12 percent.

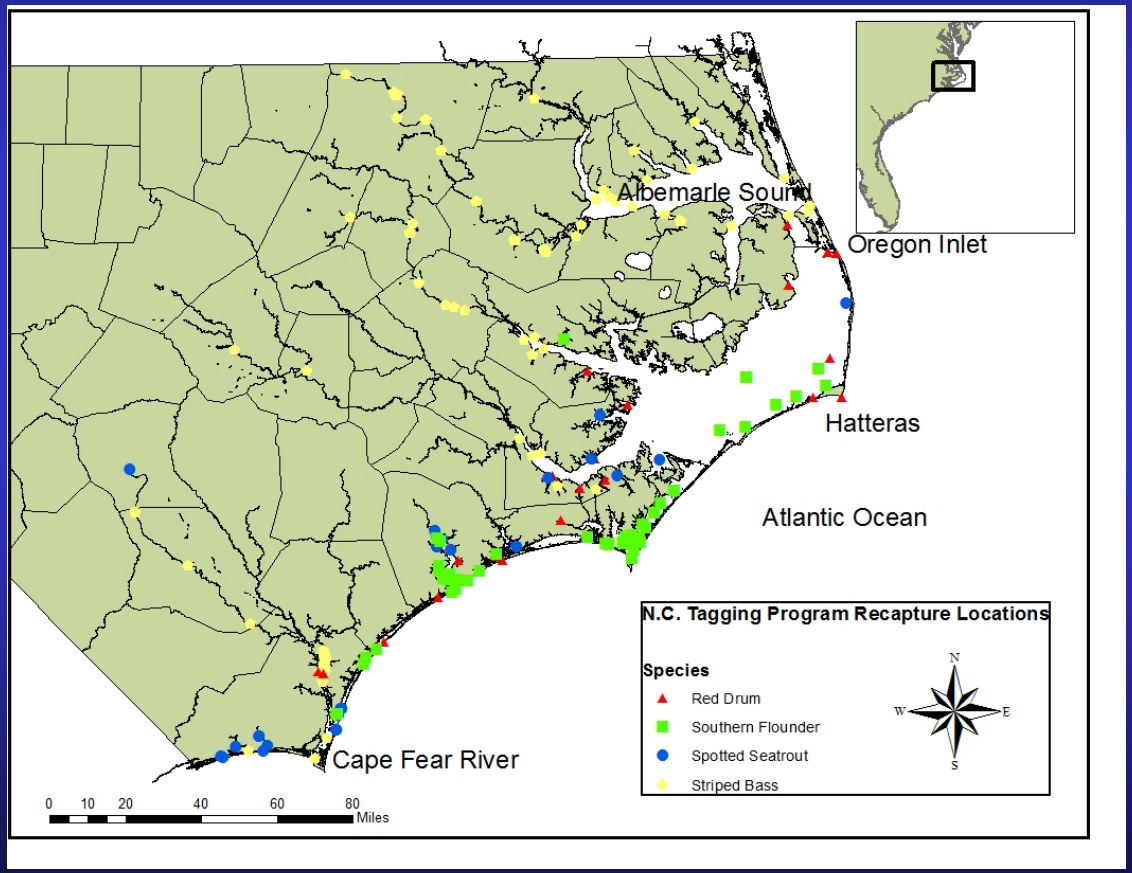
Who will be tagging fish

- Red Drum – Division employees
- Striped Bass –State employees
- Southern Flounder – Division employees with the aid of commercial pound net fishermen
- Spotted Seatrout – Division employees and recreational fishing guides

Where will fish be tagged



Recapture Locations



When will fish be tagged

- Red Drum – throughout the fishing year
- Striped Bass – April through May
- Flounder – March through December
- Spotted Seatrout – January through May and October through December

Tag Information

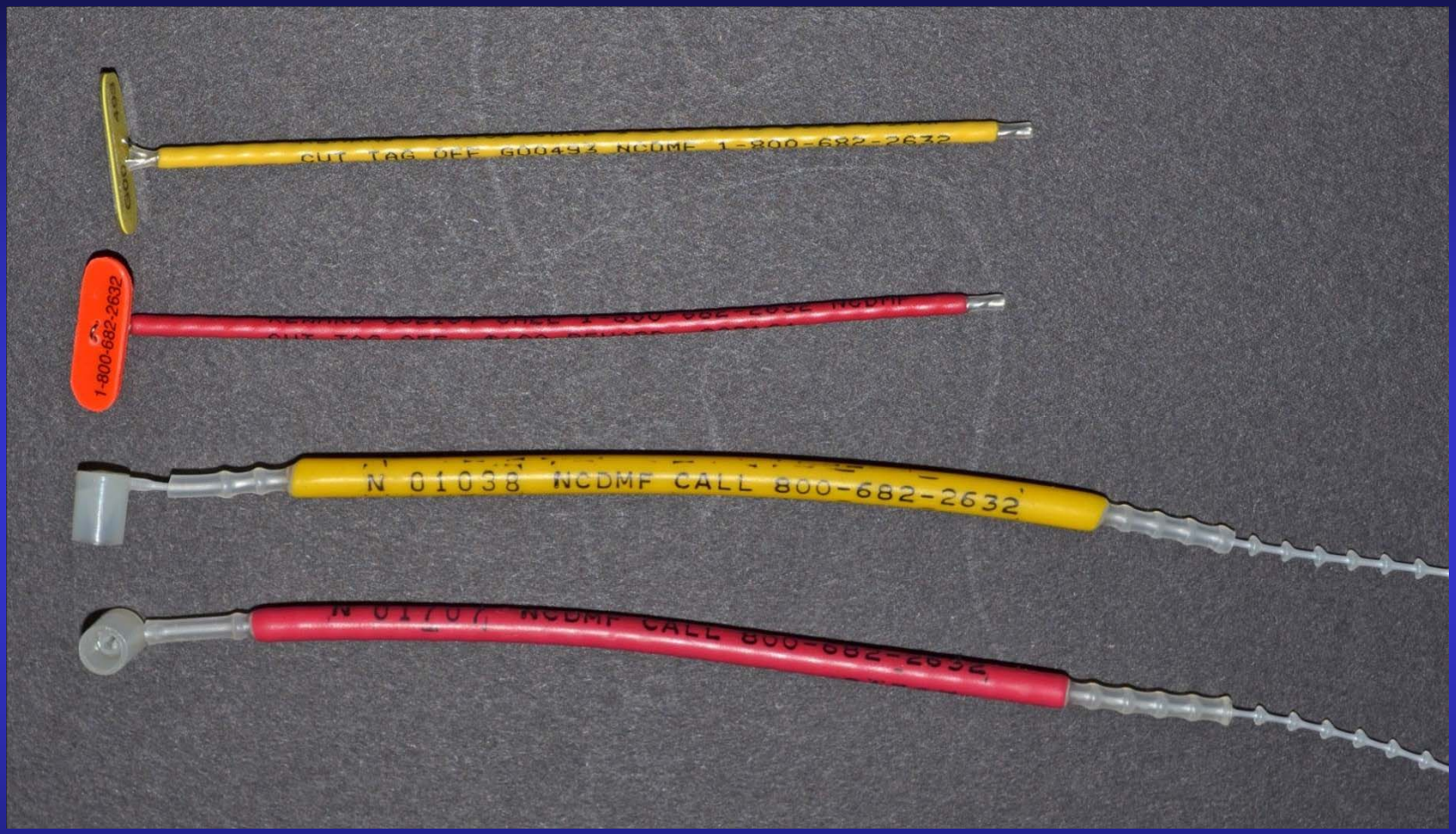
Standardized tag colors for all species

- Yellow = Standard Reward ($5, hat or towel)
- Red = High Reward ($100)
  - To receive a high reward payment the tag must be cut off and mailed or delivered to the N. C. Division of Marine Fisheries for confirmation of tag and tag number.

Tag Information

Tag labels

- All printed with “REWARD,” “NCDMF,” “CUT OFF TAG,” phone number (1-800-682-2632) and unique tag number that has alpha and numeric characters.
- Red high rewards tags will also be printed with “$100 reward.”


CUT TAG OFF 600494 NCDMF 1-800-682-2632
1-800-682-2632
N 01038 NCDMF CALL 800-682-2632

Tag Protocol

- Each year, approximately 8,600 fish will be tagged (1,500-2,600 depending on species).
- High reward tags will be placed in 4 to 25 percent of fish.
- Double tags will be placed in 10 to 25 percent of fish with one tag on each side of the fish.

Information

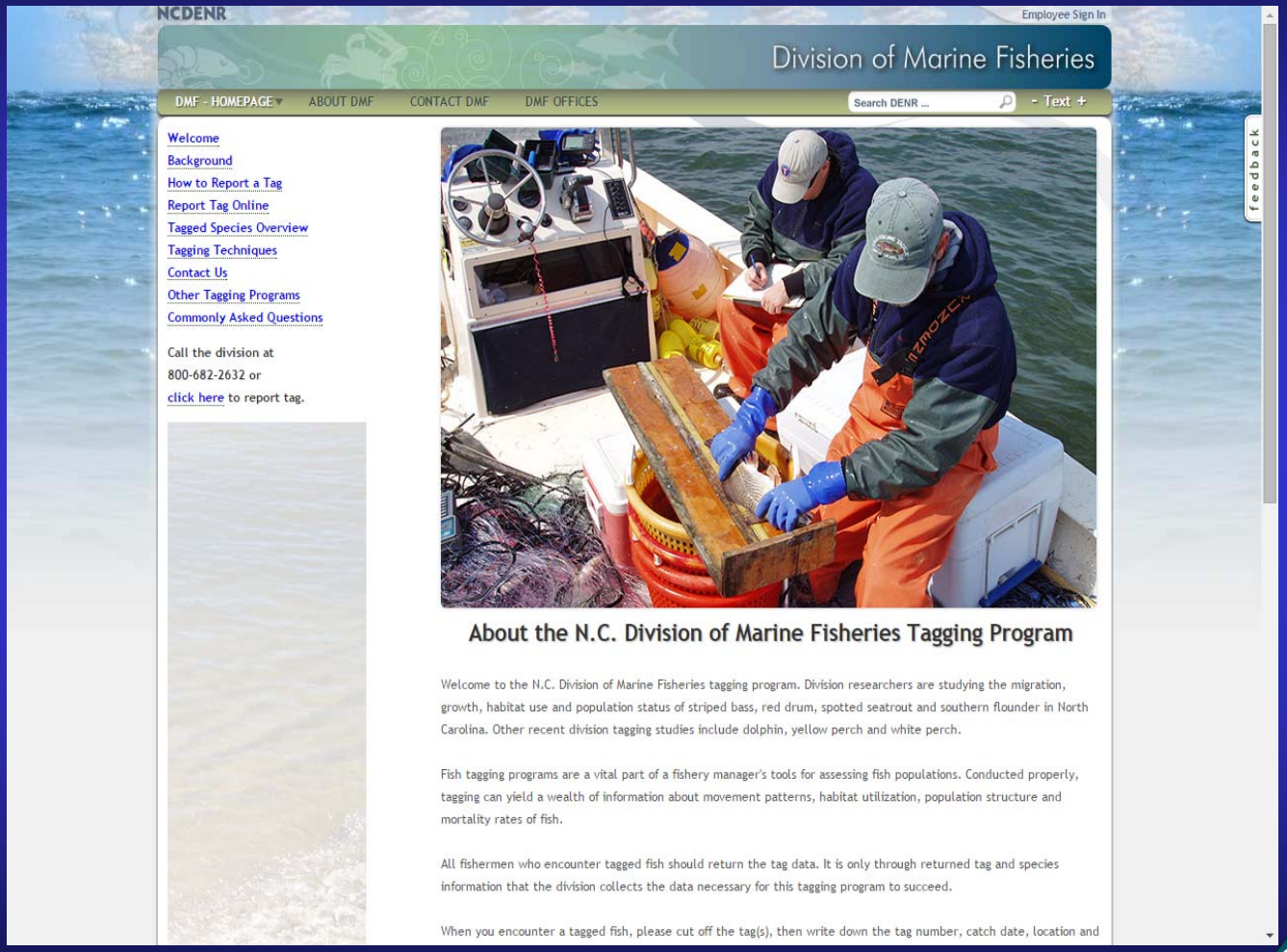
Information we wish to receive from a tag return

- Date of capture
- Location of capture
- Gear used for capture
- Length of fish
- Tag number
- Fate of fish (released or harvested)

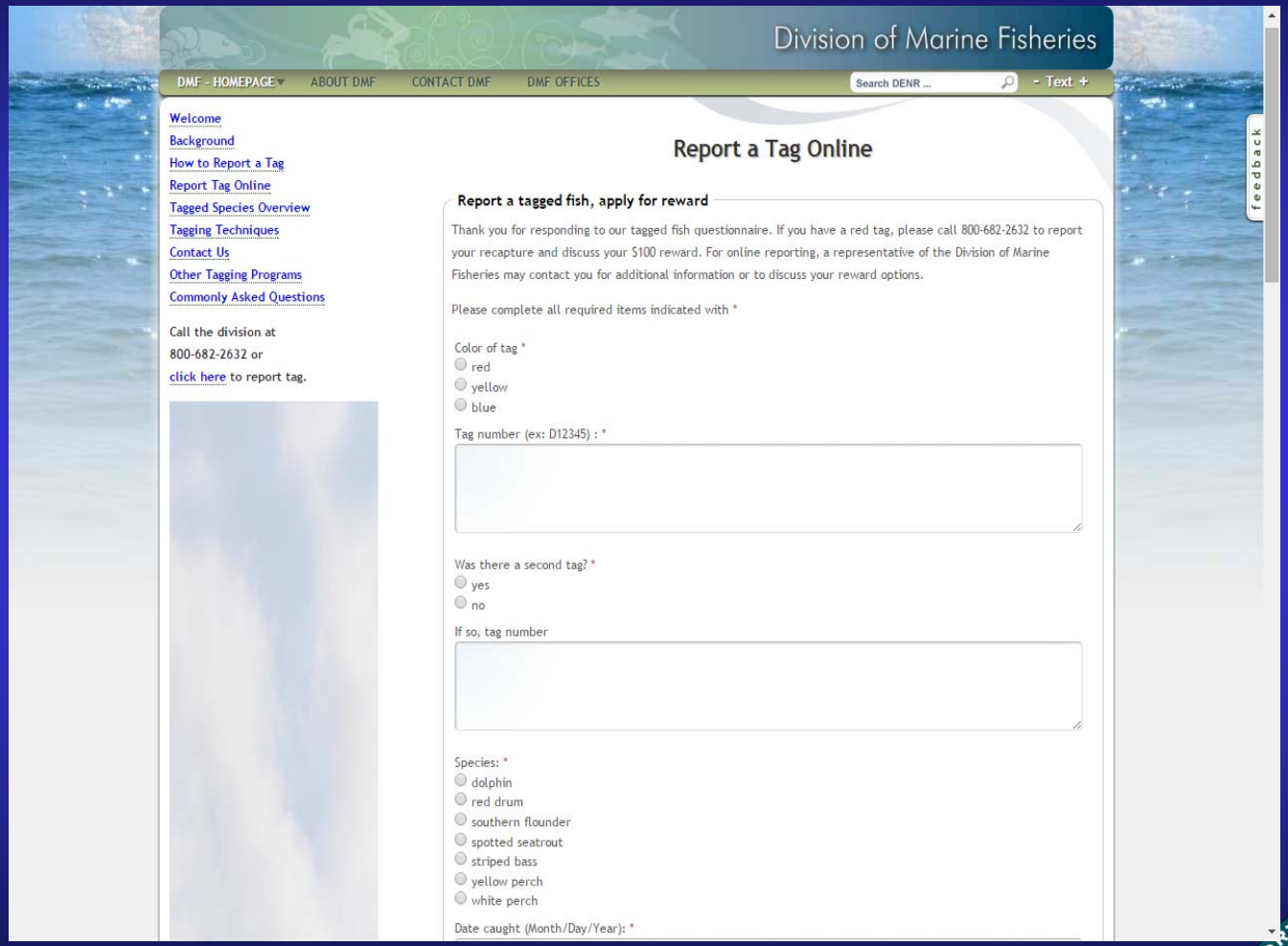
How to report a tag

- Tag returns can be called into the divisions 1-800-682-2632 number or any division office number.
- Tag returns can be brought into any division office.
- Tag returns can now be reported online at the enhanced division tagging pages through the new reporting tool.
  - http://portal.ncdenr.org/web/mf/report-tag-online

Online Reporting Tool



Online Reporting Tool



Website and Contact Information

- http://portal.ncdenr.org/web/mf/tagged-fish

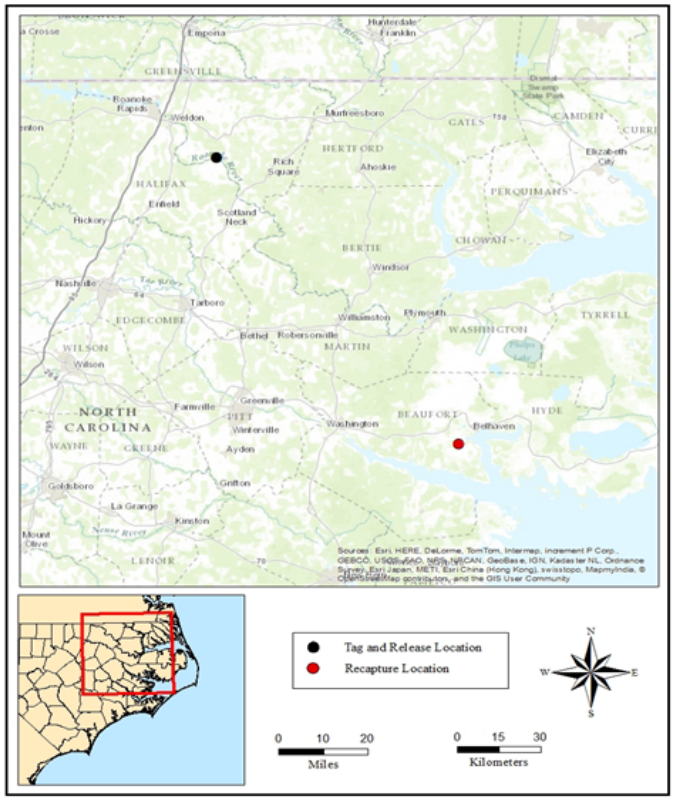
- tagrecap@ncdenr.gov

Reward

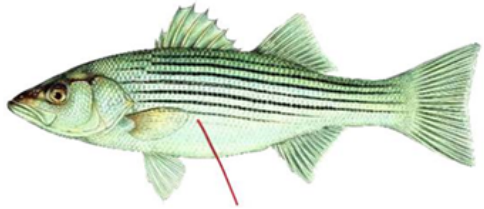
- After a return is processed each tag reporter will receive a letter, certificate and reward.
  - Date of tagging
  - Location of tagging and recapture
  - Length of fish at tagging
  - Days at large
  - Growth of fish since tagging
  - Distance from tagging to recapture site

State of North Carolina
Department of Environment and Natural Resources
Division of Marine Fisheries

Certificate of Recognition and Appreciation



Awarded to
JOHN Q. PUBLIC



For your assistance in recapturing and reporting data in the Striped Bass Tagging Program.

	Tagged	Recaptured
Date:	5/12/2014	12/14/2014
Location:	Hwy 258 Bridge, Roanoke Rapids Dam	Pungo Creek at the Route 264 Bridge
Length:	19.5 inches	22.3 inches
Distance:	Approximately 115 miles	
Days at Large:	216 days	

NCDENR

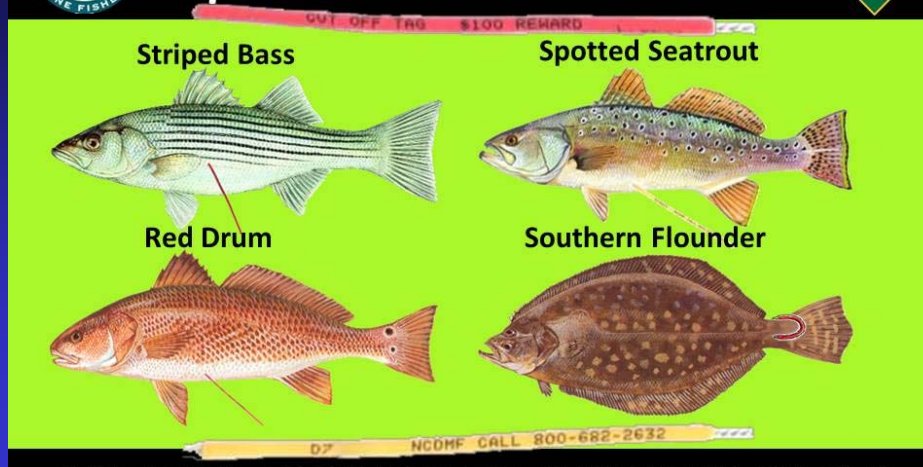
NC COASTAL RECREATIONAL FISHING LICENSE

NORTH CAROLINA MARINE FISHERIES

Updates

- Division staff have developed a new program documentation to expedite data entry and subsequent returns.
- Goal of tagging data entry of 10 business days.
- Goal of recapture processing of 10 business days.

$100 REWARD



ANGLERS, LOOK FOR TAGS IN YOUR CATCH!

The N.C. Division of Marine Fisheries will give rewards for tag and recapture information.

CHECK BOTH SIDES OF THE FISH!
Some fish may have more than one unique tag. To receive a reward you must report the tag number (or numbers), the fish species, length, date and location of catch.

Mail Cut Tags to:
Division of Marine Fisheries
P.O. Box 769
Morehead City, N.C. 28557

REWARDS FOR REPORTING TAGS
Red tag: **$100 Reward** - Tag must be cut and returned to the Division of Marine Fisheries.
Yellow tag: hat, $5 or other reward, and one entry into the Division of Marine Fisheries end-of-year drawing.

Report Tagged Fish To:
800-682-2632

For more information:
http://portal.ncdenr.org/web/mf/tagged-fish
Have Questions?
tagrecap@ncdenr.gov

A tagged spotted sea trout

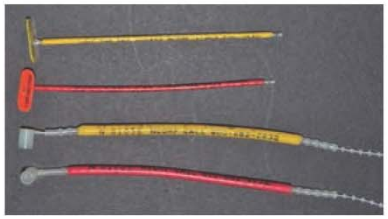
N.C. Division of Marine Fisheries Tagging Program

Division researchers are tagging more than 15,000 striped bass, red drum, southern flounder and spotted seatrout per year to improve management of these species.

Fish tagging programs are a vital part of a fishery manager's tools for assessing fish populations. Tagging programs can yield a wealth of information about fish movement patterns, habitat utilization, population structure and mortality rates.

It is only through returned tag and species information that the division collects the data necessary for this tagging program to succeed.

All fishermen who encounter tagged fish should return the tag and fish data to help improve management of these fisheries.

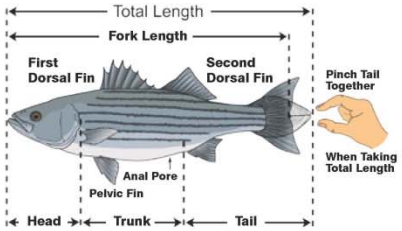


Anchor tags (top) and cinch-up tags (bottom) used in the study

How to Measure a Fish:

When you measure your fish, measure to fork length or total length.

Lay the fish down on top of a ruler or tape measure. Measure the fish even if you're planning to release it. Handle it gently, with wet hands or wet gloves, and return it to the water as quickly as possible.



Report a tagged fish:
800-682-2632

Report a tagged fish online:
http://portal.ncdenr.org/web/mf/tagged-fish

Have questions?
tagrecap@ncdenr.gov

To submit photos with your tagged fish, email tagrecap@ncdenr.gov (All photos submitted to the division are public record and, thus, may be disclosed to third parties without your approval.)

N.C. Division of Marine Fisheries
P.O. Box 769
Morehead City, N.C. 28557

xxxxx copies of this brochure were printed at a cost of xx each.

North Carolina Tagging Program

Report tagged fish to:
800-682-2632
You may receive a $100 reward

NORTH CAROLINA MARINE FISHERIES

How Can You Help?

Get involved! If you catch a tagged fish, please cut off the tag and record the tag number, date, capture location, capture method, total length, and the fate (harvested or released). Then report the information to 800-682-2632.

Reward for Reporting

If a red tag is returned to the N.C. Division of Marine Fisheries with required information, individuals are eligible for a $100 Reward. The tag must be cut and returned to receive a reward.

If a yellow tag and required information is reported, individuals can pick from a hat, $5, or other rewards.

In addition to rewards, reported tags will be entered into the division's end-of-year cash drawing. For each reported tag, fishermen will also receive a letter and personalized certificate, stating where and when the fish was released, days at large, distance from tagging location and more.

Preparing to tag a striped bass

Tagging a red drum

Information We Need:

Required information

- Species
- Tag number
- Date
- Location captured (water body and nearest landmark or latitude/longitude)
- Length (total or fork length)
- Fate of the fish (kept, released alive, etc.)
- Gear used for capture

What You Need to Know:

- Cut the tag off; don't pull it out. If releasing the fish, cut the tag as close to the body of the fish as possible.
- Record the tag information (just in case you misplace the tag before reporting).
- If the tag has algae growth, do not scrape the algae off. Let the tag soak in soapy warm water until the algae comes off.

Red tags must be cut off and returned to the N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557 to receive the $100 reward.

Things to Remember:

Be alert! Tags are designed to be as unobtrusive as possible, so they don't change the fish's behavior. That means that you might not see one if you're not looking.

Some fish may have more than one unique tag and tag number. Please report all tag and species information to the N.C. Division of Marine Fisheries.

Double-tagged flounder ready for release

Be careful when handling fish you intend to release. Handle it as little as possible, using wet hands or wet gloves. Do not pull the tag out of the fish — cut it off as close to the body as possible. Return the fish to the water quickly. This will give the fish the greatest chance of post-release survival.

Releasing a tagged fish

NORTH CAROLINA MARINE FISHERIES

Public Outreach

- Questions, comments, or suggestions for improving this tagging program

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Lee Paramore
Division of Marine Fisheries, NCDENR

DATE: Aug. 20, 2015

SUBJECT: 2015 Stock Status Report

Attached is the N.C. Division of Marine Fisheries 2015 Stock Status Report. This annual report is intended to serve as a barometer of the overall health of North Carolina's fisheries resources. The information contained in the stock status report is used to prioritize development of state fishery management plans and subsequent plan reviews. Three species with state fishery management plans had stock status changes in 2015, southern flounder, spotted seatrout and kingfishes. The remaining changes were related to species under the Interjurisdictional Fishery Management Plan. Classifications are based on updated information through 2014.

State Fishery Management Plan Species

Southern flounder was moved from depleted to concern, due to the lack of a peer reviewed stock assessment to determine stock status. This change is not considered an upgrade and concerns remain over the sustainability of current harvest levels because of a coast-wide decline in juvenile and adult abundance.

Spotted seatrout moved from depleted to viable in 2014 based on a 2014 N.C. Spotted Seatrout Stock Assessment that indicates the North Carolina and Virginia stock is not overfished and overfishing is not occurring.

Kingfishes moved from unknown to viable based on positive trends in biological data, as a regional stock assessment is not currently available.

Interjurisdictional Fishery Management Plan Species

Atlantic menhaden moved from concern to viable based on a Southeast Data, Assessment and Review 2015 benchmark stock assessment that indicates that the stock is not overfished or experiencing overfishing.

Black drum moved from unknown to viable based on a 2015 Atlantic States Marine Fisheries Commission Black Drum Stock Assessment that determined the stock is not overfished and is not experiencing overfishing.

King mackerel moved from concern to viable based on the 2014 South Atlantic Fishery Management Council stock assessment that indicated the Atlantic king mackerel stock is not overfished and overfishing is not occurring.

Black sea bass north of Hatteras moved from recovering to concern due to the lack of a recent peer reviewed stock assessment and recent low landings in North Carolina waters.

Gag moved from concern to recovering based on a 2014 South Atlantic Fishery Management Council regional stock assessment that found the stock from North Carolina to Florida was experiencing overfishing, but was not overfished. Later in 2014, the National Marine Fisheries Service removed the stock from the overfishing list after determining that the harvest levels in 2012 and 2013 indicated overfishing was no longer occurring.

Monkfish was removed from the N.C. Stock Status Report due to the limited fishery in North Carolina. In 2014, commercial landings were low and no recreational landings were reported.

Stock Status Report 2015

Species and Stock	Status					
	Viable	Recovering	Concern	Depleted	Unknown	Comments
Bass, Black Sea						
North of Hatteras						The stock was declared rebuilt in 2009 based on the 2008 stock assessment for U.S. waters north of Cape Hatteras. Due to unique life history characteristics (e.g., the species changes sex from female to male) and other data concerns, the 2011 and 2012 assessments were not accepted for determining stock status. Currently, the 2012 assessment is being used to manage the stock under a constant catch strategy. Although the Atlantic States Marine Fisheries Commission considers the stock to be rebuilt, concerns remain due to uncertainty in recent stock assessments and low landings in North Carolina waters. A new stock assessment is scheduled for 2016.
South of Hatteras						The stock is recovered after going through a federally-managed rebuilding plan, which went into place in 2006. The 2013 stock assessment indicated the stock is not overfished and has met the rebuilding plan's target.
Bass, Striped						
Albemarle Sound and Roanoke River						The 2014 Albemarle/Roanoke striped bass benchmark stock assessment (data through 2012) indicates the resource is not overfished or experiencing overfishing. However, estimates of fishing mortality and spawning stock biomass are close to the threshold reference points. Stock projections from the 2014 benchmark assessment indicated harvest at the quota approved in Amendment 1 (550,000 pounds) was unsustainable at recent levels of recruitment. Projections suggested a quota of 275,000 pounds would maintain fishing mortality and spawning stock biomass at the new reference points. Based on this information, the N.C. Marine Fisheries Commission revised Amendment 1 to the N.C. Estuarine Striped Bass Fishery Management Plan in November 2014, setting the harvest quota at 275,000 pounds, effective Jan. 1, 2015.
Atlantic Ocean Migratory Stock						In response to the results of the 2013 benchmark assessment indicating a steady decline in the spawning stock biomass, the Atlantic States Marine Fisheries Commission Striped Bass Management Board approved Addendum IV in October 2014. The Addendum establishes new fishing mortality reference points. In order to reduce fishing mortality to a level at or below the new target, the coastal states are required to implement a 25 percent harvest reduction from 2013 levels, while Chesapeake Bay states/jurisdictions are required to implement a 20.5 percent harvest reduction from 2012 levels.
Central/Southern						The lack of adequate data causes the Central Southern Management Area stocks to be quantitatively assessed as unknown and to be listed as "concern." The need for continued conservation management efforts are supported by the truncated size and age distributions, low overall abundance, and the absence of older fish in the spawning ground surveys. Amendment I to the N.C. Estuarine Striped Bass Fishery Management Plan was approved by the Marine Fisheries Commission in February 2013.

Species and Stock	Status					
	Viable	Recovering	Concern	Depleted	Unknown	Comments
Bluefish						The Atlantic stock of bluefish is not overfished and is not experiencing overfishing. The Atlantic States Marine Fisheries Commission Bluefish Technical Committee continues to work on improving and refining bluefish age data and the bluefish stock assessment. A new benchmark stock assessment is scheduled for completion at the beginning of July 2015.
Croaker, Atlantic						Atlantic croaker is not experiencing overfishing. Estimates of spawning stock biomass were too uncertain to precisely determine overfished stock status. However, given that biomass has been increasing and the age structure of the population has been expanding since the late 1980s, it is unlikely the stock is in trouble.
Dolphin						The status of dolphin is viable based on trends in landings data. The South Atlantic Fishery Management Council's Dolphin Wahoo Fishery Management Plan is currently managed under Amendment 5 (2014), which revises annual catch limits, sector allocations, accountability measures and annual catch targets implemented through the Comprehensive Annual Catch Limit Amendment.
Drum, Black						The 2015 Atlantic States Marine Fisheries Commission Black Drum Stock Assessment determined that the stock is not overfished and not experiencing overfishing. Based on the results of the stock assessment, the median biomass was estimated to be well above the median biomass that produces maximum sustainable yield, thus no additional management measures are needed beyond those established in the 2013 Atlantic States Marine Fisheries Commission fishery management plan.
Drum, Red						Overfishing is not occurring. A stock assessment completed in 2009 by the Atlantic States Marine Fisheries Commission indicates that the population is above the overfishing threshold and likely above or very near the management target. A new stock assessment will be completed in 2015.
Eel, American						The stock was declared depleted by the 2012 Atlantic States Marine Fisheries Commission benchmark stock assessment. Stock status is poorly understood due to non– standard sampling protocols across the species' range. Reliable indexes of abundance of this species are scarce. The Atlantic States Marine Fisheries Commission approved Addendum IV to the American Eel Interjurisdictional Fishery Management Plan to address issues with the glass eel fishery and glass eel aquaculture and establish a coast-wide cap for yellow eels. In 2010, the U.S. Fish and Wildlife Service was petitioned to add American Eel to the Federal List of Endangered and Threatened Wildlife. The Service began an extensive status review for the American Eel to assess the health of the population and the magnitude of threats facing the species. A decision on the proposed rule is expected by Sept. 30, 2015.

Species and Stock	Status					
	Viable	Recovering	Concern	Depleted	Unknown	Comments
Flounder, Southern						The 2014 stock assessment of southern flounder in North Carolina waters could not be used to determine stock status because the North Carolina stock of southern flounder mixes with stocks in the U.S. South Atlantic. There are concerns about the sustainability of current harvest because of a coastwide decline in juvenile and adult abundance. Supplement A to Amendment 1 is in development to address these concerns. A regional stock assessment should be considered to determine stock status.
Flounder, Summer						The 2013 National Marine Fisheries Service's Northeast Fisheries Science Center stock assessment for U.S. waters north of Cape Hatteras indicated the stock was not overfished and overfishing was not occuring. The stock was rebuilt in 2010 and is considered to be viable. A comprehensive amendment is underway and scheduled to be completed in 2017.
Grouper, Gag						According to the last regional (North Carolina to Florida) stock assessment (April 2014) from the South Atlantic Fishery Management Council, the gag stock was experiencing overfishing, but was not overfished. However, the National Marine Fisheries Service removed the stock from the overfishing list in December 2014. This decision was because in 2012 (the terminal year of the assessment) the fishing mortality rate was below the threshold, and the projected fishing mortality rate in 2013 was also below the threshold. In addition, there was a steady and consistent decline in the fishing mortality rate for the last 5-6 years of the assessment. A federal management plan is in place restricting harvest to prevent overfishing from occuring.
Herring, River (A)						
Albemarle Sound						Amendment 2 to the N.C. River Herring Fishery Management Plan was approved and became effective in 2015. The N.C. Marine Fisheries Commission implemented a no harvest provision for commercial and recreational fisheries in joint and coastal waters of the state beginning with the 2007 season.
Other Areas						No current sampling program.
Kingfishes (A)						Trends in relative fishing mortality and fishery independent data are used to track the stock condition because a regional stock assessment is not currently available. Commercial landings and recreational landings were above their 10-year average. In 2014 all management triggers were at acceptable levels for sustainability.
Mackerel, King						Based on the 2014 South Atlantic Fishery Management Council stock assessment, the South Atlantic king mackerel stock is not overfished and overfishing is not occurring. The 2014 stock assessment is an improvement from the 2008 stock assessment where overfishing could not be determined.

Species and Stock	Status					
	Viable	Recovering	Concern	Depleted	Unknown	Comments
Mackerel, Spanish						Based on the 2012 South Atlantic Fishery Management Council stock assessment, the Spanish mackerel stock in the South Atlantic is not overfished and is not undergoing overfishing.
Menhaden, Atlantic						Commercial landings increased in 2014; however the landings still remain below the ten-year average due to changes in management. The 2015 benchmark stock assessment indicates that Atlantic menhaden are neither overfished nor experiencing overfishing. Atlantic menhaden are currently managed under the Atlantic States Marine Fisheries Commission's Amendment 2, approved in 2012.
Mullet, Striped						The stock is not experiencing overfishing. Overfished status could not be determined due to a poor stock-recruitment relationship resulting in unreliable biomass based reference points. Landings for 2014 were within management threshold limits established in the 2006 fishery management plan. Historically, the commercial fishery has had sustained landings similar to current levels. Amendment 1 will be completed in 2015.
Seatrout, Spotted						The 2014 N.C. Spotted Seatrout Stock Assessment indicated that the North Carolina and Virginia stock is not overfished and overfishing is not occurring. However, there is uncertainty about the current stock status because two cold stun events occurred during the assessment process, and were not included in the analysis.
Scup						The 2012 stock assessment update completed by the National Marine Fisheries Service's Northeast Fisheries Science Center for U.S. waters north of Cape Hatteras indicated the stock was not overfished and overfishing was not occurring. A new stock assessment is underway in 2015.
Shad, American						Commercial landings decreased in 2014 and were below the ten-year average due to changes in managment. The 2007 Atlantic States Marine Fisheries Commission coastwide stock assessment concluded that the Albemarle Sound area stocks were stable, but well below historical levels, and the stock status of the other systems in North Carolina were unknown. In 2013, North Carolina adopted an American Shad Sustainable Fishery Plan to meet Atlantic States Marine Fisheries Commission requirements.
Shad, Hickory						Commercial landings increased in 2014 and value continued to be above the 10-year average. Two amendments to the Shad and River Herring Fishery Management Plan recently approved by the Atlantic States Marine Fisheries Commission do not directly address hickory shad. The N.C. Division of Marine Fisheries has not conducted any directed sampling since 1993.
Sharks						In North Carolina coastal fishing waters, sharks are included in the Atlantic States Marine Fisheries Commission Interstate Fishery Management Plan for Coastal Sharks, implemented in August 2008. This plan was implemented to compliment the National Marine Fisheries Service Consolidated Atlantic Highly Migratory Species Fishery Management Plan that includes sharks in federal waters. Recent assessment results indicate great uncertainty about the various shark species. The current status is concern because of the overfished, overfishing occurring or unknown status of sandbar, dusky, blacknose, blacktip, porbeagle and bonnethead sharks.

Species and Stock	Status					
	Viable	Recovering	Concern	Depleted	Unknown	Comments
Sheepshead						The division provided catch and biological information through 2014 to the N.C. Marine Fisheries Commission. Results prompted the Commission to implement new harvest restrictions on this species effective June 1, 2015. The recreational landings were below their 10-year average while the commercial landings were above their 10 year average for 2014.
Snapper-Grouper Complex (B) (Reef Fish)						Of the 59 species in the South Atlantic Fishery Manage Council unit, some stocks are sustainable but several stocks are considered overfished. The overfished stocks include snowy grouper, speckled hind, red porgy, red snapper, red grouper and Warsaw grouper.
Spiny Dogfish						Spiny dogfish are currently managed under a joint Mid-Atlantic Fishery Management Council and New England Fishery Management Council fishery management plan in federal waters and under the Atlantic States Marine Fisheries Commission Spiny Dogfish Interstate Fishery Management Plan in state waters. The 2014 stock assessment update, conducted by the Northeast Fisheries Science Center, estimates spiny dogfish are not overfished and not experiencing overfishing. Female spawning stock biomass estimates from 2009 to 2013 exceeded the biomass reference point. The stock was declared rebuilt in 2008.
Spot						Recreational landings increased significantly and commercial landings decreased slightly in 2014 from 2013. The juvenile abundance index decreased in 2014. In 2014, the Atlantic States Marine Fisheries Commission approved the traffic light approach to assess stock trends and initiate management for spot. A benchmark stock assessment is scheduled for 2016.
Sturgeon, Atlantic						The Atlantic States Marine Fisheries Commission is responsible for managing this species and considers the stocks to be depleted along the Atlantic Coast. There is a coastwide prohibition on possession. On April 5, 2012, the National Marine Fisheries Commission listed the Carolina Distinct Population Segment of Atlantic sturgeon as a federally endangered species. A new stock assessment is underway with plans to have peer reviews completed during 2017.
Weakfish (Gray Trout)						The weakfish stock along the Atlantic coast is at a level of low abundance. Coast- wide landings are near the lowest levels on record. The most recent assessment indicates that the cause is likely due to factors other than fishing mortality. The Atlantic States Marine Fisheries Commission has set strict harvest limits in response to the decline in an effort to aid in stock recovery. A new stock assessment is currently underway with plans to have peer reviews completed during 2016.

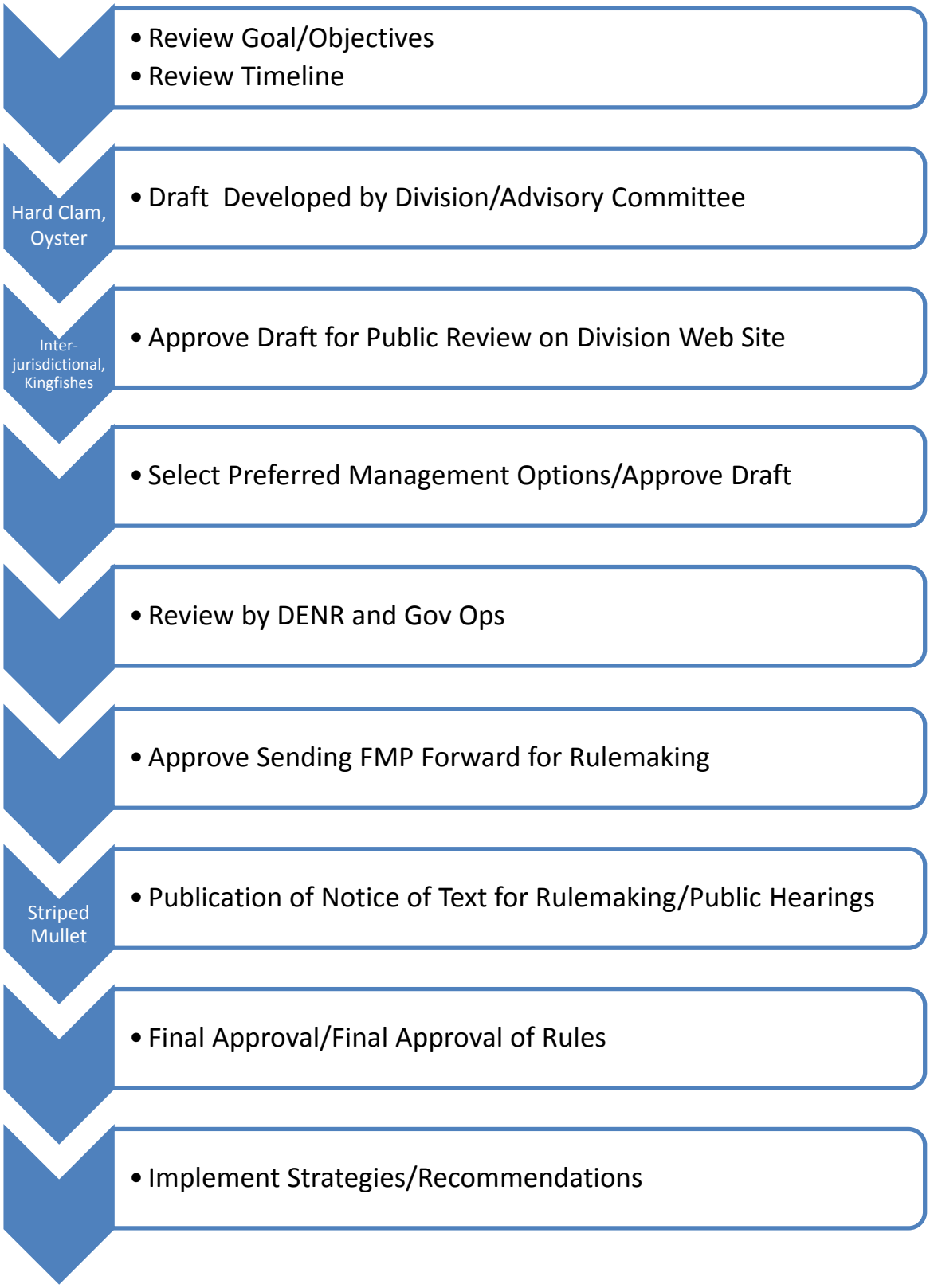
Species and Stock	Status					
	Viable	Recovering	Concern	Depleted	Unknown	Comments
Shellfish and Crustaceans						
Clam, Hard						Data limitations prevent conducting a hard clam stock assessment and calculating sustainable harvest. Based on the best available indicators, commercial hand and mechanical harvest levels in most areas showed an increasing or constant trend, except in Pamlico Sound. Amendment 1 of the fishery management plan was completed in 2008. Amendment 2 of the fishery management plan is under development.
Crab, Blue						The stock status is "concern" due to continued decreases in landings. While 2014 landings were more than 4 million pounds higher than 2013 landings, there were significant decreases in recruitment and adult abundances. Landings were lower than the 10-year average of 27 million pounds; however, value for blue crab – hard, soft and peelers – increased.
Oyster, Eastern						There are insufficient data to conduct a traditional stock assessment or estimate sustainable harvest for the Eastern oyster in North Carolina. Commercial oyster landings have been in decline for most of the past century, and are vulnerable to overharvest because of other factors such as habitat disturbance, pollution and biological and environmental stressors. Amendment 4 of the fishery management plan is under development.
Scallop, Bay						High natural mortality from environmental change and predation cause annual variability in abundance. Sampling showed low abundance in all areas 2014. The main harvest season (late January to March) was not opened in 2015 in any region due to abundance levels not meeting the threshold in Amendment 2 of the N.C. Bay Scallop Fishery Management Plan to allow harvest.
Shrimp(C)						Annual shrimp stock status is determined by environmental and recruitment conditions. Natural mortality far outweighs fishing mortality. The division is continuing to collaborate with industry on bycatch reduction in the shrimp trawl fishery.
TOTALS:	**15**	**2**	**12**	**4**	**4**	

(A) Kingfishes (Sea Mullet) includes 3 species, and there are two species of river herring.
(B) The Snapper-Grouper Complex includes about 60 species, while there are more than 40 species of sharks. Within these groups, individual species range from Viable to Overfished. The status indicated is for the group as a whole.
(C) Shrimp consists of 3 species — brown, pink, and white.

N.C. Division of Marine Fisheries • 3441 Arendell Street • Morehead City, NC 28557 • 252-726-7021 or 800-682-2632

N.C. FISHERY MANAGEMENT PLANS

August 2015



Annual Fishery Management Plan Update
N.C. Marine Fisheries Commission Meeting
Aug. 20, 2015

Authority and Process

The Fisheries Reform Act of 1997 and its subsequent amendments established the requirement to create fishery management plans for all of North Carolina's commercially and recreationally significant species or fisheries. The contents of the plans are specified, advisory committees are required and reviews by the Department of Environment and Natural Resources secretary and the Joint Legislative Commission on Governmental Operations are mandated.

The original 1997 legislation mandated the Blue Crab Fishery Management Plan be completed first and the Marine Fisheries Commission used the Division of Marine Fisheries' annual stock status review to prioritize the order of species that would be addressed in subsequent plans. All initial fishery management plans identified on the priority list have been developed. Fishery management plans normally take about two years to complete and are required to be reviewed at least once every five years. Upon review, amendment of a plan is required when changes to management strategies are necessary. An information update for a plan, which includes changes in factual and background data only, is completed if there are no management changes. The division and the Marine Fisheries Commission adopted an annual rule cycle in 2009 to coincide with rulebook production, increase efficiency in rule making processes, and consolidate efforts in the development of fishery management plans and the associated implementing rules.

The division formed a fishery management plan process committee in 2010 that audited the current plan guidelines, procedures, internal processes, and capabilities to determine how to improve and streamline the entire process. Results of that analysis have been completed and continue to be implemented and refined to maximize efficiencies in the process.

Status of State Fishery Management Plans

Five of 13 state plans are currently underway. These are information updates to the Interjurisdictional and Kingfishes fishery management plans and amendments to the Striped Mullet, Hard Clam, and Oyster fishery management plans. A table indicating the draft 2015 schedule for the plan reviews is included at the end of the report. The Marine Fisheries Commission will vote on approval of the schedule at its August 2015 business meeting.

The draft **Interjurisdictional Fisheries Management Plan Information Update** and the draft **Kingfishes Fishery Management Plan Information Update** are underway. No change in management strategies is necessary, so the plans are being updated with the most current factual and background data.

The development of the **Striped Mullet Fishery Management Plan Amendment 1** is complete. The plan was sent to the Department of Environment and Natural Resources and the Joint Legislative Commission on Governmental Operations for review in December 2014; there were no comments. The proposed implementing rules were presented to the Marine Fisheries Commission at its May 2015 meeting and approved to begin the rulemaking process. A public hearing on the proposed rules is scheduled in September 2015. Final approval of the plan and rules is scheduled for November 2015.

The **Hard Clam Fishery Management Plan Amendment 2** and the **Oyster Fishery Management Plan Amendment 4** are also underway. The 2010 supplement to the oyster plan must be addressed in this review as well as any additional management issues for both plans. The outcome of pending legislation introduced during the 2015 session will determine when the amendments will be completed.

The red drum stock assessment by the National Oceanic and Atmospheric Administration's Southeast Data, Assessment and Review is scheduled for completion in November 2015. Upon completion of the stock assessment, the division will undertake a review of the **Red Drum Fishery Management Plan Amendment 1**.

Although data inputs used in the 2014 stock assessment of southern flounder in North Carolina waters were determined to be valid, the stock assessment could not be used to determine stock status because the southern flounder stock mixes throughout the South Atlantic (North Carolina to Florida.) Concerns exist about the sustainability of current harvest levels because of a coast-wide decline in the number of young fish entering into the stock since the 1990s. As a result, a draft supplement to the **Southern Flounder Fishery Management Plan Amendment 1** was initiated in 2015 to adopt temporary management measures to reduce the catch of southern flounder up to 60 percent.

The Marine Fisheries Commission gave final approval of the **Spotted Seatrout Fishery Management Plan** in February 2012. The plan included management measures to end overfishing within two years of final adoption of the plan because the fishery was not producing a sustainable harvest. Initially, the Marine Fisheries Commission requested a review of the plan three years after adoption, instead of the usual five. In May 2015, the division presented the 2014 stock assessment to the Marine Fisheries Commission. The new assessment determined the stock is not overfished and overfishing is not occurring, although the total fishing mortality was just under the recommended allowable level. In light of the new assessment, the commission directed the division to begin the review of the plan in 2017.

The next review of the **Division of Marine Fisheries-Wildlife Resources Commission Joint Estuarine Striped Bass Fishery Management Plan Amendment 1** is scheduled to begin in 2018. The next review of the **Blue Crab Fishery Management Plan Amendment 2** is scheduled to begin in 2018.

The Marine Fisheries Commission gave its final approval of the **Shrimp Fishery Management Plan Amendment 1, Bay Scallop Fishery Management Plan Amendment 2, and Division of Marine Fisheries-Wildlife Resources Commission Joint River Herring Fishery Management Plan Amendment 2** in February 2015 and the implementing rules became effective May 1, 2015. The next reviews are scheduled to begin in 2020.

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Jason Rock
Division of Marine Fisheries, NCDENR

DATE: Aug. 20, 2015

SUBJECT: Blue Crab Traffic Light Stock Assessment Update

Amendment 2 to the N.C. Blue Crab Fishery Management Plan adopted by the N.C. Marine Fisheries Commission in November 2013 incorporated the use of the Traffic Light method and an adaptive management plan for management of the blue crab stock. The plan requires annual updates to the Blue Crab Traffic Light be presented to the Marine Fisheries Commission as part of the Division of Marine Fisheries' annual Stock Status Report.

The Blue Crab Traffic Light is divided into three separate characteristics: 1) adult abundance, 2) recruit abundance, and 3) production. Each characteristic uses data from several division biological surveys and sampling programs to determine the relative abundance of adult and recruit blue crabs in the population and various production indictors for the stock each year. Under the fishery management plan, management measures will be implemented in the blue crab fishery if certain biological triggers are met. Either the adult abundance or production characteristic of the Blue Crab Traffic Light must be above the 50% red threshold for three consecutive years to trigger moderate management action and must be above the 75% red threshold for two of three consecutive years to trigger elevated management action as established in the adaptive management plan (Table 1). The recruit abundance indicator, while not used to trigger initial management action, may be used to supplement any management action taken if a trigger is activated. The three year time period was chosen to prevent taking management action as a result of annual variability in the blue crab stock and instead base any management response on the observation of a short but continued declining trend in the population.

Results of the 2010 Blue Crab Stock Assessment showed the blue crab stock in North Carolina was not overfished and is producing a sustainable harvest; however, it is unknown if overfishing is occurring. The Blue Crab Traffic Light was updated with data through 2012 prior to the N.C. Marine Fisheries Commission's adoption of Amendment 2 and showed that no triggers had been activated. The update last year, which incorporated data through 2013, showed both the adult abundance and production characteristics had met or exceeded the moderate threshold of 50% red for the first year.

The Blue Crab Traffic Light has been updated with 2014 data for annual stock status determination (Figure 1). The current update indicates both the adult abundance and production characteristics exceeded the moderate threshold of 50% red for 2014 (adult=79% red, production=71% red). This serves as the second of the three consecutive years above the 50% red threshold for both the adult and production characteristics that is required before moderate management action must be taken. The adult abundance characteristic has also exceeded the 75% red threshold for the first year of two years in a three year period that is required before elevated management action must be taken.

The blue crab stock status is currently listed as “Concern” due to a decline in landings from peak harvest levels from 1994 to 2000 and the reduced abundance of adult and juvenile blue crabs in the population indicated by the traffic light.

Table 1. Moderate and Elevated management measures under the adaptive management framework for the Blue Crab Traffic Light in the Blue Crab Fishery Management Plan Amendment 2.

Characteristic	Moderate management level	Elevated management level
Adult abundance	A1. Increase in minimum size limit for male and immature female crabs	A4. Closure of the fishery (season and/or gear)
	A2. Reduction in tolerance of sub-legal size blue crabs (to a minimum of 5%) and/or implement gear modifications to reduce sublegal catch	A5. Reduction in tolerance of sub-legal size blue crabs (to a minimum of 1%) and/or implement gear modifications to reduce sublegal catch
	A3. Eliminate harvest of v-apron immature hard crab females	A6. Time restrictions
Recruit abundance	R1. Establish a seasonal size limit on peeler crabs	R4. Prohibit harvest of sponge crabs (all) and/or require sponge crab excluders in pots in specific areas
	R2. Restrict trip level harvest of sponge crabs (tolerance, quantity, sponge color)	R5. Expand existing and/or designate new crab spawning sanctuaries
	R3. Close the crab spawning sanctuaries from September 1 to February 28 and may impose further restrictions	R6. Closure of the fishery (season and/or gear)
		R7. Gear modifications in the crab trawl fishery
Production	P1. Restrict trip level harvest of sponge crabs (tolerance, quantity, sponge color)	P4. Prohibit harvest of sponge crabs (all) and/or require sponge crab excluders in pots for specific areas
	P2. Minimum and/or maximum size limit for mature female crabs	P5. Reduce peeler harvest (no white line peelers and/or peeler size limit)
	P3. Close the crab spawning sanctuaries from September 1 to February 28 and may impose further restrictions	P6. Expand existing and/or designate new crab spawning sanctuaries
		P7. Closure of the fishery (season and/or gear)

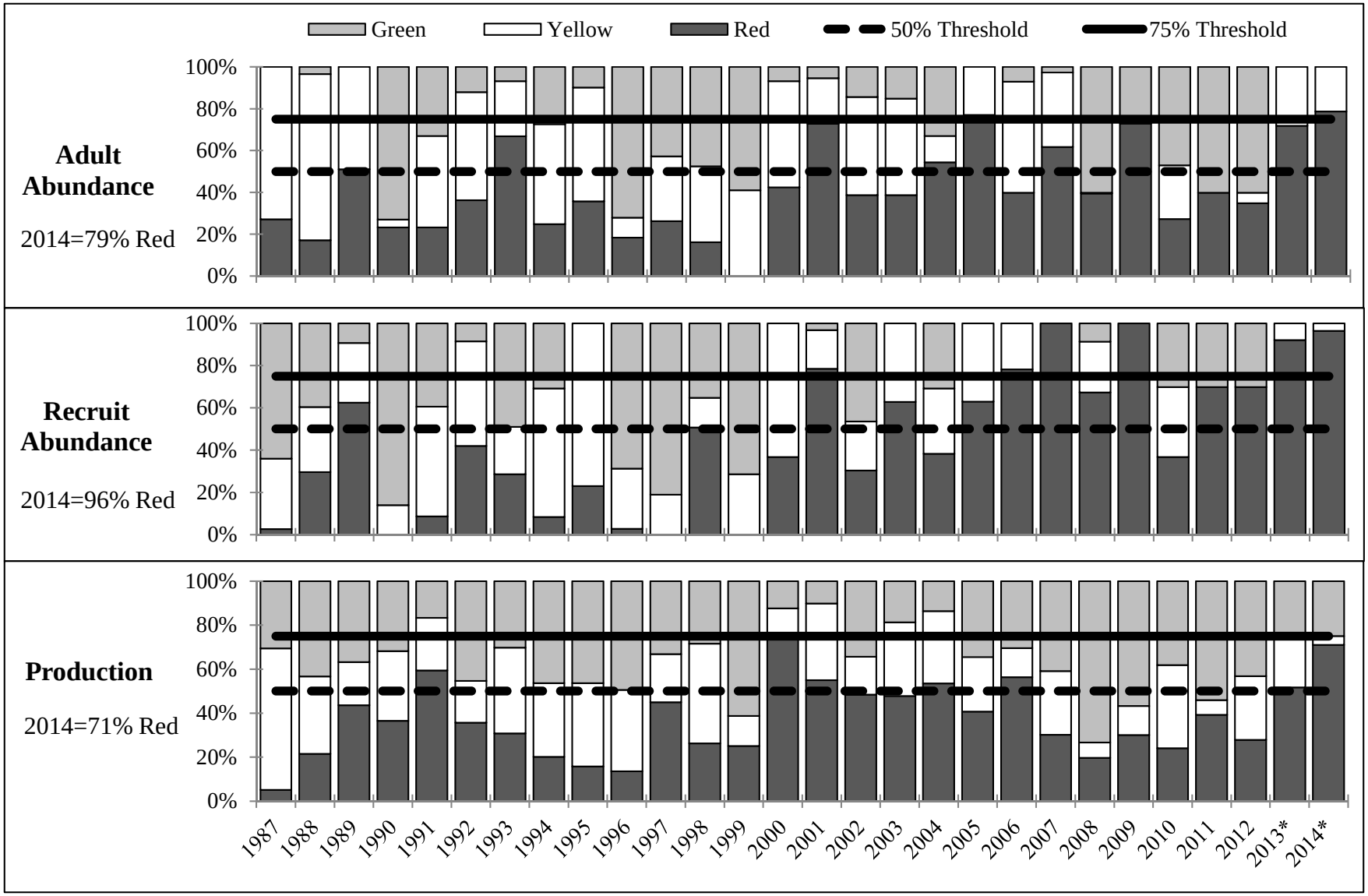


Figure 1. Adult abundance, recruit abundance, and production characteristics for the 2014 Blue Crab Traffic Light update. *2013 and 2014 represent the first and second years that count toward the three consecutive years needed to activate the moderate management trigger. 2013 was the first year of implementation of the traffic light and the adaptive management plan.

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Michelle Duval and Katy West

DATE: August 20, 2015

SUBJECT: Review of draft 2015 information update to the 2008 Interjurisdictional Fishery Management Plan

The draft 2015 information update to the 2008 Interjurisdictional Fishery Management Plan is provided for review. The commission is scheduled to vote on whether to send this draft document out for public review on the division web site at this meeting. The definition of "information update" under consideration by the division's Fishery Management Plan Process Workgroup is a "statutorily-required review of a fishery management plan at least once every five years that results in a determination that the management measures contained in a fishery management plan comply with the requirements of G.S. 113-182.1 for ensuring the long-term viability of the state's commercially and recreationally significant species or fisheries. An information update to a fishery management plan only incorporates changes in factual and background data that do not alter management strategies or management measures contained in the prior fishery management plan and does not introduce or address new management issues not previously included in the fishery management plan. An information update refreshes the fishery management plan with the most current statistics, trends, research, etc. available at the time the information update is developed. An information update is developed without the assistance of a fishery management plan advisory committee and does not require review by regional or standing advisory committees of the Marine Fisheries Commission."

The 2015 N.C. Fishery Management Plan for Interjurisdictional Fisheries Information Update maintains the 2008 Interjurisdictional Fishery Management Plan purpose, goal and objectives, management authority, management unit, and implementation strategies. The information update proposes no new rule changes, management actions, or any actions more restrictive than those required for compliance with FMPs developed by the Atlantic States Marine Fisheries Commission or federal regional fishery management councils. A list of managed species as of the 2015 information update is provided in Table 1 of the document.

Additional updates to the document include the expansion of information regarding how the Endangered Species Act intersects with the FMP, as well as additional explanation about the appointment of a Compliance Advisory Panel and the process for consideration of challenging consistency with an interstate or federal FMP. The document also contains additional history about those state fishery management plans that were developed to address additional measures deemed appropriate for North Carolina beyond those measures provided in the interstate or federal FMPs. Appendix B, which provides a detailed species summary, has also been updated and several sections of the document were rearranged for improved organization and readability.

NORTH CAROLINA

FISHERY MANAGEMENT PLAN FOR INTERJURISDICTIONAL FISHERIES

INFORMATION UPDATE

By

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
NORTH CAROLINA DIVISION OF MARINE FISHERIES
3441 ARENDELL STREET
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MOREHEAD CITY, NORTH CAROLINA 28557

July 2015 Draft

First draft March 2014
Second draft September 2014
Third draft November 2014
Fourth draft May 2015

ACKNOWLEDGEMENTS

The 2015 Fishery Management Plan (FMP) for Interjurisdictional (IJ) Fisheries was developed by the North Carolina Department of Environment and Natural Resources (DENR) Division of Marine Fisheries (DMF) under the direction of the North Carolina Marine Fisheries Commission (MFC) with advice from the Plan Development Team (PDT), all who contributed their time and knowledge to this document.

IJ FMP PDT
Catherine Blum
Michelle Duval
Mike Marshall
Kathy Rawls
Katy West

LIST OF ACRONYMS

AC – Advisory Committee

ACL – Annual Catch Limit

ACT – Annual Catch Target

AG – Attorney General

AP – Advisory Panel

ACFCMA – Atlantic Coastal Fisheries Cooperative Management Act

AM – Accountability Measure

ASMA – Albemarle Sound Management Area for striped bass

ASMFC – Atlantic States Marine Fisheries Commission

BMSY – Biomass Maximum Sustainable Yield

BRP – Biological Reference Points

CAP – Compliance Advisory Panel

CFDBS – Commercial Fisheries Database

CIE – Center for Independent Experts

Councils – Federal regional fishery management councils

DAS – Days at Sea

CSMA – Central Southern Management Area for striped bass

DENR – North Carolina Department of Environment and Natural Resources

DMF – North Carolina Division of Marine Fisheries

EEZ – Exclusive Economic Zone

EFH – Essential Fish Habitat

ESA – Endangered Species Act

F – Fishing Mortality

FMP – Fishery Management Plan

FMU – Fishery Management Unit

FRA – Fisheries Reform Act

GS – General Statute of North Carolina

HMS – Highly Migratory Species

IJ – Interjurisdictional

ISFMP – ASMFC Interstate Fisheries Management Program

LCS – Large Coastal Sharks

M – Natural Mortality

MAFMC – Mid-Atlantic Fishery Management Council

MFC – North Carolina Marine Fisheries Commission

MSA – Magnuson-Stevens Fishery Conservation and Management Act

MSY – Maximum Sustainable Yield

NEFSC – Northeast Fisheries Science Center

NEPA – National Environmental Policy Act

NMFS – National Marine Fisheries Service

NOAA – National Oceanic and Atmospheric Administration

NPDES – National Pollution Discharge Elimination System

OPR – NOAA Fisheries Office of Protected Resources

OY – Optimum Yield

PDT – Plan Development Team

PIB – Public Information Brochure

PRT – Plan Review Team

RAT – Rules Advisory Team

RRMA – Roanoke River Management Area for striped bass

SAFMC – South Atlantic Fishery Management Council

SARC – Stock Assessment Review Committee

SAW – Stock Assessment Workshop

SCA – Statistical Catch at Age

SCS – Small Coastal Sharks

SFMA – Southern Fishery Management Area for monkfish

SPR – Spawning Potential Ratio

SSB – Spawning Stock Biomass

SSC – Scientific and Statistical Committee

TAL – Total Allowable Landings

TAC – Total Allowable Catch

TC – Technical Committee

TL – Total Length

TLA – Traffic Light Approach

USFWS – United States Fish and Wildlife Service

WRC – Wildlife Resources Commission

TABLE OF CONTENTS

FISHERY MANAGEMENT PLAN, AMENDMENTS AND UPDATES

Management strategies adopted by N.C. Marine Fisheries Commission in 2002 and 2008 N.C. Fishery Management Plan for Interjurisdictional Fisheries.

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Adopt management measures appropriate for North Carolina contained in approved Council or Atlantic States Marine Fisheries Commission (ASMFC) FMPs via N.C. rulemaking (2002)	1 – 8	Reduction in duplication of effort while meeting statutory requirements of N.C. General Statute 113-182.1.
Consolidate proclamation authority contained in multiple separate rules into a single rule for purposes of implementing management measures consistent with federal regional fishery management councils (Councils) and ASMFC FMPs.	2	Elimination of duplicative rule provisions.

EXECUTIVE SUMMARY

The original N.C. Interjurisdictional Fisheries Management Plan (IJ FMP) was approved by the MFC in September 2002. The goal of the IJ FMP is to adopt FMPs, consistent with N.C. law, approved by the Councils or the ASMFC by reference and implement corresponding fishery regulations in North Carolina to provide compliance or compatibility with approved FMPs and amendments, now and in the future. The goal of these plans, established under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (federal Councils FMPs) and the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) (ASMFC FMPs), are similar to the goals of the Fisheries Reform Act of 1997 (FRA) to "ensure long-term viability" of these fisheries.

Amendment 1 to the IJ FMP was adopted by the MFC in June 2008. This amendment did not change the goal and objectives of the plan; however, it included a management strategy, with associated rule changes, to streamline and consolidate the use of proclamation authority by the DMF Director to implement management measures to comply with or complement ASMFC and Council FMPs. The amendment also included appendices containing information on applicable federal statutes, species management summaries, and management measures implemented for consistency with ASMFC and Council FMPs.

This document is an information update to the 2015 IJ FMP. An information update is a statutorily-required review of an FMP at least once every five years that results in a determination that the management measures contained in an FMP comply with the requirements of G.S. 113-182.1 for ensuring the long-term viability of the state's commercially and recreationally significant species or fisheries. An information update only incorporates changes in factual and background data that do not alter management strategies or management measures contained in the prior FMP and does not introduce or address new management issues not previously included in the FMP. An information update refreshes the FMP with the most current statistics, trends, research, etc. available at the time the information update is developed. This document updates the 2008 IJ FMP with additional information regarding the impetus for the original IJ FMP, changes in N.C. statutes, relevant management authorities, federal and interstate public process and the link between overlapping state and ASMFC FMPs.

I. PURPOSE

The FRA and subsequent revisions through 2014 requires the DENR to prepare FMPs for adoption by the MFC for all commercially and recreationally significant species or fisheries that comprise North Carolina's marine and estuarine resources. FMPs are prepared by the DMF of the DENR. Many FMPs have been developed and implemented by Councils or the compact of states under the ASMFC. The goal of these plans, established under the MSA (federal Councils FMPs) and the ACFCMA (ASMFC FMPs), are similar to the goals of the FRA to "ensure long-term viability" of these fisheries. For the purposes of this plan, sustainable harvest as defined in the FRA is synonymous with optimum yield (OY) or other recovery targets defined in ASMFC and federal Council FMPs.

The ultimate purpose of the N.C. FMP for Interjurisdictional Fisheries is as follows:

1) Adopt management measures appropriate for North Carolina contained in approved Council or ASMFC FMPs by reference as minimum standard(s);
2) Avoid duplication of effort in the development of plans under the FRA for species or species groups where equivalent Council or ASMFC FMPs have been developed and adopted with full participation from the state of North Carolina; and
3) Ensure that no inconsistencies exist with regard to Endangered Species Act (ESA) considerations for species managed under this FMP or under the ESA.

Several N.C. general statutes (G.S.) clearly acknowledge the overlapping authority of the State with the ASMFC and Councils; they also define the hierarchy within which the MFC's authority lies in establishing provisions to comply with the mandates of these management bodies. Namely, management measures established by the MFC must be consistent for those resources for which the Councils and ASMFC have primary jurisdiction. G.S. 113-182 clarifies that regulation of fish and fisheries in the Atlantic Ocean out to the limit of the federal Exclusive Economic Zone (EEZ) should be consistent with the MSA. Additionally, Article 19 of Chapter 113 of the General Statutes (G.S. 113-251 through 113-258) fully incorporates the ASMFC compact.

Notwithstanding the similar goal but differing legal basis, the Council and ASMFC FMPs when adopted by the MFC as a N.C. FMP are held to the standards established in G.S. 113-182.1 and associated policies:

1) Contain necessary information pertaining to the fishery or fisheries, including management goals and objectives, status of relevant fish stocks, stock assessments for multiyear species, fishery habitat and water quality considerations consistent with Coastal Habitat Protection Plans adopted pursuant to G.S. 143B-279.8, social and economic impact of the fishery to the State, and user conflicts.
2) Recommend management actions pertaining to the fishery or fisheries.
3) Include conservation and management measures that will provide the greatest overall benefit to the State, particularly with respect to food production, recreational opportunities, and the protection of marine ecosystems, and that will produce a sustainable harvest [revised effective 2004].

4) Specify a time period, not to exceed two years from the date of the adoption of the plan, to end overfishing. This subdivision shall not apply if the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementing the requirements of this subdivision incompatible with professional standards for fisheries management [effective 2010].
5) Specify a time period, not to exceed 10 years from the date of the adoption of the plan, for ending overfishing and achieving a sustainable harvest. This subdivision shall not apply if the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementing the requirements of this subdivision incompatible with professional standards for fisheries management [effective 2010].
6) Include a standard of at least fifty percent (50%) probability of achieving sustainable harvest for the fishery or fisheries. This subdivision shall not apply if the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementing the requirements of this subdivision incompatible with professional standards for fisheries management [effective 2010].

The revised FRA adjusted several definitions in G.S. 113-129 [effective 2004]:

Sustainable Harvest (14a) is defined as the amount of fish that can be taken from a fishery on a continuing basis without reducing the stock biomass of the fishery or causing the fishery to become overfished.

Overfished (12c) is defined as the condition of a fishery that occurs when the spawning stock biomass of the fishery is below the level that is adequate for the recruitment class of a fishery to replace the spawning class of the fishery.

Overfishing (12d) is defined as fishing that causes a level of mortality that prevents a fishery from producing a sustainable harvest.

Many of the subsequent revisions to the general statutes that comprise the FRA have focused on providing greater clarity in terminology, as well as greater accountability with regard to management measures designed to end overfishing and achieve sustainable harvest for fisheries under sole jurisdiction of the MFC and the DENR. Several of these changes are broadly reflective of similar provisions in federal law (i.e., the MSA) and/or practices employed by the ASMFC. In 2014, the DMF undertook the development of resource policies to formalize interpretation of the statutory requirements above.

II. GOAL AND OBJECTIVES

The goal of the IJ FMP is to adopt FMPs, consistent with N.C. law, approved by the Councils or ASMFC by reference and implement corresponding fishery regulations in North Carolina to provide compliance or compatibility with approved FMPs and amendments, now and in the future. To achieve this goal, the following objectives shall be met:

1. Participate fully, consistent with N.C. law, in all levels (advisory panels, technical committees, stock assessment subcommittees, plan development and review teams, management boards, monitoring committees and other committees) of the ASMFC and

Council processes for developing FMPs and amendments through appropriately informed DMF staff, MFC members, citizen advisors, and the public at large.

2. Adopt management measures appropriate for North Carolina coastal waters to implement measures promulgated by the Secretary of Commerce or approved by the ASMFC necessary to implement federal FMPs, as well as to achieve the sustainable harvest for Council and ASMFC managed species.

3. Develop a program of education and public information to help identify the causes and nature of problems in the fish stocks managed by the Councils or ASMFC, their habitat and fisheries, and the rationale for management efforts to solve these problems.

4. Develop and implement a management and regulatory process that provides adequate resource protection, optimizes yield from the fishery, and considers the needs of all user groups.

5. Promote harvesting practices, methodologies, and technologies that minimize bycatch.

6. Restore, improve and protect essential, critical fisheries habitat and environmental quality to increase growth, survival, and reproduction of fish stocks.

7. Identify, encourage, and conduct research to improve understanding of population ecology and dynamics.

8. Initiate, enhance, and conduct studies to collect the socioeconomic data needed to properly monitor and manage the fisheries.

III. BACKGROUND

The original IJ FMP was approved in September 2002 and updated through Amendment 1 to the FMP in 2008. The impetus behind the development of the FMP was not only to reduce duplication of effort, but also to foster improved communication and opportunities for input between the MFC, its advisory committees, and the ASMFC and Councils. The MFC had a lengthy discussion after its approval of the original FMP regarding the communication process on issues of interest, as well as the "due diligence" necessary on the part of both the DMF Director (to ensure items are brought forward) and the MFC (to review said items and ensure that any concerns or input are provided to the decision-making authority). The MFC recognized and acknowledged that the state's ASMFC commissioners and Council representatives are often in a position of compromise in achieving management goals for a species. Accordingly, while the concerns of the MFC on a particular topic may be conveyed by the state's representatives at Council and ASMFC meetings, the management body's ultimate decision on a particular issue may not align with the MFC's position.

IV. MANAGEMENT AUTHORITY

The ACFCMA and the 2006 reauthorization of the MSA confer the authority for management of coastal, interjurisdictional fisheries to the ASMFC and the Councils (See Appendix A). The purpose of these acts is to provide for the preparation and implementation, in accordance with

standards contained in the respective Acts, of FMPs that will achieve and maintain the availability of coastal fishery resources on a long-term basis (sustainable harvest).

North Carolina is an active, voting member on the ASMFC as well as the South and Mid-Atlantic Fishery Management Councils (SAFMC and MAFMC, respectively). North Carolina's participation in these organizations is critical to ensure that North Carolina's fishermen and fisheries resources are considered and adequately protected. To that end, North Carolina through its DMF staff, ASMFC or Council members, and citizen advisors participates fully in the development of these federal FMPs that have an impact on commercial and recreational fisheries in North Carolina.

Several N.C. general statutes deal with the adoption of federal regulations developed under authority of the ASMFC or adopted through the federal Councils by the Secretary of Commerce under authority of the MSA. G.S. 150B-21.6 states "an agency may incorporate the following material by reference in a rule without repeating the text of the referenced material: (2) All or part of a code, standard, or regulation adopted by another agency, the federal government, or a generally recognized organization or association." G.S. 113-228 states that the MFC "in its discretion may by reference in its rules adopt relevant provisions of federal laws and regulations as State rules." Additionally, this statute provides for the MFC to be "exempt from any conflicting limitations in G.S. 150B-21.6 so that it may provide for automatic incorporation by reference into its rules of future changes within any particular set of federal laws or regulations relating to some subject clearly within the jurisdiction of the Department."

G.S. 143B-289.51 describes the creation and purpose and G.S. 143B-289.52 the powers and duties of the MFC. These statutes provide for the MFC to advise the State regarding ocean and marine fisheries within the jurisdiction of the ASMFC and federal Councils, to manage or regulate fishing in the Atlantic Ocean and to adopt relevant State rules for compliance with or implementation of ASMFC or Council FMPs. Consequently, the MFC and DMF have the authority to develop an FMP that adopts ASMFC and federal Council plans by reference.

V. MANAGEMENT UNIT: FISH STOCKS MANAGED BY THE COUNCILS AND COMMISSION

Table 1 is a summary of the finfish species managed under FMPs developed by the Councils and the ASMFC as of the 2015 information update to the IJ FMP. This list constitutes the management unit for this FMP. Other species may be added to this list in the future from subsequent Council or ASMFC amendments as other fish stocks require Council or ASMFC action. Conversely, if a species is removed from a Council or ASMFC management unit, then the species is no longer contained in the IJ FMP management unit. The intent of this IJ FMP is to incorporate any species added or removed via amendments that are developed in the future. Appendices B and C provide detailed descriptions of the FMPs and North Carolina involvement in the development of those FMPs. For species that are also managed under a state FMP, new sections regarding ESA considerations, aquaculture and commercial hook-and-line fisheries are being added to the state FMP format. Please consult the appropriate state FMP for information on these topics for a particular species.

Table 1. Species or species groups managed under the jurisdiction of the ASMFC, South and/or Mid-Atlantic Councils and the N.C. MFC.

Species or species group	Atlantic States Marine Fisheries Commission	South Atlantic Fishery Management Council	Mid-Atlantic Fishery Management Council	North Carolina[1] Marine Fisheries Commission
American Eel	X			
Atlantic Croaker	X			
Atlantic Menhaden	X			
Atlantic Striped Bass	X			X
Atlantic Sturgeon*	X			
Black Drum[2]	X			
Black Sea Bass – North	X		X	
Bluefish	X		X	
Red Drum	X			X
Scup	X		X	
Shad and River Herring	X			X
Sharks	X			
Spanish Mackerel	X	X		
Spiny Dogfish	X		X	
Spot	X			
Spotted Seatrout	X			X
Summer Flounder	X		X	
Tautog	X			
Weakfish	X			
Dolphin/Wahoo		X		
King Mackerel		X		
Snapper Grouper Complex (includes Black Sea Bass – South)[3]		X		
Monkfish			X	

[1] State FMPs have been developed for these species prior or subsequent to those developed by ASMFC or the Councils.
[2]Black drum added to IJ FMP management unit subsequent to approval of ASMFC FMP in 2013.
[3]Tiger grouper, black margate, blue-striped grunt, French grunt, Spanish grunt, smallmouth grunt, porkfish, queen triggerfish, crevalle jack, yellow jack, grass porgy, sheepshead and puddingwife were removed from the Snapper Grouper Complex in April 2012; blue runner was removed from the Snapper Grouper Complex in January 2013.
*Listed as endangered under the ESA.
Species or species groups in **bold** require federal permits for fishermen.

VI. FISHERY MANAGEMENT PLANS

FMPs and their subsequent amendments have been prepared or are in the process of being prepared by the Councils or ASMFC for the species listed in Table 1. Several of these plans

have many regulatory amendments and/or full plan amendments. The intent of this FMP is to adopt these plans as North Carolina FMPs by reference, including subsequent amendments and additions, in order that management measures developed through these federal processes can be implemented in the state waters of North Carolina. All original plans and amendments are maintained electronically on Council and ASMFC websites, and may be obtained by contacting the DMF headquarters office in Morehead City, the South or Mid-Atlantic Fishery Management Councils (http://www.nmfs.noaa.gov/councils.htm), or the ASMFC (www.asmfc.org). State contacts for each federal FMP are listed in Appendix C.

This FMP document is an information update that proposes no new management actions or any actions more restrictive than those required for compliance with FMPs developed by the ASMFC or Councils. An information update is the statutorily-required review of an FMP at least once every five years that results in a determination that the management measures contained in an FMP comply with the requirements of G.S. 113-182.1 for ensuring the long-term viability of the state's commercially and recreationally significant species or fisheries. An information update to an FMP only incorporates changes in factual and background data that do not alter management strategies or management measures contained in the prior FMP and does not introduce or address new management issues not previously included in the FMP. An information update refreshes the FMP with the most current statistics, trends, research, etc. available at the time the information update is developed. An information update is developed without the assistance of an FMP advisory committee and does not require review by regional or standing advisory committees of the MFC.

A variety of MFC rules and DMF proclamations are utilized to implement management actions in order for the State to be in compliance with the ASMFC and Council plans. A 2007 review of these rules was undertaken to determine if they provide the most efficient and consistent approach. Appendix D contains a more thorough discussion of this review and all recommended rule changes that were implemented (effective Oct. 1, 2008) to improve the compliance process. No rule changes are proposed in this information update.

VII. FEDERAL MANAGEMENT

Atlantic States Marine Fisheries Commission and the Atlantic Coastal Fisheries Cooperative Management Act

The ASMFC is a compact of the 15 coastal states along the U.S. Atlantic coast from Maine to Florida. The ASMFC mission is "to promote the better utilization of the fisheries, marine, shell and anadromous, of the Atlantic seaboard by the development of a joint program for the promotion and protection of such fisheries, and by the prevention of physical waste of the fisheries from any cause". The Commission's Interstate Fisheries Management Program (ISFMP) began in 1981. The goal of the program is to promote cooperative management through interstate FMPs.

The ISFMP operates under the direction of the ISFMP Policy Board and the species management boards. The ISFMP Policy Board is composed of one representative from each member state, the District of Columbia, the Potomac River Fisheries Commission, National Oceanic and Atmospheric Administration (NOAA) Fisheries, and United States Fish and Wildlife Service (USFWS). The Policy Board provides overall guidance and ensures consistency with the ISFMP

Charter and between FMPs. The species management boards consider and approve the development and implementation of FMPs, including the integration of scientific information and proposed management measures. In this process, the species management boards primarily rely on input from two main sources – species technical committees and species advisory panels. North Carolina and the DMF have staff and citizens who serve as members of ASMFC management boards, technical committees, and advisory panels. The Director of the DMF, along with legislative and governor's appointees are the key voting members on the ASMFC, with DMF staff and citizen advisors representing the scientific, environmental, commercial, and recreational interests of North Carolina.

The importance of a cooperative program to protect and enhance the fisheries under the jurisdiction of the ASMFC has long been recognized as the most critical component of the ASMFC mission. In 1993, Congress enacted the ACFCMA (Appendix A). This Act charges all Atlantic states with implementing coastal FMPs (for fisheries occurring out to three miles from shore) adopted by the ASMFC to safeguard the future of Atlantic coastal fisheries in the best interest of both the fishermen and the nation. The powers of the ASMFC were expanded by the Act and the purposes of the ASMFC were also altered. The ASMFC became the agency charged by Congress with establishing and implementing fisheries management for migratory fish stocks along the Atlantic coast that had historically been state-controlled. In so doing, the ASMFC now exercises the sovereignty of the United States, rather than the collective power of the subscribing compact states. The Act also expanded the ASMFC's jurisdiction to include conservation of the "marine environment" in order to assure the availability of coastal fisheries resources on a long-term basis. (Attorney General Advisory Opinion, 1996)

Federal Regional Fishery Management Councils and the Magnuson-Stevens Fishery Conservation and Management Act

The 2006 reauthorization of the MSA (Appendix A), maintains the establishment of the Councils (e.g., South Atlantic and Mid-Atlantic Councils) to "exercise sound judgment in the stewardship of fishery resources through the preparation, monitoring, and revision of Fishery Management Plans which will enable the States, the fishing industry, consumer and environmental organizations, and other interested persons to participate in, and advise on, the establishment and administration of such plans and which take into account the social and economic needs of the States." Jurisdiction of the councils is for all fish within the EEZ and fishery management authority beyond the EEZ over anadromous species and Continental Shelf fishery resources. In the 2006 reauthorization, the Act calls for the FMPs to set catch levels to prevent overfishing, based on scientific advice, by 2010 for stocks subject to overfishing. The Act states that Councils shall "establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability". Management measures must be prepared and implemented to end overfishing immediately within two years of notification. In 2013, Congress began the process of reauthorization of the existing MSA, which continues at the time of this writing. The IJ FMP adopts by reference the MSA and any subsequent editions.

The Councils are comprised of the state division director or his designee, obligatory, and at-large positions appointed by the U.S. Secretary of Commerce. Similar to the ASMFC, the Councils appoint citizen advisors from states that have an interest in the specific fishery, to serve on

advisory panels to assist in the development of FMPs. Due to its geographic position as a transition zone between northern and southern fish populations, North Carolina is a member of both the Mid-Atlantic and South Atlantic Fishery Management Councils.

The clear intent of Congress in these two acts is to establish federal and state partnerships to ensure that the nation's fisheries are adequately protected and managed for optimum yield. The public participation in these processes is likewise emphasized, and the mechanisms to ensure public involvement are built into the acts. Similarly, North Carolina embraces this philosophy and strives to ensure adequate opportunities for public input and comment.

Endangered Species Act of 1973

The ESA was enacted by Congress in 1973 "to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, (and) to provide a program for the conservation of such endangered species and threatened species." The ESA is a comprehensive act that covers many aspects of endangered species protection and management. The USFWS and the NOAA Fisheries Office of Protected Resources (OPR) share responsibility for implementing the provisions of the ESA. Generally, the USFWS manages terrestrial and freshwater species, while NOAA Fisheries OPR has jurisdiction over marine and anadromous species. A species is considered "endangered" if it is in danger of extinction throughout all or a significant part of its range, and "threatened" if it is likely to become an endangered species within the foreseeable future.

The ESA prohibits the "take" of any listed species, which is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." Exceptions to the take prohibition are provided for in Sections 6, 7, and 10 of the Act through permits specific to certain activities. Section 6 allows for cooperative agreements with states actively engaged in research and monitoring that directly benefits the conservation of listed species, Section 7 relates to interagency cooperation amongst federal agencies, while Section 10 allows for takes that are incidental to otherwise lawful activities, such as fishing.

There are two primary provisions to Section 7: 1) all federal agencies shall utilize their authorities towards the furtherance of the goals of the ESA; and 2) each federal agency must consult with NOAA Fisheries or USFWS to insure that any action funded, authorized, or carried out by the agency is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. Although this section relates to federal agency cooperation, it can impact state projects through a federal nexus. If a project has federal authorization, funding, or other participation, it is subject to Section 7 consultation between the federal agency and NOAA Fisheries. DMF has received biological opinions in regards to Section 7 consultations on several grants.

Section 10 permits are an important tool for the regulated community, as they allow for a fishery to continue (under constraints and other conditions) that would otherwise have to be shut down. DMF has worked with NOAA Fisheries OPR in the development of Section 10 permits for inshore gill net and shrimp trawl fisheries over the years. The permits have allowed for the use of alternate management measures for the fisheries under an approved conservation plan designed to minimize impacts to threatened and endangered species.

Ideally, all measures needed to conserve the marine and estuarine resources of North Carolina would be developed and implemented solely under the FRA FMP process. In reality, state and federal authorities and initiatives overlap for many species, and this IJ FMP establishes which management processes take precedence. Section X. describes the implementation of these management processes.

As noted in Section I. Purpose, the IJ FMP must ensure that no inconsistencies in management strategies exist in regard to the ESA requirements for species managed under this FMP or under the ESA. The approach taken will consider how best to address the goals of the ESA and minimize activities that jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. The ESA requirements take precedence over any potential conflicting FMP management considerations. Mechanisms that further this goal are DMF programs that collect relevant data on ESA species, coordination of sampling activities under Section 7 permits, the receipt of Section 10 permits for identified fisheries, and staff participation at the federal level on technical and review panels.

VIII. COUNCIL AND ASMFC PLAN DEVELOPMENT

The process for developing FMPs is similar at the ASMFC and Council levels and is likewise similar to the process set forth in North Carolina by the FRA. The development of an FMP or amendment begins with a scoping document and scoping hearings (scoping process). This is the stage when issues are identified by the ASMFC or Councils with input from the public. A public hearing document is produced by the plan development teams and the Council or ASMFC. It contains management options aimed at rebuilding an overfished fishery or maintaining a sustainable fishery. After the scoping process, issues are discussed and included for additional analysis or rejected from further consideration. Proposed actions are reviewed by technical scientific committees to determine which alternatives achieve the conservation goals of the FMP.

A draft FMP or amendment is then developed by a species management board or Council committee and plan development team and taken out for public hearings (FMP development). Citizen advisory panels provide input during the scoping phase as well as prior to final action being taken. For Council FMPs, public hearings are usually held in each representative state. For ASMFC FMPs, public hearings may be held in the states that declare an interest in the fishery. At this point in the process, formal public comment is taken from individuals and organizations with an interest in the FMP. The Council or ASMFC reviews public comments and selects preferred alternatives. Council-approved FMPs must be subsequently reviewed by NOAA Fisheries, published in the Federal Register for a public comment period as required under the National Environmental Policy Act (NEPA) and approved by the Secretary of Commerce. For FMPs developed by the ASMFC, final species management board approval is followed by final approval by the full Commission and enacted with no further comments accepted. For FMPs developed by the Councils, comments are accepted again after the proposed rule to implement management changes is published by the Secretary of Commerce. Management measures contained in FMPs approved by the full ASMFC go to the individual states for implementation through each state's administrative process.

An abbreviated process for implementing a defined set of management changes that does not require scoping is available for both Councils and the ASMFC. For Council FMPs, both the

management changes and abbreviated process are outlined in each FMP's "framework procedure," and the public instrument used to describe the changes under consideration is called a "framework amendment" or "regulatory amendment." Similarly for ASMFC FMPs, this defined set of management changes and abbreviated process are outlined in each FMP's "adaptive management" section, and the public instrument used to describe the changes under consideration is called an "addendum." For both Council and ASMFC FMPs, the suite of management changes allowed under this abbreviated process usually includes such items as size limits, recreational bag limits, commercial trip limits, closed seasons and quotas. For Council FMPs, a 30-day comment period on the proposed rule to implement management changes is noticed; unlike the full amendment process, there is no accompanying comment period on the amendment document itself. However, Councils will accept public comment on a regulatory amendment as part of their normal public comment process both during and between Council meetings. For ASMFC FMPs, an addendum is also noticed for a 30-day public comment period, and states may request a public hearing be conducted in their jurisdictions during that timeframe. Finally, as part of the ISFMP under the ASMFC process, states and jurisdictions are allowed to implement management measures more restrictive than those required for compliance with an interstate FMP, but may not be less restrictive than the minimum standards.

IX. COORDINATION OF FMP DEVELOPMENT WITH THE N.C. MFC

Numerous individuals from member states are involved in the development of interjurisdictional FMPs; however, there is a need for specific roles to be identified for the DMF and the MFC to ensure that both are well-informed on the issues surrounding the development and approval of these federal plans. The MFC has expressed its concern to the DMF, the ASMFC and NOAA Fisheries about a lack of involvement and understanding of FMP management issues while these issues are undergoing deliberation in the federal FMP development process. Since the MFC must ultimately adopt compliance rules for state waters, stakeholders felt they should have more active involvement in the process. A joint meeting with the MFC and ASMFC was held in October 2006 to discuss this topic. The main conclusion from the meeting was the need to improve the lines of communication between all involved management entities.

In order to facilitate improved information exchange the MFC is informed of FMP scoping and development activities being undertaken by the ASMFC or federal Councils. Copies of any scoping documents, ASMFC or Council meeting summary memoranda, as well as annual compliance reports, implementation plans or Public Information Brochures (PIBs) pertinent to North Carolina are made available to the MFC. The DMF MFC Liaison office staff is responsible for circulating these documents to the MFC.

Additionally, the MFC may refer any of these materials to its committees for review. The MFC may also recommend any additional alternatives it feels are appropriate for committee review and feedback. The DMF submits any comments from the MFC to the appropriate management agency as part of that agency's public input process. The DMF MFC Liaison office staff provides resulting documents, notices of hearings, notice of final actions, and proposed rules to the MFC for review. Also, the DMF Public Information Officer forwards announcements regarding relevant Council and ASMFC issues to stakeholders via email distribution lists.

X. IMPLEMENTATION OF COUNCIL/COMMISSION PLANS

Federal law requires that the conservation management actions approved through an ASMFC or Council FMP be implemented by the State of North Carolina. Both the ACFCMA and the MSA contain measures that may be taken by the federal government should actions be taken, or fail to be taken, that will substantially and adversely affect the carrying out of such FMPs (Appendix A). The MFC, through the adoption of the IJ FMP, adopts management measures appropriate for North Carolina as the minimum standards for the management unit species or species group. This includes compliance requirements of ASMFC plans that are a product of the initial FMP or an amendment. An example of this is the requirement pursuant to Amendment 3 to the ASMFC Interstate FMP for Shad and River Herring that all states must have an approved Sustainable Fishery Plan in order to allow harvest of American shad within their jurisdictions.

During the interim between federal FMP approval and MFC rule action (if necessary) for compliance, the DMF Director may implement any approved management measure by proclamation as authorized by MFC rule 15A NCAC 03M .0512. Per G.S. 113-221.1, there are three required elements that establish the authority for the DMF Director to suspend or implement management measures by proclamation. The MFC must specifically authorize the DMF Director the ability to issue a proclamation, there must be a particular rule in place, and the rule must be affected by a variable condition. If a federally-managed species continues to be subject to variable conditions, it will continue to be managed via proclamation authority; this has generally been the practice since 2008. Conversely, should a set of conditions for a federally managed species become stable, the MFC may consider rulemaking to adopt a particular rule for that species.

The intent of this FMP is not to restrict the State of North Carolina or the MFC from implementing additional measures deemed appropriate by the best available information and in the best interest of the fisheries resources of North Carolina. The four species in Table 1 that also have N.C.-specific FMPs illustrate this point. The state FMP development process provides N.C. citizens a more in-depth or timely consideration of the stock condition, enhanced public involvement on management issues through the existing regional advisory committees, and direct authority of the MFC to implement resulting management strategies. Also, G.S. 150B-19.1 sets forth the principles of rulemaking to require that FMP rules, when appropriate, "shall be based on sound, reasonably available scientific, technical, economic, and other relevant information" and does not place an undue burden upon those persons or entities who must comply with the management action. The following brief overview of the four species with dual plans (N.C. IJ FMP and an individual N.C. FMP) describes the specific conditions that prompted development of each individual N.C. FMP.

Striped Bass

Atlantic striped bass abundance from North Carolina to Maine declined dramatically in the late 1970s. Because of the historical importance of striped bass to both the commercial and recreational sectors throughout the entire region, as well as the interjurisdictional migratory behavior of striped bass, the U.S. Congress passed the Atlantic Striped Bass Conservation Act – P.L. 98-613 on October 31, 1984 (98 stat. 3187, 16 U.S.C. 5151-5158). The historical Act established a unique state-based, federally-backed management scheme; however, the Act only

applied to Atlantic Ocean migratory stocks, so the more southern N.C. riverine endemic stocks were excluded.

The MFC and the N.C. Wildlife Resources Commission (WRC) in cooperation with USFWS implemented a Memorandum of Agreement in 1990 to address management of striped bass in the Albemarle Sound and Roanoke River (covered by the Act). The original Estuarine Striped Bass FMP was approved by the MFC in 1994 and was targeted at the continued recovery of the Albemarle/Roanoke stock, which at the time was at historically low levels of abundance and was experiencing chronic spawning failures. This comprehensive plan also, for the first time, addressed the management of all estuarine stocks of striped bass in the state, including a commercial quota for the Central/Southern stocks. The plan also satisfied the recommendation contained in the 1992 U.S. Fish and Wildlife Service Report to Congress for the North Carolina Striped Bass Study that such a plan be prepared. The N.C. Estuarine Striped Bass FMP that conformed to the requirements set out in the N.C. FRA of 1997 proceeded in order to fully address management for all the N.C. estuarine stocks and was approved in 2004.

River Herring

The ASMFC Interstate FMP for Shad and River Herring was initially approved in 1985, but no restrictions were included. Amendment 1 to that plan was approved in 1998 that provided for restrictions on the American shad (*A. sapidissima*) fisheries in the ocean, but made no specific regulatory recommendations concerning river herring. The FMP included greater biological monitoring and reporting requirements for river herring and recommended that existing management regimes be maintained or strengthened. Concern over continued reductions in both landings and juvenile survey values led to imposition of seasonal closures and harvest quotas in the early 1990s and adoption of the N.C. River Herring FMP in 2000 to comprehensively manage the fishery in state waters.

Red Drum

The red drum stocks in North Carolina were classified as stressed-declining in the 1997 DMF Stock Status Report and based on initial MFC FMP Guidelines, red drum were given high priority by the MFC for immediate FMP development. The guidelines also provided for a provisional plan required within 90 days of a listing of stressed-declining in the DMF Stock Status Report. Interim measures were implemented in October 1998 to prevent any further decline in the status of the red drum stocks and the MFC also initiated the state red drum FMP which was completed in March 2001. At that time, the MFC determined additional state measures were crucial to protect a large year class of 14- to 15-inch red drum and to move toward reaching the SAFMC goal of an OY of 40 percent spawning potential ratio (SPR) and an overfishing definition of 30 percent SPR.

Prior to the time interim measures were implemented in 1998, red drum along the Atlantic coast, including North Carolina, were already managed jointly by the ASMFC and the SAFMC. The SAFMC Red Drum FMP was developed and passed in 1990 and subsequently adopted as Amendment 1 to the ASMFC Red Drum FMP. This joint FMP, or Amendment 1, stated that intense fishing mortality on juvenile red drum in state waters was resulting in reduced recruitment to the adult spawning stock. Management measures in place prior to October 1998 were the result of these plans. The N.C. Red Drum FMP proceeded because measures taken as part of the ASMFC/SAFMC plan had been inadequate to prevent overfishing on the stock and no

plan was in place for further action with the ASMFC/SAFMC plan. The N.C. Red Drum FMP adopted the 30 percent overfishing and 40 percent target used in the ASMFC/SAFMC plans.

Spotted Seatrout

Spotted seatrout are currently managed under the 2012 N.C. Spotted Seatrout FMP with guidance provided by the ASMFC Omnibus Amendment to the Interstate ASMFC FMP for Spotted Seatrout. While North Carolina is in compliance with the ASMFC minimum size limit for both recreational and commercial sectors and has adopted the recommended 20% SPR threshold, a separate N.C. FMP for spotted seatrout was developed to fully address the status of the stock through the state stock assessment process and to ensure long-term sustainability for the spotted seatrout stock in North Carolina.

For the species managed by both an individual N.C. FMP and the N.C. IJ FMP, measures implemented to maintain compliance with an ASMFC or Council FMP are documented in writing through a revision to the individual N.C. FMP. These changes in management strategies are documented in an information paper that is part of the FMP as a dated revision. The information paper provides the rationale agreed to by the DMF and the MFC for change in management under the authority of existing adaptive management (which provides a way to adapt to changing circumstances of a fishery.) The adaptive management measures implemented via the revision shall be considered in the next review or change to the individual N.C. FMP. Since public comment is received during the development of the ASMFC or Council FMP that contains adaptive management, seeking additional public comment preceding state implementation would be redundant, would potentially delay implementation, and is not required. Again, if additional measures beyond those required by the ASMFC or Council FMP are deemed appropriate for North Carolina, the state FMP development process would be employed as mentioned above.

It is important to note that significant DMF resources are invested to create and review state FMPs. Plan development takes upwards of two years, and the promulgation of rules under the Administrative Procedure Act (G.S. 150B) adds additional time. The DMF is considering ways to do more with less as budgets are reduced and demands on staff continue to increase. The DMF Strategic Plan notes developing a process of exempting issues from inclusion in FMPs that do not impact the long-term viability of the species and achieving efficiencies to reduce workload where possible. Consideration of "retiring" a state FMP when the corresponding federal FMP adequately includes all elements that would be addressed under a state plan will be formalized in a forthcoming DMF resource policy.

At the same time, should management actions be approved by the ASMFC or Councils that fail to meet legislative requirements (such as those set forth in G.S. 113-182.1), or are deemed contrary to the best interest of the resources or fishermen of the state of North Carolina, the MFC may challenge those restrictions, realizing the implications of a finding that determines the actions or inactions of the state will substantially and adversely affect the carrying out of such FMPs. A majority vote of the MFC would be required to go out of compliance with an ASMFC FMP or to not complement the management measures contained in a Council FMP in state waters. For ASMFC FMPs, a determination of non-compliance for North Carolina by the ASMFC would be forwarded to the Secretary of Commerce. If the Secretary concurs and determines that the measures the state failed to implement and enforce are necessary for

conservation, a moratorium for the fishery in question is imposed within the waters of the non-complying state. Enforcement of the moratorium is by federal agents and the United States Coast Guard. For the Council FMPs, the Secretary of Commerce may regulate the applicable fishery within the state boundaries (for fisheries occurring out to three miles from shore) in the event that a state takes an action or fails to take any action that substantially and adversely affects the carrying out of a Council FMP.

An alternative to a decision by the MFC to go out of compliance with an ASMFC FMP or not complement measures contained in a Council FMP is appointment of a Compliance Advisory Panel (CAP) by the MFC chairman to first review whether consistency with an ASMFC or Council FMP should be challenged. Additionally, in cases where options exist, a CAP may be formed and recommend management actions necessary to meet the requirements of FMPs that permit management options to be developed at the state level. Many of the FMPs and amendments developed by ASMFC require an implementation plan to outline how a state will comply with required management measures. States may be provided with options to reduce harvest in overfished fisheries or expand harvest in recovered fisheries that are differentially suited to the needs of the various fisheries in each state. For example, Amendment 3 to the ASMFC FMP for weakfish provided the states with options to reduce the commercial and recreational weakfish harvest. The recreational fishery had a choice of bag and size limits, while the commercial fishery could be regulated by size limits, mesh sizes, closed seasons, and closed areas. Review by a CAP can contribute to development of a plan that best suits the recreational and commercial fishing interests of North Carolina. Alternatively, within time constraints, the MFC may elect to develop management measures for review by one of its existing advisory committees rather than appointing a CAP.

The recommendations developed by the CAP are required to go through the MFC's Finfish Advisory Committee, regional advisory committees and full MFC for review and recommendations to DMF for presentation to the Councils/ASMFC. Once the compliance plan is approved by the Council/ASMFC, the MFC is required to adopt the rules necessary for compliance with the ASMFC plan and should complement actions in the federal Council plan. Some FMPs, however, impose mandatory fishery management measures, including quotas, bag limits, size limits, trip limits, etc., for which there are no options or exceptions. These management measures are required to be adopted by each state affected, including North Carolina, as the minimum standard for that fishery except as noted in the challenge process previously described.

Finally, North Carolina has considered withdrawing from the ASMFC compact on two occasions. The implications of withdrawal from the compact have been reviewed by the North Carolina Attorney General's office and addressed in the 1995 legislative session with the creation of the Atlantic States Marine Fisheries Compact Withdrawal Committee that reported their findings in 1996. In both instances, the rationale against withdrawal is based on the finding that a state is still subject to the ASMFC actions, regardless of its membership in the compact (See Appendix A for advisory memorandum from office of N.C. Attorney General). The ASMFC does have an appeal process that a state may employ to have a decision made by a species management board reconsidered by the policy board (Appendix A). The ISFMP charter also allows an appeal to the ISFMP Board in regards to challenging out-of-compliance determinations by the ASMFC.

In conclusion, a variety of tools exist within the framework of the IJ FMP to ensure the differential needs of North Carolina's fisheries are considered during both the development and implementation of interstate and federal FMPs. These tools are intended to assist in achieving the goals of minimizing duplication of management effort while meeting all relevant state and federal statutes.

APPENDIX A LEGAL REFERENCES

Appendix A-1

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT
Public Law 94-265
As amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act 2006 (P.L. 109-479), Italic indicates amended sections, Shaded text shown in detail.
AN ACT
To provide for the conservation and management of the fisheries,
and for other purposes.
http://www.nmfs.noaa.gov/msa2007/,

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SEC. 2. FINDINGS, PURPOSES, AND POLICY 16 U.S.C. 1801
(b) PURPOSES.--It is therefore declared to be the purposes of the Congress in this Act--
99-659, 101-627, 102-251
(1) to take immediate action to conserve and manage the fishery resources found off the coasts of the United States, and the anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species and Continental Shelf fishery resources[, and fishery resources in the special areas]*;
(2) to support and encourage the implementation and enforcement of international fishery agreements for the conservation and management of highly migratory species, and to encourage the negotiation and implementation of additional such agreements as necessary;
104-297
(3) to promote domestic commercial and recreational fishing under sound conservation and management principles, including the promotion of catch and release programs in recreational fishing;
(4) to provide for the preparation and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield from each fishery;
101-627
(5) to establish Regional Fishery Management Councils to exercise sound judgment in the stewardship of fishery resources through the preparation, monitoring, and revision of such plans under circumstances (A) which will enable the States, the fishing industry, consumer and environmental organizations, and other interested persons to participate in, and advise on, the establishment and administration of such plans, and (B) which take into account the social and economic needs of the States;
95-354, 96-561, 104-297
(6) to encourage the development by the United States fishing industry of fisheries which are currently underutilized or not utilized by United States fishermen, including bottom fish off Alaska, and to that end, to ensure that optimum yield determinations promote such development in a non-wasteful manner; and

104-297

(7) to promote the protection of essential fish habitat in the review of projects conducted under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat.

SEC. 306. STATE JURISDICTION (16 U.S.C. 1856)

97-453, 98-623

(a) IN GENERAL.--

(1) Except as provided in subsection (b), nothing in this Act shall be construed as extending or diminishing the jurisdiction or authority of any State within its boundaries.

(2) For the purposes of this Act, except as provided in subsection (b), the jurisdiction and authority of a State shall extend

(A) to any pocket of waters that is adjacent to the State and totally enclosed by lines delimiting the territorial sea of the United States pursuant to the Geneva Convention on the Territorial Sea and Contiguous Zone or any successor convention to which the United States is a party;

(B) with respect to the body of water commonly known as Nantucket Sound, to the pocket of water west of the seventieth meridian west of Greenwich; and

(C) to the waters of southeastern Alaska (for the purpose of regulating fishing for other than any species of crab) that are--

(i) north of the line representing the international boundary at Dixon Entrance and the westward extension of that line; east of 138 degrees west longitude; and not more than three nautical miles seaward from the coast, from the lines extending from headland to headland across all bays, inlets, straits, passes, sounds, and entrances, and from any island or group of islands, including the islands of the Alexander Archipelago (except Forrester Island); or

(ii) between the islands referred to in clause (i) (except Forrester Island) and the mainland.

104-297

(3) A State may regulate a fishing vessel outside the boundaries of the State in the following circumstances:

(A) The fishing vessel is registered under the law of that State, and (i) there is no fishery management plan or other applicable Federal fishing regulations for the fishery in which the vessel is operating; or (ii) the State's laws and regulations are consistent with the fishery management plan and applicable Federal fishing regulations for the fishery in which the vessel is operating.

(B) The fishery management plan for the fishery in which the fishing vessel is operating delegates management of the fishery to a State and the State's laws and regulations are consistent with such fishery management plan. If at any time the Secretary determines that a State law or regulation applicable to a fishing vessel under this circumstance is not consistent with the fishery management plan, the Secretary shall promptly notify the State and the appropriate Council of such determination and provide an opportunity for the State to correct any inconsistencies identified in the notification. If, after notice and opportunity for corrective action, the State does not correct the inconsistencies identified by the Secretary, the authority granted to the State under this subparagraph shall not apply until the Secretary and the appropriate Council find that the State has corrected the inconsistencies. For a fishery for which there was a fishery management plan in place on August 1, 1996 that did not delegate management of the

fishery to a State as of that date, the authority provided by this subparagraph applies only if the Council approves the delegation of management of the fishery to the State by a three-quarters majority vote of the voting members of the Council.
(C) The fishing vessel is not registered under the law of the State of Alaska and is operating in a fishery in the exclusive economic zone off Alaska for which there was no fishery management plan in place on August 1, 1996, and the Secretary and the North Pacific Council find that there is a legitimate interest of the State of Alaska in the conservation and management of such fishery. The authority provided under this subparagraph shall terminate when a fishery management plan under this Act is approved and implemented for such fishery.
99-659, 104-297
(b) EXCEPTION.--
(1) If the Secretary finds, after notice and an opportunity for a hearing in accordance with section 554 of title 5, United States Code, that--
(A) the fishing in a fishery, which is covered by a fishery management plan implemented under this Act, is engaged in predominately within the exclusive economic zone and beyond such zone; and
(B) any State has taken any action, or omitted to take any action, the results of which will substantially and adversely affect the carrying out of such fishery management plan; the Secretary shall promptly notify such State and the appropriate Council of such finding and of his intention to regulate the applicable fishery within the boundaries of such State (other than its internal waters), pursuant to such fishery management plan and the regulations promulgated to implement such plan.
(2) If the Secretary, pursuant to this subsection, assumes responsibility for the regulation of any fishery, the State involved may at any time thereafter apply to the Secretary for reinstatement of its authority over such fishery. If the Secretary finds that the reasons for which he assumed such regulation no longer prevail, he shall promptly terminate such regulation.
(3) If the State involved requests that a hearing be held pursuant to paragraph (1), the Secretary shall conduct such hearing prior to taking any action under paragraph (1).

Appendix A-2

TITLE 16 - CONSERVATION
CHAPTER 71 - ATLANTIC COASTAL FISHERIES COOPERATIVE MANAGEMENT ACT
Sec. 5101. - Findings and purpose
(a) Findings
The Congress finds the following:
(1)
Coastal fishery resources that migrate, or are widely distributed, across the jurisdictional boundaries of two or more of the Atlantic States and of the Federal Government are of substantial
commercial and recreational importance and economic benefit to the Atlantic coastal region and the Nation.
(2)
Increased fishing pressure, environmental pollution, and the loss and alteration of habitat have reduced severely certain Atlantic coastal fishery resources.
(3)
Because no single governmental entity has exclusive management authority for Atlantic coastal fishery resources, harvesting of such resources is frequently subject to disparate, inconsistent, and
intermittent State and Federal regulation that has been detrimental to the conservation and sustainable use of such resources and to the interests of fishermen and the Nation as a whole.
(4)
The responsibility for managing Atlantic coastal fisheries rests with the States, which carry out a cooperative program of fishery oversight and management through the Atlantic States Marine Fisheries Commission. It is the responsibility of the Federal Government to support such cooperative interstate management of coastal fishery resources.
(5)
The failure by one or more Atlantic States to fully implement a coastal fishery management plan can affect the status of Atlantic coastal fisheries, and can discourage other States from fully implementing coastal fishery management plans.
(6)
It is in the national interest to provide for more effective Atlantic State fishery resource conservation and management.
(b) Purpose
The purpose of this chapter is to support and encourage the development, implementation, and enforcement of effective interstate conservation and management of Atlantic coastal fishery resources.
Sec. 5102. - Definitions
In this chapter, the following definitions apply:
(1)
The term "coastal fishery management plan" means a plan for managing a coastal fishery resource, or an amendment to such plan, prepared and adopted by the Commission, that -
(A)
contains information regarding the status of the resource and related fisheries; and
(B)

specifies conservation and management actions to be taken by the States.
(2)
The term "coastal fishery resource" means any fishery, any species of fish, or any stock of fish that moves among, or is broadly distributed across, waters under the jurisdiction of two or more States or waters under the jurisdiction of one or more States and the exclusive economic zone.
(3)
The term "Commission" means the Atlantic States Marine Fisheries Commission established under the interstate compact consented to and approved by the Congress in Public Laws 77-539 and 81-721.
(4)
The term "conservation" means the restoring, rebuilding, and maintaining of any coastal fishery resource and the marine environment, in order to assure the availability of coastal fishery resources on a long-term basis.
(5)
The term "Councils" means Regional Fishery Management Councils established under section 1852 of this title.
(6)
The term "exclusive economic zone" means the exclusive economic zone of the United States established by Proclamation Number 5030, dated March 10, 1983. For the purposes of this chapter, the inner boundary of that zone is a line coterminous with the seaward boundary of each of the coastal States, and the outer boundary of that zone is a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measured.
(7)
The term "fish" means finfish, mollusks, crustaceans, and all other forms of marine animal life other than marine mammals and birds.
(8)
The term "fishery" means -
(A)
one or more stocks of fish that can be treated as a unit for purposes of conservation and management and that are identified on the basis of geographical, scientific, technical, commercial, recreational, or economic characteristics; or
(B)
any fishing for such stocks.
(9)
The term "fishing" means -
(A)
the catching, taking, or harvesting of fish;
(B)
the attempted catching, taking, or harvesting of fish;
(C)
any other activity that can be reasonably expected to result in the catching, taking, or harvesting of fish; or
(D)
any operations at sea in support of, or in preparation for, any activity described in subparagraphs (A) through (C). Such term does not include any scientific research activity or the catching, taking, or harvesting of fish in an aquaculture operation.

(10)
The term "implement and enforce" means to enact and implement laws or regulations as required to conform with the provisions of a coastal fishery management plan and to assure compliance with such laws or regulations by persons participating in a fishery that is subject to such plan.
(11)
The term "person" means any individual (whether or not a citizen or national of the United States), any corporation, partnership, association, or other entity (whether or not organized or existing under the laws of any State), and any Federal, State, local, or foreign government or any entity of any such government.
(12)
The term "Secretary" means the Secretary of Commerce.
(13)
The term "State" means Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, the District of Columbia, or the Potomac River Fisheries Commission

Sec. 5103. - State-Federal cooperation in Atlantic coastal fishery management

(a) Federal support for State coastal fisheries programs

The Secretary in cooperation with the Secretary of the Interior shall develop and implement a program to support the interstate fishery management efforts of the Commission. The program shall include activities to support and enhance State cooperation in collection, management, and analysis of fishery data; law enforcement; habitat conservation; fishery research, including biological and socioeconomic research; and fishery management planning.

(b) Federal regulation in exclusive economic zone

(1)
In the absence of an approved and implemented fishery management plan under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.), and after consultation with the appropriate Councils, the Secretary may implement regulations to govern fishing in the exclusive economic zone that are -

(A)
compatible with the effective implementation of a coastal fishery management plan; and

(B)
consistent with the national standards set forth in section 301 of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1851). The regulations may include measures recommended by the Commission to the Secretary that are necessary to support the provisions of the coastal fishery management plan. Regulations issued by the Secretary to implement an approved fishery management plan prepared by the appropriate Councils or the Secretary under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) shall supersede any conflicting regulations issued by the Secretary under this subsection.

(2)
The provisions of sections 307, 308, 309, 310, and 311 of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1857, 1858, 1859, 1860, and 1861) regarding prohibited acts, civil penalties, criminal offenses, civil forfeitures, and enforcement shall apply with respect to regulations issued under this subsection as if such regulations were issued under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.)

Sec. 5104. - State implementation of coastal fishery management plans

(a) Coastal fishery management plans

(1)
The Commission shall prepare and adopt coastal fishery management plans to provide for the conservation of coastal fishery resources. In preparing a coastal fishery management plan for a fishery that is located in both State waters and the exclusive economic zone, the Commission shall consult with appropriate Councils to determine areas where such coastal fishery management plan may complement Council fishery management plans. The coastal fishery management plan shall specify the requirements necessary for States to be in compliance with the plan. Upon adoption of a coastal fishery management plan, the Commission shall identify each State that is required to implement and enforce that plan.
(2)
Within 1 year after December 20, 1993, the Commission shall establish standards and procedures to govern the preparation of coastal fishery management plans under this chapter, including standards and procedures to ensure that -
(A)
such plans promote the conservation of fish stocks throughout their ranges and are based on the best scientific information available; and
(B)
the Commission provides adequate opportunity for public participation in the plan preparation process, including at least four public hearings and procedures for the submission of written comments to the Commission.
(b) State implementation and enforcement
(1)
Each State identified under subsection (a) of this section with respect to a coastal fishery management plan shall implement and enforce the measures of such plan within the timeframe established in the plan.
(2)
Within 90 days after December 20, 1993, the Commission shall establish a schedule of timeframes within which States shall implement and enforce the measures of coastal fishery management plans in existence before December 20, 1993. No such timeframe shall exceed 12 months after the date on which the schedule is adopted.
(c) Commission monitoring of State implementation and enforcement
The Commission shall, at least annually, review each State's implementation and enforcement of coastal fishery management plans for the purpose of determining whether such State is effectively implementing and enforcing each such plan. Upon completion of such reviews, the Commission shall report the results of the reviews to the Secretaries

Sec. 5105. - State noncompliance with coastal fishery management plans

(a) Noncompliance determination
The Commission shall determine that a State is not in compliance with the provisions of a coastal fishery management plan if it finds that the State has not implemented and enforced such plan within the timeframes established under the plan or under section 5104 of this title.
(b) Notification
Upon making any determination under subsection (a) of this section, the Commission shall within 10 working days notify the Secretaries of such determination. Such notification shall include the reasons for making the determination and an explicit list of actions that the affected State must take to comply with the coastal fishery management plan. The Commission shall provide a copy of the notification to the affected State.
(c) Withdrawal of noncompliance determination

After making a determination under subsection (a) of this section, the Commission shall continue to monitor State implementation and enforcement. Upon finding that a State has complied with the actions required under subsection (b) of this section, the Commission shall immediately withdraw its determination of noncompliance. The Commission shall promptly notify the Secretaries of such withdrawal

Sec. 5106. - Secretarial action

(a) Secretarial review of Commission determination of noncompliance

Within 30 days after receiving a notification from the Commission under section 5105(b) of this title and after review of the Commission's determination of noncompliance, the Secretary shall make a finding on -

(1)

whether the State in question has failed to carry out its responsibility under section 5104 of this title; and

(2)

if so, whether the measures that the State has failed to implement and enforce are necessary for the conservation of the fishery in question.

(b) Consideration of comments

In making a finding under subsection (a) of this section, the Secretary shall -

(A)

give careful consideration to the comments of the State that the Commission has determined under section 5105(a) of this title is not in compliance with a coastal fishery management plan, and provide such State, upon request, with the opportunity to meet with and present its comments directly to the Secretary; and

(B)

solicit and consider the comments of the Commission and the appropriate Councils.

(c) Moratorium

(1)

Upon making a finding under subsection (a) of this section that a State has failed to carry out its responsibility under section 5104 of this title and that the measures it failed to implement and enforce are necessary for conservation, the Secretary shall declare a moratorium on fishing in the fishery in question within the waters of the noncomplying State. The Secretary shall specify the moratorium's effective date, which shall be any date within 6 months after declaration of the moratorium.

(2)

If after a moratorium is declared under paragraph (1) the Secretary is notified by the Commission that the Commission is withdrawing under section 5105(c) of this title the determination of noncompliance, the Secretary shall immediately determine whether the State is in compliance with the applicable plan. If so, the moratorium shall be terminated.

(d) Implementing regulations

The Secretary may issue regulations necessary to implement this section. Such regulations -

(1)

may provide for the possession and use of fish which have been produced in an aquaculture operation, subject to applicable State regulations; and

(2)

shall allow for retention of fish that are subject to a moratorium declared under this section and unavoidably taken as incidental catch in fisheries directed toward menhaden if -

(A)

discarding the retained fish is impracticable;
(B)
the retained fish do not constitute a significant portion of the catch of the vessel; and
(C)
retention of the fish will not, in the judgment of the Secretary, adversely affect the conservation of the species of fish retained.
(e) Prohibited acts during moratorium
During the time in which a moratorium under this section is in effect, it is unlawful for any person to -
(1)
violate the terms of the moratorium or of any implementing regulation issued under subsection (d)
of this section;
(2)
engage in fishing for any species of fish to which the moratorium applies within the waters of the State subject to the moratorium;
(3)
land, attempt to land, or possess fish that are caught, taken, or harvested in violation of the moratorium or of any implementing regulation issued under subsection (d) of this section;
(4)
fail to return to the water immediately, with a minimum of injury, any fish to which the moratorium applies that are taken incidental to fishing for species other than those to which the moratorium applies, except as provided by regulations issued under subsection (d) of this section;
(5)
refuse to permit any officer authorized to enforce the provisions of this chapter to board a fishing vessel subject to such person's control for purposes of conducting any search or inspection in connection with the enforcement of this chapter;
(6)
forcibly assault, resist, oppose, impede, intimidate, or interfere with any such authorized officer in the conduct of any search or inspection under this chapter;
(7)
resist a lawful arrest for any act prohibited by this section;
(8)
ship, transport, offer for sale, sell, purchase, import, or have custody, control, or possession of, any fish taken or retained in violation of this chapter; or
(9)
interfere with, delay, or prevent, by any means, the apprehension or arrest of another person, knowing that such other person has committed any act prohibited by this section.
(f) Civil and criminal penalties
(1)
Any person who commits any act that is unlawful under subsection (e) of this section shall be liable to the United States for a civil penalty as provided by section 308 of the Magnuson-Stevens
Fishery Conservation and Management Act (16 U.S.C. 1858).
(2)
Any person who commits an act prohibited by paragraph (5), (6), (7), or (9) of subsection (e) of

this section is guilty of an offense punishable as provided by section 309(a)(1) and (b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1859(a)(1) and (b)).
(g) Civil forfeitures
(1)
Any vessel (including its gear, equipment, appurtenances, stores, and cargo) used, and any fish (or the fair market value thereof) taken or retained, in any manner, in connection with, or as the result of, the commission of any act that is unlawful under subsection (e) of this section, shall be subject to forfeiture to the United States as provided in section 310 of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1860).
(2)
Any fish seized pursuant to this chapter may be disposed of pursuant to the order of a court of competent jurisdiction or, if perishable, in a manner prescribed in regulation.
(h) Enforcement
A person authorized by the Secretary or the Secretary of the department in which the Coast Guard is operating may take any action to enforce a moratorium declared under subsection (c) of this section that an officer authorized by the Secretary under section 311(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1861(b)) may take to enforce that Act (16 U.S.C. 1801 et seq.). The Secretary may, by agreement, on a reimbursable basis or otherwise, utilize the personnel, services, equipment (including aircraft and vessels), and facilities of any other Federal department or agency and of any agency of a State in carrying out that enforcement

Sec. 5107. - Financial assistance

The Secretary and the Secretary of the Interior may provide financial assistance to the Commission and to the States to carry out their respective responsibilities under this chapter, including -
(1)
the preparation, implementation, and enforcement of coastal fishery management plans; and
(2)
State activities that are specifically required within such plans

Appendix A-3

Atlantic States Marine Fisheries Commission

APPEALS PROCESS

Approved by the ISFMP Policy Board

August 18, 2004

Background

The Atlantic States Marine Fisheries Commission's interstate management process is based on the voluntary commitment and cooperation of the states. The involved states have frequently demonstrated their willingness to compromise and the overall process has proven to be very successful. However, there have been instances where a state/jurisdiction has expressed concern that the Board decisions have not been consistent with language of an FMP, resulted in unforeseen circumstances or impacts, did not follow established processes, or were based on flawed technical information. In order to address these concerns, the ISFMP Policy Board charged the Administrative Oversight Committee with "exploring and further developing an appeals process".

Under the current management process the primary policy development responsibility lies with species management boards. And, in the case of development of new fishery management plans or amendments the full Commission has final approval authority prior to implementation. The purpose of the appeals process is to provide a mechanism for a state/jurisdiction to petition for a management decision to be reconsidered, repealed or altered. The appeals process is intended to only be used in extraordinary circumstances where all other options have been exhausted. The management boards have the ability to go back and correct errors or address additional technical information through the recently clarified process on "amending or rescinding previous board actions".

During the December 2003 ISFMP Policy Board meeting, the decision was made to continue to have the Policy Board serve as the deliberative body that will consider valid appeals. This decision is consistent with the language that is included in the ISFMP Charter. However, the Charter does not provide detailed guidance on how an appeal is to be addressed.

This paper details for the Commission appeals process.

Appeal Criteria –The intent of the appeals process is to provide a state with the opportunity to have a decision made by a species management board or section reconsidered by the Policy Board. The following criteria will be used to guide what type of decisions can be appealed. In general, management measures established through the FMP/amendment/addendum process can be appealed. However, the appellant must use one of the following criteria to justify an appeal:

1. Decision not consistent with FMP

2. Failure to follow process

3. Insufficient/inaccurate/incorrect application of technical information

4. Historical landings period not adequately addressed
5. Management actions resulting in unforeseen circumstances/impacts

The following issues could not be appealed:

1. Management measures established via emergency action

2. Out-of-compliance findings (this can be appealed but, through a separate, established process)

3. Changes to the ISFMP Charter

Appeal Initiation – The ISFMP Charter provides that a state aggrieved by a management board action can appeal to the ISFMP Policy Board. Any state can request to initiate an appeal; also a group of states can submit a unified request for an appeal. The states are represented on the Commission by three representatives that have the responsibility of acting on behalf of the states' Executive and Legislative branches of government. Therefore, in order to initiate an appeal all seated Commissioners (not proxies) of a state's caucus must agree that an appeal is warranted and must sign the letter submitted to the Commission. If a multi-state appeal is requested all the Commissioners from the requesting states must sign the letter submitted to the Commission. During meetings where an appeal is discussed proxies will be able to participate in the deliberations. Meeting specific proxies will not be permitted to vote on the final appeal determination, consistent with Commission policy.

A state (or group of states) can request and appeal on behalf of the Potomac River Fisheries Commission, District of Columbia, National Marine Fisheries Service, or the United States Fish and Wildlife Service.
The letter requesting an appeal will be submitted to the Chair of the Commission and include the measure(s) or issue(s) being appealed, the justification for the appeal, and the commitment to comply with the finding of the Policy Board. This letter must also include a demonstration that all other options to gain relief at the management board level have been exhausted. This letter must be submitted via certified mail at least **45 days** prior to a scheduled ASMFC Meeting Week. The Commission Chair, Vice-Chair and immediate past Chair will determine if the appeal meets the qualifying guidelines and notify the Policy Board of their decision. If the immediate past chair is no longer a commissioner the Chair will select an alternate from a state that is not affected by the appeal.

Convene a "Fact Finding" Committee (optional) -- Upon review of the appeal documentation, the Commission Chair, Vice-Chair and immediate past Chair (or alternate if necessary, as described above) may establish a "Fact Finding" Committee to conduct analyses and/or compile additional information if necessary. This group will be made up of individuals with the technical expertise (including legal, administrative, social, economic, or habitat expertise if necessary) and familiarity with the fishery to conduct the necessary analysis. If such a committee is convened the schedule included in the last section of this document may need to be adjusted to provide time for the Committee to conduct analyses. The Commission Chair, Vice-Chair and immediate past Chair (or alternate if necessary, as described above) may set a deadline for the Committee to complete its work to ensure the appeal is addressed in a timely manner.

ISFMP Policy Board Meeting –Following the determination that an appeal has met the qualifying guidelines, a meeting of the Policy Board will be convened at a scheduled ASMFC

meeting week. The agenda of this meeting will be set to allow sufficient time for all necessary presentations and discussions. The Chair of the Commission will serve as the facilitator of the meeting. If the Chair is unable to attend the meeting or would like to more fully participate in the deliberations, the Vice-Chair of the Commission will facilitate the meeting. The ISFMP Director will provide the background on the development of the management program as well as a summary of the justification provided in the record for the management board's action. The ISFMP Director will also present the potential impacts of the appeal on other affected states. The appellant Commissioners will present their rationale for appealing the decision and provide a suggested solution. The Policy Board will then discuss the presentations and ask any necessary questions. The Board will vote to determine if the management board's action was justified. A simple majority of the Policy Board is required to forward a recommendation to a management board for corrective action. If the Policy Board determines that the existing management program should be modified, it will issue a finding to that effect as well as any guidance regarding corrective action to the appropriate species management board. The referral may be worded to allow the management board flexibility in determining the details of the corrective action.

Upon receipt of the Policy Board's recommendation the management board will discuss the findings and make the necessary changes to address the appeal. The management board is obligated to make changes that respond to the findings of the Policy Board. A simple majority of the management board will be necessary to approve the changes.

Appeal Products and Policy Board Authority—Following the Policy Board meeting a summary of the meeting will be developed. This summary will include a detailed description of the findings and will be forwarded to the appropriate management board and Policy Board upon completion. If the Policy Board determines that changes to the management program are necessary, the summary may include guidance to the management board for corrective action. The report of the Policy Board will be presented to the management board for action at the next scheduled meeting.

Considerations to Prevent Abuse of the Appeals Process – The appeals process is intended to be used only in extraordinary situations and is in no way intended to provide a potential avenue to preempt the established board process. The initiation of an appeal will not delay the Commission process for finding a state out of compliance nor delay or impede the imposition of penalties for delayed compliance.

Limiting Impacts of Appeal Findings – If a state is successful in an appeal and the management program is altered, another state may be negatively impacted by the appeals decision. In order to prevent an appeals "chain reaction," the Policy Board's recommendation and the resulting management board's decision will be binding on all states. All states with an interest in the fishery will be obligated to implement the changes as approved by the management board. Upon completion of the appeals process, a state is not precluded from taking further action beyond the Commission process to seek relief.

If the Policy Board supports the appeal and determines that corrective action is warranted, the potential for management changes to negatively impact other states will be evaluated by the Policy Board and the species management board.

Appeals Process Timeline

1. Within **15 working days** of receipt of a complete appeal request the Commission Chair, Vice-Chair, and immediate past chair (or alternate) will determine if the state has an appeal which meets the qualifying guidelines.

2. Upon a finding that the appeal meets the qualifying guidelines, the appeal will be included on the agenda of the ISFMP Policy Board meeting scheduled during the next ASMFC Meeting Week (provided an adequate time period is available for preparation of the necessary documentation).

3. Following the finding that an appeal meets the qualifying guidelines, Commission staff and the appellant commissioners will have a minimum of **15 working days** to prepare the necessary background documents.

4. The background documents will be distributed at least **15 days** prior to the Policy Board meeting.

5. A summary of the Policy Board meeting will be developed and distributed to all Commissioners within **15 working days** of the conclusion of the meeting.

Appendix A-4

ROY COOPER
ATTORNEY GENERAL

State of North Carolina
Department of Justice
9001 Mail Service Center
RALEIGH, NORTH CAROLINA
27699-9001

REPLY TO: Francis W. Crawley
Environmental Division
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MEMORANDUM

TO: North Carolina Marine Fisheries Commission

FROM: Francis W. Crawley
Special Deputy Attorney General

DATE: May 19, 2006

RE The Commission's Relationship with the Atlantic States Marine Fisheries Commission and the United States in Fisheries Management Matters

Two memoranda authored by Assistant Attorney General Tim Nifong in 1993 and 1995 addressed the Atlantic States Marine Fisheries Commission's (ASMFC) authority over striped bass in State waters and the effect of withdrawal from the ASMFC. The relevant conclusions in these detailed memoranda are incorporated into this memorandum but Mr. Nifong's writings need not be fully reproduced; they are available from the Division of Marine Fisheries. [1]

The following questions were asked during the April 2006 Commission meeting and will be addressed.

I. Is the ASMFC covered under the Magnuson-Stevens Fishery Conservation Act, 16 USC 1801, et seq.? Answer: No

The ASMFC was created by an interstate compact entered into by the Atlantic coastal states. In 1949, the General Assembly codified the terms of the Compact in G.S. § 113-251 to § 113-253, and North Carolina became a member of the Commission that year. Originally the ASMFC made recommendations to the states for joint fishery management at the state level. Today the ASMFC is authorized by the Atlantic Coastal Fisheries Cooperative Management Act, 16 USC §§ 5101, et seq., to adopt Fishery Management Plans (FMP) for coastal fisheries resources that are located in or move between several states, or which occur in both state and federal waters. The Act requires the member States to implement the FMPs and comply with the management

[1] This is an advisory memorandum. It has not been reviewed and approved in accordance with procedures for issuing an Attorney General's opinion.

requirements set forth in the Plans. If the ASMFC determines that a State is not in compliance with the requirements of a plan, the U.S. Secretary of Commerce, after making required findings may impose a moratorium on fishing in the fishery with the State's waters. The Act authorizes the Secretary of Commerce to enforce a moratorium and incorporates the civil and criminal penalty provisions found in the Magnuson-Stevens Act.

II. How can the State withdraw from the ASMFC? Answer: The State May Withdraw by Following the Procedure in Article XII of the Compact.

North Carolina joined the ASMFC by the action of the General Assembly in passing G.S. § 113-252, et seq. The legislation specifies the three members from North Carolina and the Marine Fisheries Commission is not represented. Article XII of the Compact provides "this compact shall continue in force and remain binding upon each compacting state until renounced by it. Renunciation of this Compact must be preceded by sending six month's notice in writing of intention to withdraw from the Compact to the other states party hereto." G.S. § 113-252. Furthermore, the governor is required to execute and transmit the notice of intention to withdraw in accordance with Article XII. G.S. § 113-253. The decision to withdraw from the Compact rests with the General Assembly. Withdrawal would be accomplished by the General Assembly's directing the Governor to send the notice of intention required by Article XII which would be followed by the repeal to Article 19 of Chapter 113 of the General Statutes, the current statutes concerning the Compact.

III. What Consequences Would Result from Withdrawal from the ASMFC?

If North Carolina acts in accord with Article XII and effects a withdrawal from ASMFC, the State will no longer have any rights or powers concerning the Commission as set forth in the Compact. North Carolina will lose its representation and its right to vote on the adoption of FMPs that affect coastal fishery resources occurring in State waters.

A second consequence would be that North Carolina would continue to be held to the requirements of FMPs adopted by the ASMFC, but would not have a vote or any way to influence FMP development. The Atlantic Coastal Cooperative Management Act, 16 USC § 1501 et seq., extends to all jurisdictions on the Atlantic where coastal fishery resources within the meaning of the Act occur, not just to the current members of the Compact. Therefore, North Carolina would continue to be subject to the Act's requirement that the State implement and enforce the fishery management plans for its fisheries even after a withdrawal from the ASMFC.[2]

The ultimate consequence following from the State's failure to implement and enforce ASMFC fishery management plans applicable to coastal fishery resources occurring in North Carolina would be federal closure of any fisheries that are not being conducted in compliance with an ASMFC plan. Individuals violating the closure would

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[2] Nifong memo to Sherri Evans-Stanton, 29 March 1995.

be subject to federal civil and criminal penalties. In addition the State would be unable to enforce its regulations in the E-E-Z to the extent the States rules are inconsistent with federal plans.

In carrying out the General Assembly's directive to adopt FMPs for commercially or recreationally significant species of fisheries, G.S. § 113-182-1, the Marine Fisheries Commission adopted the Interjurisdictional Fishery Management Plan. The FMP adopts by reference the management measures required by FMPs approved by the Councils and the ASMFC. These management measures are then adopted as the State's management measures for the affected fisheries. A consequence of withdrawal from the ASMFC and rejection of the federal management measures would be a possible finding of non-compliance by the ASMFC and the Secretary of Commerce's closing the affected fisheries in the State's coastal waters.

IV. What is the Relevant Authority of the Marine Fisheries Commission?
Answer: The Commission Exercises Regulatory Authority Through Rulemaking.

The Marine Fisheries Commission exercises only those powers that have been delegated to it by the General Assembly, State ex. rel. Commissioner of Insurance v. North Carolina Rate Bureau, 300 N.C. 381, 269 S.E.2d 547, reh'g denied, 301 N.C. 107, 273 S.E. 2d 300 (1980). The Commission is authorized to regulate all marine and estuarine resources in coastal fishing waters, and exercises this authority through rulemaking. Additionally, the Commission is given authority to adopt rules to comply with a FMP adopted by the ASMFC or the U.S. Secretary of Commerce. § 143B-289.52(e).

The authority to administer and enforce the statutes and regulations pertaining to coastal fisheries is expressly given to the Department. G.S. § 113-181. By statute, the commission is authorized to initiate a legal action only to contest the claim of title or claimed right of fishery in any navigable water that was registered as required by G.S. § 113-206.

Challenges to regulations implementing federal FMPs have been filed in the Federal District Court by fisherman or associations of fisherman who have been directly affected by the regulation. See Fisherman's Dock Cooperative v. Brown, 75 3d 164 (4th Circuit) (1996); NC Fisheries Association, Inc., et al. v Evans, 172 F Supp 2d 792 (Eastern District Va) (2001); NC Fisheries Association, Inc., et al. v. Brown, 917 F Supp 1108 (Eastern District Va) (1996). In several instances the State of North Carolina has intervened as a plaintiff on relation of the Governor. NC Fisheries Association, Inc., et al. v. Brown, 917 F Supp 1108; NC Fisheries Association, Inc. et al. v. Evans, 152 F Supp 2d 870, (Eastern District Va) (2001); NC Fisheries Association, Inc. et al. v Daley, 16 F Supp 2d 647, (Eastern District Va) (1997).

In conclusion, the decision to continue membership in the ASMFC rests with the General Assembly and, regardless of the State's membership status, North Carolina coastal waters will be subject to FMPs adopted by the ASMFC.

APPENDIX B SPECIES SUMMARY

The state of North Carolina currently participates in the development and implementation of the following ASMFC or federal Council FMPs that comprise the management units for the North Carolina Interjurisdictional Fishery Management Plan. These FMPs are being placed in an appendix to facilitate updates, acknowledging the changing nature of rules and regulations developed under these FMPs with which North Carolina must comply. The information contained in this appendix is current through July 2015. Annual updates to these summaries may be found at http://portal.ncdenr.org/web/mf/fmps-under-development ("FMP Review"). North Carolina representatives (DMF staff and North Carolina citizens) involved in plan development may likewise change over time and are thus contained in Appendix C.

ATLANTIC STATES MARINE FISHERIES COMMISSION

American Eel:

American eel, at the coast wide level, are managed as a single unit stock under the ASMFC Interstate Fisheries Management Plan (FMP) for American eel. Since the initial adoption of the ASMFC Interstate FMP there have been two stock assessments, three addenda, and a fourth addendum is being developed.

The ASMFC Interstate FMP for American Eel was initially developed and approved in 1999, in response to concerns about a decline in the abundance of American eel. American eel abundance declined from historical levels but remained relatively stable until the 1970s. Since the 1970s fishermen, resource managers, and scientists hypothesized that the stock may have further declined. However, at that time, the stock status was poorly understood; thus, the status was listed as unknown. This was due mainly to an overall lack of data, which resulted from inconsistent harvest data, short time series, and lack of standardized methodology. In the absence of reliable data and reference points and adequate information for management decisions, the FMP focused on data collection, as well as habitat protection and restoration. The plan initially implemented a six-inch minimum size limit for the recreational fishery and a 50-fish per person per day creel limit. It also required states to keep in place their current or more restrictive management measures for the commercial fisheries.

In 2006, the ASMFC American Eel Management Board (Management Board) approved Addendum I to the ASMFC Interstate FMP for American Eel. This addendum was developed to mandate data collection as a result of the 2006 stock assessment peer review, which highlighted a lack of eel catch and effort data. Addendum I mandated a catch and effort monitoring program, which in North Carolina is met through the North Carolina Eel Logbook Program.

In 2008, the Management Board approved Addendum II to the ASMFC Interstate FMP for American Eel. This addendum was developed to protect out-migrating silver eels using options such as gear restrictions, size limits, and seasonal closures to allow increased silver eel escapement. However, the Management Board chose to delay action on the commercial fishery management measures in order to incorporate upcoming stock assessment results.

In 2012, the ASMFC completed its American Eel Benchmark Stock Assessment. The stock

assessment found the coast wide American eel stock to be depleted as a result of historical overfishing, habitat loss, river damming, *Anguillacolla*, toxic pollutants, and climate change. In response to the 2012 ASMFC American Eel Benchmark Stock Assessment the Management Board initiated Addendum III.

In 2013, Addendum III to the ASMFC Interstate FMP for American Eel was approved for management use. This addendum implemented size and mesh restrictions, seasonal gear closures, and sampling mandates. The minimum size limit was increased from six inches total length (TL) to nine inches TL for recreational and commercial fisheries. A ½ x ½ inch minimum pot mesh size was implemented coastwide. It also implemented a harvest moratorium for all gears other than baited traps and pots from September 1st through December 31st. Additionally, it requires states with fishery-independent surveys that routinely collect American eel to continue them. For North Carolina, the Beaufort Bridgenet Survey (conducted by NOAA Fisheries) and the Estuarine Trawl Survey (conducted by DMF) are the two surveys that must be continued.

In 2013, upon approval of Addendum III the Management Board initiated Addendum IV to the ASMFC Interstate FMP for American Eel. Addendum IV was approved in October 2014 and addressed concerns in the glass eel, yellow eel, and silver eel fisheries. It reduced Maine's glass eel quota, established a payback provision for overages of any state or jurisdiction's glass eel quota, and required development of a life cycle survey for any state or jurisdiction with a glass eel quota. It also established a requirement for daily electronic reporting by both harvesters and dealers of glass eels, and allowed a limited harvest of glass eels for domestic aquaculture purposes within a state or jurisdiction under an approved aquaculture plan. Additionally, the addendum included a coastwide quota for yellow eels, with management triggers to implement state-by-state quotas if necessary, and allowed for the continuation of the Delaware River silver eel weir fishery.

Atlantic Croaker:

Atlantic croaker is currently managed as a single unit stock with a range from New Jersey to the east coast of Florida. The ASMFC initially approved the Interstate FMP for Atlantic Croaker in 1987. In November 2005, ASMFC approved Amendment 1 to the FMP which established biological reference points to allow for resource management on a coast wide basis, emphasized the restoration and maintenance of essential habitat, and developed research needs to improve future stock assessments. Amendment 1 also required stock assessments every five years, and established management triggers based on annual evaluation of specific metrics; depending on the results, a stock assessment could be conducted sooner than the prescribed five-year interval. The primary trigger was based on landings data, and required a stock assessment to be conducted if the most recent year's commercial or recreational landings were less than 70% of the previous two years' average landings.

The 2005 stock assessment divided the population into Mid-Atlantic and South Atlantic regions, but only assessed the Atlantic croaker population in Mid-Atlantic; it determined the stock in this region was not overfished and overfishing was not occurring. The fishing mortality (F) target and threshold rates, 0.29 and 0.39 respectively, were used to determine if croaker was experiencing overfishing. The target and threshold spawning stock biomass (SSB), 28,932 metric tons and 20,252 metric tons respectively, were used to determine if croaker was in an

overfished state. However, the estimates of F and SSB did not include bycatch from the shrimp fishery, a potentially significant source of mortality. Atlantic croaker is a recruitment-driven stock where abundance appears to be dependent on natural environmental conditions.

The 2010 benchmark assessment used data from the Mid-Atlantic and South Atlantic regions to produce a single, coast-wide assessment. A statistical catch-at-age (SCA) model was used in the assessment. The model was run with varying shrimp trawl fishing mortality, and in all instances overfishing was not occurring. Because of the high degree of uncertainty in the estimates of shrimp trawl bycatch, the model estimates of stock size and fishing mortality were not considered reliable. Therefore, the assessment can only provide trends in spawning stock biomass and estimates of relative fishing mortality, not absolute numbers. However, given that biomass had been increasing and the age-structure of the population had been expanding since the late 1980s, it is unlikely the stock is depleted.

Following the 2010 stock assessment the ASMFC's South Atlantic State/Federal Fisheries Management Board approved Addendum I to Amendment I to the Interstate FMP for Atlantic Croaker in 2011. The addendum changed the management unit to one region (New Jersey through the east coast of Florida) and modified the biological reference points (BRPs) used to assess stock condition based on the results of the 2010 assessment. The BRPs for the coastwide resource are:

- F target = $0.75*F_{MSY;}$ F threshold = F_{MSY}
- SSB target = $SSB_{MSY;}$ SSB threshold = $0.70*SSB_{MSY}$ (MSY = maximum sustainable yield)

In 2013, the board initiated the development of new management options in response to concerns over trends in the spot and Atlantic croaker fisheries and the extent of bycatch and discards of both species in the shrimp trawl fishery. Addendum II, approved in August 2014, adopted a new method (Traffic Light Approach, TLA) to annually evaluate trends in fisheries indicators and to develop state-specified management actions (e.g. bag limits, size restrictions, time and area closures, and gear restrictions) based on the annual fisheries evaluation if indicator thresholds are exceeded. The TLA will remain in use until the completion of the next benchmark stock assessment, scheduled for 2016.

<u>Atlantic Menhaden:</u>

Management of Atlantic menhaden falls under the jurisdiction of the ASMFC Interstate FMP for Atlantic Menhaden. It is managed as a single unit stock with a range from the Gulf of Maine to central Florida. The Atlantic Menhaden FMP was originally approved by the ASMFC in 1981. Amendment 1 replaced that plan in 1992. Neither the original FMP nor Amendment 1 included restrictions on fishing. The stock was considered to be recruitment overfished during the mid-1960s to the mid-1970s, but recovered well by the mid-1980s. Although the spawning stock is considered adequate, recruitment has been poor since the late 1980s because of unidentified environmental factors that control spawning success. The fishery has declined greatly over the last 25 years, primarily for economic and social reasons, as the coastal areas occupied by the plants have become urbanized. Only one processing plant located in Virginia remains in the Atlantic coast reduction fishery, but those vessels land a greater volume of fish than any other

Atlantic coast commercial fishery.

Addendum I was passed in August of 2004 and modified the plan's biological reference points, schedule for stock assessments and habitat section. These actions were based on recommendations of the Menhaden Technical Committee subsequent to the 2003 stock assessment, which found that menhaden were not overfished and overfishing was not occurring on a coastwide basis. The assessment used a forward-projecting model and fecundity-based biological reference points to determine stock status. These reference points are more accurate and take into account the number of mature ova (eggs). This was a significant departure from the way menhaden assessments were conducted previously. The Addendum changed the fishing mortality target and threshold levels as recommended by the Menhaden Technical Committee and supported by the peer review. Rather than conducting a full-scale annual assessment, the addendum proposed a three-year assessment cycle to allow for the increased complexity and data requirements of the new model. The addendum also required the Technical Committee to annually review landings, catch-per-unit-effort (CPUE) and indices used in the stock assessment to determine if the following triggers were met:

- The CPUE index falls below the 5th percentile for the past 20 years
- The ratio of ages 2-4 to the total catch of all ages falls below the second standard deviation unit over the last 20 years

Based on review of the data and calculation of the triggers, if the Technical Committee determined a significant change in status occurred, a full assessment would be conducted for that year. Since 2003, the triggers have not been met.

Addendum II was passed by the Menhaden Management Board in October 2005 and addressed concerns about the possibility of localized depletion of menhaden stocks in the Chesapeake Bay. This addendum instituted a harvest cap on Atlantic menhaden by the reduction fishery in Chesapeake Bay at 106,000 metric tons (the average landings from 2000-2004). Harvest overages would be deducted from the following year's quota but any amount of under-harvest would not be transferred. It also addressed research priorities necessary to determine the status of menhaden populations in the Chesapeake Bay and assess whether localized depletion was occurring.

The Atlantic Menhaden Stock Assessment Subcommittee conducted an assessment update for 2006 as required by Addendum I. The 2005 estimate of fishing mortality was determined to be 56% of its limit (and 91% of its target) and population fecundity was estimated at 158% of its fecundity target (and 317% of its limit). Therefore the stock was not considered to be overfished, nor was overfishing occurring.

Subsequent to the 2006 stock assessment update, Addendum III was passed in October 2006 and revised the annual harvest cap for the Chesapeake Bay reduction fishery established under Addendum II with final 2005 landings. The revised cap was 109,020 metric tons, based on the average landings from 2001 – 2005, and was effective from 2006 through 2010. The Addendum also included a provision allowing under-harvest in one year to be credited only to the following year's harvest, not to exceed 122,740 metric tons. Addendum IV was approved in November 2009 and extended the provisions of Addendum III through 2013.

A benchmark stock assessment was conducted in 2010 and determined that although the stock was not overfished, overfishing was occurring in the terminal year (2008) of the assessment. As a result, Addendum V was passed in November 2011 and modified the fishing mortality reference points (F) adopted in Addendum I. A "maximum spawning potential" (MSP) approach was implemented, with interim reference points of F30%MSP (target) and F15% MSP (threshold) adopted in order to reduce overfishing and increase abundance and spawning stock biomass.

Atlantic menhaden is currently managed under Amendment 2, which was approved in December 2012 after an update to the 2010 benchmark assessment confirmed that overfishing was still occurring. Amendment 2 established a 170,800 metric ton total allowable catch that is allocated by state based on landings from 2009-2011; this allocation will be revisited three years after implementation. Quota transfers between states are allowed and any harvest overages are required to be paid back the following year. The amendment also established a bycatch allowance for non-directed fisheries once a state's directed quota has been caught. Additionally, new biological reference points for spawning stock biomass based on maximum spawning potential (MSP) were adopted, with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species. The new abundance points use the same metric (i.e., MSP) as that used to define overfishing (fishing mortality target and threshold of F30% and F15% MSP, respectively).

A new benchmark assessment was completed in 2014 and approved by ASMFC for management use in February 2015. A number of significant changes were made to address issues of concern from the 2010 benchmark assessment and the 2012 update, including exploration of new datasets and new model configurations. The results of the final peer-reviewed assessment indicated that the coastwide population of menhaden was not undergoing overfishing, and that the fishing mortality rate (F) had fluctuated around the target for most of the time series, and has been below the target F since 1999. Consistent with the previous assessment, the 2014 benchmark also indicated the stock was not overfished. In response to these positive findings, a 10 percent increase in the total allowable catch for 2015 and 2016 was approved by the management board. Additionally, the board is currently developing an amendment to re-examine the existing state quotas, as well as address ecological reference points that will account for menhaden's role as a forage species.

<u>Atlantic Striped Bass:</u>

In 1981 the ASMFC developed and adopted the Interstate FMP for Atlantic Striped Bass. Striped bass constitute major recreational and commercial fisheries from Maine to North Carolina. Commercial landings along the east coast peaked at nearly 15 million pounds in 1973. Harvest declined by 77% to 3.5 million pounds in 1983, resulting in a moratorium on the harvest of the Atlantic migratory (coastal stock) population. The fishery reopened in 1990, and the stock was declared recovered in 1997.

Striped bass is currently managed through Amendment 6 to the Interstate FMP for Atlantic Striped Bass (February 2003) and its subsequent addenda (Addendum I-IV). The management program includes target and threshold biological reference points and sets regulations aimed at

achieving the targets. Required regulatory measures include recreational and commercial minimum size limits, recreational creel limits, commercial quotas and commercial harvest tags. States can implement alternative management measures that are deemed to be equivalent to the preferred measures in Amendment 6.

In response to the results of the 2013 benchmark stock assessment, the ASMFC Striped Bass Management Board approved Addendum IV to Amendment 6 in October 2014. The addendum adopted new fishing mortality reference points for the coastal stock as well as stock-specific reference points for the Albemarle/Roanoke stock. Coastal states and jurisdictions were required to implement a 25 percent reduction from 2013 harvest levels, while the Chesapeake Bay jurisdictions were required to implement a 20.5 percent reduction from 2012 harvest levels.

Fisheries in the Albemarle Sound Management Area (ASMA) and Roanoke River Management Area (RRMA) are also managed under an ASMFC harvest quota via the N.C. Estuarine Striped Bass FMP. Because the Albemarle/Roanoke stock contributes minimally to the coastal migratory stock, the stock-specific biological reference points noted above are set using the results of assessments conducted by the N.C. Division of Marine Fisheries. Amendment 1 to the N.C. Estuarine Striped Bass FMP was approved by the N.C. Marine Fisheries Commission in February of 2013 and by the N. C. Wildlife Resources Commission in May 2013. The rules implementing the amendment became effective for the respective commissions June 1 and August 1, 2013. There were no major changes to the existing commercial and recreational striped bass management measures. The N.C. Estuarine Striped bass FMP also includes the Central Southern Management Area (CSMA). The CSMA is managed solely by North Carolina. Regulations differ by management area, but include an 18-inch total length minimum size limit, a slot limit, season closures, no more than three fish daily creel limit (recreational only), gill net restrictions, commercial trip limits, a 50% bycatch provision for commercial trips (not in CSMA), as well as recreational (not in CSMA) and commercial quotas. Additionally, the North Carolina Striped Bass Cooperative must submit a fishing plan annually to the ASMFC for the ASMA and the RRMA. The ASMFC Striped Bass Management Board must approve any changes in the upcoming year's fishing plan before the seasons open.

As required by the ASMFC, a new assessment for the Albemarle/Roanoke stock was conducted in late 2013, in conjunction with the benchmark assessment for the coastal migratory stock. The results indicated a need to significantly reduce the existing 550,000 pound harvest quota for the stock. The November 2014 Revision to Amendment 1 to the N.C. Estuarine Striped Bass FMP implemented a 50 percent reduction in the harvest quota, effective January 1, 2015.

Atlantic Sturgeon:

The ASMFC adopted an Interstate FMP for Atlantic Sturgeon in 1990. Among the management recommendations of that plan were the following:

- Minimum size limit of 2.13 meters total length (TL) and institute a monitoring plan;
- A moratorium on all harvest; or
- An alternative measure to be submitted to the Plan Review Team for determination of conservation equivalency.

In North Carolina, effective September 1, 1991, the N.C. Marine Fisheries Commission

voluntarily implemented a harvest moratorium for sturgeon.

Because the voluntary measures under the original FMP proved insufficient to halt the decline of sturgeon populations, Amendment 1 to the Atlantic Sturgeon FMP was approved in July 1998. This amendment brought the FMP into compliance with the ACFCMA, and implemented a mandatory coastwide harvest and possession moratorium as the primary management measure. The goal of this amendment was to restore Atlantic sturgeon spawning stocks to population levels that would provide for sustainable fisheries and ensure viable spawning populations. In order to achieve this goal the plan set forth the following objectives:

- Establish 20 protected year classes of females in each spawning stock;
- Close the fishery for a sufficient time period to reestablish spawning stocks and increase numbers in current spawning stocks;
- Reduce or eliminate bycatch mortality;
- Determine the spawning sites and provide protection of spawning habitats for each spawning stock;
- Where feasible, reestablish access to historical spawning habitats for Atlantic sturgeon; and
- Conduct appropriate research as needed.

Addendum I to Amendment 1 was approved by the Sturgeon Management Board (Board) in January 2001, and provided an exemption from the possession moratorium for the state of Florida to allow development of private aquaculture facilities for the propagation of the species. At the request of North Carolina, the Board approved Addendum II in May 2005 to provide a similar exemption to LaPaz Group LLC, permitting it to import Atlantic sturgeon fry/fingerlings, produce fish, and sell the meat of the fish. It also provided an exemption to Acadian Sturgeon and Caviar to allow for the importation of its Atlantic sturgeon into North Carolina. Addendum III, approved in November 2006, complements Addendum II by providing the Sturgeon Management Board the ability to modify the details of the exemption in these addenda through a Board vote. This addendum also provides exemptions to allow LaPaz to import Atlantic sturgeon from Supreme Sturgeon and Caviar of Penfield, New Brunswick, for commercial aquaculture production and sale in North Carolina. These actions are intended to provide a domestic product through an environmentally and socially sound aquaculture operation.

Addendum IV to Amendment 1 to the interstate Fishery Management Plan for Atlantic sturgeon was completed September 2012. This addendum describes the habitats necessary for all life stages of Atlantic sturgeon, water quality requirements, habitat protection and restoration, and research recommendations.

In April 2012, NOAA Fisheries listed the Carolina Distinct Population Segment (DPS), as well as the New York Bight, Chesapeake Bay and South Atlantic DPSs of Atlantic sturgeon as endangered under the ESA, and listed the Gulf of Maine DPS as threatened. The ASMFC identified members to serve on a stock assessment subcommittee and began the initial steps of reviewing available data and preparing for the first data workshop, held in late summer 2013. The estimated completion for a peer-reviewed stock assessment at that time was early 2015. At the August 2014 ASMFC business meeting the Interstate Fisheries Management Program Policy

Board delayed the Atlantic sturgeon assessment until 2017. This delay is intended to allow the stock assessment subcommittee to conduct a more comprehensive assessment on a stock or distinct population segment scale as well as include recent data collected through federal ESA Section 6 grants research currently underway.

Black Drum

In May 2013, the ASMFC adopted the Interstate FMP for Black Drum. The FMP includes all states from Florida to New Jersey. The management unit is defined as the black drum (*Pogonias cromis*) resource throughout the range of the species within U.S. waters of the northwest Atlantic Ocean from the estuaries eastward to the offshore boundaries of the EEZ. This definition is based on the distribution of the species along the Atlantic coast, as noted in tagging studies from Maryland, Virginia, South Carolina, and Georgia, and historical harvest patterns that have identified fisheries for black drum from Florida north through New Jersey.

The management measures contained in the FMP required all states to maintain their current regulations for black drum and implement a maximum possession limit and minimum size limit (of no less than 12 inches total length) by January 1, 2014. States were also required to further increase the minimum size limit (to no less than 14 inches total length) by January 1, 2016. In response, the N.C. Marine Fisheries Commission implemented a 14- to 25-inch total length slot limit (with one fish over 25 inches), a 10-fish recreational bag limit and a 500-pound commercial trip limit effective January 1, 2014.

A coastwide stock assessment for black drum was conducted in 2014 and approved for management use by ASMFC in February 2015. The results of the assessment indicate that the black drum stock is not overfished and overfishing is not occurring. While there has been a very gradual decline in biomass, it is still well above the level considered necessary to produce maximum sustainable yield. Given the outcome of the assessment, the management board elected not to modify the management program at this time.

Black Sea Bass (North of Cape Hatteras):

The black sea bass stock north of Cape Hatteras is managed under the joint ASMFC/MAFMC Summer Flounder, Scup, and Black Sea Bass FMP. The joint FMP for black sea bass became effective in 1996, and was adopted by the MAFMC as Amendment 9 to the existing Summer Flounder FMP. Based on landings data from 1983-1992, 49% of the Total Allowable Landings (TAL) is allocated to the commercial fishery and 51% is allocated to the recreational fishery. While both the ASMFC and MAFMC have established joint management measures, they have done so through their respective administrative processes; these consist of amendments and shorter addenda at the ASMFC level, and of amendments and shorter framework actions at the MAFMC level. This summary focuses primarily on the ASMFC actions relative to the FMP, while council-related actions are found in the section pertaining to MAFMC FMPs.

The goals of the FMP are to:

- Reduce fishing mortality in the summer flounder, scup and black sea bass fisheries to assure that overfishing does not occur;
- Reduce fishing mortality on immature summer flounder, scup and black sea bass to increase spawning stock biomass (SSB);

- Improve the yield from these fisheries;
- Promote compatible management regulations between state and federal jurisdictions;
- Promote uniform and effective enforcement of regulations;
- Minimize regulations to achieve the management objectives stated above.

Management measures in the original FMP included commercial quotas, minimum mesh sizes for trawls, escape vents for pots, and minimum fish size limits. Amendment 13 to the FMP implemented state-specific allocations of the coastwide commercial quota for black sea bass for 2003 and 2004, and removed the necessity for fishermen who have both a Northeast Region Black Sea Bass permit and a Southeast Region Snapper Grouper permit to relinquish their permits for a six-month period prior to fishing south of Cape Hatteras during a northern closure. North Carolina's share of the coastwide commercial quota is 11 percent.

Addenda XII, XIII and XIX continued the use of the commercial state-specific allocation system indefinitely, modified the annual specifications process to allow for setting of multi-year TALs, and allowed for incorporation of new or revised stock status determination criteria (i.e., criteria that define whether a stock is overfished or overfishing is occurring) into the annual management measures for all three species in the FMP.

Addendum XX modified and streamlined the commercial quota transfer process between states, set clear policies and guidelines for transferring and receiving states, and established a mechanism to reconcile small quota overages.

Addendum XXIII established regional management measures only for the 2013 recreational black sea bass season. Previously, the FMP only allowed for coastwide recreational measures (minimum size, possession limit, and seasons), which were disproportionately impacting different states due to the broad geographic range of the species. Addendum XXV continued the use of regional measures to manage the 2014 black sea bass recreational fishery. Two regions were created for this purpose, Massachusetts to New Jersey (northern) and Delaware to North Carolina (southern).

The most recent benchmark stock assessment for the black sea bass stock north of Hatteras was completed in 2008, using a statistical catch at length (SCALE) model, a significant change from the previous simple, index-based models. This assessment approach was accepted by the Data Poor Workshop review panel (conducted by the NOAA Fisheries Northeast Fisheries Science Center (NEFSC) 2009) and involved estimates of fishing mortality and population size determined from changes in size composition of the population. However, the stock was still considered to be data poor with significant uncertainty in the results. In addition, tagging studies suggested spatial partitioning of the stock along the coast that was not accounted for in the assessment model; therefore the results may not reflect the stock condition in all local groups of black sea bass. In 2012 an update to the 2008 SCALE model was conducted, but results were not used for determining stock status. The model results indicated fishing mortality declined in 2001 through 2011, while biomass increased over the same period. For management (catch limits, etc.) a constant catch-based strategy was used with support from the 2012 stock assessment review panel. Recommendations from a Black Sea Bass Data Workshop in June 2013 included postponing the next benchmark stock assessment until 2016 (with no updates to be done in the interim). Research is currently underway to resolve concerns about data inputs.

Bluefish:

The ASMFC and MAFMC jointly manage bluefish under Amendment 1 to the Bluefish FMP. The original FMP (adopted in 1989) defines the management unit as bluefish occurring in U.S. waters of the western Atlantic Ocean and is considered a single stock of fish. It also implemented a state-by-state commercial quota system and a recreational harvest limit to control fishing mortality.

Amendment 1 (implemented in 2001) initiated a ten-year rebuilding schedule to eliminate overfishing and allow for stock rebuilding to a level which would support harvests at or near maximum sustainable yield (MSY) by the year 2010 or earlier. It also established an annual specification setting process to adjust the commercial quota and recreational harvest limit. It allocated 83 percent of the coastwide quota to the recreational sector and 17 percent to the commercial sector, with an option to increase the commercial allocation up to 10.5 million pounds in any given year if the recreational sector is not projected to harvest its entire allocation. Additionally, the amendment outlined a series of permitting and reporting requirements such as: operator permits for commercial, party, and charter boats; vessel permits for commercial, party and charter boats; and dealer permits.

A benchmark stock assessment was completed in 2005. The assessment passed peer review (Stock Assessment Review Committee (SARC) 41) and was approved by the ASMFC Bluefish Management Board and the MAFMC Coastal Migratory Species Committee. The assessment developed reference points for both bluefish biomass and fishing mortality. The Age Structured Assessment Program (ASAP) model used to calculate population abundance in this assessment has been updated annually with landings and survey indices, and the output from the model is used to set the annual Total Allowable Catch (TAC). The 2014 stock assessment update (utilizing 2013 catch data) indicated that bluefish are not overfished and overfishing is not occurring. Estimates from the model show a decreasing trend in fishing mortality, an increasing trend in population biomass, and an increasing trend in population numbers from 1997 to 2007 followed by a decline from 2007 (86 million fish) to 2012 (59 million fish). This decreasing trend in biomass is likely due to poor incoming age classes.

Based on the stock assessment update, the Council and ASMFC Bluefish Management Board adopted a TAL of 18.19 million pounds for bluefish for 2015. As such, the commercial TAL is 3,662,407 lbs (quota) and the recreational TAL is 14,530,134 lbs (harvest limit) for 2015. Based on recreational landings in the past 10 years, it is expected that the recreational sector will land less than the 83% recreational harvest limit.

Each state is required to constrain commercial landings to its respective state quota allocation, while the recreational fishery is managed through an annual framework of possession limits, size limits, and seasonal closures. Due to a decrease in recreational harvest, the MAFMC recommended an increase in the recreational possession limit from 10 to 15 fish in 2001. North Carolina increased the bluefish recreational possession limit to 15 fish (proclamation effective 6/19/2001), and the N.C. Marine Fisheries Commission adopted a rule whereby only 5 of the 15 fish could be >24" TL (effective 4/01/2003). The possession limits have remained at 15 fish since 6/19/2001 and the ASMFC and MAFMC have recommended that the possession limit

remain at 15 per day through 2015.

Sharks:

In 1989, the five Atlantic Fishery Management Councils asked the Secretary of Commerce to develop a Shark FMP. The Councils were concerned about the late maturity and low fecundity of sharks, the increase in fishing mortality and the possibility of the resource being overfished. In 1993, NOAA Fisheries implemented the FMP for Sharks of the Atlantic Ocean. The FMP established a fishery management unit (FMU) consisting of 39 frequently caught species of Atlantic sharks, separated into three groups for assessment and regulatory purposes (Large Coastal Sharks (LCS), Small Coastal Shark (SCS) and pelagic sharks). At that time, NOAA Fisheries identified LCS as overfished and pelagic and SCS as fully fished. NOAA Fisheries implemented commercial quotas for LCS and established recreational harvest limits for all sharks. Under the rebuilding plan established in the 1993 FMP, the LCS quota was expected to increase every year up to the maximum sustainable yield estimated in the 1992 stock assessment; however, to date this has not happened.

The 1999 FMP for Atlantic Tunas, Swordfish and Sharks replaced the existing Atlantic Shark and Atlantic Swordfish FMPs and established the first FMP for Atlantic Tunas. Management measures related to sharks in the 1999 FMP included: reductions in commercial LCS and SCS quotas, reductions in recreational retention limits for all sharks, establishment of a recreational minimum size limit for all sharks except Atlantic sharpnose, an expanded list of prohibited shark species, implementation of limited access in commercial fisheries and establishment of new procedures for counting dead discards and state landings of sharks after federal fishing season closures against federal quotas. Some of the non-species specific management measures included establishing the threshold levels to determine if a stock is overfished, if overfishing is occurring or if the stock is rebuilt, as well as identifying essential fish habitat (EFH) for all Atlantic tunas, swordfish and sharks.

Results of the 2002 SCS stock assessment indicated that overfishing was occurring on finetooth sharks while the three other species in the SCS complex (Atlantic sharpnose, bonnethead and blacknose) were not overfished, nor was overfishing occurring. Results of the 2002 LCS stock assessment indicated that the LCS complex was still overfished and overfishing was occurring. Additionally, the assessment found that sandbar sharks were no longer overfished but that overfishing was still occurring, and that blacktip sharks were rebuilt and not experiencing overfishing.

In 2003, NOAA Fisheries amended the measures enacted in the 1999 FMP based on the 2002 LCS and SCS stock assessments, litigation and public comments. Implementing regulations for Amendment 1 to the 1999 FMP were published on December 24, 2003 (68 FR 74746). Management measures enacted in the amendment included: re-aggregating the large coastal stock complex; revising the rebuilding timeframe for LCS; using maximum sustainable yield (MSY) as a basis for setting commercial quotas; eliminating the commercial minimum size restrictions; establishing three regional commercial quotas (Gulf of Mexico, South Atlantic and North Atlantic) for LCS and SCS management units; implementing trimester commercial fishing seasons effective January 1, 2005; adjusting the recreational bag limit; establishing gear restrictions to reduce bycatch and bycatch mortality; establishing a time/area closure off the

coast of North Carolina effective January 1, 2005; updating several shark EFH identifications; establishing criteria to add or remove species to the prohibited shark list; and establishing vessel monitoring system (VMS) requirements for bottom longline and gillnet fishermen.

The regional commercial quotas established in Amendment 1 to the Highly Migratory Species (HMS) FMP for LCS and SCS were intended to improve overall management of the stocks by tailoring quotas to specific regions based on landing information. These quotas were based upon average historical landings (1999-2001) from the canvass and quota monitoring databases. The canvass database provides a near-census of the landings at major dealers in the southeast U.S. (including state landings) and the quota monitoring database collects information from dealers in the South Atlantic and Gulf of Mexico.

On November 30, 2004, NOAA Fisheries issued a final rule (69 FR 69537), which established, among other measures, new regional quotas based on updated landings information from 1999-2003. This final rule did not change the overall quotas for LCS and SCS established in Amendment 1, only the percentages allocated to each of the regions. The updated information was based on several different databases, including the canvass and quota monitoring databases, the Northeast Commercial Fisheries Database (CFDBS) and the snapper grouper logbook. The new regional quotas and trimester seasons for the commercial Atlantic shark fishery became effective January 1, 2005.

In July 2006 NOAA Fisheries finalized the Consolidated Atlantic Highly Migratory Species (HMS) FMP. This FMP consolidated the Atlantic Billfish and the Atlantic tunas, swordfish and sharks FMP and included a range of management measures for all HMS fisheries. This consolidated FMP augmented and combined the 1999 Atlantic Tunas, Swordfish and Sharks FMP, Amendment 1 to the 1999 Atlantic Tunas, Swordfish and Shark FMP, the 1988 Billfish FMP and Amendment 1 to the Billfish FMP into a single fishery management plan.

Amendment 2 to the 2006 Consolidated HMS FMP implemented management measures consistent with recent stock assessments for sandbar, porbeagle, dusky, blacktip, and LCS; initiated rebuilding plans for porbeagle, dusky, and sandbar sharks; implemented commercial quotas and retention limits; modified recreational measures to reduce fishing mortality; modifed reporting requirements; modified timing of shark stock assessments; clarified timing of release for annual SAFE reports; updated dehooking requirements for smalltooth sawfish; implemented a shark research program; and established time/area closures proposed by the SAFMC. The final rule implementing Amendment 2 published in April 2008.

Amendment 3 implemented management measures consistent with recent stock assessments for SCS and shortfin mako sharks; established a rebuilding plan for blacknose sharks; implemented commercial quotas consistent with stock assessment recommendations; and modified the Atlantic HMS management unit to include smooth dogfish. The final rule for Amendment 3 was issued in March 2010.

Amendment 5a implemented management measures consistent with recent stock assessments for sandbar, scalloped hammerhead, Gulf of Mexico blacktip, and Atlantic and Gulf of Mexico blacknose sharks; established a rebuilding plan for Atlantic blacknose and scalloped hammerhead sharks; implemented commercial quota limits consistent with stock assessment

recommendations; and modified recreational measures or prohibited the retention of overfished stocks. The final rule for Amendment 5a published in July 2013. Amendment 5b pertains to dusky shark management, and is still under development. It was separated from Amendment 5a based on the need for further analyses.

Amendment 6 to the consolidated HMS FMP considers a range of actions intended to address flexibility in management of commercial shark fisheries including: options for permit stacking; adjusting the LCS trip limit for shark directed limited access permit holders; creating sub-regional quotas in the Atlantic and Gulf of Mexico regions for LCS and SCS; modifying the LCS and SCS quota linkages; implementing total allowable catches (TACs) and adjusting the non-blacknose SCS commercial quotas in the Atlantic and Gulf of Mexico regions based on the 2013 Atlantic sharpnose and bonnethead sharks stock assessments; and modifying upgrading restrictions for shark permit holders. While development of the amendment began in 2010, multiple large-scale changes to commercial shark fisheries resulted in significant modification to the proposed actions and a delay in publication of the final amendment. The proposed rule was issued in January 2015 and comments were accepted until April 2015. A final rule has not yet been published.

Amendment 9 to the consolidated HMS FMP addresses management of smoothhound sharks (smooth dogfish, Florida smoothhound, Gulf smoothhound) and was developed during 2014, just prior to a stock assessment for these species (see below). The amendment includes actions to: establish an effective date for previously-adopted smoothhound shark management measures finalized in Amendment 3 to the 2006 Consolidated HMS FMP, and in the 2011 HMS Trawl Rule; adjust the commercial quota for the smoothound shark fishery; consider implementation of the smooth dogfish-specific provisions of the Shark Conservation Act of 2010; implement the shark biological opinion; and modify Atlantic shark gillnet VMS requirements. The proposed rule was published in August 2014 and was open for comment until November 2014. A final rule has not yet been published. The stock assessment was completed in January 2015, and underwent peer-review in February 2015.

To complement the actions of NOAA Fisheries in state waters, the ASMFC approved the Interstate Fishery Management Plan for Coastal Sharks (FMP) in August 2008. Coastal sharks are managed under this plan as six different complexes: prohibited, research, small coastal (SCS), non-sandbar large coastal (LCS), pelagic and smooth dogfish (smoothhound shark). The Spiny Dogfish and Coastal Shark Management Board (Board) does not set quotas and follows NOAA Fisheries openings and closures for small coastal sharks, non-sandbar large coastal shark and pelagic sharks. The management unit encompassed by the FMP covers the entire coastwide distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ.

Currently, there are no amendments to the ASMFC FMP. Addendum I to the FMP was approved in 2009 to allow limited smooth dogfish processing at sea (removal of fins from the carcass) from March through June as long as the total wet weight of fins found on board the vessel did not exceed 5% of the total dressed weight of the smooth dogfish carcasses. Addendum I also removed smooth dogfish recreational possession limits and removed gillnet check requirements for smooth dogfish fishermen.

Addendum II and Addendum III were both implemented in 2013, and addressed changes in the

federal management of coastal sharks. Addendum II allocated state shares of the smooth dogfish coastwide quota, modified the FMP to allow year round smooth dogfish processing at sea and modified the maximum fin-to-carcass ratio from 5% to 12% of the total dressed weight of the smooth dogfish carcasses, consistent with the Shark Conservation Act of 2010. Addendum III created two new species groups ('Hammerhead' and 'Blacknose') and increased the recreational size limit for hammerheads.

It is important to note that the FMP and its three addendums continue to prohibit the finning of sharks. Finning is defined as the removal of the fins of a shark while discarding the carcass at sea. Fin-to-carcass ratios are used in high volume fisheries to allow fishermen to process the catch at sea, so long as the weight of the fins corresponds to the correct ratio of carcasses on board the vessel.

Stock status is assessed by species complex for most coastal shark species and by species group for species with enough data for an individual assessment. A number of assessments have been conducted through the SouthEast Data, Assessment and Review (SEDAR) process. SEDAR 11 (2006) assessed the LCS complex and blacktip sharks. The LCS assessment suggested is was inappropriate to assess the LCS complex as a whole due to the variation in life history parameters, different intrinsic rates of increase, and different catch and abundance data for all species in the complex. Based on these results, NOAA Fisheries changed the status of the LCS complex from overfished to unknown. As part of SEDAR 11, blacktip sharks were assessed for the first time as two separate populations: Gulf of Mexico and Atlantic. The results indicated that the Gulf of Mexico stock is not overfished and overfishing is not occurring, while the current status of blacktip sharks in the Atlantic region is unknown.

SEDAR 13 (2007) assessed the SCS complex, finetooth, Atlantic sharpnose, and bonnethead sharks. The SEDAR 13 peer reviewers considered the data to be the 'best available at the time' and determined the status of the SCS complex to be 'adequate.' Finetooth, Atlantic sharpnose and bonnethead were all considered to be not overfished and not experiencing overfishing. Porbeagle sharks were assessed by the International Commission for the Conservation of Atlantic Tunas (ICCAT) Standing Committee on Research and Statistics in 2009. The assessment found that while the Northwest Atlantic stock is increasing in biomass, the stock is considered to be overfished with overfishing not occurring. A 2011 benchmark assessment of dusky, sandbar, and blacknose sharks (SEDAR 34) indicates that both sandbar and dusky sharks continue to be overfished with overfishing occurring for dusky sharks. Blacknose sharks, part of the SCS complex, are overfished with overfishing occurring. The smoothhound complex (smooth dogfish, Florida smoothhound, Gulf smoothhound) were assessed in 2014 through SEDAR 39 and peer-reviewed in early 2015. The conclusion was that Atlantic smooth dogfish were unlikely to be overfished and unlikely to be experiencing overfishing.

Red Drum:

Red drum in North Carolina is managed both by a state FMP and an ASMFC Interstate FMP. The most recent plans are Amendment 1 to the N.C. Red Drum FMP (2008) and Amendment 2 to the ASMFC Red Drum FMP (2002).

The primary goal of both the state and ASMFC plans is to prevent overfishing, and both plans have set a threshold of 30 percent static spawner potential ratio (sSPR) as an overfishing definition and 40 percent sSPR as the management target for the fishery. Specifically, the management goal for Amendment 2 to the ASMFC plan is to achieve and maintain the Optimum Yield for the Atlantic coast red drum fishery as the amount of harvest that can be taken by U.S. fishermen while maintaining the sSPR at or above 40%. The regulatory requirements of Amendment 2 state that:

- All states are required to implement red drum harvest controls (e.q. bag and size limits) in order to achieve a minimum 40% sSPR.
- A maximum size limit of 27 inches or less shall be implemented for all red drum fisheries.
- All states must maintain current or more restrictive commercial fishery regulations for red drum, i.e. no relaxation of current fisheries management measures.

Prior to the development of Amendment 2 to the ASMFC FMP, North Carolina established a suite of preventative measures in the red drum fishery to reduce fishing mortality through implementation of the state Red Drum FMP in 2001. As a result, at the time Amendment 2 to the ASMFC FMP was approved, North Carolina regulations included: a slot limit ranging from 18 to 27 inches total length in all fisheries, a one fish recreational bag limit, the continuation of a 250,000 pound commercial harvest cap, and a bycatch allowance of seven red drum as a daily commercial trip limit. As a result of these proactive measures taken prior to the development of Amendment 2, North Carolina had no additional regulatory changes to implement when Amendment 2 was approved.

Since the development of Amendment 2 (August 2003), the ASMFC South Atlantic State/Federal Fisheries Management Board approved a motion to allow the N.C. Fisheries Director to raise or lower the current seven-fish commercial trip limit while maintaining the 250,000 pound harvest cap. Since this time, the trip limit has ranged from 4 to 10 fish. It is important to note that by enacting the 7-fish commercial trip limit, North Carolina realized a decrease in commercial landings of over 40 percent when compared to the previous management program, which did not restrict red drum harvest at the trip level. In addition, North Carolina requires that commercially harvested fish be landed as bycatch, with no more than 50 percent of the total trip weight comprised of red drum. These commercial restrictions along with the recreational bag limit of one fish 18-27 inches TL have reduced fishing mortality and red drum in North Carolina are no longer experiencing overfishing as of the most recent Atlantic coast stock assessment completed in 2009. Findings from this assessment indicate that as of 2007, both the threshold and target sSPR values set forth in the goals of Amendment 2 were being met. A new ASMFC stock assessment is underway and is scheduled to be completed in the fall of 2015.

<u>Scup:</u>

Scup is one of four species jointly managed by the ASMFC and MAFMC. In 1996, both the Commission and the Council adopted the Fishery Management Plan and Addendum 1 for Scup. (In the MAFMC plan, this is Amendment 8 and the Regulatory Amendment to the FMP for Summer Flounder, Scup and Black Sea Bass). The FMP defined the management unit as scup in

U.S. waters from Cape Hatteras northward to the U.S.-Canadian border, and included a seven-year plan for reducing fishing effort and restoring the stock. Due to concerns about the near collapse of the stock, exploitation rates were significantly reduced between 1997 and 2002 through coastwide commercial quotas and recreational season, size and possession limits. The FMP allocates a TAC 78 percent to the commercial sector and 22 percent to the recreational sector. Discard estimates are deducted from both commercial and recreational TACs to establish total allowable landings for both sectors. The FMP has been amended several times since its initial implementation, with each amendment enacting comprehensive management measures to attain annual fishing targets and address overfishing.

Addendum 1 to the Summer Flounder, Scup, and Black Sea Bass FMP established the procedure for management and distribution of the coastwide commercial quota that was approved in September 1996 and implemented as a coastwide TAC in 1997. The addendum divided the annual coastwide commercial quota among three periods: winter I (Jan-Apr), summer (May-Oct), and winter II (Nov-Dec). During the winter periods, the quota is available coastwide and is restricted through the implementation of trip limits, while a state-by-state quota system is in effect during the summer period. In the state-by-state system, quotas are distributed to the states based on their percentage share of commercial landings for the period May-October, 1983-1992. As such, North Carolina's commercial allocation is only 0.02 percent of the summer period.

Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass FMP, which established revised overfishing definitions (Fmax serving as a proxy for Fmsy), identified essential fish habitat, and defined the framework adjustment process, was approved by the ASMFC and MAFMC in October 1998. The amendment established a biomass threshold for scup (2.77 kg/tow) based on the maximum value of the 3-year moving average of the NEFSC spring bottom trawl survey index of spawning stock biomass. The stock was considered overfished if the index was below the threshold value.

The 2002 stock assessment indicated scup were no longer overfished, but could not be evaluated with respect to overfishing, despite relative declines in exploitation rates. Therefore, no comparison with the F threshold specified in the FMP could be made, and the rebuilding schedule was disapproved. However, based on the NEFSC spring bottom trawl survey estimates, the index values for 2004 and 2005 were below the threshold (2.77 kg/tow), and the stock was considered overfished in 2004 and 2005.

Despite an apparent increase of scup abundance and a decline in relative exploitation rates, the lack of an assessment led both management authorities to take a precautionary approach in establishing the 2007 TAL for scup. The recommended TAL for scup was within the range of long-term potential catches associated with a stock at approximately ½ Bmsy.

In 2002, the ASMFC developed Addendum V to the FMP to avoid the necessity of developing emergency rules for summer period quota management. This addendum revised the commercial landings dataset used to establish state shares of the summer period quota to include previously unavailable landings from Massachusetts added to the NOAA Fisheries database in 2000.

Addendum VII established a state specific management program for the 2002 recreational fishery, and Addendum IX established a state specific management program for the 2003

recreational fishery; both were based on the average landings (number of fish) for 1998-2001. Only the states of Massachusetts through New York were permitted to develop individual management programs. Due to the extremely limited data available, the Board developed specific management measures for the states of New Jersey, Delaware, Maryland, Virginia and North Carolina.

Amendment 13 to the Summer Flounder, Scup and Black Sea Bass FMP, implemented by the ASMFC and MAFMC in 2003, established a coastwide quota, established Fmax (0.26) as the overfishing threshold, and developed a fishing mortality rate reduction strategy that included minimum fish sizes and gear restrictions.

Addendum X allowed for any unused quota from the commercial winter I scup fishery to be rolled over into the winter II fishery period. It also increased the possession limit by 500 lbs per 500,000 pounds of scup that are rolled over. It established an alternative to the summer period start date such that states can allow for landings of scup by state permit holders beginning on April 15th. If there is a closure prior to April 15th, state permit holders could land and sell scup caught exclusively in state waters to state and federally permitted dealers after April 15th and prior to the federal opening of the summer period on May 1.

Addendum XI, approved in January 2004, allowed states to customize management measures for the recreational fishery and provided for a process to minimize administrative burdens when implementing conservation equivalency.

Addendum XIII (August 2004) allowed for multiple-year specification of TALs for the summer flounder, scup, and/or black sea bass fisheries in any given year for up to three years (this is also MAFMC Framework 5).

The MAFMC also approved the development of a framework (2005) that mirrored the provisions in ASMFC Addendum X, allowed the transfer of scup at sea, and modified mesh size requirements for trawls.

Addendum XX, adopted in 2009, established a process to annually reconcile minor overages in state commercial quotas for the scup summer period and black sea bass.

Addenda XXI and XXII (approved in 2011 and 2012, respectively) pertained to recreational scup management. Addendum XXI established state-specific measures to achieve a required reduction in recreational harvest, while Addendum XXII allowed for a regional liberalization in recreational harvest for northern states.

A statistical catch at age model was used in the 2008 peer-reviewed and accepted scup assessment. The stock was considered rebuilt in 2009. Based on the June 2011 update, the scup stock was not overfished and overfishing was not occurring in 2010. The fishing mortality rate (F) was estimated to be below the threshold reference point, while spawning stock biomass was estimated to be above the biomass target reference point. Notably, the 2010 year class was estimated to be well below average.

The 2011 MAFMC Omnibus Amendment contains Amendment 15 to the Summer Flounder,

Black Sea Bass and Scup FMP (the most recent Amendment that impacts the scup fishery). The amendment is intended to formalize the process of addressing scientific and management uncertainty when setting catch limits for the upcoming fishing year(s) and to establish a comprehensive system of accountability for catch (including both landings and discards) relative to those limits.

Shad and River Herring:

The ASMFC Interstate FMP for Shad and River Herring was adopted in 1985. In 1994, the Plan Review Team and the Management Board determined that the original FMP was no longer adequate for protecting or restoring the remaining shad and river herring stocks. As a result, Amendment 1 was adopted in October 1998 (completed April 1999) with an amended goal to protect, enhance, and restore East Coast migratory spawning stocks of American shad, hickory shad, and river herring (collectively alewife and blueback herring) in order to achieve stock restoration and maintain sustainable levels of spawning stock biomass. Amendment 1 focused on American shad regulations and monitoring programs, but also required states to initiate fishery-dependent monitoring programs for river herring and hickory shad in addition to existing fishery-independent programs. The goal was to improve data collection and stock assessment capabilities.

Amendment 1 also contained specific measures to control exploitation of American shad populations, including a five-year phase-out of the ocean intercept fishery beginning January 1, 2000. States with a non-directed harvest of American shad in ocean fisheries are allowed bycatch landings that do not exceed five percent of the total landings (pounds) per trip. For recreational fisheries, a 10-fish/person/day creel limit for American and hickory shad was implemented. In addition, the N.C. Marine Fisheries Commission has made it unlawful to take shad by any method other than hook- and- line from April 15 through December 31. Finally, states and jurisdictions were required to maintain existing or more conservation regulations for in-river fisheries, and to submit recovery plans for stocks identified for restoration.

Technical Addendum I to Amendment 1 of the Interstate FMP for Shad and River Herring was created by the Shad and River Herring Technical Committee and approved by the Management Board in 2000. This technical addendum was created to address modifications to the state's fishery-dependent and independent monitoring programs for American shad.

In February 2002, the Plan Review Team and the Technical Committee recommended several changes to both Amendment 1 and Technical Addendum I. Addendum I was developed and included the following: changed the conditions for marking hatchery-reared alosines; clarified the definition and intent of *de minimis* status for the American shad fishery; and modified and clarified the fishery-independent and dependent monitoring requirements of Technical Addendum I. These measures went into effect on January 1, 2003.

Amendment 2 to the Interstate FMP was adopted in August 2009 and focused on river herring management. It prohibited commercial and recreational fisheries for river herring beginning January 1, 2012 unless a state or jurisdiction has Sustainable Fishery Plan that has been reviewed by the Technical Committee and approved by the Management Board. The amendment defines a sustainable fishery as "a commercial and/or recreational fishery that will not diminish the

potential future stock reproduction and recruitment." The states of Maine, New Hampshire, New York, North Carolina and South Carolina have approved sustainable fishery plans for river herring.

In February 2010, the Management Board approved Amendment 3, which modified the management program for American shad. The amendment was developed in response to the 2007 update to the American shad stock assessment, which indicated that most stocks were either at low levels of abundance or not recovering. Similar to Amendment 2, Amendment 3 implemented a requirement for states to have an approved sustainable fishery plan or close commercial and recreational fisheries for American shad (with the exception of catch and release recreational fisheries) by January 1, 2013. States with approved plans are Florida, Georgia, South Carolina, North Carolina, the Potomac River Fisheries Commission, and the Delaware River Basin Fish and Wildlife Management Cooperative (on behalf of New York, Delaware, New Jersey, and Pennsylvania) and Connecticut. Additionally, states and jurisdictions were required to develop a habitat plan to identify threats and prioritize opportunities for restoration of American shad habitat.

A benchmark stock assessment for river herring was conducted in 2011 and approved for management use in May 2012. The assessment was conducted on a river-by-river basis where data allowed. Many river systems did not have sufficient information for a model-based approach; for these systems, trend analyses were used to identify patterns in existing datasets. Of the 52 stock for which data were available, 23 were depleted relative to historic levels, one was increasing and 28 were unknown.

River herring in North Carolina are also managed under a state FMP. The original N.C. River Herring FMP was adopted in 2000 due to concerns regarding significant decreases in landings and juvenile abundance indices, and the lack of conservation measures for river herring in the ASMFC FMP at that time. Original management measures included commercial harvest quotas for the Albemarle Sound gill net fishery and Chowan River pound net fishery, and a 25-fish recreational bag limit. Amendment 1 (approved in 2007) implemented a harvest moratorium for both sectors, with the exception of a limited research set-aside; this was intended to provide a small amount of product to support local herring festivals as well as provide data for future assessments. The amendment also established four stock recovery indicators that currently are the basis for N.C.'s approved River Herring Sustainable Fishery Plan.

Amendment 2 to the N.C. River Herring FMP was approved in April 2015 and eliminates the discretionary harvest provision, as it was not meeting its intended purpose of providing data or product for local herring festivals. Additionally, the amendment revised the stock recovery indicators to "stock status indicators" and proposed a regulation to prohibit possession of river herring greater than 6 inches while fishing or boating in coastal waters. The latter measure is intended to complement a similar regulation implemented by the N.C. Wildlife Resources Commission in Inland Waters.

Spanish Mackerel:

The South Atlantic Fishery Management Council (SAFMC) manages the king and Spanish mackerel fisheries through the Coastal Migratory Pelagics FMP. A complementary ASMFC

plan was adopted for state waters in 1990 and complements the actions of the SAFMC FMP. Please see the section on South Atlantic Fishery Management Council FMPs for further information.

Omnibus Amendment 1 to the ASMFC FMPs for Spot, Spotted Seatrout and Spanish Mackerel was adopted in 2011 to update the plans with the requirements of the ISFMP. Specific to Spanish mackerel, the amendment includes commercial and recreational management measures, adaptive management measures, and a process for Board review and action in response to changes in the federal regulations. This allows for complementary management throughout the range of the species.

Addendum I to the FMP was adopted in August 2013 established a two-year pilot program to allow for a seasonal exemption from the minimum size limit during the months of July through September for pound nets only. The program allows for harvest of Spanish mackerel that are 11.5 inches fork length and is intended to reduce waste of these shorter fish, which are discarded dead in the summer months, by converting them to landed fish that will be counted against the quota. The program will be evaluated after the 2014 fishing year to determine if it will continue in the future.

Spiny Dogfish:

The FMP for spiny dogfish in federal waters was jointly adopted by the MAFMC and the New England Fishery Management Council (NEFMC) with an effective date of May 1, 2000. The joint Spiny Dogfish Committee and the Spiny Dogfish Industry Advisory Panel oversees development of the plan. The ASMFC Interstate FMP for Spiny Dogfish in state waters was adopted in November 2002 became effective on May 1, 2003. The ASMFC Spiny Dogfish Management Board, Technical Committee, Plan Development Team, and Advisory Panel oversee the development of the plan. The plans were developed to rebuild the spiny dogfish stock that was declared overfished by NOAA Fisheries in 1998.

Both federal and interstate FMPs used annual quotas and trip limits to allow a non-directed commercial fishery during the rebuilding period. Both FMPs established a fishing year starting May 1 divided into two six-month periods (May 1- October 31 and November 1- April 30). In addition, dealer permits with weekly reporting requirements are mandatory for the purchase of spiny dogfish. Each state must also report weekly commercial landings to the NOAA Fisheries.

In November 2005, the ASMFC approved Addendum I to the Spiny Dogfish FMP, which allowed for multiple-year specification of total allowable landings (TALs) for spiny dogfish. Within any given year, TALs for spiny dogfish can be specified for up to five years, but annual review of updated fishery and stock information is required. In January 2006, the MAFMC implemented Framework 1 to the federal FMP that also would allow for multiple-year specifications in federal waters, but without the requirement for annual review.

ASMFC Addendum II was approved in October 2008. It maintained a May 1 start date to the fishing year, but dissolved the 6-month seasonal quota allocation and instead established regional allocations of the annual quota. The northern region (Maine to Connecticut) received 58 percent, the southern region (New York through Virginia) received 26 percent, and North Carolina

received 16 percent. This was due to North Carolina's geographic disadvantage in having access to the resource when the fish are available under a May 1 start date. Addendum III dissolved the southern region allocation, established state quota shares for states from New York to North Carolina, and allowed for quota transfers, rollovers of up to five percent, state-specified possession limits, and a three-year reevaluation of management measures. North Carolina is allocated 14.036% of the southern quota. Addendum IV, approved in August 2012, addressed the differences in the definitions of overfishing between the NEFMC, MAFMC and the ASMFC.

The 2006 Northeast Regional Stock Assessment Workshop (SAW-43) determined that the spiny dogfish stock was not overfished, with an estimated stock size of mature females of 106,000 mt, and overfishing was not occurring. However, recruitment estimates from 1997 to 2003 represented the seven lowest values in the entire series, resulting in concerns regarding future stock growth. However, spiny dogfish were declared 'rebuilt' in 2008 when the spawning stock biomass (SSB) exceeded the target for the first time since the ASMFC began managing spiny dogfish in 2002. The interstate FMP allows for quotas based on the fishing mortality target once the mature female portion of the spawning stock has reached the biomass target.

The F target and threshold and SSB target and threshold were updated in the 2010 NEFSC Spiny Dogfish BRP report. The NEFSC Update on the Status of Spiny Dogfish in 2011 and Initial Evaluation of Alternative Harvest Strategies predicted SSB to remain above the target and then decline around 2019 because of poor recruitment from 1997 to 2003. The same NEFSC report estimated that SSB continued to exceed the target in 2011, for the fourth year in a row. Other positive trends included increases in pup biomass over the last few years and recruitment in 2009 that was the fifth highest in the 42–year NEFSC Spring Survey.

The 2013 stock assessment update, conducted by the NEFSC, estimated spiny dogfish are not overfished and not experiencing overfishing. SSB was estimated at 465.99 million pounds in 2013 and has exceeded the target (351.23 million pounds) for the past six years. Fishing mortality was estimated to be 0.15 in 2012, well below the plan's threshold (0.2439). The recommendation from the MAFMC Science and Statistical Committee (SSC) took into account the projected record low recruitment from 1997 to 2003; the recommended quotas are not expected to cause SSB to decline below the biomass threshold.

Discards have remained relatively stable at 11 million pounds over the past decade and are expected to remain near that level in the future fishing seasons. Canadian and foreign landings have also decreased significantly in recent years. It is anticipated the Canadian dogfish harvest will not increase in the near future given the lack of demand for the product and the subsequent closure of Canadian spiny dogfish processors.

Spot:

Spot are managed by the ASMFC South Atlantic State/Federal Fisheries Management Board. Spot support important commercial and recreational fisheries in the South Atlantic, particularly from the Chesapeake Bay southward. A Fishery Management Plan (FMP) for spot was adopted by the ASMFC in 1987. Unlike many of the Commission's FMPs, the plan did not contain mandatory management measures but instead provided recommendations for states to follow in order to reach the plan's goals.

Annual FMP reviews have been conducted by a Spot Plan Review Team (PRT) and presented to the South Atlantic Board. In 2006, the PRT recommended the development of an amended spot FMP with objective compliance criteria. This recommendation was made based on concerns over the continuing declines in commercial landings. To better inform future compliance criteria and to better track stock trends, the PRT began reviewing and analyzing available fishery-dependent and fishery-independent datasets on an annual basis beginning in 2008.

In 2011, the Atlantic States Marine Fisheries Commission approved the Omnibus Amendment for spot, spotted seatrout, and Spanish mackerel. The amendment updated all three plans with requirements under the ACFCMA and the ISFMP Charter (1995). The updates to the plans included commercial and recreational management measures and recommendations, adaptive management options, *de minimis* thresholds and exemptions, and monitoring recommendations. The Omnibus Amendment also included management triggers for spot, to assist the management board in monitoring the status of the stock until a full coast-wide stock assessment could be completed. The results of the annual review of the management triggers would determine if the management board should consider additional action.

In February 2014, South Atlantic State/Federal Fisheries Management Board approved a motion to initiate the development of an addendum to the Interstate FMP for spot to employ the traffic light approach in order to better manage this species. While establishment of the management triggers established in the Omnibus Amendment was a positive step, they were limited in their ability to illustrate long-term declines in abundance. The high level of inter-annual variability in the indices used made it difficult to respond to gradual but persistent decreases in the trigger indices without a formal response mechanism. The traffic light approach provides that management framework, with action triggered based on the relative proportions of indicators meeting a threshold level. Addendum I was approved in August 2014.

In June 2015, ASMFC announced preparations for the first benchmark stock assessment for spot, to be completed in 2016.

<u>Spotted Seatrout:</u>

Spotted seatrout in North Carolina are managed under both a state FMP and an ASMFC FMP. The ASMFC adopted the Interstate FMP for Spotted Seatrout in 1984, with the states of Florida through Maryland having a declared interest in the FMP. Amendment 1 to this FMP was approved by the ISFMP Policy Board in November 1991. The goal of Amendment 1 to the spotted seatrout FMP was "to perpetuate the spotted seatrout resource in fishable abundance throughout its range and generate the greatest possible economic and social benefits from its harvest and utilization overtime." This amendment added an objective of maintaining a spawning potential ratio (SPR) of at least 20% to minimize the possibility of recruitment failure. Overall, the plan's objectives are to: 1) attain over time optimum yield; 2) maintain a spawning potential ratio of at least 20% to minimize the possibility of recruitment failure; 3) promote conservation of the stocks in order to reduce the inter-annual variation in availability and increase yield per recruit; 4) promote the collection of economic, social, and biological data required to effectively monitor and assess management efforts relative to the overall goal; 5) promote research that improves understanding of the biology and fisheries of spotted seatrout; 6) promote harmonious use of the resource among various components of the fishery through

coordination of management efforts among the various political entities having jurisdiction over the spotted seatrout resource; and 7) promote determination and adoption of standard of environmental quality and provide habitat protection necessary for the maximum natural protection of spotted seatrout.

The initial adoption of the spotted seatrout FMP was adopted prior to the passage of the Atlantic Coastal Fisheries Cooperative Management Act (1993) and the ASMFC ISFMP Charter (1995). While both the Advisory Committee and Spotted Seatrout Plan Review Team believed the goal and objectives of the plan were still valid, they determined that full implementation of the FMP had not been achieved across the entire management unit due to lack of standards as required by both ACFCMA and the charter. The adoption of the Omnibus Amendment to the Spot, Spotted Seatrout and Spanish Mackerel FMPs (Amendment 2 to the Interstate FMP for Spotted Seatrout) in August 2011 updates the FMP with ACFCMA and ISFMP Charter requirements, implementing compliance requirements for each state. The minimum requirements adopted include a 12-inch minimum size limit for both recreational and commercial sectors, adaptive management that may include; seasons, area closures, and many other measures, and a recommended SPR threshold of 20%. All states in the management unit (Maryland through Florida) have implemented a minimum size limit of at least 12 inches total length.

A formal coastwide stock assessment of spotted seatrout has not been conducted and is impractical considering the biology and population dynamics of this species. The 1984 FMP recognized the lack of biological and fisheries data necessary for a stock assessment and effective management of the resource. Spotted seatrout life history information and fisheries data have generally been localized and conducted at different levels of population abundance. Detailed information on incidental bycatch, release mortality, and the size and age structure of releases has become a more important component of assessments of the condition of spotted seatrout populations.

Tagging studies and genetic analyses have shown little evidence of stock mixing and support the regional scope of recent state assessments. Florida, South Carolina and Georgia have conducted virtual population analyses on local stocks of spotted seatrout. Florida's spotted seatrout management plan has a goal of a 35 percent SPR. The most recent (2001) estimates of transitional SPR for Florida are 57 percent in the northeast region north of Volusia County and 33 percent in the southeast region from Volusia County south (Murphy 2003). The analysis conducted in South Carolina indicated that fishing mortality needed to be reduced approximately 20 percent to meet the plan objective of a 20 percent SPR. The 2002 Georgia assessment was conducted, but results were highly questionable due to substantial data limitations.

North Carolina's initial stock assessment on local spotted seatrout stocks was completed in 2009 conjunction with the state's established FMP process. The 2009 North Carolina Spotted Seatrout Stock Assessment indicated that the stock in North Carolina and Virginia was overfished and that overfishing was occurring throughout the entire 18–year time series, with SPR below the ASMFC recommendation of 20 percent. The N.C. Spotted Seatrout FMP was developed subsequent to the stock assessment and approved in February 2012 with the following management measures: a 14-inch total length minimum size limit; a 4-fish recreational bag limit; a 75-fish commercial trip limit; and no use of gill nets in Joint Waters on weekends. Additionally, the FMP included a provision that allowed the director to close harvest through

June 15 should a significant cold stun event occur. The FMP also required re-examination of management measures within three years of adoption to determine if management measures were achieving sustainable harvest.

In March 2014, Supplement A to the N.C. Spotted Seatrout FMP was adopted to allow for the continuation of the management measures adopted in 2012 as interim measures while sources of uncertainty from the 2009 stock assessment were analyzed in preparation for the mandatory three-year review.

In early 2015 a new stock assessment was completed that included several changes: additional fishery-independent indices; age data from the Virginia portion of the stock; and tag-return data that provided additional insight regarding natural mortality. The assessment determined that the stock is not overfished, although biomass levels have decreased to near the time series average since 2007. Furthermore, the assessment determined that overfishing was not occurring, but the F rate was close to the target. Based on these results, the N.C. Marine Fisheries Commission elected to maintain the status quo management measures approved in 2012. The next review of the FMP will occur in 2017.

Summer Flounder:

The ASMFC and the MAFMC manage summer flounder, scup and black sea bass under a joint FMP. The management unit includes summer flounder in U.S. waters in the western Atlantic Ocean from the southern border of North Carolina to the U.S.-Canadian border. The original ASMFC FMP for summer flounder was approved in 1982. The objectives of the FMP are to: 1) reduce fishing mortality of summer flounder to assure overfishing does not occur; 2) reduce fishing mortality of immature summer flounder to increase spawning stock biomass; 3) improve yield from the fishery; 4) promote compatible management regulations between state and federal jurisdictions; 5) promote uniform and effective enforcement of regulations; and 6) minimize regulations to achieve the stated objectives. The MAFMC FMP for summer flounder, prepared in 1988, mirrored the ASMFC FMP and established a 13" minimum size limit.

Over the years, multiple amendments and addenda to the ASMFC FMP have occurred. Amendment 12, approved by the ASMFC in October 1998, was developed to bring the Summer Flounder, Scup, and Black Sea Bass Fishery management Plan in to compliance with the new and revised National Standards and other required provisions of the 1996 reauthorization of the MSA. Specifically, the amendment revised the overfishing definitions (National Standard 1) for all three species and identified Essential Fish Habitat.

Addenda III and IV were approved on January 29, 2001. Addendum IV provided that, upon the recommendation of the relevant monitoring committee and joint consideration with the MAFMC, the ASMFC will make a decision concerning what state regulations will be rather than forward a recommendation to NOAA Fisheries. The states will then be responsible for implementing the Board's decision. Addendum III established specifications for the 2001 recreational summer flounder fishery.

Addendum VIII, adopted in 2003, established state-specific recreational allocations based on the coastwide harvest in 1998.

The commission approved Addendum XIII in August of 2004. This addendum modifies the FMP so that, within a given year, TALs for the summer flounder, scup, and/or black sea bass can be specified for up to three years.

Addendum XV developed a process to allocate increases in the coastwide commercial quotas for 2005 and 2006.

Addenda XVII (August 2005) and XVIII (February 2006) pertained to recreational harvest. The former provided for use of multiple years of data in developing recreational harvest measures, while the latter implemented a system to mitigate drastic cuts in recreational harvest for three states in the northeast.

Addendum XXIV to the Summer Flounder Fishery Management Plan, established a mechanism to allow states access to the 2013 summer flounder recreational harvest limit (RHL) that is projected to not be harvested. The Addendum only applied to the 2013 fishery.

Addendum XXV allowed for the use of regional measures to manage the 2014 summer flounder recreational fishery. The application of a single coastwide minimum size, possession limit, and season restrictions does not affect all areas involved in the fishery the same way; and the application of state-by-state conservation equivalency has resulted in disparate measures by neighboring states. Dividing the coastal states into regions allowed states the flexibility to pursue more equitable harvest opportunities, while providing consistent measures to states within the same region, in many cases sharing the same fishing grounds. The coastwide recreational harvest limit was divided into four regions: 1) Massachusetts-Rhode Island 2) Connecticut-New Jersey 3) Delaware-Virginia and 4) North Carolina. Each state within a region had the same regulations.

Despite many amendments and addenda to both MAFMC and ASMFC FMPs described above, the basic framework of the management program has been fairly consistent. Commercial fishery management measures include an annual quota with state-by-state allocations, a 14-inch minimum size limit, a federal (EEZ) moratorium on entry into the commercial fishery, vessel and dealer permitting and reporting requirements, and a minimum mesh size of 5 ½ inch stretched diamond mesh between the wings and the cod end of the trawls with an exemption program. Recreational fishery measures include an annual quota with state-by-state allocations, size limits, possession limits and seasonal closures. The states from Massachusetts to North Carolina establish state-specific seasons, size and possession limits through conservation equivalency to manage their recreational summer flounder fisheries. An ASMFC Plan Review Team and Management Board and the MAFMC Demersal Species Committee provide management input to both organizations. A joint ASMFC-MAFMC Technical Monitoring Committee that is comprised of staff members from state agencies, MAFMC, ASMFC, NOAA Fisheries and USFWS, provides annual technical and framework adjustment advice.

The summer flounder stock was under a rebuilding plan that required the stock to be rebuilt by January 1, 2013. The summer flounder stock assessment is updated annually. An update and peer review of the summer flounder stock assessment in September 2006 resulted in revised fishing mortality (F) and spawning stock biomass (SSB) estimates and biological reference

points. The peer review found it more appropriate to use SSB and average recruitment as biological reference points instead of total stock biomass and median recruitment. The 2007 annual stock assessment update determined the stock was overfished and overfishing was occurring compared to the revised biological reference points, although F was significantly lower than in past years and biomass was close to the reference point. Retrospective analysis showed a tendency to overestimate the spawning stock biomass and underestimate the fishing mortality rate in the most recent years in the stock assessment, which has delayed stock rebuilding. A benchmark stock assessment in 2008 found that the stock was not overfished and overfishing was not occurring. The stock reached the biomass target in 2010, therefore the stock was considered rebuilt and viable. The 2013 benchmark stock assessment indicated the stock was not overfished and overfishing was not occurring.

Tautog:

The Atlantic coastwide tautog FMP is overseen by the ASMFC Tautog Management Board. States must request de minimus status each year and requests for *de minimis* status are reviewed by the Tautog Plan Review Team as part of the annual FMP review process. *De minimis* status has been extended to North Carolina since the inception of the coastwide FMP. Specific management measures required of *de minimis* states include: commercial and recreational 14-inch total lengths minimum size limits, degradable fastener provisions for pots, and commercial regulations consistent with recreational requirements.

When the FMP was developed there were inadequate data to prepare recreational bag and season requirements for North Carolina. No recreational measures have since been urged by the ASMFC, nor adopted by North Carolina. Degradable pot fasteners are currently enforced in the state. North Carolina has not implemented size limits for either sector, yet this has not affected the extension of *de minimis* status to North Carolina.

The Management Board had previously expressed concern that fishermen from northern states might attempt to land fish in North Carolina to avoid more restrictive regulations. Prior to 2001, DMF had considered rules that provided protection against expansion in recreational landings. Since most recreational trips in North Carolina land one or two tautog, a five-fish possession limit for commercial and recreational fisheries was proposed as a reasonable alternative that would prevent excessive expansion of the fishery, but not an undue burden (J. Carmichael; DMF staff). To date, however, no rules have been considered necessary by ASMFC.

The first tautog assessment was performed in 1995. A coastwide virtual population analysis was performed but rejected during the SAW/SARC peer-review. Nonetheless, an F estimate from that assessment was incorporated into the initial FMP (ASMFC 1996). At that time, it was estimated that the coastwide stock of tautog was overfished and that overfishing was occurring.

Addendum I of the FMP (May 1997) required all states reach the interim fishing mortality target (F=0.24) and a 14-inch size limit by April 1, 1998. Furthermore, it required all states achieve the F target of 0.15 by April 1, 2000. Addendum I also adjusted the compliance schedule and added *de minimis* specifications.

A second benchmark coastwide stock assessment was performed in 1999, based upon a virtual

population analysis run and corroborative tag-based survival estimates, peer-reviewed and accepted through the SAW/SARC process. The 1999 assessment determined that the terminal year F value had dropped to close to the interim target, but well above the final plan target. Addendum II (November 1999) was developed in response to the assessment and extended the compliance schedule such that states had until April 2, 2002 to meet the target overfishing definition.

A 2002 stock assessment update found that recreational catch rates had returned to levels prior to the minimum size increase and that F had increased above the overfishing definition. This required reductions in recreational harvest starting in 2003, in an attempt to return F to the FMP target value. Addendum III (ASMFC 2002) required the states to develop and implement plans to reduce F in their respective recreational fisheries by April 1, 2003 and revised the plan F target to F40% Spawning Stock Biomass (SSB).

The 2007 Addendum V proposed removing North Carolina from the tautog management plan. North Carolina's annual commercial and recreational harvest have made up less than 1% of the coastwide fishery meeting the requirement for de minimis status since the Atlantic States Marine Fisheries Commission began regulating tautog in 1996. Because North Carolina tautog fishery was insignificant, the State requested their removal from the plan to relieve them from all burdens that accompany their inclusion. Future expansion in the North Carolina fishery is highly unlikely considering North Carolina's low latitude in the context of tautog's distinctively temperate, geographical distribution. The ASMFC declined to support this request so North Carolina will remain in the management unit with de minimis status.

A peer-reviewed benchmark assessment was conducted in 2006, and was the first full benchmark since 1999. The tautog assessment was delayed to allow incorporation of two years of harvest information since the previous management changes. The stock assessment report indicated the tautog resource continued to be at low biomass levels. A substantial decrease in biomass had occurred since the mid-1980's and while total stock biomass had been stable since 1999, it remained at a low level of abundance. Since the plan did not define a specific biomass target, it could not be determined if the population was overfished. Although F was marginally over the threshold, the assessment concluded that overfishing was occurring.

Addendum V, approved in 2007, contained an action to remove North Carolina from the tautog management plan. North Carolina's annual commercial and recreational harvests were less than 1% of the coastwide fishery (qualifying the state for *de minimus* status) since the ASMFC began regulating tautog in 1996. Future expansion in the North Carolina fishery is highly unlikely considering North Carolina's low latitude in the context of tautog's distinctively temperate, geographical distribution. The ASMFC declined to support this request so North Carolina remained in the management unit with *de minimis* status. The addendum also provided flexibility to states in reducing recreational and commercial harvests, since commercial harvest had expanded in some states.

The 2011 stock assessment update determined that the coastwide tautog stock was overfished and overfishing was occurring relative to the biological reference points established in Addendum IV. In order to end overfishing and initiate stock rebuilding, Addendum VI (2011) lowered the F target to 0.15 and required states to implement measures to achieve a 39%

reduction in exploitation by January 1, 2012. It also required all states to prohibit the possession of undersized tautog in excess of bag and possession limits. The measure was intended to deter illegal harvest of tautog for the live market.

A new benchmark stock assessment for tautog was approved for management use in February 2015. Unlike previous assessments, a regional approach was used to better reflect life history differences. Two different approaches, each with three regions, were offered for the management board's consideration in developing future management measures. Regardless of the approach, tautog remain overfished, with overfishing occurring in the most northern part of the range (Massachusetts and Rhode Island), while the southern portion of the range (Delaware and south) is not subject to overfishing. Based on the results of the assessment, in May 2015 the Tautog Management Board initiated the development of an amendment that includes both regional approaches, each with different stock units, for the public's consideration. The amendment will be completed in late 2015 or early 2016.

Weakfish:

The Interstate FMP for Weakfish was adopted in 1985 by the ASMFC. The weakfish program functions under the ISFMP with immediate oversight provided by the Weakfish Management Board (Board). The FMP has been amended in 1991, 1994, 1996 and most recently by Amendment 4 in 2002. Amendment 3, adopted in June 1996, was designed to provide an expanded age structure, and to restore fish to their full geographical extent. As a result, specific restrictions were required by the various states. For North Carolina these included: BRD requirements for shrimp trawls; 12-inch commercial minimum size limit for all but estuarine pound net and long haul seine fisheries (seasonal 10 inch size limit); minimum mesh sizes for gill nets and trawls; 150-pound bycatch allowance in non-directed fisheries; and recreational bag and size limits. In addition, North Carolina was required to reduce harvest by 35%. The harvest reduction was achieved by closing the area south of Cape Hatteras to flynets.

When Amendment 4 was adopted in November 2002, states were allowed to choose from a suite of recreational size and creel limit options and were required to maintain the commercial measures developed under Amendment 3, with the one exception of increasing the commercial bycatch allowance from 150 to 300 pounds. While management measures implemented through Amendments 3 and 4 resulted in an initial positive response to rebuilding the overfished stocks of weakfish along the Atlantic coast, the 2006 stock assessment indicated that spawning stock biomass declined rapidly after 1999 and was at the lowest level in the time series. The decline in biomass was reflected in landings along the Atlantic coast which were at historic lows. While the 2006 stock assessment was not upheld by a peer review panel, the Board accepted five conclusions (supported by significant evidence) for management use: 1) the stock is declining; 2) total mortality is increasing; 3) there is not much evidence of overfishing; 4) something other than fishing mortality is causing the decline in the stock; and 5) there is a strong chance that regulating the fishery will not, in itself, reverse stock decline.

The Commission's Weakfish Management Board approved Addendum II to Amendment 4 to the FMP in 2007. The Addendum considered several options to restrict and/or constrain harvest but also recognized that further restriction would do little to recover the weakfish stocks if fishing mortality was not the culprit in the decline. Under the Addendum, the states of Massachusetts

through North Carolina were required to implement a six-fish recreational bag limit at their current size limit for the recreational fishery. The addendum established a coastwide commercial landings limit of approximately 3.7 million pounds (based on the average landings for 2000-2004), and reduced the allowable bycatch limit from 300 pounds to 150 pounds per day or trip. The addendum also included a trigger for re-evaluation of the management measures.

Addendum III to Amendment 4 was also approved in 2007, and updated the bycatch reduction certification requirements to conform with those in the SAFMC's Shrimp FMP.

The most recent weakfish stock assessment was conducted in 2009 and indicated that weakfish were depleted, with no overfishing occurring. While juvenile abundance surveys demonstrated strong year classes, this production has not translated into higher adult biomass. Addendum IV was developed in response to this assessment and implemented a one-fish recreational creel limit, a 100-pound commercial trip limit, a 100-pound commercial bycatch limit during closed seasons, and a 100 undersized fish per trip allowance for the finfish trawl fishery. These measures are intended to reduce the level of harvest without creating a large amount of discards and poise the stock for recovery should natural mortality decrease in the future.

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Black Sea Bass (north of Hatteras):

As noted in the previous section, black sea bass is managed cooperatively between the ASMFC and MAFMC (please see previous section for information on ASMFC actions and addenda). The following is a brief summary of amendments and actions taken by the MAFMC to address black sea bass management through the Council's Summer Flounder, Scup and Black Sea Bass FMP:

Amendment 9 incorporated Black Sea Bass into the Summer Flounder FMP and established black sea bass measures, including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements.

Amendment 11 modified certain provisions related to vessel replacement and upgrading, permit history transfer, splitting, and permit renewal regulations.

Amendment 12 revised the FMP to comply with the Sustainable Fisheries Act and established a framework adjustment process; a quota set-aside for research for summer flounder, scup, and black sea bass; established state-specific conservation equivalency measures; allowed the rollover of winter scup quota; revised the start date for summer quota period for scup fishery; established a system to transfer scup at sea.

Amendment 13 revised the black sea bass commercial quota system and addressed other black sea bass management measures. It also established multi-year specification setting of quota for all three species, region-specific conservation equivalency measures for summer flounder, and built flexibility into the process to define and update status determination criteria for each plan species.

Amendment 15 - Established Annual Catch Limits (ACLs) and Accountability Measures, while Amendment 16 established a standardized bycatch reporting methodology.

Bluefish:

Bluefish is jointly managed by the ASMFC and MAFMC. Please refer to the previous section on ASMFC FMPs for information on bluefish.

Monkfish:

The NEFMC and MAFMC jointly manage monkfish, with the NEFMC as the administrative lead. The original Monkfish FMP became effective in November 1999 and established a 10-year rebuilding plan for the fishery. The FMP is designed to stop overfishing and rebuild the stocks through a number of measures, including: limiting the number of vessels with access to the fishery and allocating days-at-sea for those vessels; setting limits for vessels fishing for monkfish; minimum fish size limits; gear restrictions; mandatory time out of the fishery during spawning season; and a framework adjustment process. The councils manage the fishery as two stocks, Southern Fishery Management Area (SFMA) and Northern Fishery Management Area (NFMA). North Carolina is in the SFMA (SFMA) that ranges from the southern flank of Georges Bank through the Mid-Atlantic Bight to North Carolina.

Federal laws to protect harbor porpoise, large Atlantic whales, and sea turtles from entanglement regulate the North Carolina large mesh gill net monkfish fishery. These federal laws allow a one-month window, March 16 - April 14, to utilize large mesh gill nets. Further, participants in this fishery must hold a Monkfish Large Mesh Gill Net Permit, confine their fishing efforts to waters from the NC/VA state line to Wimble Shoals (out 2 miles but not more than 3), and report any sea turtle or marine mammal interactions.

The original FMP was modified and amended to include an annual measure of the status of the stocks and adjustment to management measures as needed to maintain a 10-year rebuilding schedule. In April 1999, the councils adopted Amendment 1 to the monkfish FMP, which described and identified the essential fish habitat (EFH) for the monkfish fishery, compliant with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Framework Adjustment 2, effective May 2004, established a process to determine an annual total allowable catch (TAC) and appropriate fishing measures for each management area. This method is based upon the relationship between the 3-year running average of NOAA Fisheries fall trawl survey biomass index and established biomass index targets. The data indicated that the biomass indices were less than the current targets for both management areas. Due to concern about the ability of the stocks to rebuild to target levels by the end of the 10-year rebuilding period under this process, the Councils modified the management measures in the NMFA and changed the annual adjustment process.

Amendment 2, effective May 2005, included measures to address EFH and bycatch issues, as well as other issues raised during the public scoping process. Amendment 2 did not modify the stock-rebuilding program established in Framework 2. Amendment 2 implemented the

following measures: a new limited access permit for qualified vessels fishing south of 38°20' N latitude; an offshore monkfish fishery in the Southern Fishery Management Area (SFMA); a maximum roller-gear disc diameter of 6 inches in the SFMA; closure of two deep-sea canyon areas to all gears when fishing under monkfish days at sea (DAS); establishment of a research DAS set-aside program and a DAS exemption program; a North Atlantic Fisheries Organization Regulated Area Exemptions Program; adjustments to the monkfish incidental catch limits; a decrease in the monkfish minimum size in the SFMA; removal of the 20-day block requirement; and new additions to the list of actions that can be taken under the framework adjustment process contained in the FMP.

A stock assessment (SAW 40) from November of 2004 showed that monkfish were not overfished in either the NFMA or the SFMA based on existing reference points. Fishing mortality rates estimated from NEFSC and Cooperative survey data were not reliable for evaluation of fishing mortality with respect to reference points.

In 2006, North Carolina and NOAA Fisheries Southeast Regional Office (SERO) entered into an agreement enabling limited large mesh gill net fisheries for striped bass and monkfish in state waters. The large mesh monkfish fishery, for gill nets with a stretched mesh greater than seven inches, is open by proclamation from March 16 through April 14 unless closed sooner by proclamation. The Atlantic Ocean is closed to the use of gill nets greater than seven inches stretched mesh from December 22 through April 14 by proclamation, with the exception of the monkfish and striped bass fisheries. The agreement allows the state to implement Atlantic sturgeon, sea turtle and marine mammal conservation measures under its proclamation authority as well as gear restrictions on large mesh gillnets. Participants in this fishery must confine their fishing efforts to waters from the NC/VA state line to Wimble Shoals (out 2 miles but not more than 3), and report any sea turtle or marine mammal interactions. Each year, North Carolina contacts the NOAA Fisheries SERO to ensure that they have enough days-at-sea observer coverage for the opening of the fishery. Once NOAA Fisheries has confirmed observer coverage a proclamation is issued opening the large mesh fishery to gill nets greater than seven inches in the Atlantic Ocean. Large mesh gill nets are required to be fished every 48 hours, weather permitting. The area could be closed if reliable sea surface temperature data indicated water temperatures greater than 11° C or if an interaction occurred between large mesh gill nets and marine mammals or sea turtles. Masters of vessels that fish for monkfish in the specified area are required to possess a current year monkfish large mesh gill net permit issued by DMF to valid commercial license holders. The permit requires holders to report weekly trip information to DMF and mandated participation in the NOAA Fisheries observer program, in order to monitor interactions with protected species.

Despite several years of increase in biomass in both stocks, by the fall of 2006 both stocks were considered to be in decline with approximately 50% of the biomass being below the annual biomass index targets. Framework 3, effective November 2006 and included in Framework 42 to the Northeast Multispecies FMP, prohibited targeting monkfish on Multispecies permit B-regular days-at-sea (DAS). In 2007, Framework 4 was proposed by the Council to revise the monkfish management program so that the goals of the rebuilding plan could be met. Framework 4 included, among other measures, a backstop provision that would adjust and potentially close, the directed monkfish fishery in 2009 if the landings in the 2007 fishing year exceeded the target total allowable catch by more than 30 percent.

Amendment 3, effective February 2008, included monkfish in part of the standardized bycatch reporting methodology omnibus amendment. The omnibus amendment was applied to FMPs of the MAFMC and NEFMC and was developed to address the requirements of the MSA to include, in all FMPs, a standardized bycatch reporting methodology.

In July 2007, the Northeast Data Poor Stocks Working Group (DPWG) completed a new stock assessment which indicated that the monkfish stocks were not overfished and overfishing was no longer occurring. The council adopted these new revised reference points recommended by the DPWG in May 2008, and implemented Framework 5. Framework 6 was also implemented in 2008, eliminating the backstop provision adopted in Framework 4. The backstop provision was no longer necessary because both stocks were considered rebuilt.

Amendment 5, effective May 2011, was issued to bring the Monkfish FMP into compliance with the 2007 re-authorization of the Magnuson-Stevens Act. The Magnuson-Stevens Act was reauthorized and revised; it included the requirement that all FMPs establish Annual Catch Limits (ACLs) and measures to ensure accountability (AMs). For stocks not subject to overfishing, such as monkfish, the Act set a deadline of 2011 for the implementation of ACLs and AMs. Amendment 5 established the mechanism for specifying ACLs, AMs, annual catch target (ACT) and associated measures for DAS. Amendment 5 also brought the biological and management reference points in the FMP into compliance with the revised 2009 National Standard 1 (NS1) Guidelines.

In June 2010, another stock assessment, Stock Assessment Review Committee (SARC 50), concluded that both stocks are above their respective current biomass thresholds, and above the new biomass thresholds recommended by the assessment, indicating that both stocks are not overfished. The current estimated fishing mortality rate for each stock is below its respective fishing mortality threshold, therefore over fishing is not occurring on either stock. The SARC 50 Report also emphasized the continuing high degree of uncertainty in the assessment.

As a result of SARC 50, the NEFMC's SSC revised the estimate of ACLs for both stocks. The revised ACL for the NFMA is below the proactive AM annual catch target (ACT) for that area proposed in Amendment 5. Framework Adjustment 7, effective October 2011, adjusted the ACT for the NFMA to be consistent with the most recent scientific advice regarding the acceptable biological catch (ABC) for monkfish. Framework Adjustment 7 also specified a new DAS allocation and trip limits for the NFMA consistent with the new ACT and established revised biomass reference points for the NFMA and SFMA.

Summer Flounder:

As noted in the previous section regarding ASMFC FMPs, summer flounder are managed jointly between the MAFMC and ASMFC. The MAFMC Summer Flounder, Scup, and Black Sea Bass FMP uses output controls (catch and landings limits) as the primary management tool, with landings divided between the commercial and recreational fisheries. The FMP also includes minimum fish sizes, bag limits, seasons, gear restrictions, permit requirements, and other provisions to prevent overfishing and ensure sustainability of the fisheries. Recreational bag/size limits and seasons are determined on a state-by-state basis using conservation equivalency. The

commercial quota is divided into state-by-state quotas based on historical landings. The following is a brief summary of MAFMC-specific actions and amendments. Please see the previous section on ASMFC FMPs for further information.

Amendment 1 established an overfishing definition for summer flounder, while Amendment 2 established a rebuilding schedule, commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, reporting requirements and created the Summer Flounder Monitoring Committee.

Amendment 3 revised the exempted fishery line for summer flounder; increased the large mesh net threshold for summer flounder; and established otter trawl retention requirements for large mesh use in the summer flounder fishery.

Amendment 4 revised state-specific shares for summer flounder commercial quota allocation while Amendment 5 allowed states to combine or transfer summer flounder commercial quota.

Amendment 6 set criteria for allowance of multiple nets on board commercial vessels for summer flounder; established deadline for publishing catch limits; and established commercial management measures for summer flounder.

Amendment 7 revised the fishing mortality rate reduction schedule for summer flounder.

Amendment 10 modified commercial minimum mesh requirements; continued the commercial vessel moratorium; prohibited transfer of summer flounder at sea; and established a special permit for the party/charter sector for summer flounder.

Amendment 11 modified certain provisions related to vessel replacement and upgrading, permit history transfer, splitting, and permit renewal regulations.

Amendment 12 revised the FMP to comply with the Sustainable Fisheries Act and established a framework adjustment process; established quota set-aside for research for summer flounder, scup, and black sea bass; and established state-specific conservation equivalency measures.

Amendment 13 established multi-year specification setting of quota for all three species; and region-specific conservation equivalency measures for summer flounder. It also built flexibility into process to define and update status determination criteria for each plan species.

Amendment 15 established ACLs and AMs, and Amendment 16 established a standardized bycatch reporting methodology.

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

<u>Dolphin and Wahoo:</u>

The SAFMC, in cooperation with the MAFMC and NEFMC, developed FMP for Dolphin and Wahoo of the Atlantic in 2004. The FMP establishes the management unit for dolphin and wahoo as that portion of the stocks found in the EEZ along the U.S. Atlantic coast from Maine

through the east coast of Florida. While dolphin was not overfished, the Council adopted a precautionary and risk-averse approach to management for this fishery and to maintain status quo over the years 1993 through 1997. The FMP established recreational bag limits for both species, as well as vessel, operator and dealer permits, and established EFH designations.

Amendment 1 revised EFH Habitat Areas of Particular Concern, while Amendment 2 was included as part of the SAFMC's Comprehensive ACL Amendment of 2011. It established ACLs, AMs and established no recreational sale provisions for dolphin. In 2013, Amendment 5 was approved and adopted by the SAMFC and was the most comprehensive amendment to the Dolphin/Wahoo FMP, in terms of management measures and process updates. Amendment 5 updated the ABC and ACLs for both species, and set an ACT for the recreational fishery in an effort to achieve optimum yield (OY) of the stock. This amendment also set up an abbreviated framework procedure whereby modifications to the ACLs, ACTs, and AMs can be implemented by NOAA Fisheries without a full regulatory amendment. .

King Mackerel:

The original Gulf of Mexico (GMFMC) and SAFMC's FMP for Coastal Migratory Pelagic Resources (king and Spanish mackerel, cobia) was approved in 1983. This plan treated king mackerel as one U.S. stock. Allocations were established for recreational and commercial fisheries, and the commercial allocation was divided between net and hook-and-line fishermen. The FMP established procedures for the Secretary to take action by regulatory amendment to resolve possible future conflicts in the fishery, such as establish fishing zones and local quotas for each gear or user group. Numerous amendments have been implemented since the first FMP and are described below:

Amendment 1, established in 1985, provided a framework for pre–season adjustment of total allowable catch (TAC), revised king mackerel maximum sustainable yield (MSY) downward, recognized separate Atlantic and Gulf migratory groups of king mackerel, and established fishing permits and bag limits for king mackerel. Commercial allocations among gear users were eliminated.

Amendment 3 (1998) prohibited drift gill nets for coastal pelagics and purse seines and run-around gillnets for the overfished groups of mackerels. The habitat section of the FMP was updated and vessel safety considerations were included in the plan. A new objective to minimize waste and bycatch in the fishery was added to the plan.

Amendment 5 (1990) extended the management area for the Atlantic groups of mackerels through MAFMC jurisdiction. It revised problems in the fishery and plan objectives, revised the definition of "overfishing", added cobia to the annual stock assessment procedure, provided that the SAFMC will be responsible for pre–season adjustments of TACs and bag limits for the Atlantic migratory groups of mackerels, and redefined recreational bag limits as daily limits. It created a provision specifying that the bag limit catch of mackerel may be sold, provided guidelines for corporate commercial vessel permits, imposed a bag limit of two cobia per person per day for all fishermen, established a minimum size of 12 inches (30.5 cm.) fork length or 14 inches total length for king mackerel and included a definition of "conflict" to provide guidance to the Secretary.

Amendment 6 (1992) identified additional problems and an objective in the fishery, provided for rebuilding overfished stocks of mackerels within specific periods, provided for biennial assessments and adjustments, and provided for more seasonal adjustment actions, including size limits, vessel trip limits, closed seasons or areas, and gear restrictions. It provided for commercial Atlantic Spanish mackerel possession limits, changed commercial permit requirements to allow qualification in one of three preceding years, discontinued the reversion of the bag limit to zero when the recreational quota is filled, modified the recreational fishing year to the calendar year, changed the minimum size limit for king mackerel to 20 inches fork length, and changed all size limit measures to fork length only.

Amendment 7 (1994) equally divided the Gulf king mackerel commercial allocation in the Eastern Zone at the Dade–Monroe County line in Florida. The sub-allocation for the area from Monroe County through Western Florida was equally divided between commercial hook–and–line and net gear users.

Amendment 8 (1996) dentified additional problems in the fishery, specified allowable gear, established a moratorium on new commercial king mackerel permits and provided for transferability of permits during the moratorium, revised qualifications for a commercial permit, extended the management area of cobia through New York, allowed retention of up to 5 damaged king mackerel on vessels with commercial trip limits, revised the seasonal framework procedures to a) delete a procedure for subdividing the Gulf migratory group of king mackerel, b) request that the stock assessment panel provide additional information on spawning potential ratios and mixing of king mackerel migratory groups, c) provide for consideration of public comment, d) redefine overfishing and allow for adjustment by framework procedure, e) allow changes in allocation ratio of Atlantic Spanish mackerel, f) allow setting zero bag limits, g) allow gear regulation including prohibition.

Amendment 9 (2000) changed the percentage of the commercial allocation of king mackerel TAC for the Florida east coast (North Area) and Florida west coast (South/West Area) of the Eastern Zone to 46.15 percent North and 53.85 percent South/West (previously, this allocation was 50%/50%). It also allowed possession of cut-off (damaged) king or Spanish mackerel that comply with the minimum size limits and the trip limits in the Gulf, Mid-Atlantic, or South Atlantic EEZ (sale of such cut-off fish is allowed and is in addition to the existing allowance for possession and retention of a maximum of 5 cut-off (damaged) king mackerel that are not subject to the size limits or trip limits, but that cannot be sold or purchased, nor counted against the trip limit). (Note: Several other changes were made involving allocation and gear restrictions that affected the Florida west coast and Gulf fisheries).

Amendment 10 (1998) designated Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concerns for coastal migratory pelagics.

Amendment 11 (1998) amended the FMP as required to make definitions of MSY, OY, overfishing and overfished consistent with the MSA National Standard Guidelines. It also identified and defined fishing communities and addressed bycatch management measures.

Amendment 12 (1999) extended the commercial king mackerel permit moratorium from October

15, 2000 to October 15, 2005, or until replaced with a license limitation, limited access, and/or individual fishing quota or individual transferable quota system (ITQ), whichever occurs earlier.

Amendment 13 (2002) established two marine reserves in the exclusive economic zone (EEZ) of the Gulf of Mexico in the vicinity of the Dry Tortugas, Florida known as Tortugas North and Tortugas South, in which fishing for coastal migratory pelagic species is prohibited. This action complements previous actions taken under the National Marine Sanctuaries Act.

Amendment 14 (2002) established a 3-year moratorium on the issuance of charter vessel and headboat Gulf group king mackerel permits in the Gulf unless replaced by a comprehensive effort limitation system. The control date for eligibility was established as March 29, 2001. The amendment also included other provisions for eligibility, application, appeals, and transferability of permits.

Amendment 15 (2005) established an indefinite limited access program for king mackerel in the EEZ under the jurisdiction of the Gulf of Mexico, South Atlantic, and Mid-Atlantic Fishery Management Councils and changed the fishing year to March 1 through February 28/29 for Atlantic group king and Spanish mackerels.

Amendment 18 established Annual Catch Limits and Accountability Measures for king and Spanish mackerel, as well as cobia as per the 2006 reauthorization of the MSA.

Amendment 20a prohibited the sale of king mackerel caught under the bag limit unless the fish are caught as part of a state-permitted tournament and the proceeds from the sale are donated to charity. In addition, the rule removes the income qualification requirement for king mackerel commercial vessel permits.

Amendment 20b eliminated the 500-pound trip limit that is effective when 75 percent of the respective quotas are landed for king mackerel in the Florida west coast Northern and Southern subzones, and allows transit of commercial vessels with king mackerel through areas closed to king mackerel fishing, if gear is appropriately stowed. It also created Northern and Southern Zones for Atlantic migratory group king and Spanish mackerel, each with separate quotas. NOAA Fisheries will close each zone when the respective quota is met or expected to be met. The dividing line between the zones is at the North Carolina/South Carolina state line.

A stock assessment was completed for king mackerel in the South Atlantic in 2014, concluding that the stock was not overfished and overfishing was not occurring.

Spanish Mackerel

As noted above, the SAFMC and GMFMC jointly manage Spanish mackerel under the Coastal Migratory Pelagics FMP. All of the amendments described in the above section regarding king mackerel also contain measures that apply to Spanish mackerel. The only additional amendments to the FMP that are specific to Spanish mackerel are as follows:

Amendment 2, established in 1987 revised Spanish mackerel maximum sustainable yield (MSY) downward, recognized two migratory groups, and set commercial quotas and bag limits. Charter

boat permits were required, and it was clarified that Total allowable catch (TAC) for overfished stocks must be set below the upper range of acceptable biological catch (ABC). The use of purse seines on overfished stocks was prohibited.

Amendment 4 (1989) reallocated Atlantic group Spanish mackerel equally between recreational and commercial fishermen with an increase in TAC.

Framework Amendment 2013 established provisions to allow transfer at sea of Spanish mackerel caught in gillnets when one set exceeds the trip limit. The amendment also modified the trip limit for the Florida East Coast subzone by moving the potential step-up to 75 fish per day in the last month of the season and if less than 70 percent of the subzone's ACL has been met.

Framework Amendment 1 (2014) updated the ACLs for Atlantic group and Gulf group Spanish mackerel based on the recent stock assessment (SEDAR 28).

Snapper Grouper (includes black sea bass south of Cape Hatteras)

Of the 75 species managed by the SAFMC, 59 of these are included in the Snapper Grouper FMP. Because of its mixed species nature, this fishery offers the greatest challenge for SAFMC to manage successfully. The original FMP was implemented in 1983. Initially, FMP regulations consisted of minimum sizes, gear restrictions and a provision for the designation of special management zones (SMZs). Early attempts to develop more effective management measures were thwarted by lack of data on both the resource and the fishery. The condition of many of the species within the snapper grouper complex was, and still is, unknown. Improved data collection (in terms of quantity and quality) during the 1980's and 90's has provided more management information on some of the more commercially and recreationally valuable species, but lack of basic management data on many of the species still remains the major obstacle to successful management.

Snapper grouper management is also difficult because many of these species are slow growing, late maturing, hermaphroditic, and long lived, so rebuilding efforts for some species will take years to produce full recovery. Strict management measures, including prohibition of harvest in some cases, have been implemented to rebuild overfished species in the snapper grouper complex. Such harvesting restrictions are beneficial not only in rebuilding species, but also in helping to alleviate the need for these species to be listed in the future.

Regulatory Amendment 1 (1987) prohibited fishing in Special Management Zones (SMZs) except with hand-held hook-and-line and spearfishing gear; prohibited harvest of goliath grouper in SMZs; and implemented SMZs off SC and GA.

Regulatory Amendment 2 (1989) established two artificial reefs off Ft. Pierce, FL as SMZs.

Amendment 1 (1988) prohibited use of trawl gear to harvest fish in the snapper grouper fishery south of Cape Hatteras, NC and north of Cape Canaveral, FL; defined the directed snapper grouper fishery as a vessel with trawl gear and greater than or equal to 200 pounds of snapper grouper species onboard; and established the assumption that vessels with snapper grouper species onboard harvested these fish in the EEZ.

Regulatory Amendment 3 established an artificial reef at Key Biscayne, FL as an SMZ in Dade County, FL and prohibited fish trapping, bottom longlining, spearfishing and harvesting of

Goliath grouper in SMZs.

Amendment 2 (1990) prohibited harvest or possession of Goliath grouper in or from the EEZ in the South Atlantic, and defined overfishing for snapper grouper species according to existing NOAA Fisheries guidelines.

Amendment 3 (1990) established a management program for the wreckfish fishery which: added wreckfish to the snapper grouper management unit; defined OY and overfishing; required an annual permit to fish for, land or sell wreckfish; established a control date of March 28, 1990 for the area bounded by 33° and 30° N. latitude; established a fishing year beginning April 16; established a process whereby annual quotas would be specified; implemented a 10,000 pound trip limit and a January 15 – April 15 spawning season closure.

Amendment 4 (1991) prohibited the use of various gear, including fish traps, the use of bottom longlines for wreckfish, and powerheads in SMZs off South Carolina; established bag limits and minimum size limits for several species; established income requirements to qualify for permits; and required that all snapper grouper species possessed in the South Atlantic EEZ must have heads and fins intact through landing.

Amendment 5 (1991) established an Individual Transferable Quota (ITQ) management program for the wreckfish fishery.

Regulatory Amendment 4 (1992) modified the definition of black sea bass pots and allowed for multi-gear trips and the retention of incidentally caught fish.

Regulatory Amendment 5 (1992) established eight additional SMZs off the coast of South Carolina.

Amendment 6 (1993) established commercial quotas for snowy grouper and golden tilefish; established commercial trip limits for snowy grouper, golden tilefish, speckled hind, and warsaw grouper; included golden tilefish in grouper recreational aggregate bag limits; prohibited sale of warsaw grouper and speckled hind; created the Oculina Experimental Closed Area; and specified data collection needs for evaluation of possible future Individual Fishing Quota (IFQ) system.

Amendment 7 (1994) established size limits and bag limits for hogfish and mutton snapper; specified allowable gear; prohibited the use of explosive charges, including powerheads, off South Carolina; and required dealer, charter and headboat federal permits.

Regulatory Amendment 6 (1994) included provisions to rebuild and protect hogfish by implementing a recreational bag limit of 5 fish per person off Florida; protect cubera snapper by implementing a recreational bag limit of 2 per person for fish 30 inches TL or larger off Florida; and protected gray triggerfish by implementing a minimum size limit of 12 inches TL off Florida.

Amendment 8 (1997) established a limited entry system for the snapper grouper fishery.

Regulatory Amendment 7 (1999) established ten SMZs at artificial reefs off South Carolina.

Amendment 9 (1998) increased the minimum size limits on red porgy, black sea bass, vermillion snapper (recreational only), gag, and black grouper; changed recreational bag limits for red porgy, black sea bass, greater amberjack, gag, and black grouper; established an aggregate recreational bag limit of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners; and specified that vessels with bottom longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge

grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

Amendment 10 (1998) identified EFH and EFH-Habitat Areas of Particular Concern for species in the snapper grouper management unit.

Amendment 11 (1998) amended the FMP as required by the MSA to make definitions of MSY, OY, overfishing and overfished consistent with the National Standard Guidelines; identified and defined fishing communities; and addressed bycatch management measures.

Regulatory Amendment 8 (2000) established 12 SMZs at artificial reefs off Georgia; revised boundaries of seven existing SMZs off Georgia to meet Coast Guard permit requirements; and restricted fishing in new and revised SMZs.

Amendment 12 (2000) set regulatory limits for red porgy including a recreational bag limit, a commercial incidental catch limit, and a recreational and commercial size limit. It also permitted the transfer of the 225-pound trip limited commercial permit to another vessel (not another person) regardless of vessel size.

Amendment 13A (2003) extended regulations within the Oculina Experimental Closed Area off the east coast of Florida that prohibit fishing for and retention of snapper grouper species for an indefinite period with a 10 year re-evaluation by the Council. It provided for the Council to review the configuration and size of the area within 3 years of publication of the final rule.

Amendment 13C (2006) addressed overfishing for snowy grouper, golden tilefish, black sea bass and vermilion snapper. The amendment also allowed for a moderate increase in the harvest of red porgy as stock continued to rebuild.

Amendment 14 (2007) established a series of deepwater marine protected areas in the South Atlantic Exclusive Economic Zone.

Amendment 15A (2008) updated management reference points for snowy grouper, black sea bass, and red porgy; modified rebuilding schedules for snowy grouper and black sea bass; defined rebuilding strategies for snowy grouper, black sea bass, and red porgy; and redefined the minimum stock size threshold (MSST) for the snowy grouper stock.

Amendment 15B (2008) prohibited the sale of bag-limit caught snapper grouper species; reduced the effects of incidental hooking on sea turtles and smalltooth sawfish; changed the commercial permit renewal period and transferability requirements; implemented a plan to monitor and address bycatch; and established management reference points for golden tilefish. Amendment 15B also established allocations between recreational and commercial fishermen for snowy grouper and red porgy.

Amendment 16 (2009) included measures to end overfishing for gag grouper and vermilion snapper; established commercial and recreational allocations for both species; established a January through April spawning season closure for gag, black grouper, red grouper, scamp, red hind, rock hind, yellowmouth grouper, tiger grouper, yellowfin grouper, graysby, and coney; reduced the aggregate grouper bag limit from five fish to three fish, and within that, reduced the gag bag limit from two fish to one gag or black grouper, combined; reduced the vermilion snapper bag limit from ten fish to five fish; established a recreational closed season for vermilion snapper of November through March; excluded captain and crew on for-hire vessels from retaining a bag limit of groupers; and required the use of dehooking tools to reduce bycatch mortality.

Amendment 19 (2009) was included under the Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1) and included measures to provide presentation of spatial information for EFH and EFH-Habitat Areas of Particular Concern (EFH-HAPC) designations under the Snapper Grouper FMP; and designation of deepwater coral HAPCs.

Amendment 17A (2010) addressed management measures to end overfishing of red snapper and rebuild the stock, including ACLs and AMs. It extended the prohibition of red snapper in federal waters throughout the South Atlantic EEZ effective immediately. Amendment 17A also included a regulation requiring the use of non-stainless circle hooks north of 28 degrees N. latitude effective March 3, 2011.

Amendment 17B (2010) established ACLs and AMs and addressed overfishing for nine species in the snapper grouper management complex: golden tilefish, snowy grouper, speckled hind, warsaw grouper, black grouper, black sea bass, gag, red grouper, and vermilion snapper. Measures in Amendment 17B included a deepwater closure (240 ft. seaward) for deepwater species to help protect warsaw grouper and speckled hind. Additional measures in the amendment included a reduction in the snowy grouper bag limit; establishment of a combined ACL for gag, black grouper, and red grouper; an allocation of 97% commercial and 3% recreational for the golden tilefish fishery based on landings history; and establishment of accountability measures as necessary.

Regulatory Amendment 10 (2010) eliminated the large area closure in Amendment 17A for all snapper grouper species off the coasts of southern Georgia and north/central Florida. The regulatory amendment modified measures implemented in Amendment 17A to end overfishing for red snapper.

Regulatory Amendment 9 (2011) reduced the bag limit for black sea bass from 15 fish per person to five fish per person, established trip limits on vermilion snapper and gag, and increased the trip limit for greater amberjack.

Regulatory Amendment 11 (2011) eliminated a restriction on the possession or harvest of some deepwater snapper grouper species in waters greater than 240 feet deep.

Amendment 25 (Comprehensive Annual Catch Limit Amendment) (2011) met the 2011 deadline mandated by the MSA to establish ACLs and AMs for species managed by the Council that were not undergoing overfishing.

Amendment 24 (2011) implemented measures to end overfishing and establish a rebuilding plan for red grouper. The amendment also implemented or revised parameters such as MSY, MSST, ACLs and AMs and specified allocations for the commercial and recreational sectors.

Amendment 23 (Comprehensive Ecosystem-Based Amendment 2) (2011) included measures to designate the Deepwater MPAs as EFH-HAPCs; limited harvest of snapper grouper species in S.C. SMZs to the bag limit; and modified sea turtle release gear.

Amendment 18A (2012) established management actions to limit participation and effort in the black sea bass fishery. Measures included establishment of an endorsement program and other modifications to the commercial black sea bass pot fishery; establishment of a commercial trip limit (all gear-types) for black sea bass; and increased minimum size limits for both commercial and recreational black sea bass fisheries.

Amendment 20A (2012) defined and reverted inactive shares within the wreckfish ITQ program;

redistributed reverted shares to active shareholders; established a share cap; and implemented an appeals process.

Regulatory Amendment 12 (2012) adjusted the ACL and OY for golden tilefish; specified a commercial ACT; and revised recreational AMs for golden tilefish.

Amendment 18B (2013) addressed management of golden tilefish. Actions included in the amendment are: An endorsement program for the longline sector of the golden tilefish component of the snapper-grouper fishery; establishment of landings criteria to determine who will receive endorsements; an appeals process for the golden tilefish endorsement program; establishment of a procedure to allow transferability of golden tilefish endorsements; allocation of 75 percent of the commercial annual catch limit to the longline sector and 25 percent to the hook-and-line sector; and modification of the golden tilefish trip limit.

Regulatory Amendment 13 (2012) revised the ABCs, ACLs (including sector ACLs), ad ACTs for 37 unassessed snapper grouper species. The revisions incorporated updates to the recreational data for these species, as per the new Marine Recreational Information Program, as well as revisions to commercial and for-hire landings. Regulatory Amendment 13 was necessary to avoid triggering accountability measures for these snapper-grouper species based on annual catch limits that were established by the Comprehensive Annual Catch Limit Amendment in April 2012, using recreational data under the Marine Recreational Fisheries Statistics Survey system.

Regulatory Amendment 14 (2013) modified the fishing year for greater amberjack; revised the minimum size limit measurement for gray triggerfish; increased the minimum size limit for hogfish; modified the commercial and recreational fishing year for black sea bass; adjusted the commercial fishing season for vermilion snapper; modified the aggregate grouper bag limit; and revised the Accountability Measures for gag and vermilion snapper.

Regulatory Amendment 15 (2013) modified the existing specification of optimum yield and annual catch limit for yellowtail snapper in the South Atlantic; modified existing regulations for yellowtail snapper in the South Atlantic; and modified the existing gag commercial ACL and AM that requires a closure of all other shallow water groupers (black grouper, red grouper, scamp, red hind, rock hind, graysby, coney, yellowmouth grouper, and yellowfin grouper) in the South Atlantic when the gag commercial annual catch limit is met or projected to be met.

Amendment 27 (2013) assumed management of Nassau grouper in the Gulf of Mexico; modified the crew size restriction for dual-permitted vessels (those with a Snapper Grouper Unlimited or 225-Pound Permit and a Charter/Headboat Permit for Snapper Grouper); modified the bag limit retention restriction for captain and crew of for-hire vessels; changed the existing snapper grouper framework procedure to allow for more timely adjustments to annual catch limits; and removed blue runner from the fishery management unit.

Amendment 28 (2013) established a process to determine if a red snapper fishing season will occur each year, including specification of the allowable harvest for both sectors and season length for the recreational sector; an equation to determine the ACL for red snapper for each sector; and management measures if fishing for red snapper is allowed.

Regulatory Amendment 18 (2013) adjusted the ACL (and sector ACLs) for vermilion snapper and red porgy based on the stock assessment updates for those two species and removed the annual recreational closure for vermilion snapper.

Regulatory Amendment 19 (2013) adjusted the black sea bass ACLs based on the results of the 2013 assessment. Because the increase to the ACL was substantial, there was concern that this could extend fishing with pots into the calving season for right whales and create a risk of entanglement for large migratory whales during the fall months. To minimize this risk, the amendment also established a closure to black sea bass pot gear from November 1 to April 30.

Regulatory Amendment 21 (2014) prevents snapper-grouper species with low natural mortality rates (red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack) from being unnecessarily classified as overfished. For these species, even small fluctuations in biomass due to natural conditions rather than fishing mortality may cause a stock to be classified as overfished. Modification of the MSST definition (used in determining whether a species is overfished) prevents these species from being classified as overfished unnecessarily.

Amendment 32 (2014) addressed the determination that blueline tilefish are overfished and undergoing overfishing. The amendment removed blueline tilefish from the deep-water complex; established blueline tilefish commercial and recreational sector ACLs and AMs; revised the deep-water complex ACLs and AMs; established a blueline tilefish commercial trip limit; and revised the blueline tilefish recreational bag limit and harvest season.

Amendment 29 (2014) revised ACLs and recreational ACTs for four unassessed snapper grouper species and three snapper grouper species complexes based on an update to the ABC control rule, and revised ABCs for 14 snapper-grouper stocks. Additionally, this final rule revises management measures for gray triggerfish in the EEZ in the South Atlantic region, including modifying minimum size limits, establishing a split commercial season, and establishing a commercial trip limit.

Table B-1 Management measures implemented to comply with or complement ASMFC or Council FMPs as of the adoption of Amendment 1 to the N.C. IJ FMP (2008). This information is included as reference.

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
American eel	ASMFC	FMP 1999 Add #1 2006 (maintain current restrictions)	3J .0301	(f) It is unlawful to use eel pots with mesh sizes smaller than one inch by one-half inch unless such pots contain an escape panel that is at least four inches square with a mesh size of 1 inch by one-half inch located in the outside panel of the upper chamber of rectangular pots and in the rear portion of cylindrical pots, except that not more than two eel pots per fishing operation with a mesh of any size may be used to take eels for bait.	No-Daily reports required via a DMF letter to fishers		3M .0512 Conditional Proclamation ***see note at end of Table**
			3M .0510	Unlawful to: (1) Possess, sell or take eels less than six inches in length; and (2) Possess more than 50 eels per person per day for recreational purposes			
Atlantic croaker	ASMFC	FMP 1997 Amen #1 2005	No comply rules		No		3M .0512 Conditional Proclamation
Atlantic menhaden	ASMFC	FMP 1981 Add #1-#3 2004-2006	No comply rules		No		3M .0512 Conditional Proclamation
Atlantic Striped Bass (Ocean)	ASMFC	FMP 1981 Amen #6 2003	3M .0201 General	(a) Striped bass is defined as striped bass (Morone saxatilis) and its hybrids taken in coastal and joint waters. (b) Hook-and-line fishing equipment is not commercial fishing equipment in the striped bass fishery. It is unlawful to sell or purchase striped bass taken by hook-and-line. Striped bass taken legally with hook-and-line may be	Various annuallyFF -30-07	effective at 12:01 A.M., Sunday, April 1, 2007**,** the season for the harvest of striped bass with ocean trawls in the Atlantic Ocean waters of North Carolina SHALL OPEN. The following restrictions will apply: I. SIZE LIMIT No person may possess, transport,	3M .0204 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				possessed and transported. (c) It is unlawful to possess striped bass imported from other states less than 18 inches long (total length). (d) It is unlawful to import, buy, sell, transport, offer to buy or sell, or possess striped bass except: (1) during the open season in internal coastal waters established in 15A NCAC 03M .0202; (2) during any open season established for the Atlantic Ocean in 15A NCAC 03M .0204; or (3) during any open season of another state without possession of the following: (A) A bill of lading as described in 15A NCAC 03I .0114; (B) A numbered, state-issued tag from the State of origin affixed through the mouth and gill cover. This tag must remain affixed until processed for consumption by the consumer. (e) The management units and recreational fishery management areas for estuarine striped bass fisheries in coastal North Carolina are designated in 15A NCAC 03R .0201.		buy, sell, or offer for sale striped bass less than 28 inches total length taken with ocean trawls from the Atlantic Ocean. II. HARVEST RESTRICTIONS A. No ocean trawl operation, regardless of the number of persons or vessels involved, may land or sell more than 100 striped bass during the harvest period beginning at 12:01 A.M. Sunday, April 1, 2007 and ending at 6:00 P.M., Sunday, April 15, 2007. B. Striped bass may not be transferred from the harvesting vessel to any other vessel during harvesting operations or be transported by any vessel other than the vessel in which they are harvested. III. GEAR RESTRICTIONS A. For purposes of this proclamation, a trawl is defined as a net made of multi-strand nylon consisting of wings, a body and a codend. B. No gill nets may be possessed on board a vessel used in the taking or landing of striped bass. Plus permits, tags, reporting, etc	
Atlantic Striped Bass	ASMFC		3M .0204 Season,	(a) It is unlawful to possess striped bass taken from the Atlantic Ocean			3M .0204 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
(Ocean)			Size, Etc. Ocean	less than the size limit as determined by the Atlantic States Marine Fisheries Commission in their Interstate Fisheries Management Plan for striped bass. The Fisheries Director shall issue proclamations necessary to bring North Carolina's size limit in compliance with the Interstate Fisheries Management Plan. (b) It is unlawful to buy, sell, transport, or possess striped bass from the Atlantic Ocean by any means except that the Fisheries Director may establish an open season at any time, and is further empowered to impose any or all of the following restrictions: (1) Specify number of days, (2) Specify areas, (3) Specify means and methods which may be employed in the taking, (4) Specify time period, (5) Limit the quantity, both commercially and recreationally, and (6) Provide for biological sampling of fish harvested.			
Atlantic striped bass (internal, ASMA, RRMA)	ASMFC	FMP 1981 Amen #6 2003	3M.0202 Season, Size, Etc. Internal	(a) The Fisheries Director may, by proclamation, impose any or all the following restrictions on the taking of striped bass in internal coastal waters: (1) Specify season or seasons: (A) for recreational purposes; (B) for commercial fishing operations from October 1 through April 30, (2) Specify areas,	Several annually FF-35-07 rec.	effective at 8:01 P.M., Monday, April 30, 2007 the season for striped bass taken for recreational purposes in the Albemarle Sound Management Area shall open with the following restrictions: AREA DESCRIPTION: The Albemarle Sound Management Area as defined in	3M.0202 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				(3) Specify quantity, (4) Specify means/methods, (5) Specify size, but the minimum size specified shall not be less than 18 inches total length, and Require submission of statistical and biological data. Fish that do not meet the minimum size limit specified by proclamation shall immediately be returned to the waters from which taken regardless of condition. (b) The Fisheries Director may, by proclamation, impose any or all the following restrictions on the taking of striped bass by hook-and-line or for recreational purposes in internal coastal waters in order to comply with the management requirements incorporated in the North Carolina Estuarine Striped Bass Plan: (1) Specify quantity, but shall not exceed possession of more than three fish in any one day, and (2) Specify size, but the minimum size specified shall not be less than 18 inches total length.	FF-33-07	Marine Fisheries Rule 15A NCAC 3R .0201 (a), excluding Inland fishing waters. II. SEASON, MEANS AND METHODS: A. Striped bass may be taken for recreational purposes seven days a week during the open season. B. Recreational Commercial Gear License (RCGL) gill net(s) with a mesh length of 5 ½ inches and larger are required to be equipped with floats that do not exceed 2 inches in diameter and 6 inches in length, with float placement no less than 10 yards apart. The net(s) shall be set so as to fish on the bottom not to exceed a vertical fishing height of 48 inches. The net(s) shall be attended when used from one hour after sunrise through one hour before sunset. C. The recreational season for striped bass in the Albemarle Sound Management Area shall close at 8:00 P.M., Sunday, May 6, 2007, unless closed earlier by a proclamation. III. SIZE AND CREEL LIMITS: A. No person shall take or possess striped bass less than 18 inches total length taken for recreational	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						purposes from the Albemarle Sound Management Area. B. No person, including RCGL holders, shall take or possess more than three (3) striped bass taken in any one day for recreational purposes from the Albemarle Sound Management Area. effective at 8:01 P.M., Saturday, April 14, 2007, the harvest of striped bass with COMMERCIAL FISHING OPERATIONS IN THE ALBEMARLE SOUND MANAGEMENT AREA WILL OPEN and the following provisions shall apply: I. AREA DESCRIPTION Albemarle Sound Management Area as described in Marine Fisheries Rule 15A NCAC 3R .0201 (a), excluding Inland fishing waters. II. SIZE AND HARVEST RESTRICTIONS: A. It is unlawful to take, possess, transport, buy, sell, or offer for sale striped bass less than 18 inches total length taken by commercial fishing operations from the Albemarle Sound Management Area. B. It is unlawful for an individual	
					M-5-07		

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						or commercial fishing operation regardless of the number of persons or vessels involved, to possess, land, sell or offer for sale more than five (5) striped bass, unless taken in conjunction with other commercially important finfish. Striped bass shall be limited to 50% by weight, of the combined daily harvest, not to exceed 5 fish per day, per Standard Commercial Fishing License (SCFL) holder. The daily harvest limit of 5 striped bass shall not be exceeded, regardless of where taken from internal waters, unless the fish are taken in accordance with II. C. below. C. It is unlawful for any operation consisting of more than one SCFL holder to be in possession of more than two daily harvest limits. A SCFL holder must accompany each single harvest limit until the time of sale to a dealer possessing a valid 2006/2007 STRIPED BASS DEALER PERMIT validated for the Albemarle Sound Management Area. Plus permits, tags, etc. effective at 12:01 A.M., Sunday, April 15, 2007 the following provisions shall apply to the use of gill nets in the ALBEMARLE SOUND MANAGEMENT AREA.	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						I. AREA DESCRIPTION: The Albemarle Sound Management Area as described in Marine Fisheries Rule 15A NCAC 3R .0201 (a) excluding Inland Fishing Waters. II. COMMERCIAL NET RESTRICTIONS: Only gill nets meeting the specified mesh lengths shall be used in the following areas identified below. A fishing operation, regardless of the number of vessels or persons involved, shall not use more than the lengths of gill nets specified for the following areas: Albemarle Sound, Currituck Sound, Croatan Sound and Roanoke Sound and their Joint Water Tributaries A. Gill nets with a mesh length of 3 ¼ inches shall not exceed 800 yards in length…….. Gill nets with a mesh length of 5 1/2 inches and larger that are equipped with floats that do not exceed 2 inches in diameter and 6 inches in length placed a minimum of 10 yards apart, not to exceed 11 floats per 100 yards of net. Nets must not exceed 3,000 yards in length and must be set so as to fish on the bottom not to exceed a vertical height of 48	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						inches. Gill nets with a mesh length of 5 1/2 inches and larger not meeting the criteria in Section II. D. for floats are required to be equipped with tie downs spaced no farther apart than 30 feet restricting the vertical distance between the top and bottom lines to 48 inches or less. Nets must not exceed 3000 yards in length and must be set so as to fish on the bottom not to exceed a vertical height of 48 inches. F. No gill nets may be used in the area southwest of a line from Black Walnut Point 35° 59 .3833' N- 76° 41 .0060' W, running 138° (M) to a point 35° 56 .3333'N- 76° 36 .0333' W at the mouth of Mackey's Creek, including Roanoke, Cashie, Middle and Eastmost rivers.	
Atlantic Sturgeon	ASMFC	FMP 1990 Amen # 1 1998 Add #2 2004	3M .0508	It is unlawful to possess sturgeon in North Carolina.	No		3M .0512 Conditional Proclamation
Black sea bass-North **&** **Black sea**	ASMFC & MAFMC SAFMC	FMP ?? Amen #13 ?? ??	3M. 0506	(a) The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the fisheries for species of the snapper-grouper complex and black sea bass in order to comply with the	FF-40-07	Effective at 12:01 A.M., Tuesday, May 1, 2007, the following restrictions shall apply to the commercial black sea bass fishery north of Cape Hatteras (35°	3M.0506 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
bass-South				management requirements incorporated in the Fishery Management Plans for Snapper-Grouper and Sea Bass developed by the South Atlantic Fishery Management Council or Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission: (1) Specify size; (2) Specify seasons; (3) Specify areas; (4) Specify quantity; (5) Specify means/methods; and (6) Require submission of statistical and biological data.		15.3'N. Latitude): SIZE LIMIT It is unlawful to possess black sea bass less than 11 inches total length north of Cape Hatteras. Total length shall be measured along the lateral midline from the tip of the nose to the tip tail, excluding the caudal fin filament. HARVEST LIMITS During the period beginning at 12:01 A.M., Tuesday, May 1, 2007 and ending at 6:00 P.M., Tuesday, May 15, 2007, no commercial trawl, fish pot or hook and line fishing operation, regardless of the number of people involved, may have total landings of more than 15,000 pounds of black sea bass taken from the Atlantic Ocean north of Cape Hatteras. The Atlantic Ocean black sea bass fishery will close immediately after the Director issues a public notice that the quota of black sea bass has been landed from the Atlantic Ocean north of Cape Hatteras, or at 6:00 P.M., May 15, 2007, whichever occurs first. B. During any closed season, vessels may land up to 100 pounds of black sea bass per trip taken from the Atlantic Ocean. III. GEAR RESTRICTIONS	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						FISH TRAPS/POTS: Black sea bass pots or traps must conform with the Federal rule requirements for escape vents specified in 50 CFR 648.144 (b)(2) and for degradable fasteners specified in 50 CFR 648.144 (b)(3)(i), (ii) and (iii). (See Section IV.H). IV. PERMITS A. Finfish dealers may not buy more than 100 pounds of black sea bass caught north of Cape Hatteras per day per commercial fishing operation unless the dealer has a valid 2007 Black Sea Bass – North of Cape Hatteras Dealer Permit from the North Carolina Division of Marine Fisheries. Permits will be issued only to those licensed fish dealers holding a valid license as authorized in G.S. 113-169.3. Dealers must abide by all conditions of the 2007 Black Sea Bass-North of Cape Hatteras Dealer Permit as set out in Proclamation FF-53-2006, dated November 21, 2006. B. Dealers possessing a 2007 Black Sea Bass – North of Cape Hatteras Dealer Permit shall report daily by noon through FAX transmittal (252-726-3903) to the Division of Marine Fisheries black sea bass landings from the Atlantic Ocean for the previous day.	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
			3M. 0506 (Pots)	(s) Fish Traps/Pots: (1) It is unlawful to use or have on board a vessel fish traps for taking snappers and groupers except sea bass pots as allowed in Subparagraph (2) of this Paragraph. (2) Sea bass may be taken with pots that conform with the federal rule requirements for mesh sizes and pot size as specified in 50 CFR Part 646.2, openings and degradable fasteners specified in 50 CFR Part 646.22(c)(2)(i), and escape vents and degradable materials as specified in 50 CFR Part 622.40 (b)(3)(i) and rules published in 50 CFR pertaining to sea bass north of Cape Hatteras (35° 15' N Latitude). Copies of these rules are available via the Federal Register posted on the Internet at www.gpoaccess.gov/fr and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost.			
Black sea bass-South	SAFMC		3M .0506	(b) Black sea bass, south of Cape Hatteras (35° 15.0321'): (1) It is unlawful to possess black sea bass less than ten inches total length. (2) It is unlawful to take or possess more than 20 black sea bass per person per day without a valid Federal Commercial Snapper-Grouper permit.	FF-39-07	Effective at 12:01 A.M., Sunday, April 29, 2007, the following restrictions will apply to the taking of snapper-grouper from the Atlantic Ocean for recreational and commercial purposes: I. SIZE AND POSSESSION LIMITS A. The size and possession limits of N.C. Fisheries Rules for Coastal Waters 15A NCAC 3M .0506 that were suspended in	G.S 113-221.1 Suspend Rule

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						Proclamation FF-19-2007, dated February 23, 2007 are replaced with the following provisions in accordance with proclamation authority in the same Rule: 1. It is unlawful to possess black sea bass south of Cape Hatteras (35 ° 15.0321' N) less than eleven inches total length when taken for recreational purposes. It is unlawful to take or possess more than 15 black sea bass per person per day south of Cape Hatteras without a valid Federal Commercial Snapper-Grouper permit. Sea bass may be taken with pots that conform with the federal rule requirements for mesh sizes and pot size as specified in 50 CFR Part 622.40 and rules published in 50 CFR pertaining to sea bass north of Cape Hatteras (35° 15'N Latitude).	
Bluefish	ASMFC & MAFMC	FMP ?? Amen #1 2000	3M .0511	(a) In order to comply with or utilize conservation equivalency to comply with the management requirements incorporated in the Fishery Management Plan for Bluefish developed cooperatively by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission, the Fisheries Director may, by proclamation, take any or all of the following actions for bluefish: (1) Taken by a commercial fishing operation: (A) Specify size;	FF-26-03	effective at 12:01 A.M., Tuesday, April 1, 2003, the following change will apply to the taking of bluefish for recreational purposes: Proclamation FF-42-2001, dated June 19, 2001, is RESCINDED. That proclamation specified the possession limit of 15 bluefish per person per day for recreational purposes. GENERAL INFORMATION C) The recreational	3M .0511 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				(B) Specify seasons; (C) Specify areas; (D) Specify quantity; (E) Specify means/methods; and (F) Require submission of statistical and biological data. (2) Taken for recreational purposes: (A) Specify size; (B) Specify quantity. (b) It is unlawful to possess more than 15 bluefish per person per day for recreational purposes. Of these 15 bluefish, it is unlawful to possess more than five bluefish that are greater than 24 inches total length.		possession limit for blue fish (15 fish per person per day) now appears in N.C. Marine Fisheries Rule 15A NCAC 3M .0511. Also included in this rule is a provision which states, "Of these 15 bluefish, it is unlawful to possess more than five bluefish that are greater than 24 inches total length." D) This proclamation rescinds Proclamation FF-42-2001, dated June 19, 2001.	
Dolphin & Wahoo	SAFMC	FMP 2004	3M .0515 dolphin	(a) It is unlawful to possess more than 10 dolphin per person per day taken by hook and line for recreational purposes except charter vessels with a valid National Marine Fisheries Service Coastal Migratory Pelagic Permit and licensed by the U.S. Coast Guard to carry six or less passengers for hire, may possess a maximum of 60 dolphin per day regardless of the number of people on board. (b) Vessels, including charterboats when fishing with three or less persons (including captain and mate) on board, with a valid Standard or Retired Standard Commercial Fishing License or a Land or Sell License, may possess more than 60 dolphin per day.	No		G.S 113-221.1 Suspend Rule 3M .0512 Conditional Proclamation
			3M .0517 wahoo	(a) It is unlawful to possess more than two wahoo per person per day	No		G.S 113-221.1

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				taken by hook and line for recreational purposes. (b) It is unlawful to take or possess more than two wahoo per person per day, or sell wahoo without a Federal Commercial Dolphin/Wahoo permit and either a Standard Commercial Fishing License, Retired Standard Commercial Fishing License, or a Land or Sell License. (c) It is unlawful to possess aboard or land more than 500 pounds of wahoo per trip in a commercial fishing operation			Suspend Rule 3M .0512 Conditional Proclamation
Mackerel, king	SAFMC	FMP 1983 Amen 1-13 2004	3M .0301	(b) King mackerel: (1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions for king mackerel: (A) Specify areas. (B) Specify seasons. (C) Specify quantity. (D) Specify means/methods. (E) Specify size. (2) It is unlawful to possess king mackerel less than 24 inches fork length. (3) It is unlawful to possess more than three king mackerel per person per day taken for recreational purposes. (4) It is unlawful to possess more than three king mackerel per person per day in the Atlantic Ocean: (A) by hook and line except for persons holding a valid National Marine Fisheries Service King Mackerel Commercial Vessel Permit; or			3M .0301 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				(B) between three miles and 200 miles from the State's mean low water mark in a commercial fishing operation except for persons holding a valid National Marine Fisheries Service King Mackerel Commercial Vessel Permit. (5) It is unlawful to use gill nets in the Atlantic Ocean to take more than three king mackerel per person per day south of 34° 37.3000' N (Cape Lookout). (c) Charter vessels or head boats that hold a valid National Marine Fisheries Service Coastal Migratory Pelagic (Charter Boat and Head Boat) permit must comply with the king mackerel and Spanish mackerel possession limits established in Subparagraphs (a)(3) and (b)(3) of this Rule when fishing with more than three persons (including the captain and mate) on board. (d) It is unlawful to possess aboard or land from a vessel, or combination of vessels that form a single operation, more than 3,500 pounds of Spanish or king mackerel, in the aggregate, in any one day.			
Mackerel, Spanish	SAFMC & ASMFC	FMP 1983 Amen 1-13 2004	3M .0301	(a) Spanish Mackerel: (1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions for Spanish mackerel: (A) Specify areas. (B) Specify seasons. (C) Specify quantity. (D) Specify means/methods. (E) Specify size. (2) It is unlawful to possess			3M .0301 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				Spanish mackerel less than 12 inches fork length. (3) It is unlawful to possess more than 15 Spanish mackerel per person per day taken for recreational purposes. It is unlawful to possess more than 15 Spanish mackerel per person per day in the Atlantic Ocean beyond three miles in a commercial fishing operation except for persons holding a valid National Marine Fisheries Service Spanish Mackerel Commercial Vessel Permit. c) Charter vessels or head boats that hold a valid National Marine Fisheries Service Coastal Migratory Pelagic (Charter Boat and Head Boat) permit must comply with the king mackerel and Spanish mackerel possession limits established in Subparagraphs (a)(3) and (b)(3) of this Rule when fishing with more than three persons (including the captain and mate) on board. (d) It is unlawful to possess aboard or land from a vessel, or combination of vessels that form a single operation, more than 3,500 pounds of Spanish or king mackerel, in the aggregate, in any one day.			
Monkfish	MAFMC	FMP ?? Amen #2 2005	No Comply Rules		(Turtle related)		3M .0512 Conditional
Red Drum	ASMFC	FMP ?? Amen #2 2002 (maintain current restrictions)	3M .0501	(a) The Fisheries Director, may by proclamation, impose any or all of the following restrictions on the taking of red drum: (1) Specify areas. (2) Specify seasons. (3) Specify quantity.	FF-47-01	effective at 6:00 P.M. Thursday, September 6, 2001, the following restrictions will apply to the taking of red drum (channel bass) in a commercial fishing operation: I. HARVEST LIMIT	3M .0501 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				(4) Specify means/methods. (5) Specify size. (b) It is unlawful to remove red drum from any type of net with the aid of any boat hook, gaff, spear, gig, or similar device. (c) It is unlawful to possess red drum less than 18 inches total length or greater than 27 inches total length. (d) It is unlawful to possess more than one red drum per person per day taken-by hook-and-line or for recreational purposes. (e) The annual commercial harvest limit (September 1 through August 31) for red drum is 250,000 pounds. If the harvest limit is projected to be taken, the Fisheries Director shall, by proclamation, prohibit possession of red drum taken in a commercial fishing operation.		A. It is unlawful to possess more than seven (7) red drum per day taken in a commercial fishing operation, regardless of the number of individuals or vessels involved. B. Subject to I. A. above, no person may possess red drum incidental to any commercial fishing operation unless the weight of the combined catch of all other finfish (excluding menhaden) exceeds the weight of the red drum retained.	
Reef fish	SAFMC	FMP?? Amen 1-15	3M .0506	(a) The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the fisheries for species of the snapper-grouper complex and black sea bass in order to comply with the management requirements incorporated in the Fishery Management Plans for Snapper-Grouper and Sea Bass developed by the South Atlantic Fishery Management Council or Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission: (1) Specify size; (2) Specify seasons; (3) Specify areas;	FF-39-07	Effective at 12:01 A.M., Sunday, April 29, 2007, the following restrictions will apply to the taking of snapper-grouper from the Atlantic Ocean for recreational and commercial purposes: I. SIZE AND POSSESSION LIMITS A. The size and possession limits of N.C. Fisheries Rules for Coastal Waters 15A NCAC 3M .0506 that were suspended in Proclamation FF-19-2007, dated February 23, 2007 are replaced with the following provisions in accordance with proclamation	G.S 113-221.1 Suspend Rule 3M .0506 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				(4) Specify quantity; (5) Specify means/methods; and (6) Require submission of statistical and biological data. The species of the snapper-grouper complex listed in the South Atlantic Fishery Management Council Fishery Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region are hereby incorporated by reference and copies are available via the Federal Register posted on the Internet at www.gpoaccess.gov/fr and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost. See rule for species size and creels		authority in the same Rule: 1…. It is unlawful to possess vermillion snapper (beeliner) less than 12 inches total length. It is unlawful to possess more than three red porgy per person per day without a valid Federal Commercial Snapper-Grouper permit. It is unlawful to land more than 120 individual red porgy from May 1 through December 31 in a commercial fishing operation. B. The following is to be added to Marine Fisheries Rule 15A NCAC 3M .0506 (p)(2) Combined Bag Limits: It is unlawful to possess more than five grouper without a Federal Commercial Snapper-Grouper permit of which: No more than one per person per day may be a snowy grouper; No more than one per person per day may be a golden tilefish	
			3M. 0516 (Cobia)	(a) It is unlawful to possess cobia less than 33 inches fork length. (b) It is unlawful to possess more than two cobia per person per day.			
Scup	ASMFC & MAFMC	FMP 1996 Add #1 1996	3M .0514	In order to comply with or utilize conservation equivalency to comply with the management requirements incorporated in the Fishery Management Plan for Scup developed cooperatively by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission, the Fisheries Director may, by	FF-31-07	effective at 9:00 A.M., Sunday, April1, 2007, the following restrictions will apply to the commercial scup fishery in coastal waters including the Atlantic Ocean north of Cape Hatteras (35° 15' N. Latitude): I. SIZE AND HARVEST	3M .0514 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				proclamation, take any or all of the following actions in the scup fishery: (1) Specify size; (2) Specify seasons; (3) Specify areas; (4) Specify quantity; (5) Specify means/methods; and (6) Require submission of statistical and biological data.		LIMITS No person may take, possess, buy, sell or offer for sale scup less than 9 inches in length. No person may possess, sell or offer for sale more than 30,000 pounds of scup during each of the following two week periods when taken with commercial fishing equipment or for commercial purposes during the Winter I Harvest Period. 1. From 9:00 A.M., April 1 through 9:00 P.M., April 15, 2007. From 9:01 A.M., April 16 through 9:00 P.M., April 30, 2007. II. TRAWL MESH REQUIREMENTS The minimum mesh size for the commercial scup fishery will be 5 inches stretched mesh with a minimum length of 75 meshes from the terminus of the net. For small nets with less than 75 mesh codends, the entire net will be 5 inches.	
Shad & River herring	ASMFC	FMP 1985 Amen1 1999 Add #1 2003 (maintain current restrictions)	3M .0513	(a) The Fisheries Director may, by proclamation, based on variability in environmental and local stock conditions, take any or all of the following actions in the blueback	FF-71-06	effective at 12:01 A.M., Monday, January 1, 2007, the following restrictions shall apply to the harvest of American and hickory	3M .0513 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				herring, alewife, American shad and hickory shad fisheries: (1) Specify size; (2) Specify season; (3) Specify area; (4) Specify quantity; (5) Specify means/methods; and (6) Require submission of statistical and biological data. e) It is unlawful to take American shad and hickory shad by any method except hook-and-line from April 15 through December 31. (f) It is unlawful to possess more than 10 American shad or hickory shad, in the aggregate, per person per day taken by hook-and-line or for recreational purposes.		shad: I. SEASON The American shad harvest season in the internal Coastal and Joint fishing waters of the state, excluding the Atlantic Ocean, will open. The hickory shad harvest season in the Atlantic Ocean, Internal Coastal and Joint fishing waters of the state will open. The season for the commercial harvest of American shad and hickory shad shall close at 12:00 midnight, Saturday, April 14, 2007. II. RECREATIONAL HARVEST LIMITS It is unlawful to possess more than ten (10) American shad or hickory shad, in the aggregate, per person per day taken by hook-and-line or for recreational purposes.	
Sharks coastal	ASMFC (pending)& NMFS	FMP 1999 Amen #1 2003	3M .0505	The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the shark fishery: (1) Specify size; (2) Specify seasons; (3) Specify areas; (4) Specify quantity; (5) Specify means/methods; and (6) Require submission of	FF-24-04	Effective at 6:00 A.M. Monday, March 8, 2004, the harvest of sharks taken in state waters is restricted as follows: I. COMMERCIAL HARVEST RESTRICTIONS: A. Seasons: The possession of sharks taken for commercial purposes may only occur during an open portion	3M .0505 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				statistical and biological data.		of the seasons established by this proclamation. Open seasons in state waters shall be the same as open seasons established by the National Marine Fisheries Service (NMFS) for federal waters. These open seasons are dependent on established quotas. The fishing seasons are defined herein as:…… B. Limits 1. No person may possess more than one (1) shark per vessel per day during an open season taken in internal coastal waters or in the Atlantic Ocean within three nautical miles of shore by any gear for commercial purposes. 2. The one shark possession may be made up of a shark from any of the three following shark categories:Large Coastal, Small Coastal, and Pelagic (see General Information Section). If NMFS closes any of these categories, then possession or sale of sharks from that category is prohibited. 3. The possession of all sharks, except for tiger (Galeocerdo cuvieri), thresher (Alopias vulpinus), bigeye thresher (Alopias superciliosus), shortfin mako (Isurus oxyrinchus), and hammerhead species, genus (Sphyrna), greater than 84 inches fork length is prohibited. 4. The shark species, Atlantic sharpnose (Rhizoprionodon terraenovae) is exempt from these harvest and size restrictions. 5. Smooth dogfish (Mustelis canis) are exempt from	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						the season, harvest and size restrictions listed above. 6. Spiny dogfish (Squalus acanthias) seasons and harvest limits are established under the Mid-Atlantic/New England Council Spiny Dogfish Fishery Management Plan or the ASMFC Spiny Dogfish FMP. 7. All sharks not retained must be returned to the water in a manner to ensure the highest likelihood of survival. 8. In accordance with Federal Rule 50 CFR §635.30 (c) (2), a person may eviscerate (dress) and remove the head and fins from a shark at sea, but must retain the fins with the dressed carcass and land all fins and corresponding carcasses from the vessel at the same point of landing. This applies to Atlantic sharpnose sharks. 9. Smooth dogfish may be dressed at sea and are exempt from the requirement to retain and land fins and corresponding carcasses together as specified in I.B.8 above. II. RECREATIONAL PURPOSES AND HOOK-AND-LINE POSSESSION LIMITS: A. The possession of any shark species, excluding smooth dogfish (Mustelus canis), and spiny dogfish (Squalus acanthias), is limited to one (1) shark per vessel per day, for vessels other than charter and head boat vessels for hire.	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						B. The possession limit for charter and head boat vessels, excluding smooth dogfish (Mustelus canis), and spiny dogfish (Squalus acanthias), is one (1) shark per person per day excluding captain and crew. The sale of a charter or head boat vessel possession limit is prohibited. The catch cannot be transferred from individual anglers to the captain or crew. C. If no vessel is involved, the possession limit is one (1) shark per person per day. D. All sharks except Atlantic sharpnose (Rhizoprionodon terraenovae), smooth dogfish, and spiny dogfish must be a minimum size of 54 inches fork length. E. The possession of all sharks, except for tiger (Galeocerdo cuvieri), thresher (Alopias vulpinus), bigeye thresher (Alopias superciliosus), shortfin mako (Isurus oxyrinchus) and hammerhead species, genus (Sphyrna), greater than 84 inches fork length is prohibited. F. Any shark retained must have head, tail, and fins intact with the carcass through the point of landing. G. All sharks not retained must be returned to the water in a manner to ensure the highest likelihood of survival. III. PROHIBITED SPECIES: Possession of the following shark species is prohibited in state waters: basking (Cetorhinus	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						maximus), white (Carcharodon carcharias), sand tiger (Odontaspis taurus) and whale (Rhincodon typus).	
Spiny Dogfish	ASMFC & MAFMC	FMP 2003 Add #1 2005	3M .0505	The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the shark fishery: (1) Specify size; (2) Specify seasons; (3) Specify areas; (4) Specify quantity; (5) Specify means/methods; and (6) Require submission of statistical and biological data.	FF-8-07	effective at 6:00 A.M., Monday, February 5, 2007 the following restrictions will apply to the harvest of spiny dogfish in the Atlantic Ocean waters of North Carolina. I. HARVEST PERIODS The fishing year for spiny dogfish is divided into two periods: Quota Period I and Quota Period II. Period I is from May 1 through October 1 each year, and Period II is from November 1 through April 30. II. TRIP LIMITS No commercial fishing operation, regardless of the number of people involved, may possess more than 4,000 pounds per trip of spiny dogfish during this portion of Period II.	3M .0505 Explicit
Spot	ASMFC	FMP 1987	No comply rules		No		3M .0512 Conditional Proclamation
Spotted seatrout	ASMFC	FMP 1984 Amen #1 1991	No comply rules		No		3M .0512 Conditional Proclamation
Summer flounder	ASMFC & MAFMC	FMP 1982 Amen 1-15	3M .0503	(a)It is unlawful to possess flounder less than 14 inches total length taken	FF-9-07 rec ocean	effective at 12:01 A.M., Thursday, February 8, 2007, the	3M .0503 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				from the Atlantic Ocean in a commercial fishing operation See Rule for license to land flounder, and gear restrictions (j) The Fisheries Director may, by proclamation, establish trip limits for the taking of flounder from the Atlantic Ocean to assure that the individual state quota allocated to North Carolina in the joint Mid-Atlantic Fishery Management Council/Atlantic States Marine Fisheries Commission Fishery Management Plan for Summer Flounder is not exceeded. (k) The Fisheries Director may, by proclamation, based on variability in environmental and local stock conditions, take any or all of the following actions in the flounder fishery: (1) Specify size; (2) Specify season; (3) Specify area; (4) Specify quantity; (5) Specify means/methods; and (6) Require submission of statistical and biological data.	FF-10-07 set internal at 14 comm & rec FF-24-07	following restrictions will apply to the taking of flounder for recreational purposes from the Atlantic Ocean: I. A. MINIMUM SIZE LIMIT No person may possess flounder less than 14½ inches total length taken from the Atlantic Ocean for recreational purposes. POSSESSION LIMIT It is unlawful to possess more that eight flounder taken in the Atlantic Ocean for recreational purposes per person per day or per trip if a trip occurs on more than one calendar day. The possession limit shall apply to flounder taken in the Atlantic Ocean by all gears, including gigs, if possession is for a recreational purpose. effective at 12:01 A.M., Friday, March 2, 2007, the following restrictions shall apply to the commercial flounder fishery: I. HARVEST LIMITS During the period beginning at 12:01 A.M., Friday, March 2, 2007 and ending at 6:00 P.M., Friday, March 16, 2007, no commercial fishing operation, regardless of the number of	G.S 113-221.1 Suspend Rule

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						people involved, may have total landings of more than 10,000 pounds of flounder taken from the Atlantic Ocean. These operations require a valid License to Land Flounder from the Atlantic Ocean. The Atlantic Ocean flounder fishery will close immediately after the Director issues a public notice that the spring quota of flounder has been landed from the Atlantic Ocean, or at 6:00 P.M., March 16, 2007, whichever occurs first. Plus permits, reporting	
Tautog	ASMFC	FMP 1996 Add 1-3	No Comply rules				3M .0512 Conditional Proclamation
Weakfish	ASMFC	FMP 1985 Amen 1-4 Add 1	3M .0504	(b) Weakfish (gray trout). (1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions on the taking of weakfish by commercial fishing operations: (A) Specify areas. (B) Specify seasons. (C) Specify quantity. (D) Specify means/methods. (E) Specify size, but the minimum size shall not be greater than 12 inches total length. (2) The Fisheries Director may, by proclamation, in order to comply with or utilize conservation equivalency to comply with the Atlantic States Marine Fisheries Commission Weakfish Management Plan, impose any or all of the	FF-24-06	effective at 12:00 Noon, Friday, March 17, 2006, the following restrictions will apply to the commercial weakfish fishery: I. COMMERCIAL FISHING OPERATIONS, EXCLUDING HOOK-AND-LINE, SIZE LIMITS: A. No person may take, possess, transport, buy, sell, or offer for sale weakfish less than 12 inches total length in state waters or within 200 miles of shore in the Atlantic Ocean except as provided in I.(B) below. B. From April 1 through	3M .0504 Explicit

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				following restrictions on the taking of weakfish by hook-and-line or for recreational purposes: (A) Specify quantity. (B) Specify size.		November 15, weakfish 10 inches total length or more may lawfully be taken in North Carolina internal waters by use of long haul seines or pound nets only and possessed, transported, bought, sold, or offered for sale. GEAR RESTRICTIONS: A. GILL NETS: No person may possess aboard or land from, any vessel using or having on board a gill net with a mesh length less than 2 7/8 inches stretched mesh, more than 300 pounds of weakfish during any one day or on any trip, whichever is longer, in state waters or within 200 miles of the shore in the Atlantic Ocean. B. FLYNETS: No person may possess aboard or land from any vessel using a flynet more than 300 pounds of weakfish during any one day or trip, whichever is longer, in state waters or within 200 miles of the shore in the Atlantic Ocean, unless all flynets on board meet the following requirements:…… C. For commercial fishing operations operating with gill nets and flynets that do not meet the requirements of II. (A) and (B) above, weakfish may be taken as	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						bycatch incidental to those gill net and flynet operations provided that the weight of the weakfish shall not exceed 50% of the total weight of the combined catch up to 300 pounds of weakfish. D. SHRIMP/CRAB TRAWLS:No person may possess more than 150 pounds of weakfish (12 inches or more in total length) taken with a shrimp or crab trawl. The weight of the weakfish shall not exceed 50% of the total weight of the combined catch up to 150 pounds of weakfish. This limit does not apply to a Recreational Commercial Gear License shrimp trawl.	

* Broad proclamation authority is given in rule 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS:
In order to comply with management requirements incorporated in Federal Fishery Management Council Management Plans or Atlantic States Marine Fisheries Commission Management Plans, the Fisheries Director may, by proclamation, suspend the minimum size and harvest limits established by the Marine Fisheries Commission, and implement different minimum size and harvest limits. Proclamations issued under this Section shall be subject to approval, cancellation, or modification by the Marine Fisheries Commission at its next regularly scheduled meeting or an emergency meeting held pursuant to G.S. 113-221(e1).
History Note: Authority G.S. 113-134; 113-182; 113-221; 143B-289.4;Eff. March 1, 1996. Note G.S. 113-221(e1) was repealed in 2003.
**Note (2015) that the above rule NCAC 03M .0512 was modified to its present form with the adoption of Amendment 1 to the N.C. FMP for Interjurisdictional Fisheries in 2008 (see Appendix D for the 2008 issue paper with proposed rule changes).
Also rule 03O .0506 SPECIAL PERMIT REQUIRED FOR SPECIFIC MANAGEMENT PURPOSES is used for compliance actions and it states
"The Fisheries Director may, by proclamation, require individuals taking marine and estuarine resources regulated by the Marine Fisheries Commission, to obtain a special permit."

APPENDIX C STATE CONTACTS

The following website links provide the names and contact information for individuals currently serving as North Carolina representatives on the ASMFC, Councils, Technical Committees (TC), Scientific and Statistical Committees (SSC) and Advisory Panels (AP) that pertain to the various plans included in this FMP.

Atlantic States Marine Fisheries Commission

The ASMFC policy-making body is represented by the DMF Director, a Legislative Appointee and a Governor's Appointee. Contact information for these individuals can be found here: http://www.asmfc.org/about-us/commissioners.

The following website links provide contact information for state agency TC representatives and citizen AP representatives for the various finfish species management boards (note: the South Atlantic Species AP serves as the citizen AP for Atlantic croaker, black drum, red drum, Spanish mackerel, spot and spotted seatrout). An overview of the ASMFC Fisheries Management Program, as well as links to individual species management board pages can be found here: http://www.asmfc.org/fisheries-management/program-overview.

American Eel (http://www.asmfc.org/species/american-eel)
TC: http://www.asmfc.org/uploads/file//54877630AmEelTC.pdf.
AP: http://www.asmfc.org/uploads/file//542c7cfbamericanEel_AP.pdf.

Atlantic Croaker (http://www.asmfc.org/species/atlantic-croaker)
TC: http://www.asmfc.org/uploads/file//53b2ff35atlanticCroakerTC.pdf
AP: http://www.asmfc.org/uploads/file//53bd83bcsouthAtlanticAP.pdf

Atlantic Menhaden (http://www.asmfc.org/species/atlantic-menhaden)
TC: http://www.asmfc.org/uploads/file//53b1caf2atlanticMenhadenTC.pdf
AP: http://www.asmfc.org/uploads/file//53b1cb59atlanticMenhadenAP.pdf

Atlantic Striped Bass (http://www.asmfc.org/species/atlantic-striped-bass)
TC: http://www.asmfc.org/uploads/file//548777b6AtlStripedBassTC.pdf
AP: http://www.asmfc.org/uploads/file//53602121atlanticStripedBassAP.pdf

Atlantic Sturgeon (http://www.asmfc.org/species/atlantic-sturgeon)
TC: http://www.asmfc.org/uploads/file//54c93c81SturgeonTechnicalCommittee.pdf
AP: http://www.asmfc.org/uploads/file//53bbf8a9atlanticSturgeonAP.pdf

Black Drum (http://www.asmfc.org/species/black-drum)
TC: http://www.asmfc.org/species/black-drum
AP: http://www.asmfc.org/uploads/file//53bd83a7southAtlanticAP.pdf

Black Sea Bass (north of Cape Hatteras, http://www.asmfc.org/species/black-sea-bass)
TC: http://www.asmfc.org/uploads/file//54877a05SFlounderScupBSB_TC.pdf
AP: http://www.asmfc.org/uploads/file//53d675afblackSeaBassAP.pdf

Bluefish (http://www.asmfc.org/species/bluefish)
TC: http://www.asmfc.org/uploads/file//54877825BluefishTC.pdf
AP: http://www.asmfc.org/uploads/file//53bc158fbluefishAP.pdf

Coastal Sharks (http://www.asmfc.org/species/coastal-sharks)
TC: http://www.asmfc.org/uploads/file//5487789aCoastalSharksTC.pdf
AP: http://www.asmfc.org/uploads/file//53baf01dcoastalSharkAdvisoryPanel.pdf

Red Drum (http://www.asmfc.org/species/red-drum)
TC: http://www.asmfc.org/uploads/file//548779b5RedDrumTC.pdf
AP: http://www.asmfc.org/uploads/file//53bd830asouthAtlanticAP.pdf

Scup (http://www.asmfc.org/species/scup)
TC: http://www.asmfc.org/uploads/file//548779f0SFlounderScupBSB_TC.pdf
AP: http://www.asmfc.org/uploads/file//53d68a8cscupAP.pdf

Shad & River Herring (http://www.asmfc.org/species/shad-river-herring)
TC: http://www.asmfc.org/uploads/file//548b194eShad_RiverHerringTC.pdf
AP: http://www.asmfc.org/uploads/file//53b1cc75shadRiverHerringAP.pdf

Spanish Mackerel (http://www.asmfc.org/species/spanish-mackerel)
TC: no TC for Spanish mackerel; all technical recommendations from SAFMC
AP: http://www.asmfc.org/uploads/file//53bd823asouthAtlanticAP.pdf

Spiny Dogfish (http://www.asmfc.org/species/spiny-dogfish)
TC: http://www.asmfc.org/uploads/file//54877ae8SpinyDogfishTC.pdf
AP: http://www.asmfc.org/uploads/file//53be9b28spinyDogfishAP.pdf

Spot (http://www.asmfc.org/species/spot)
TC: none listed
AP: http://www.asmfc.org/uploads/file//53bd8261southAtlanticAP.pdf

Spotted Seatrout (http://www.asmfc.org/species/spotted-seatrout)
TC: none listed
AP: http://www.asmfc.org/uploads/file//53bd82f0southAtlanticAP.pdf

Summer Flounder (http://www.asmfc.org/species/summer-flounder)
TC: http://www.asmfc.org/uploads/file//548779faSFlounderScupBSB_TC.pdf
AP: http://www.asmfc.org/uploads/file//53d66224summerFlounderAP.pdf

Tautog (http://www.asmfc.org/species/tautog)
TC: http://www.asmfc.org/uploads/file//54877b76TautogTC.pdf
AP: http://www.asmfc.org/uploads/file/tautog_AP0710.pdf

Weakfish (http://www.asmfc.org/species/weakfish)
TC: http://www.asmfc.org/uploads/file//54877bd1WeakfishTC.pdf
AP: http://www.asmfc.org/uploads/file//5356e849weakfishAP.pdf

South Atlantic Fishery Management Council

Voting members on the SAFMC from North Carolina include the DMF Director (or his designee), an obligatory member and an at-large member. Contact information for these individuals can be found here: http://safmc.net/about-us/council-members.

Unlike the ASMFC, the SAFMC does not have separate technical advisory bodies (TCs) for each of its managed species. As mandated under the MSA, all federal Councils have an SSC (Scientific and Statistical Committee) that reviews all species technical information, including stock assessments, and provides catch level scientific advice that the Councils must adhere to. In addition to its SSC, the SAFMC also has a Socio-Economic Panel (SEP) that focuses specifically on the social and economic impacts of potential management measures. Contact information for SSC and SEP members is found here: http://safmc.net/science-and-statistics/scientific-and-statistical-committee.

The SAFMC does have citizen advisory panels for all managed species (http://safmc.net/AboutUs/AdvisoryPanels). Information regarding the Council's finfish FMPs and contact information for advisory panel members can be found via the website links below.

Dolphin/Wahoo (http://safmc.net/Library/Dolphin-Wahoo)
AP: http://safmc.net/AboutUs/AdvisoryPanels/DolphinWahoo

King/Spanish Mackerel, Cobia (http://safmc.net/Library/CoastalMigratoryPelagicsmackerel)
AP: http://safmc.net/AboutUs/AdvisoryPanels/KingandSpanishMackerel

Snapper Grouper (http://safmc.net/resource-library/snapper-grouper)
AP: http://safmc.net/AboutUs/AdvisoryPanels/SnapperGrouper

Mid-Atlantic Fishery Management Council

Voting members on the MAFMC from North Carolina include the DMF Director (or his designee), an obligatory member and an at-large member. Contact information for these individuals can be found here: http://www.mafmc.org/members/.

Similar to the SAFMC, the MAFMC has a statutorily-mandated SSC (Scientific and Statistical Committee) that reviews all species technical information, including stock assessments, and provides catch level scientific advice. Information regarding SSC members is found here: http://www.mafmc.org/ssc. Because of the joint management responsibility the MAFMC shares with the ASMFC for several species, the Council also utilizes Monitoring Committees that review advice from the SSC and recommend changes in management, in conjunction with ASMFC TCs. State agency TC members often serve as Monitoring Committee members as well.

Bluefish (http://www.mafmc.org/bluefish/)
AP: http://www.mafmc.org/advisors/bluefish

Mackerel, Squid, Butterfish (http://www.mafmc.org/msb/)
AP: http://www.mafmc.org/advisors/msb

Monkfish (http://www.mafmc.org/monkfish/)
AP: http://www.mafmc.org/advisors/monkfish

Spiny Dogfish (http://www.mafmc.org/dogfish/)
AP: http://www.mafmc.org/advisors/spiny-dogfish

Summer Flounder, Scup, Black Sea Bass (north) (http://www.mafmc.org/sf-s-bsb/)
AP: http://www.mafmc.org/advisors/sf-s-bsb

APPENDIX D PROPOSED RULE CHANGES FROM 2008

RULES FOR IJA FMP
June 2008

I. ISSUE

Review of current MFC rules to determine if they provide the most efficient and effective means of complying with federal Council and ASMFC requirements adopted by reference in the North Carolina Interjurisdictional Fisheries Management Plan (IJA FMP).

II. ORIGINATION

The Division's PDT for the IJA FMP

III. BACKGROUND

The IJA FMP was initially adopted by the MFC in August 2002. It is undergoing the five year review as required by the Fisheries Reform Act (FRA) of 1997. The IJA FMP adopts by reference existing fisheries management plans for 23 finfish species or species group developed by the Atlantic States Marine Fisheries Commission (ASMFC) or federal regional management Councils (South Atlantic and Mid-Atlantic.). A variety of MFC rules and Division proclamations are utilized to put in place management actions in order for the state to be in compliance with the ASMFC and Council plans. The first systematic review of these IJA FMP compliance rules was undertaken by the PDT in 2007 and a number of rules changes are brought forth for consideration.

IV. AUTHORITY

North Carolina General Statutes

113-134. MFC adopt rules implementing subchapter
113-182. Regulation of fishing and fisheries
113-182.1 Fishery Management Plans
113-221.1 Proclamations, emergency review
143B-289.52 MFC powers and duties

V. DISCUSSION

A wide range of approaches are found in the MFC rules that deal with compliance issues. In some cases each rule is very explicit and the text contains all the actions in effect (American eel, Atlantic sturgeon, dolphin, wahoo, cobia). In other instances the rule grants broad proclamation authority to the Fisheries Directors (sharks, scup,) and for most others the rule is a mix of proclamation authority combined with some explicit text. Several species (Atlantic croaker, Atlantic menhaden, monkfish, spot, spotted seatrout, and tautog) have no MFC compliance rules at all.

A single rule, 03M .0512 (compliance with fishery management plans), allows for the suspension of only existing size or harvest limits by proclamation and the implementation of different size or harvest limits by proclamation. Actions taken under this rule are in effect till and subject to review at the next MFC meeting. The Division is proposing to modify the text of this rule to include a correction to a General Statute reference [GS 113-221(e1) was repealed in 2003] and to broaden the types of actions that may be implemented by proclamation. The Director's proclamation authority to comply with Council or ASMFC plans would be maintained and provide for subsequent approval, cancellation, or modification by the MFC. Rule 03O .0506 (special permit required for specific management purposes) is often utilized to implement the more administrative measures for compliance such as quota monitoring and reporting requirements. No changes are recommended in this rule.

Also the existing text in certain species specific rules that confers proclamation authority should be deleted, in order to consistently use the broader authority provided by the proposed modified rule 03M .0512. In this way any conflict with the species rules that may have different parameters for the utilization of proclamation authority can be

avoided. The following species rules will not be modified because the existing proclamation authority in these rules is needed to implement state management actions, often associated with a state FMP: 03M .0202 – striped bass season, size and harvest limit: internal coastal waters; and 03M.0503 – flounder.

VI. PROPOSED RULE(S)

MODIFY SUBCHAPTER 3M - FINFISH
SECTION .0200 – STRIPED BASS
15A NCAC 03M .0201 GENERAL is proposed for amendment as follows:

15A NCAC 03M .0201 GENERAL

(a) Striped bass is defined as striped bass (Morone saxatilis) and its hybrids taken in coastal and joint waters.

(b) Hook-and-line fishing equipment is not commercial fishing equipment in the striped bass fishery. It is unlawful to sell or purchase striped bass taken by hook-and-line. Striped bass taken legally with hook-and-line may be possessed and transported.

(c) It is unlawful to possess striped bass imported from other states less than 18 inches long (total length).

(d) It is unlawful to import, buy, sell, transport, offer to buy or sell, or possess striped bass ~~except:~~ except during any:

(1) ~~during the~~ open striped bass season ~~in~~ established for internal coastal ~~waters established in 15A NCAC 03M .0202;~~ waters;

(2) ~~during any~~ open striped bass season established for the Atlantic ~~Ocean in 15A NCAC 03M .0204;~~ Ocean; or

(3) ~~during any~~ open striped bass season of another state without possession of the following:

(A) A bill of lading as described in 15A NCAC 03I .0114;

(B) A numbered, state-issued tag from the State of origin affixed through the mouth and gill cover. This tag must remain affixed until processed for consumption by the consumer.

(e) The management units and recreational fishery management areas for estuarine striped bass fisheries in coastal North Carolina are designated in 15A NCAC 03R .0201.

Authority G.S. 113-134; 113-182; 143B-289.52.
History Note: Authority G.S. 113-134; 113-182; 143B-289.52;
Eff. January 1, 1991;
Amended Eff. March 1, 1994; September 1, 1991;
Temporary Amendment Eff. May 1, 2000;
Amended Eff. October 1, 2004; April 1, 2001.

15A NCAC 03M .0204 SEASON, SIZE AND HARVEST LIMIT: ATLANTIC OCEAN is proposed for amendment as follows:

15A NCAC 03M .0204 SEASON, SIZE AND HARVEST LIMIT: ATLANTIC OCEAN

~~(a)~~ It is unlawful to possess striped bass taken from the Atlantic Ocean less than the size limit as determined by the Atlantic States Marine Fisheries Commission in their Interstate Fisheries Management Plan for striped bass. The Fisheries Director shall issue proclamations necessary to bring North Carolina's size limit in compliance with the Interstate Fisheries Management Plan.

~~(b) It is unlawful to buy, sell, transport, or possess striped bass from the Atlantic Ocean by any means except that the Fisheries Director may establish an open season at any time, and is further empowered to impose any or all of the following restrictions:~~

~~(1) Specify number of days,~~
~~(2) Specify areas,~~
~~(3) Specify means and methods which may be employed in the taking,~~
~~(4) Specify time period,~~
~~(5) Limit the quantity, both commercially and recreationally, and~~
~~(6) Provide for biological sampling of fish harvested.~~

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;
Eff. January 1, 1991;
Amended Eff. March 1, 1996;

Temporary Amendment Eff. October 1, 1996;
Amended Eff. July 1, 1998.

SECTION .0300 – SPANISH AND KING MACKEREL
15A NCAC 03M .0301 SPANISH AND KING MACKEREL is proposed for amendment as follows:
15A NCAC 03M .0301 SPANISH AND KING MACKEREL

(a) Spanish Mackerel:

~~(1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions for Spanish mackerel:~~
~~(A) Specify areas.~~
~~(B) Specify seasons.~~
~~(C) Specify quantity.~~
~~(D) Specify means/methods.~~
~~(E) Specify size.~~

~~(2)~~(1) It is unlawful to possess Spanish mackerel less than 12 inches fork length.

~~(3)~~(2) It is unlawful to possess more than 15 Spanish mackerel per person per day taken for recreational purposes.

~~(4)~~(3) It is unlawful to possess more than 15 Spanish mackerel per person per day in the Atlantic Ocean beyond three miles in a commercial fishing operation except for persons holding a valid National Marine Fisheries Service Spanish Mackerel Commercial Vessel Permit.

(b) King mackerel:

~~(1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions for king mackerel:~~
~~(A) Specify areas.~~
~~(B) Specify seasons.~~
~~(C) Specify quantity.~~
~~(D) Specify means/methods.~~
~~(E) Specify size.~~

~~(2)~~(1) It is unlawful to possess king mackerel less than 24 inches fork length.

~~(3)~~(2) It is unlawful to possess more than three king mackerel per person per day taken for recreational purposes.

~~(4)~~(3) It is unlawful to possess more than three king mackerel per person per day in the Atlantic Ocean:
(A) by hook and line except for persons holding a valid National Marine Fisheries Service King Mackerel Commercial Vessel Permit; or
(B) between three miles and 200 miles from the State's mean low water mark in a commercial fishing operation except for persons holding a valid National Marine Fisheries Service King Mackerel Commercial Vessel Permit.

~~(5)~~(4) It is unlawful to use gill nets in the Atlantic Ocean to take more than three king mackerel per person per day south of 34° 37.3000' N (Cape Lookout).

(c) Charter vessels or head boats that hold a valid National Marine Fisheries Service Coastal Migratory Pelagic (Charter Boat and Head Boat) permit must comply with the king mackerel and Spanish mackerel possession limits established in Subparagraphs ~~(a)(3)~~ (a)(2) and ~~(b)(3)~~ (b)(2) of this Rule when fishing with more than three persons (including the captain and mate) on board.

(d) It is unlawful to possess aboard or land from a vessel, or combination of vessels that form a single operation, more than 3,500 pounds of Spanish or king mackerel, in the aggregate, in any one day.

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;
Eff. January 1, 1991;
Amended Eff. March 1, 1996;
Temporary Amendment Eff. January 1, 2000; July 1, 1999;
Amended Eff. August 1, 2002; April 1, 2001.

SECTION .0500 – OTHER FINFISH
15A NCAC 03M .0501 Red Drum is proposed for amendment: (RULE ALSO CHANGES VIA DRUM FMP)
15A NCAC 03M .0501 RED DRUM

~~(a) The Fisheries Director, may by proclamation, impose any or all of the following restrictions on the taking of red drum:~~

~~(1) Specify areas.~~
~~(2) Specify seasons.~~
~~(3) Specify quantity.~~
~~(4) Specify means/methods.~~
~~(5) Specify size.~~

~~(b)~~(a) It is unlawful to remove red drum from any type of net with the aid of any boat hook, gaff, spear, gig, or similar device.

~~(c)~~(b) It is unlawful to possess red drum less than 18 inches total length or greater than 27 inches total length.

~~(d)~~(c) It is unlawful to possess more than one red drum per person per day taken by hook-and-line or for recreational purposes.

~~(e)~~(d) The annual commercial harvest limit (September 1 through August 31) for red drum is 250,000 pounds. If the harvest limit is projected to be taken, the Fisheries Director shall, by proclamation, prohibit possession of red drum taken in a commercial fishing operation.

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: *Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;*
Eff. January 1, 1991;
Amended Eff. March 1, 1996; October 1, 1992; September 1, 1991;
Temporary Amendment Eff. May 1, 2000; July 1, 1999; October 22, 1998;
Amended Eff. April 1, 2001;
Temporary Amendment Eff. May 1, 2001;
Amended Eff. August 1, 2002.

15A NCAC 03M .0504 TROUT is proposed for amendment:

15A NCAC 03M .0504 TROUT

~~(a)~~ Spotted seatrout (speckled trout).

(1) It is unlawful to possess spotted seatrout less than 12 inches total length.
(2) It is unlawful to possess more than 10 spotted seatrout per person per day taken by hook-and-line or for recreational purposes.

~~(b) Weakfish (gray trout).~~

~~(1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions on the taking of weakfish by commercial fishing operations:~~
~~(A) Specify areas.~~
~~(B) Specify seasons.~~
~~(C) Specify quantity.~~
~~(D) Specify means/methods.~~
~~(E) Specify size, but the minimum size shall not be greater than 12 inches total length.~~

~~(2) The Fisheries Director may, by proclamation, in order to comply with or utilize conservation equivalency to comply with the Atlantic States Marine Fisheries Commission Weakfish Management Plan, impose any or all of the following restrictions on the taking of weakfish by hook-and-line or for recreational purposes:~~
~~(A) Specify quantity.~~
~~(B) Specify size.~~

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: *Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;*
Eff. January 1, 1991;
Amended Eff. March 1, 1996; March 1, 1995; February 1, 1992;
Temporary Amendment Eff. September 9, 1996;

15A NCAC 03M .0505 SHARK is proposed for **REPEAL:**

~~**.0505 SHARK**~~

~~The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the shark fishery:~~

~~(1) Specify size;~~
~~(2) Specify seasons;~~
~~(3) Specify areas;~~
~~(4) Specify quantity;~~
~~(5) Specify means/methods; and~~
~~(6) Require submission of statistical and biological data.~~

History Note: *Authority G.S. 113-134; 113-182; 113-221; 143B-289.4;*
Eff. January 1, 1991;
Amended Eff. September 1, 1991.

15A NCAC 03M .0506 SNAPPER-GROUPER is proposed for amendment as follows:

15A NCAC 03M .0506 SNAPPER-GROUPER COMPLEX

~~(a) The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the fisheries for species of the snapper-grouper complex and black sea bass in order to comply with the management requirements incorporated in the Fishery Management Plans for Snapper-Grouper and Sea Bass developed by the South Atlantic Fishery Management Council or Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission:~~

~~(1) Specify size;~~
~~(2) Specify seasons;~~
~~(3) Specify areas;~~
~~(4) Specify quantity;~~
~~(5) Specify means/methods; and~~
~~(6) Require submission of statistical and biological data.~~

(a) The species of the snapper-grouper complex listed in the South Atlantic Fishery Management Council Fishery Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region are hereby incorporated by reference and copies are available via the Federal Register posted on the Internet at ~~www.gpoaccess.gov/fr~~ www.safmc.net and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost.

~~(b) Black sea bass, south of Cape Hatteras (35° 15.0321'):~~

~~(1) It is unlawful to possess black sea bass less than ten inches total length.~~
~~(2) It is unlawful to take or possess more than 20 black sea bass per person per day without a valid Federal Commercial Snapper-Grouper permit.~~

~~(c) Gag grouper:~~

~~(1) It is unlawful to possess gag grouper (gray grouper) less than 24 inches total length.~~
~~(2) It is unlawful to possess more than two gag grouper (gray grouper) per person per day without a valid Federal Commercial Snapper-Grouper Permit.~~
~~(3) It is unlawful to possess more than two gag grouper (gray grouper) per person per day during the months of March and April.~~
~~(4) It is unlawful to sell or purchase gag grouper (gray grouper) taken from waters under the jurisdiction of North Carolina or the South Atlantic Fishery Management Council during the months of March and April.~~

~~(d) Black grouper:~~

~~(1) It is unlawful to possess black grouper less than 24 inches total length.~~
~~(2) It is unlawful to possess more than two black grouper per person per day without a valid Federal Commercial Snapper-Grouper Permit.~~
~~(3) It is unlawful to take or possess more than two black grouper per person per day during the months of March and April.~~
~~(4) It is unlawful to sell or purchase black grouper taken from waters under the jurisdiction of North Carolina or the South Atlantic Fishery Management Council during the months of March and April.~~

~~(e) It is unlawful to possess red grouper less than 20 inches total length.~~
~~(f) It is unlawful to possess yellowfin grouper (fireback grouper) less than 20 inches total length.~~
~~(g) It is unlawful to possess scamp less than 20 inches total length.~~
~~(h) It is unlawful to possess yellowmouth grouper less than 20 inches total length.~~
~~(i) Speckled hind (kitty mitchell) and warsaw grouper:~~

(1) It is unlawful to sell or purchase speckled hind or warsaw grouper.

(2) It is unlawful to possess more than one speckled hind or one warsaw grouper per vessel per trip.

(j) Greater amberjack:

(1) For recreational purposes:

(A) It is unlawful to possess greater amberjack less than 28 inches fork length.

(B) It is unlawful to possess more than one greater amberjack per person per day.

(2) It is unlawful to sell or purchase greater amberjack less than 36 inches fork length.

(3) It is unlawful to possess more than one greater amberjack per person per day without a valid Federal Commercial Snapper-Grouper Permit.

(4) It is unlawful to possess more than one greater amberjack per person per day during the month of April.

(5) It is unlawful to sell or purchase greater amberjack during any season closure for greater amberjack.

(k) Red Snapper:

(1) It is unlawful to possess red snapper less than 20 inches total length.

(2) It is unlawful to possess more than two red snapper per person per day without a valid Federal Commercial Snapper-Grouper permit.

(l) Vermilion Snapper:

(1) For recreational purposes:

(A) It is unlawful to possess vermilion snapper (beeliner) less than 11 inches total length.

(B) It is unlawful to possess more than 10 vermilion snapper per person per day.

(2) It is unlawful to possess or sell vermilion snapper (beeliner) less than 12 inches total length with a valid Federal Commercial Snapper-Grouper permit.

(m) It is unlawful to possess silk snapper (yelloweye snapper) less than 12 inches total length.

(n) It is unlawful to possess blackfin snapper (hambone snapper) less than 12 inches total length.

(o) Red Porgy (Pagrus pagrus):

(1) It is unlawful to possess red porgy less than 14 inches total length.

(2) It is unlawful to possess more than one red porgy per person per day without a valid Federal Commercial Snapper-Grouper permit.

(3) It is unlawful to sell or offer for sale red porgy from January 1 through April 30.

(4) It is unlawful to land more than 50 pounds of red porgy from May 1 through December 31 in a commercial fishing operation.

(p) Combined Bag Limits:

(1) It is unlawful to possess more than 10 vermilion snapper and 10 other snappers per person per day of which no more than two may be red snapper without a valid Federal Commercial Snapper-Grouper permit.

(2) It is unlawful to possess more than five grouper without a valid Federal Commercial Snapper-Grouper permit of which:

(A) no more than two may be gag or black grouper (individually or in combination) per person per day;

(B) no more than one may be speckled hind or one warsaw grouper per vessel per trip.

(3) It is unlawful to possess more than 20 fish in the aggregate per person per day of the following species without a valid Federal Commercial Snapper-Grouper permit: whitebone porgy, jolthead porgy, knobbed porgy, longspine porgy, sheepshead, gray triggerfish, queen triggerfish, yellow jack, crevalle jack, bar jack, almaco jack, lesser amberjack, banded rudderfish, white grunt, margates, spadefish, and hogfish.

(q) It is unlawful to possess any species of the Snapper-Grouper complex except snowy, warsaw, yellowedge, and misty groupers; blueline, golden and sand tilefishes; while having longline gear aboard a vessel.

(r) It is unlawful to possess Nassau grouper or jewfish.

(s) Fish Traps/Pots:

(1) It is unlawful to use or have on board a vessel fish traps for taking snappers and groupers except sea bass pots as allowed in Subparagraph (2) of this Paragraph.

(2) Sea bass may be taken with pots that conform with the federal rule requirements for mesh sizes and pot size as specified in 50 CFR Part 646.2, openings and degradable fasteners specified in 50 CFR Part 646.22(c)(2)(i), and escape vents and degradable materials as specified in 50 CFR Part 622.40 (b)(3)(i) and rules published in 50 CFR pertaining to sea bass north of Cape Hatteras (35°

~~15' N Latitude). Copies of these rules are available via the Federal Register posted on the Internet at www.gpoaccess.gov/fr and at the Division of Marine Fisheries, P.O. Box 769, Morehead City, North Carolina 28557 at no cost.~~

~~(t) It is unlawful for persons in possession of a valid National Marine Fisheries Service Snapper-Grouper Permit for Charter Vessels to exceed the creel restrictions established in Paragraphs (b), (j), (o), and (p) of this Rule when fishing with more than three persons (including the captain and mate) on board.~~

~~(u)~~(b) In the Atlantic Ocean, it is unlawful for an individual fishing under a Recreational Commercial Gear License with seines, shrimp trawls, pots, trotlines or gill nets to take any species of the Snapper- Grouper complex.

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;
Eff. January 1, 1991;
Amended Eff. April 1, 1997; March 1, 1996; September 1, 1991;
Temporary Amendment Eff. December 23, 1996;
Amended Eff. August 1, 1998; April 1, 1997;
Temporary Amendment Eff. January 1, 2002; August 29, 2000; January 1, 2000; May 24, 1999;
Amended Eff. May 1, 2004; July 1, 2003; April 1, 2003; August 1, 2002.

15A NCAC 03M .0511 BLUEFISH is proposed for amendment as follows:

15A NCAC 03M .0511 BLUEFISH

~~(a) In order to comply with or utilize conservation equivalency to comply with the management requirements incorporated in the Fishery Management Plan for Bluefish developed cooperatively by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission, the Fisheries Director may, by proclamation, take any or all of the following actions for bluefish:~~

~~(1) Taken by a commercial fishing operation:~~
~~(A) Specify size;~~
~~(B) Specify seasons;~~
~~(C) Specify areas;~~
~~(D) Specify quantity;~~
~~(E) Specify means/methods; and~~
~~(F) Require submission of statistical and biological data.~~
~~(2) Taken for recreational purposes:~~
~~(A) Specify size;~~
~~(B) Specify quantity.~~

~~(b)~~ It is unlawful to possess more than 15 bluefish per person per day for recreational purposes. Of these 15 bluefish, it is unlawful to possess more than five bluefish that are greater than 24 inches total length.

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;
Eff. March 1, 1994;
Amended Eff. March 1, 1996;
Temporary Amendment Eff. September 9, 1996;
Amended Eff. April 1, 1997;
Temporary Amendment Eff. July 1, 1999;

15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS is proposed for amendment as follows:

15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS

In order to comply with management requirements incorporated in Federal Fishery Management Council Management Plans or Atlantic States Marine Fisheries Commission Management ~~Plans,~~ Plans or to implement state management measures, the Fisheries Director may, by proclamation, ~~suspend the minimum size and harvest limits established by the Marine Fisheries Commission, and implement different minimum size and harvest limits.~~ take any or all of the following actions for species listed in the Interjurisdictional Fisheries Management Plan:

(1) Specify size;
(2) Specify seasons;

(3) Specify areas:
(4) Specify quantity;
(5) Specify means and methods; and
(6) Require submission of statistical and biological data.

Proclamations issued under this ~~Section~~ Rule shall be subject to approval, cancellation, or modification by the Marine Fisheries Commission at its next regularly scheduled meeting or an emergency meeting held pursuant to ~~G.S. 113-221(e1).~~ G.S. 113-221.1.

Authority G.S. 113-134; 113-182; 113-221; 143B-289.4.
History Note: Authority G.S. 113-134; 113-182;113-182.1; 113-221.1; 143B-289.4;
Eff. March 1, 1996.

15A NCAC 03M .0513 RIVER HERRING AND SHAD is proposed for amendment as follows:

15A NCAC 03M .0513 RIVER HERRING ~~AND SHAD~~

~~(a)~~ It is unlawful to possess river herring taken from coastal fishing waters unless the river herring season is open.

~~(b) The take of river herring shall be set forth in the North Carolina River Herring Fishery Management Plan for implementation under Paragraph (c) of the Rule.~~

~~(c) The Fisheries Director may, by proclamation, based on variability in environmental and local stock conditions, take any or all of the following actions in the commercial and recreational blueback herring, alewife, American shad and hickory shad fisheries:~~

~~(1) Specify size;~~
~~(2) Specify season;~~
~~(3) Specify area;~~
~~(4) Specify quantity;~~
~~(5) Specify means/methods; and~~
~~(6) Require submission of statistical and biological data.~~

~~(d) It is unlawful to take American shad and hickory shad by any method except hook and line from April 15 through December 31.~~

~~(e) It is unlawful to possess more than 10 American shad or hickory shad, in the aggregate, per person per day taken by hook and line or for recreational purposes.~~

Authority G.S. 113-134; 113-182; 113-221; 143B-289.52.
History Note: Authority G.S. 113-134; 113-182; 113-221; 143B-289.52;
Eff. March 1, 1995;
Amended Eff. August 1, 1998;
Temporary Amendment Eff. May 1, 2000; August 1, 1999; July 1, 1999; March 1, 1999;
Amended Eff. April 1, 2001.

15A NCAC 03M .0514 SCUP is proposed for **REPEAL**

15A NCAC 03M .0514 SCUP

~~In order to comply with or utilize conservation equivalency to comply with the management requirements incorporated in the Fishery Management Plan for Scup developed cooperatively by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission, the Fisheries Director may, by proclamation, take any or all of the following actions in the scup fishery:~~

~~(1) Specify size;~~
~~(2) Specify seasons;~~
~~(3) Specify areas;~~
~~(4) Specify quantity;~~
~~(5) Specify means/methods; and~~
~~(6) Require submission of statistical and biological data.~~

Authority G.S. 113-134; 113-182; 113-221; 143B-289.4.
History Note: Authority G.S. 113-134; 113-182;113-182.1; 113-221.1; 143B-289.4;
Eff. March 1, 1996.

15A NCAC 03M .0519 SHAD is proposed for **Adoption**

15A NCAC 03M .0519 SHAD
(a) It is unlawful to take American shad and hickory shad by any method except hook-and-line from April 15 through December 31.
(b) It is unlawful to possess more than 10 American shad or hickory shad, in the aggregate, per person per day taken by hook-and-line or for recreational purposes.

Authority G.S. 113-134; 113-182; 113-221; 143B-289.4.

VII. ADVISORY COMMITTEE RECOMMENDATIONS AND PUBLIC COMMENT

Finfish AC, Met Washington 7 August 2007
Approve by consensus to take to regional review.

Southeast Regional AC, Met Wilmington 14 August 2007
Motion to accept the IJ FMP amendment and rule changes as presented and it was passed unanimously.

Central Regional AC, Met Washington 17 October 2007
Motion made be John Stone, seconded by Steve Dillon to take no action. Motion passed without debate, vote 3 to 1. (Note the late hour of the presentation).

Northeast Regional AC, Met Manteo 18 October 2007
Owen Maxwell made a motion to accept the IJ FMP amendment and rule changes as presented. Fred Waterfield seconded the motion and it was passed unanimously. Kelly Schoolcraft raised the issue of a 2.5 million pound reduction on king mackerel in the commercial fishery. If this had been in place would have resulted in early closure last year. Mr. Schoolcraft wants to see a state managed quota and not a regional quota. The king mackerel fishery is expanding to more northern states. Damon Tatem informed the AC that he agreed with what DMF was proposing relative to more involvement by the MFC and the public in the early process of federal management councils and Atlantic States Marine Fisheries FMP development. During the public comment period several individuals raised objections to the Director being granted broader proclamation authority.

Inland AC, Met Raleigh 23 October 2007
Jim Rice made a motion to accept the IJ FMP amendment and rule changes as presented. Hans Vogelsong seconded the motion and it was passed unanimously. Committee discussed whether the tuna rules would be a burden on Marine Patrol, and Marine Patrol staff member clarified he did not think so.

Reviewed by Joint Legislative Study Commission of Seafood and Aquaculture on November 29, 2008 with no revisions offered.

Proposed rules for the Marine Fisheries Commission (MFC) were published in Volume 22, Issue 20 of the *North Carolina Register* on April 15, 2008. There were four public hearings to collect comments about these proposed rules, as follows:

- Monday, May 12, 2008, 7:00 p.m., Roanoke Island Festival Park, One Festival Park, Manteo, NC 27954
- Tuesday, May 13, 2008, 7:00 p.m., Pitt Community College, Reddrick Building, Room 242, 1986 Pitt Tech Road, Winterville, NC 28590
- Wednesday, May 14, 2008, 7:00 p.m., DENR Wilmington Regional Office, 127 Cardinal Drive Extension, Wilmington, NC 28405
- Monday, May 19, 2008, 7:00 p.m., Center for Marine Science and Technology, 303 College Circle, Room 306, Morehead City, NC 28557.

There was no public comment on the IJ FMP rules.

VIII. RECOMMENDATION
DMF recommends MFC adoption of the IJ FMP rules and Amendment 1 to the FMP.

Prepared by Katy West
12 July 2007

Modified 21 August 2007
Modified 10 June 2008

NOTICE OF TEXT ATTACHMENT
In order to effectively comply with mandated measures contained in federal Fishery Management Plans (FMPs) for species in the North Carolina Interjursidictional FMP broad proclamation authority is granted in rule 15A NCAC 03M.0512 to the Division Director, along with a subsequent review by the Marine Fisheries Commission. Potentially conflicting proclamation authority is being removed from selected species rules.(Ocean striped bass, Spanish mackerel, king mackerel, weakfish, snapper-grouper complex including black sea bass, bluefish, and scup).

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Beth Egbert and Kevin Brown
N.C. Division of Marine Fisheries, NCDENR

DATE: Aug. 20, 2015

SUBJECT: Kingfish FMP Information Update

A draft Information Update is being provided for your review and for a vote to take this document out for public comment. An Information Update as defined by the division's FMP Process workgroup is "statutorily-required review of an FMP at least once every five years that results in a determination that the management measures contained in an FMP comply with the requirements of G.S. 113-182.1 for ensuring the long-term viability of the state's commercially and recreationally significant species or fisheries. An information update to an FMP only incorporates changes in factual and background data that do not alter management strategies or management measures contained in the prior FMP and does not introduce or address new management issues not previously included in the FMP. An information update refreshes the FMP with the most current statistics, trends, research, etc. available at the time the information update is developed. An information update is developed without the assistance of an FMP advisory committee and does not require review by regional or standing advisory committees of the MFC."

The 2015 Kingfish FMP Information Update maintains the 2007 Kingfish FMP management strategy for determining stock sustainability through the use of trend analysis and management triggers. Trend analysis methods and management triggers were updated by DMF and the Commission reviewed changes to trigger management and gave approval to proceed with an Information Update at the May 2015 business meeting. All updates to the management triggers are documented in Appendix 1 of the draft Information Update.

Issues addressed by the initial 2007 Kingfish FMP have been summarized in the applicable sections of the Information Update. Issues so incorporated were related to habitat and water quality, protected species, and management triggers. Updated information on habitat and water quality, along with the status of 2007 research recommendations can be found in Section 11, Environmental Factors. Updated information related to protected species can be found in Section 8, Protected Species. The revised management strategy with updated management triggers is noted in Section 5.1, Recommended Management Program and details may be found in Appendix 1, Evaluation of Management Triggers for Kingfish. Section 13 provides the Recommended Management Strategies and Research Recommendations.

North Carolina Kingfish Fishery Management Plan

Information Update

By

North Carolina Department of Environment and Natural Resources

Division of Marine Fisheries
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August 2015

August 2013	Timeline begins
July 2015	Internal review of comments
	First draft approved by NCMFC for public comment
	Review of public comment
	Final draft of Information update approved by NCMFC

1.0 ACKNOWLEDGMENTS

The 2015 North Carolina Kingfish Fishery Management Plan (FMP) information update was developed under the direction of the North Carolina Marine Fisheries Commission (NCMFC). The North Carolina Department of Environment and Natural Resources' (DENR) Division of Marine Fisheries (NCDMF) prepared the information update.

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2.0 FISHERIES MANAGEMENT PLAN, AMENDMENTS, AND UPDATES

Table 2.1 The Marine Fisheries Commission selected management strategies, objectives followed, and required actions in the 2007 Kingfish Fishery Management Plan.

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
1. Maintain a long-term sustainable harvest of kingfishes on the North Carolina Coast.	1 and 2	Accomplished; Establish management triggers based on the biology of kingfishes, to ensure the long-term sustainability for the kingfishes stock in North Carolina using proclamation authority to enact management action if management triggers warrant.

3.0 TABLE OF CONTENTS

3.1 LIST OF TABLES

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3.3 LIST OF ACRONYMS

ADA – Aquaculture Development Act

APAIS – Access Point Angler Intercept Survey

ASMA – Albemarle Sound Management Area

BDTRT – Bottlenose Dolphin Take Reduction Team

BRD – Bycatch Reduction Device

CAMA – Coastal Area Management Act

CHPP – Coastal Habitat Protection Plan

CHTS – Coastal Household Telephone Survey

CORMP – Coastal Ocean Research and Monitoring Program

CP – Conservation Plan

CPUE – Catch-per-unit-effort

CPI – Consumer Price Index

CRFL – Coastal Recreational Fishing License

DO – Dissolved oxygen

DDT – Dichlorodiphenyltrichloroethane

DEHNR – North Carolina Department of Environment Health and Natural Resources

DENR – North Carolina Department of Environment and Natural Resources

DSP – Distinct Population Segment

EIS – Environmental Impact Statement

EPA – United States Environmental Protection Agency

F – Fishing Mortality

ESA – Endangered Species Act

FMP – Fishery Management Plan

FR – United States Office of the Federal Register

FRA – Fisheries Reform Act

FRG – Fisheries Research Grant

FSC – Federal species of concern

G.S. – General Statute

GSAFDF – Gulf and South Atlantic Fisheries Development Foundation

GSI – Gonadosomatic Index

HCP – Habitat Conservation Plan

HQW – High Quality Waters

IWW – Intracoastal Waterway

ITP – Incidental Take Permit

lb – Pounds

m – Meters

M – Natural Mortality

MAFMC – Mid-Atlantic Fishery Management Council

MBTA – Migratory Bird Treaty Act

mg/l – milligrams per liter

MGNRA – Mainland Gill Net Restricted Area

mm – Millimeters

MMPA – Marine Mammal Protection Act

MRFSS- Marine Recreational Fisheries Statistical Survey

MRIP – Marine Recreational Information Program

MSC – Moratorium Steering Committee

NCAC – North Carolina Administrative Code

NCCR – National Coastal Condition Reports

NCCRC – North Carolina Coastal Resources Commission

NCDACS – North Carolina Department of Agriculture and Consumer Services

NCDCM – North Carolina Division of Coastal Management

NCDMF – North Carolina Division of Marine Fisheries

NCDWQ – North Carolina Division of Water Quality

NCDWR – North Carolina Division of Water Resources

NCEMC – North Carolina Environmental Management Commission

NCMFC – North Carolina Marine Fisheries Commission

NCTTP – North Carolina Trip Ticket Program

NCWRC – North Carolina Wildlife Resources Commission

NLCD – National Land Cover Data

NMFS – National Marine Fisheries Service

NNCESS – Northern North Carolina Estuarine System Stock

NOAA – National Oceanic and Atmospheric Administration

NPDES – National Pollutant Discharge Elimination

NSW – Nutrient Sensitive Waters

ORW – Outstanding Resource Waters

PAH – Polycyclic aromatic hydrocarbons

PCB – Polychlorinated biphenyls

ppt – Parts per thousand

PSGNRA – Pamlico Sound Gill Net Restricted Area

PSE – Proportional Standard Error

PSS – Pamlico Sound Survey

RCGL – Recreational Commercial Gear License

RDD – Random Digit Dialing

SAV – Submerged Aquatic Vegetation

SAB – South Atlantic Bight

SAFMC – South Atlantic Fishery Management Council

SCAR – Scientific Council on Amphibians and Reptiles

SCDNR – South Carolina Department of Natural Resources

SCFL – Standard Commercial Fishing License

SEAMAP – Southeast Area Monitoring and Assessment Program

SGNRA – Shallow Water Gill Net Restricted Area

SHA – Strategic Habitat Area

SL – Standard length

SNCESS – Southern North Carolina Estuarine System Stock

SSB – Spawning Stock Biomass

STAC – Sea Turtle Advisory Committee

STSSN – Sea Turtle Stranding and Salvage Network

TBT – Tributyltin

TED – Turtle Excluder Device

TL – Total Length

USACE – United States Army Corp of Engineers

USFWS – United States Fish and Wildlife Service

WS – Water Supply

YOY – Young-of-the-Year

4.0 EXECUTIVE SUMMARY

Three species of kingfishes occur in North Carolina: southern kingfish (*Menticirrhus americanus*), Gulf kingfish (*M. littoralis*), and northern kingfish (*M. saxatilis).* These species help support significant recreational and commercial fisheries. Southern kingfish is the most abundant kingfish species in the South Atlantic Bight (SAB) and therefore, was chosen as the indicator species for this assemblage. All three species are short-lived, demersal fish that inhabit nearshore ocean and estuarine habitats.

The North Carolina Kingfish Fishery Management Plan (FMP) was developed and approved by the North Carolina Marine Fisheries Commission (NCMFC) in November of 2007. The goal of the 2007 Kingfish FMP is to determine the status of the stock and ensure the long-term sustainability of the kingfishes stock in North Carolina. The plan objectives include 1) develop an objective management program that provides conservation of the resource and sustainable harvest in the fishery; 2) ensure that the spawning stock is of sufficient capacity to prevent recruitment overfishing; 3) address socio-economic concerns of all user groups; 4) restore, improve, and protect critical habitats that affect growth, survival, and reproduction of the North Carolina stock of kingfishes; 5) evaluate, enhance, and initiate studies to increase our understanding of kingfishes' biology and population dynamics in North Carolina; and 6) promote public awareness regarding the status and management of the North Carolina kingfishes stock.

This document is an information update to the 2007 Kingfish FMP. An information update only incorporates changes in factual and background data that do not alter management strategies or management measures contained in the prior FMP and does not introduce or address new management issues not previously included in the FMP. An information update refreshes the FMP with the most current statistics, trends, research, etc. available at the time the information update is developed.

The 2007 Kingfish FMP selected the use of trend analysis and management triggers as the preferred management strategy to monitor the viability of the kingfish stock in North Carolina (NCDMF 2007). A second management strategy promotes work to enhance public information and education. As a review of the 2007 Kingfish FMP, best available data and techniques used for the trend analysis and management triggers were refined and modified to better assess population trends as part of this FMP Information Update (Appendix 1, Evaluations of Management Trigger for Kingfish). Changes to management triggers better inform management and do not alter the basic concept of trigger management set forth in the original 2007 FMP. Management triggers set forth in this plan will continue to be the management strategy used for maintaining the long-term sustainable harvest in the kingfish fishery. A coast-wide stock assessment is a long-term research need that will have to be addressed before any estimation of biological reference points related to sustainable harvest can be estimated.

The trend analysis and management triggers will be updated annually and results will be presented to the NCMFC as part of the annual FMP Update. For reference, the 2015 annual update including data through 2014 can be found on the NCDMF website at http://portal.ncdenr.org/web/mf/fmps-under-development.

The trend analysis incorporates management triggers to alert managers to the potential need for management action based on stock conditions. The activation of any two management triggers two years in a row (regardless of category) warrants further data evaluation and potential management action. The NCMFC will be alerted by the NCDMF should this criterion be met.

No triggers were activated in either 2013 or 2014. The current stock status is “viable” based on positive trends in the management triggers used as a tool to determine sustainable harvest. The inability to conduct a peer reviewed stock assessment resulted in the designation of an “unknown” stock status in the 2007 Kingfish FMP. While the current plan lists kingfish in North Carolina as “viable”, a coast-wide stock assessment is a high research priority that needs to be addressed before biological reference points relative to overfished and overfishing can be determined.

Research recommendations were updated by the NCDMF to address deficiencies in the current data. These recommendations will increase our understanding of the life history and stock structure of kingfishes in North Carolina and the Atlantic Coast.

5.0 INTRODUCTION

5.1 RECOMMENDED MANAGEMENT PROGRAM

5.1.1 Management Authority

Fisheries management includes all activities associated with maintenance, improvement, and use of the fisheries resources of coastal areas, including research, development, regulation, enhancement, and enforcement.

All authority for management of North Carolina's fishery for kingfishes is vested in the state of North Carolina. Management of the fishery includes all activities associated with the use, maintenance, and improvement of populations of kingfishes and their habitats in coastal areas, including research, development, regulation, enhancement, and enforcement. North Carolina's jurisdiction over kingfishes is limited to estuarine and ocean waters, located within three miles of the states coastline, and are included under rules set by the North Carolina Marine Fisheries Commission (NCMFC). The North Carolina Department of Environment and Natural Resources (DENR) is the agency directed by North Carolina General Statute (G.S.) 113-182.1 to prepare Fishery Management Plans (FMPs) for all commercially or recreationally significant species or fisheries that comprise State marine or estuarine resources. These plans must be approved and adopted by the NCMFC.

Many different state laws provide the necessary authority for fishery management in North Carolina. General authority for stewardship of the marine and estuarine resources by the DENR is provided in G.S. 113-131. The North Carolina Division of Marine Fisheries (NCDMF) is the branch of the DENR that carries out this responsibility. General Statute 113-136 provides enforcement authority for NCDMF Marine Patrol officers. General Statute 113-181 authorizes research and statistical programs. The NCMFC is charged to "manage, restore, develop, cultivate, conserve, protect, and regulate the marine and estuarine resources of the State of North Carolina" (G.S. 143B-289.51). The NCMFC can regulate fishing times, areas, fishing gear, seasons, size limits, and quantities of fish harvested and possessed (G.S. 113-182 and 143B-289.52). General Statute 143B-289.52 allows the NCMFC to delegate authority to implement its regulations for fisheries "which may be affected by variable conditions" to the Director of NCDMF by issuing public notices called "proclamations". Thus, North Carolina has a very powerful and flexible legal basis for coastal fisheries management. The General Assembly has retained for itself the authority to establish commercial fishing licenses and permit fees greater than $100. It has delegated to the NCMFC authority to establish permits for various fishing activities.

The Fisheries Reform Act of 1997 (FRA) establishes a process for preparation of coastal FMPs in North Carolina (G.S. 113-182.1.). The FRA has been amended several times. The FRA states, "The goal of the plans shall be to ensure the long-term viability of the State's commercially and recreationally significant species or fisheries." Each plan shall be designed to reflect fishing practices so that one plan may apply to a specific fishery, while other plans may be based on gear or geographic areas. Each plan shall:

- Contain necessary information pertaining to the fishery or fisheries, including management goals and objectives, status of relevant fish stocks, stock assessments for multiyear species, fishery habitat and water quality considerations consistent with

Coastal Habitat Protection Plans adopted pursuant to G.S. 143B-279.8, social and economic impact of the fishery to the State, and user conflicts.

- Recommend management actions pertaining to the fishery or fisheries.
- Include conservation and management measures that will provide the greatest overall benefit to the State, particularly with respect to food production, recreational opportunities, and the protection of marine ecosystems, and that will produce a sustainable harvest.
- Specify a time period, not to exceed two years from the date of the adoption of the plan, to end overfishing. This subdivision shall not apply if the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementing the requirements of this subdivision incompatible with professional standards for fisheries management.
- Specify a time period, not to exceed 10 years from the date of the adoption of the plan, for achieving a sustainable harvest. This subdivision shall not apply if the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementing the requirements of this subdivision incompatible with professional standards for fisheries management.
- Include a standard of at least fifty percent (50%) probability of achieving sustainable harvest for the fishery or fisheries. This subdivision shall not apply if the Fisheries Director determines that the biology of the fish, environmental conditions, or lack of sufficient data make implementing the requirements of this subdivision incompatible with professional standards for fisheries management." (G.S. 113-182.1)

Sustainable harvest is defined in the FRA (§ 113-129) as "the amount of fish that can be taken from a fishery on a continuing basis without reducing the stock biomass of the fishery or causing the fishery to become overfished". Overfished is defined as the condition of a fishery that occurs when the spawning stock biomass (SSB) of the fishery is below the level that is adequate to replace the spawning class of the fishery. Overfishing is defined as fishing that causes a level of mortality that prevents a fishery from producing a sustainable harvest (G.S. 113-129).

5.1.2 Goal and Objectives

As an Information Update, the goal and objectives are the same as the 2007 Kingfish Fishery Management Plan (NCDMF 2007). The goal is to determine the status of the stock and ensure the long-term sustainability for the kingfishes stock in North Carolina.

Objectives:

- Develop an objective management program that provides conservation of the resource and sustainable harvest in the fishery.
- Ensure that the spawning stock is of sufficient capacity to prevent recruitment overfishing.
- Address socio-economic concerns of all user groups.
- Restore, improve, and protect critical habitats that affect growth, survival, and reproduction of the North Carolina stock of kingfishes.
- Evaluate, enhance, and initiate studies to increase our understanding of kingfishes' biology and population dynamics in North Carolina.
- Promote public awareness regarding the status and management of the North Carolina kingfishes stock.

5.1.3 Definition of Management Unit and Unit Stock

The management unit for the North Carolina Kingfish includes the three species of kingfishes (southern, Gulf, and northern), their habitat, and the fisheries that harvest these species in all coastal fishing waters of North Carolina. Southern kingfish, being the most abundant kingfish in the South Atlantic Bight (SAB), is designated as the indicator species for this assemblage.

The management unit identified in this plan does not encompass the entire unit stock range for any of the three species of kingfishes inhabiting North Carolina. This is the primary reason that a quantified state-specific stock assessment could not be conducted and further why a regional stock assessment approach is recommended as the most appropriate mechanism for determining the stock status and the long-term viability of this stock (NCDMF 2007).

5.1.4 Sustainable Harvest

Sustainable harvest in the North Carolina fishery for kingfishes is defined as the amount of harvest that can be taken without reducing the SSB below a level necessary to ensure adequate reproduction. Reference points for sustainable harvest (overfishing/overfished) cannot be determined due to deficiencies in data needed for a regional stock assessment. Sustainable harvest in North Carolina is based on monitoring trends in abundance and fishing mortality (i.e., Relative *F*) for southern kingfish.

5.1.5 Management Strategy

The management strategy for kingfishes in North Carolina is to 1) maintain a sustainable harvest of kingfishes over the long-term, and 2) promote public education. The first strategy is accomplished by evaluating annual trends in population abundance and relative fishing mortality. Management triggers were established in the 2007 Kingfish FMP (to monitor potential causes for concern in the North Carolina kingfish stock (NCDMF 2007). As a review of the 2007 Kingfish FMP, best available data and techniques used for the trend analysis and management triggers were refined and modified to better assess population trends as part of this FMP Information Update (Appendix 1, Evaluations of Management Trigger for Kingfish). The analysis is updated annually and all trends relative to management triggers are provided annually as part of the annual FMP update provided to the NCMFC in August of each year. The FMP updates can be found on the NCDMF website (http://portal.ncdenr.org/web/mf/fmps-under-development). The second strategy will be accomplished by the NCDMF working to enhance public information and education.

5.1.6 Research Needs

5.1.6.1 Management Related Research Needs

- Conduct a coast-wide stock assessment of southern kingfish along the Atlantic Coast including estimation of biological reference points for sustainable harvest. (HIGH)
- Validate Young-of-the-year (YOY) and adult indices used in trend analysis. (HIGH)
- Develop a fisheries-independent survey in the ocean for juvenile and adult kingfishes. (HIGH)
- Collect observer data from commercial fishing operations to estimate at-sea species composition of the catch, discard rates, and lengths. (HIGH)
- Improve recreational data collection, particularly the species composition of discards, discard rates and associated biological data. (HIGH)

- Improve dependent commercial data collection of more sample sizes for life history information. (MEDIUM)
- Evaluate and potentially expand the NCDMF fishery-independent gill-net survey to provide data on species composition, abundance trends, and population age structure by including additional areas of North Carolina's estuarine and near-shore ocean waters. (MEDIUM)
- Continue bycatch reduction device studies in the shrimp trawl fishery to decrease bycatch. (MEDIUM)
- Determine stock structure using genetics of kingfishes along North Carolina and the Atlantic Coast. (LOW)

5.1.6.2 Biological Research Needs

- Develop tagging study to estimate natural and fishing mortality, to investigate stock structure, and to understand movement patterns. (HIGH)
- Collect histological data to develop maturity schedule with priority to southern kingfish. (HIGH)
- Conduct an age validation study with priority to southern kingfish. (HIGH)
- Conduct study to estimate fecundity with priority to southern kingfish. (MEDIUM)
- Conduct study to identify spawning areas with priority for southern kingfish. (MEDIUM)
- Sample inlets and river plumes to determine the importance of these areas for kingfishes and other estuarine-dependent species. (LOW)
- Determine the effects of beach nourishment on kingfishes and their prey. (LOW).
- Conduct a study to investigate how tidal stages and time of day influence feeding in kingfishes. (LOW)

5.1.6.3 Social and Economic Research Needs

- Increase the sample size of surveyed participants in the commercial kingfish fishery to better determine specific business characteristics and the economics of working in the fishery. (LOW)
- Update information on the participants in the recreational kingfish fishery. (LOW)

5.1.6.4 Status of 2007 Kingfish Fishery Management Plan Coastal Habitat Protection Plan Recommendations

The 2007 Kingfish FMP included habitat and water quality as principal issues citing the maintenance and improvement of suitable estuarine and marine habitat and water quality as important factors in maintaining sustainable stocks of kingfishes (NCDMF 2007). Many of the action items outlined in the 2007 Kingfish FMP Principal Issues and Management Options section have been implemented or are substantially underway and/or were also components of the CHPP implementation plan. They include:

Habitat

- NCCRC has revised dock rules to require review by resource agencies for GP dock applications located over SAV, shell bottom, or PNAs, and where water depth is less than 2 ft mean water level to avoid boating related impacts.
- NCDMF is in the process of identifying and delineating SHAs that will enhance protection of southern, Gulf, and northern kingfishes.

- Wetland buffers along coastal streams and rivers have been used to enhance wetlands and improve water quality.
- Although North Carolina legislation has been passed to allow terminal groins to be built in coastal North Carolina, the NCDMF has been in talks with applicants to minimize the adverse impacts to fisheries. In addition, the North Carolina Division of Coastal Management (NCDCM) has created standards for beach nourishment projects. These standards include sediment size and moratorium periods to minimize impacts.
- Coast-wide imagery of SAV was taken in 2007/2008 and has been mapped.
- Identification and designation of strategic SAV areas is underway through the SHA process.
- Additional bottom disturbing gear restrictions have been implemented through the bay scallop and oyster fishery management plans to avoid damage to SAV and oysters.
- DENR staff has been cooperating to develop permit conditions for marsh sills to minimize the impacts of vertical shoreline stabilization methods.
- Loss of additional riparian wetlands has been minimized through the permitting process, land acquisition, and land use planning.

Water Quality

- Neuse and Tar-Pamlico NSW nutrient reduction measures have successfully reduced nutrient loading by more than their 30% reduction goals for point source dischargers and agriculture.
- North Caroline Division of Water Resources (NCDWR) revised coastal storm water rules that limit impervious surface and run-off in coastal areas.
- Wetland buffers along coastal streams and rivers have been used to enhance wetlands and improve water quality.

5.2 GENERAL PROBLEM STATEMENT

5.2.1 Update to Management Framework for North Carolina Kingfish Stock

The 2007 Kingfish FMP implemented a management strategy for maintaining a long-term sustainable harvest in the kingfish fishery (NCDMF 2007). The strategy included developing and monitoring management triggers to evaluate stock conditions annually. Management triggers were based on biological indicators, dependent catch-per-unit-effort (CPUE), and independent surveys indices. These triggers inform management on the potential need for regulatory changes. Based on the 2007 Kingfish FMP, consideration for a management change occurs if one or more triggers are activated in a single year. Triggers are to be updated and evaluated annually.

This document is an information update to the 2007 Kingfish FMP. An information update only incorporates changes in factual and background data that do not alter management strategies or management measures contained in the prior FMP and does not introduce or address new management issues not previously included in the FMP. An information update refreshes the FMP with the most current statistics, trends, research, etc. available at the time the information update is developed.

In the review of the 2007 Kingfish FMP, NCDMF gathered available data on kingfish through 2013 and determined that data were still insufficient to move forward with a traditional stock assessment. In lieu of a stock assessment, NCDMF further evaluated and refined the management triggers established in the 2007 Kingfish FMP. Any refinement of existing triggers

was based on using best available and most current data and analytical techniques to better inform management. The updated management triggers and analyses results are provided in Appendix 1, Evaluation of Management Triggers for Kingfish. No management triggers were activated in 2013. The NCMFC reviewed the results of the management trigger modifications and analyses results at their May 2015 business meeting and voted to proceed with the review of the 2007 Kingfish FMP in the form of an Information Update. The changes and updates to the management triggers provided in Appendix 1, Evaluation of Management Triggers for Kingfish, do not alter the basic strategic concept of the trigger management set forth by the 2007 FMP.

Another management strategy discussed but not adopted in the 2007 Kingfish FMP involved the possibility for regional (multi-state) management and stock assessment for kingfish. After the 2007 FMP was finalized, regional management was considered. In 2008, the Atlantic States Marine Fisheries Commission (ASMFC) South Atlantic Board met and reviewed data on kingfish and charged a newly formed Southern Kingfish Technical Committee with two tasks 1) developing a prioritized list of research and data needs and 2) conducting a trend analysis of data from the Southeast Area Monitoring and Assessment Program (SEAMAP). This was completed in September of 2008 and the technical committee reported no major concerns with the kingfish stocks and provided a list of data/research needs. More recently, in May of 2014, the ASMFC South Atlantic Board was presented with an update on the trends and research priorities and subsequently decided not to pursue any further action on the management of kingfish. As a result, Kingfish management in North Carolina continues to fall solely within the framework of the state FMP process.

5.3 EXISTING PLANS, STATUTES, AND RULES

5.3.1 Plans

There are no existing federal fishery management plans along the U.S. Atlantic coast for kingfishes (NCDMF 2007). North Carolina and Georgia are currently the only states with a management plan for kingfishes.

5.3.2 Statutes

In 2007, the FMP for the kingfish stock in the waters of North Carolina was finalized. All management authority for North Carolina's kingfish fishery is vested in the State of North Carolina. Statutes that have been or could be applied to the kingfish fishery include:

- G.S. 113-168.1. General provisions governing licenses and endorsements
- G.S. 113-168.2. Standard Commercial Fishing License
- G.S. 113-168.3. Retired Standard Commercial Fishing License
- G.S. 113-168.4. Sale of fish
- G.S. 113-168.6. Commercial fishing vessel registrations
- G.S. 113-174.1. License required; general provisions governing licenses
- G.S. 113-174.2. Coastal Recreational Fishing License
- G.S. 113-182. Regulation of fishing and fisheries
- G.S. 113-182.1. Fishery Management Plans
- G.S. 113-183. Unlawful possession, transport, and sale of fish
- G.S. 113-185. Fishing near ocean piers; trash or scrap fishing
- G.S. 113.221.1. Proclamations; emergency review

- G.S. 113-268. Injuring, destroying, stealing, or stealing from nets, seines, buoys, pots, etc.

5.3.3 Marine Fisheries Commission Rules

The following rules adopted by the NCMFC affect management of the kingfishes in North Carolina. The version of the rules shown below is taken from North Carolina Marine Fisheries Commission Rules effective May 1, 2015. The following rules are codified in Title 15A (Environment and Natural Resources) Chapter 03 (Marine Fisheries) of the North Carolina Administrative Code (15A NCAC 03):

- 15A NCAC 03J .0101 FIXED OR STATIONARY NETS
- 15A NCAC 03J .0103 GILL NETS, SEINES, IDENTIFICATION, RESTRICTIONS
- 15A NCAC 03J .0202 ATLANTIC OCEAN
- 15A NCAC 03J .0402 FISHING GEAR RESTRICTIONS
- 15A NCAC 03M .0102 UNMARKETABLE FINFISH
- 15A NCAC 03M .0103 MINIMUM SIZE LIMITS
- 15A NCAC 03M .0518 KINGFISH (SEA MULLET)

The details of these rules as well as information regarding North Carolina's current commercial and recreational fishery regulations are available on the NCDMF website (http://portal.ncdenr.org/web/mf/rules-and-regulations).

5.3.4 Kingfish Rules and Regulations Outside North Carolina

South Carolina has a 50 per person, daily fish bag limit for an aggregate of kingfishes, spot, and croaker.

5.3.5 Federal Regulations

Pursuant to Title 33 U.S. Code Section 3, the U.S. Army Corps of Engineers (USACE) has adopted regulations, which restrict access to, and activities within certain areas of coastal and inland fishing waters. Federal Rules codified at 33 CFR 334.410 through 334.450 designate prohibited and restricted military areas, including locations within North Carolina coastal fishing waters, and specify activities allowed in these areas.

Gill nets are prohibited in federal waters from the North Carolina/South Carolina border to New Smyrna Beach, Florida in response to an entanglement and mortality of a northern right whale (*Eubalaena glacialis*). A closure was enacted first on February 15, 2006 through March 31, 2006 and listed in the U.S. Office of the Federal Registry (FR 2006a). A permanent closure in these waters was enacted on June 25, 2007 (FR 2007). As of 2015, the waters are closed from 15 November through 15 April, using the Federal Registry Notice (FR 2006b). Maps of the closure area are available on Atlantic Large Whale Take Reduction Plan found at: http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/docs/Updated%20Docs%2082514/northeast_trap_pot___dec_2014.pdf.

6.0 STATUS OF THE STOCK

6.1 GENERAL LIFE HISTORY

6.1.1 Background

Three species of kingfishes occur in North Carolina: southern (*Menticirrhus americanus*), Gulf (*M. littoralis*), and northern kingfishes (*M. saxatilis*). Kingfish refers to a single species while kingfishes refers to multiple species. Kingfishes are demersal members of the drum family (*Sciaenidae*). Southern kingfish is the most abundant kingfish species in the SAB and Gulf of Mexico (Irwin 1970; Dahlberg 1972; Crowe 1984; Smith and Wenner 1985; Harding and Chittenden 1987) with a range extending from Cape May, New Jersey southward to Buenos Aires, Argentina (Fischer 1978). Northern kingfish is the most abundant kingfish species in the Mid-Atlantic Bight (Hildebrand and Schroeder 1928; Schaefer 1965; Ralph 1982) with a range extending from the Gulf of Maine into the Gulf of Mexico (Fischer 1978). Gulf kingfish is the most abundant kingfish species in the surf zone south of Cape Hatteras, North Carolina, and has a range extending from Virginia (Welsh and Breder 1923; Irwin 1970) to Rio Grande, Brazil (Fischer 1978). Past reports had listed a fourth species, *M. focaliger*, but the species was determined to be southern kingfish (Irwin 1970). The kingfishes have several regional names including sea mullet, king whiting, king croaker, sea mink, roundhead, hard head, whiting, hake, Carolina whiting, and Virginia mullet (Welsh and Breder 1923).

The three Atlantic species are morphologically and meristically similar, causing difficulty in species identification. A rough key is outlined in Section 6.1.4.4 Adults (Figures 6.10, 6.11 and 6.12) and a more detailed key is given in Carpenter (2002).

Since all three species are harvested in North Carolina, the FMP will include discussions on the three species (if data are available). However, the focus of the management plan will be on southern kingfish due to its greater abundance relative to the other two kingfish species and a larger amount of data and published research. Gulf and northern kingfishes are included as an initial effort to describe information on life history, biology, and fishery importance in North Carolina's waters.

Length is reported as total length (TL) unless otherwise noted.

6.1.2 Physio-chemical Tolerances and Preferences

6.1.2.1 Temperature

Kingfishes are temperate fishes generally found in waters warmer than 10.0°C. Southern kingfish have been collected in waters with temperatures ranging from 8.0°C (Bearden 1963) to 37.3°C (Irwin 1970). Larval and postlarval southern kingfish are found in warmer temperature waters (12.0–37.3°C) than adults (Crowe 1984). Since kingfish spawn during the early spring to early fall, it would be unlikely to find larval and postlarval kingfish in cold water (<10.0°C). As temperatures cool southern kingfish move to deeper, warmer water or migrate south (Bearden 1963).

Northern kingfish occur in water temperatures of 7.8 to 35.8°C (Irwin 1970). The greatest concentration of northern kingfish occurs in temperatures between 24.0 and 26.0°C (Ralph 1982).

Gulf kingfish have been collected in water temperatures ranging from 10.8 to 31.0°C (Irwin 1970). Few studies have reported the temperature tolerances of Gulf kingfish.

6.1.2.2 Salinity

Kingfishes are euryhaline and inhabit waters that range from nearly fresh (2.0 part per thousand; ppt), to hypersaline (36.6 ppt), depending on the species (Bearden 1963; Irwin 1970; Crowe 1984). Southern kingfish have been observed in ocean and estuarine waters with salinities as low as 2.0 ppt. Mean length increases with salinity indicating inshore waters act as a nursery area for juveniles and sub-adult southern kingfish (Crowe 1984). Most southern kingfish are found in salinities greater than 20.0 ppt (Bearden 1963; Irwin 1970).

In North Carolina, Gulf and northern kingfishes are more common in the surf zone than southern kingfish (Ross and Lancaster 2002). Northern kingfish have been collected in waters with salinities as low as 8.0 ppt, but are most common in waters with salinities greater than 16.0 ppt (Irwin 1970). Younger northern kingfish are associated with lower salinity waters while adults are associated with higher salinity waters indicating the importance of estuaries as nursery habitats (Ralph 1982). Gulf kingfish are almost exclusively oceanic but have been found in estuarine waters with salinities as low as 17.9 ppt (Irwin 1970).

6.1.2.3 Food/Feeding

The kingfishes are demersal feeders that use a single chin barbel to detect epibenthic or benthic prey (Viosca 1959; Irwin 1970; Chao and Musick 1977; Rodrigues and Vieira 2010). Southern kingfish consume decapod crustaceans, polychaetes, amphipods, mysids, pelecypod siphon tips, and mole crabs (Hildebrand and Cable 1934; Viosca 1959; Irwin 1970; McMichael and Ross 1987; Rodrigues and Vieira 2010; Anderson and Comyns 2013; SEAMAP 2013). Northern kingfish switch from feeding on copepods, mysids, crabs, and amphipods as juveniles to mole crabs, amphipods, hermit crabs, polychaetes, and small fishes as adults (Irwin 1970; Chao and Musick 1977; McMichael and Ross 1987; Anderson and Comyns 2013). Dietary analyses of Gulf kingfish found crustaceans, polychaetes, amphipods, molluscs, fishes, and pelecypod siphon tips (Viosca 1959; Irwin 1970; McMichael and Ross 1987; Palmeira and Monteiro-Neto 2010; Rodrigues and Vieira 2010; Anderson and Comyns 2013).

An ontogenetic shift in the diet of kingfishes has been attributed to atrophication of the swimbladder (Bearden 1963; Irwin 1970; Delancey 1984; McMichael and Ross 1987; Anderson and Comyns 2013). The swimbladder of southern and northern kingfishes begins to atrophy at approximately 3.9 inches TL (100 mm; Irwin 1970; Ross et al. 1987). As the swimbladder atrophies, the diet shifts from epibenthic or planktonic prey to more benthic items such as pelecypod siphon tips, polychaetes, and mole crabs (Bearden 1963; Irwin 1970; Delancey 1984; McMichael and Ross 1987; Anderson and Comyns 2013).

Tidal stage as well as day versus night feeding may have an influence on the diets of kingfishes. Delancey (1984) observed tidal variation in the diet of Gulf kingfish. Ross et al. (1987) found a significant difference between day and night diets, but did not observe a difference in the tidal stage. More detailed studies need to be conducted to understand how tidal stage and time of day influence feeding in kingfishes.

6.1.3 Reproductive Biology

6.1.3.1 Size at Maturity

Length and sex at maturity varies for each kingfish species. Southern kingfish may mature sexually at a total length of approximately 5.3 inches (135 mm) for males and 7.6 inches (192 mm) for females (Smith and Wenner 1985). Most southern kingfish females are mature at 8.3 inches (212 mm) in North Carolina (n = 2,076; Figure 6.1). The length at maturity (L_{50}) was defined as the point at which 50% of the fish are mature using logistic regression and maturity was estimated based on macroscopic descriptions from Smith and Wenner (1985).

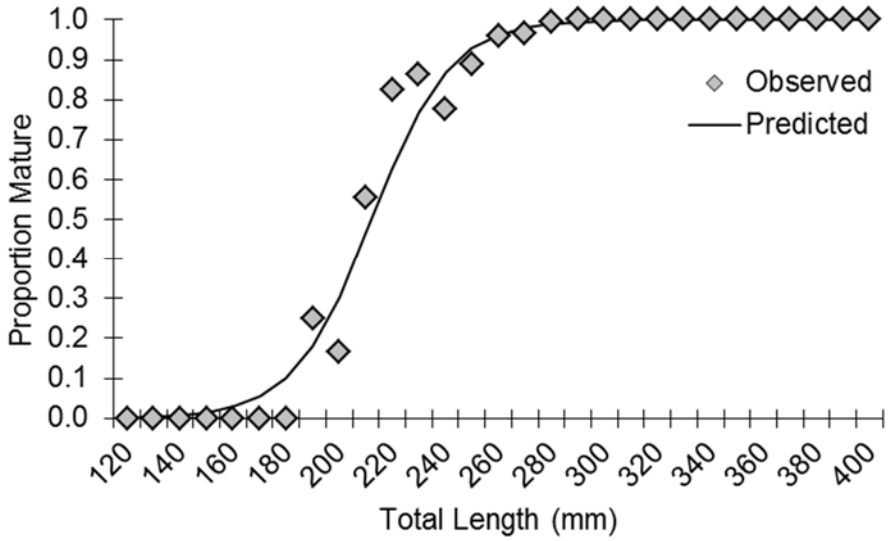

Figure 6.1 The percent of southern kingfish females mature by size, 1997–2013, n = 2,076 (Source: NCDMF, unpublished data).

Male kingfishes mature at a smaller size than the females. The smallest mature male southern kingfish was 3.9 inches (99 mm; SCDNR unpublished data) and the smallest mature female was 7.1 inches (180 mm; Smith and Wenner 1985). In North Carolina, the smallest mature female southern kingfish was 4.8 inches (122 mm).

Gulf kingfish females begin to mature at 7.4 inches (183 mm) and with an L_{50} of 8.5 inches (215 mm; Figure 6.2). The females are all mature by 11.8 inches (300 mm; n=426).

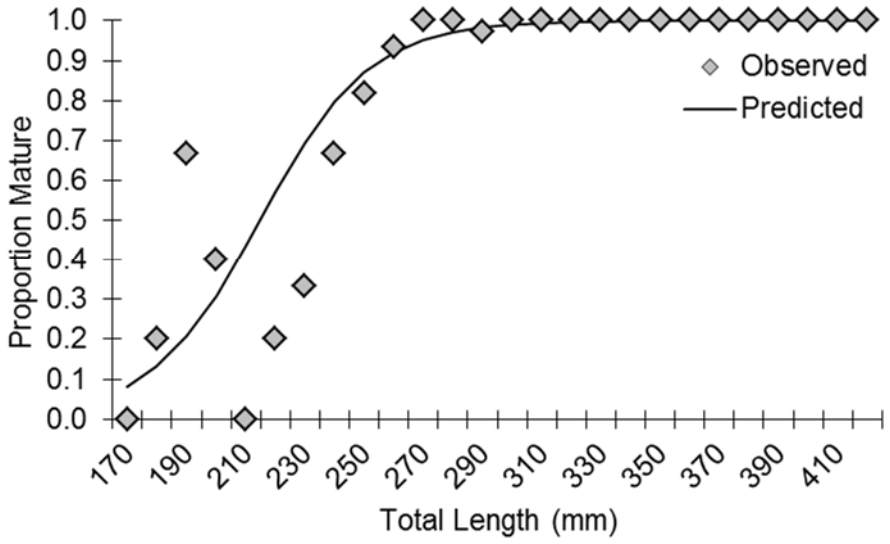

Figure 6.2 The percent of Gulf kingfish females mature by size, 1997–2013, n = 426 (Source: NCDMF, unpublished data).

Northern kingfish females began to mature at 7.9 inches (202 mm) with an L_{50} of 9.5 inches (241 mm) in NC (n = 273; Figure 6.3). Northern kingfish are 100% mature at 13.0 inches (330 mm).

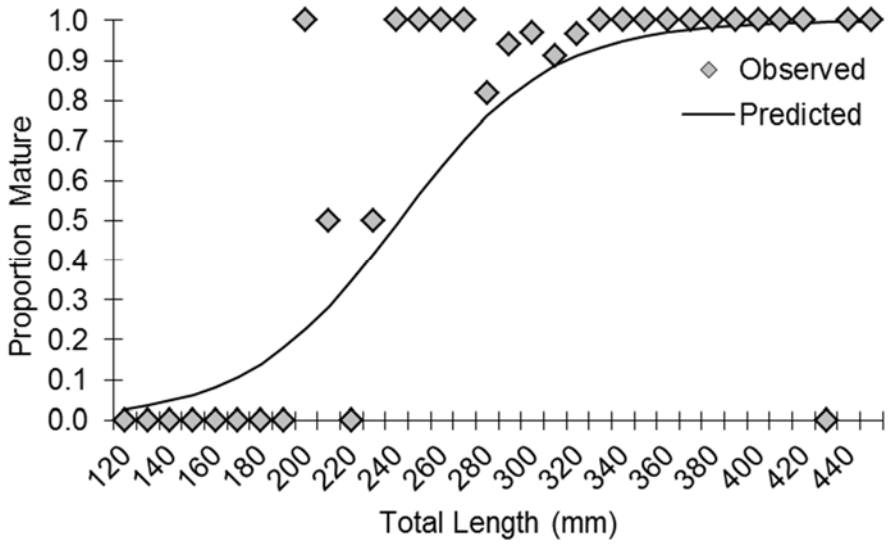

Figure 6.3 The percent of northern kingfish females mature by size, 1997–2013, n = 273 (Source: NCDMF, unpublished data).

6.1.3.2 Age at Maturity

Kingfishes begin to mature during their second summer (Hildebrand and Cable 1934; Schaefer 1965; Smith and Wenner 1985). Individuals of all three species begin to mature at age 0 and most individuals are mature by age 1 with Gulf kingfish females having the smallest proportion mature at 87% at age 1 (Figure 6.4). All kingfishes are mature by age 3. The NCDMF assigned

the birth date of kingfishes as May 1 because it corresponds with annulus formation on the otolith and peak spawning season for southern and Gulf kingfishes.

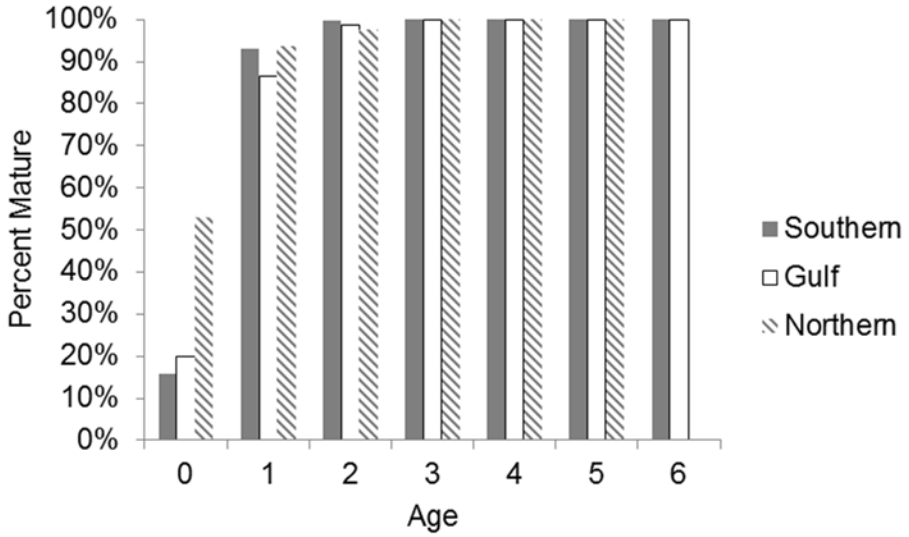

Figure 6.4 The percent mature at age for female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).

6.1.3.3 Sex ratio

The sexually dimorphic growth rates among kingfishes cause changes in sex ratio depending on the length of the fish (Figure 6.5). Female kingfishes grow faster and to larger sizes than males. The ratio of southern kingfish females to males begins to increase after 10.2 inches (260 mm). Nearly all southern kingfish are females by 13.4 inches (340 mm). Gulf kingfish are 100% female by 15.0 inches (380 mm). The proportion of northern kingfish females was greater than 50% for all lengths and had an increasing trend in percent of females as length increased for sizes greater than 10.2 inches (260 mm).

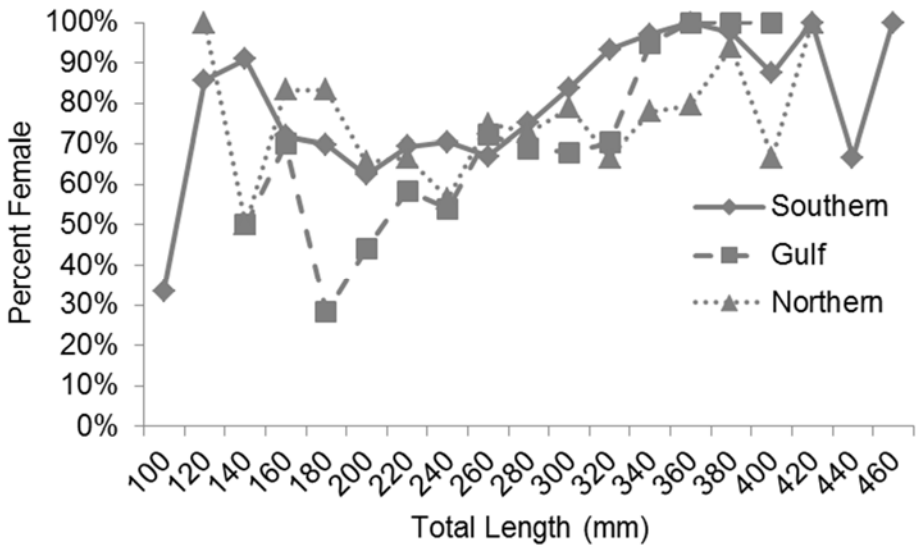

Figure 6.5 The percentage of female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).

A study of the shrimp trawl fishery found that most of the southern kingfish (79%) landed were female (Smith and Wenner 1985). A separate ageing study by NCDMF found that 64% of all southern kingfish caught by trawl were female (Table 6.1). In Smith and Wenner (1985), only the fish retained by the fishermen (>7.5 inches; >190 mm) were included in the ratio, while in the NCDMF ageing study all fish caught were included. Gulf kingfish had similar proportions of males and females from gill nets (54%) and long haul seines (47%), while beach seines and hook-and-line tended to harvest more females. The overall percentage for Gulf kingfish was 69% female (Table 6.1). The NCDMF found 73% of the northern kingfish to be female (Table 6.1). The bias in the NCDMF data could be due to the size selective nature of commercial gears, which tend to harvest larger individuals. The ratios were similar among gill nets and beach seines.

Table 6.1 The proportion female by gear for the southern, Gulf, and northern kingfishes, 1997–2013. Sample sizes are listed in parentheses (Source: NCDMF, unpublished data).

Species	Pound Net	Gillnet	Beach Seine	Long Haul Seine	Hook & Line	Trawl	Grand Total[1]
Southern	0.91 (44)	0.83 (2,651)	0.95 (39)	0.70 (326)	0.78 (386)	0.64 (601)	0.79 (4,047)
Gulf	-	0.54 (228)	0.68 (65)	0.47 (34)	0.78 (490)	-	0.69 (817)
Northern	-	0.75 (455)	0.71 (59)	0.63 (30)	0.79 (73)	0.69 (160)	0.73 (777)

[1] For gears with less than 10 fish, the proportion was not listed but was included in the grand total for species composition.

6.1.3.4 Fecundity

Based on evidence of multiple oocyte maturation stages and post-ovulatory follicles, southern kingfish are iteroparous, heterochronal spawners exhibiting indeterminate fecundity (McDowell and Robillard 2013; Clardy et al. 2014). Iteroparous spawners are those fish that spawn

multiple times over a lifetime, and heterochronal spawners spawn more than once during a season. Fish with indeterminate fecundity are those in which multiple stages of oocytes are found in the ovary during the spawning season. Batch fecundity in southern kingfish was estimated to be between 22,589 oocytes for an 8.7 inches (222 mm) female to 152,109 oocytes for a 12.8 inches (324 mm) female (McDowell and Robillard 2013).

6.1.3.5 Spawning Location

Spawning locations for kingfishes are unknown off North Carolina. Anecdotal evidence suggests spawning occurs on the bottom in the nearshore ocean and possibly in estuarine waters (Ralph 1982). Ripe kingfishes and kingfish eggs have been collected in nearshore ocean and estuarine waters from early spring to September (Hildebrand and Cable 1934; Bearden 1963; Hoese 1965; Smith and Wenner 1985; Bourne and Govoni 1988).

6.1.3.6 Gonadosomatic Index and Spawning Period

Based on the presence of juveniles in surf zone seine surveys, the spawning season of kingfishes occurs from April through October (Welsh and Breder 1923; Hildebrand and Schroeder 1928; Bearden 1963; Schaefer 1965; Smith and Wenner 1985). Southern and northern kingfishes spawn earlier than Gulf kingfish based on peak juvenile abundance in the surf zone (Irwin 1970; Modde 1980; McMichael and Ross 1987).

Spawning seasonality for southern kingfish has been estimated by the NCDMF to be from March to September using macroscopic determination of female gonadal development as well as gonadosomatic index (GSI; Figure 6.6). The GSI value is the percent of gonad weight (grams) divided by the sum of total weight minus gonad weight (% gonad weight / [total weight-gonad weight]; Clardy et al. 2014). GSI is a technique used to standardize gonad weight for fish of all sizes to enable quantitative investigations of spawning seasonality. The stages were based on macroscopic descriptions from Smith and Wenner (1985).

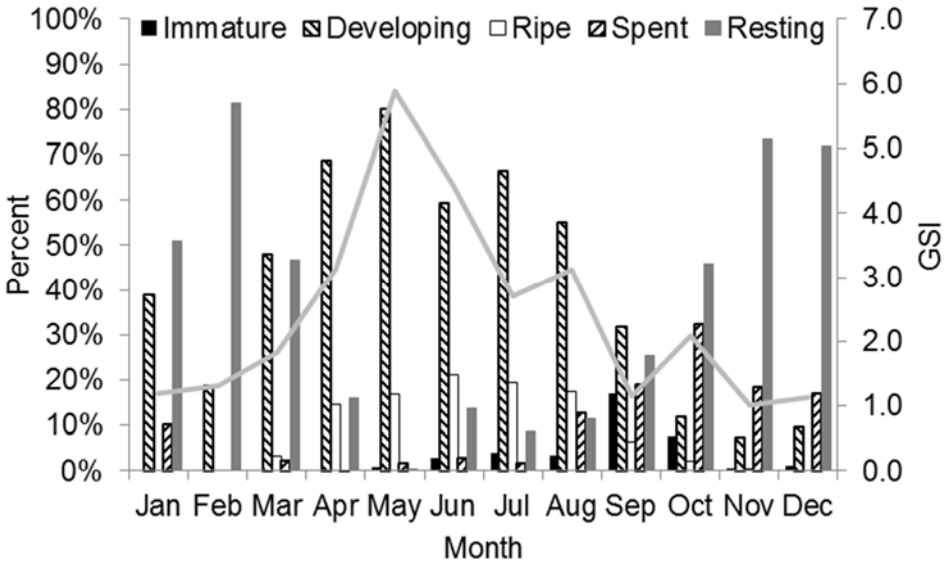

Figure 6.6 The percent of southern kingfish females in the five stages of reproductive development (n = 2,076) and gonadosomatic index (GSI) by month, 1997–2013 (Source: NCDMF, unpublished data).

The spawning season for Gulf kingfish begins in May and extends through September based on length frequency data from seine studies (Bearden 1963; Modde 1980; McMichael and Ross 1987). The NCDMF ageing study, which collects kingfish from a variety of fishery-dependent and fishery-independent surveys, saw ripe fish from May to October and developing fish from March to October (Figure 6.7). The GSI values are highest in late spring and early summer and decrease monthly until November when fish are either resting or immature.

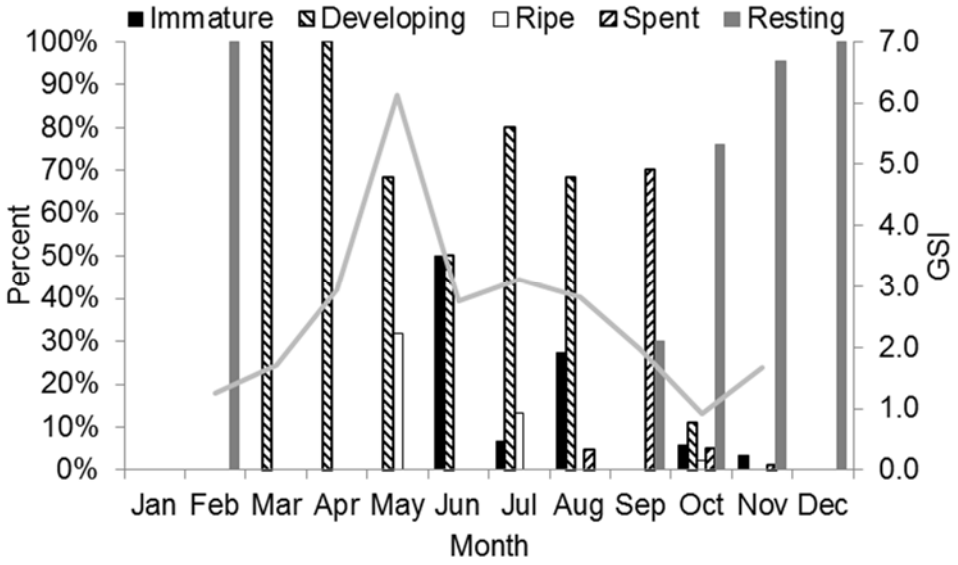

Figure 6.7 The percent of Gulf kingfish females in the five stages of reproductive development (n = 426) and gonadosomatic index (GSI) by month, 1997–2013 (Source: NCDMF, unpublished data).

The spawning season for northern kingfish extends from late June through August (Welsh and Breder 1923; Schaefer 1965; Miller et al. 2002). The NCDMF has collected northern kingfish in the ripe condition in April through August and developing fish from March through October (Figure 6.8). There was one fish in developing condition collected in December. The GSI values indicated peak spawning occurs in the early summer and then drops dramatically in late summer (after June).

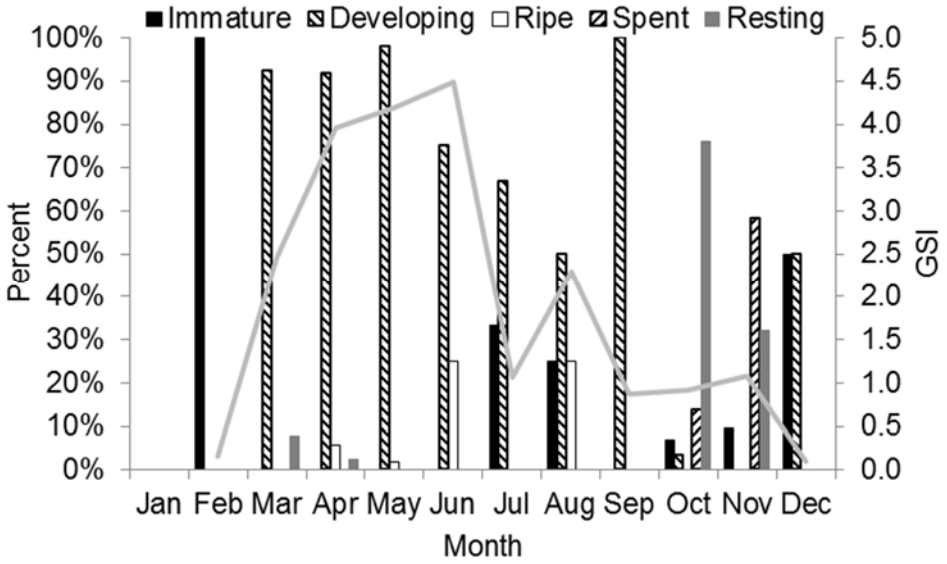

Figure 6.8 The percent of northern kingfish females in the five stages of reproductive development (n = 273) and gonadosomatic index (GSI) by month, 1997–2013 (Source: NCDMF, unpublished data).

6.1.4 Age, Growth, and Development

Only general descriptions are used for eggs, larvae, and juveniles since past studies may have confused the three species (Fahay 1983; Ditty et al. 2006).

6.1.4.1 Eggs

The eggs are pelagic and buoyant with many oil globules (1–18) and a diameter of 0.7–0.9 mm TL. Incubation lasts 46–50 hours at 20 to 21°C (Welsh and Breder 1923).

6.1.4.2 Larval Stage

The larvae are 2.0 to 2.5 mm TL at hatching. Early larvae have three vertical bands of chromatophores on the tail posterior to the vent and melanophores in the anterior-dorsal finfold. At 3.7 mm, the head is large and deep and melanophores form along the ventral surface of the abdomen in rows. At 8.0 to 10.0 mm TL, all fins are present and the upper jaw projects beyond the lower jaw (Lippson and Moran 1974; Able and Fahay 1998; Figure 6.9). Body and fins are covered partially or wholly with melanophores (Able and Fahay 1998). Pigmentation patterns occur at different sizes in juveniles collected from the Gulf of Mexico and juveniles from the Atlantic Coast (Ditty et al. 2006). The caudal fin is asymmetrically elongate (Welsh and Breder 1923).

6.1.4.3 Juveniles

At 18 to 20 mm TL, a small knob begins to form the single chin barbel (Figure 6.9). The tail becomes more pointed asymmetrically (Lippson and Moran 1974). The spinous dorsal fin is distinct from the soft dorsal fin. The soft dorsal fin is about twice the length of the anal fin and body pigmentation is dusky to dark (Able and Fahay 1998). Juveniles begin to display adult characteristics by 100 mm.

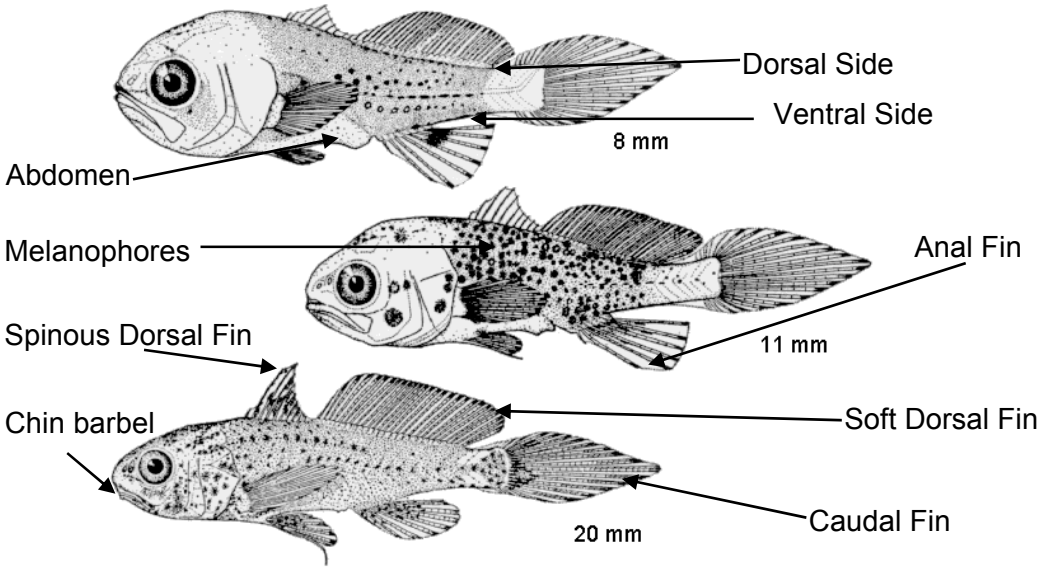

Figure 6.9 Larval and juvenile southern kingfish with a key to morphological characters.

6.1.4.4 Adults

Adult kingfishes are an elongate fusiform fish with a single chin barbel and an S-shaped caudal fin. The spinous dorsal fin contains 10 to11 rays and the soft dorsal fin contains 19 to 27 rays. The anal fin has one spine with six to nine soft rays (Carpenter 2002).

Southern kingfish colors are variable and range from silvery to a blotchy gray with seven to eight faint oblique bars. The inner side of the gill cover is often black (Carpenter 2002). The pectoral fin extends beyond the tip of the pelvic fin (Figure 6.10).

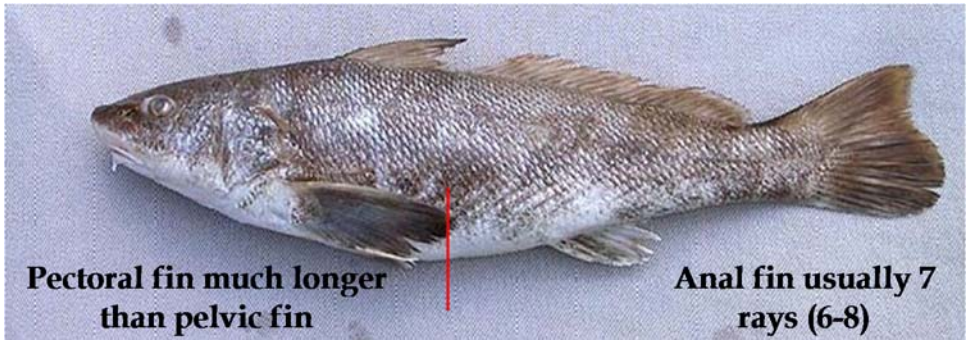

Figure 6.10 Adult southern kingfish with a key to morphological characters.

Gulf kingfish are silvery in color with black etching on the upper lobe of the caudal fin with reduced scales on the pelvic (breast) plate. The inner side of the gill cover is dusky (Carpenter 2002). The pectoral fin does not extend beyond the tip of the pelvic fin (Figure 6.11). The anal fin has six to eight soft rays.

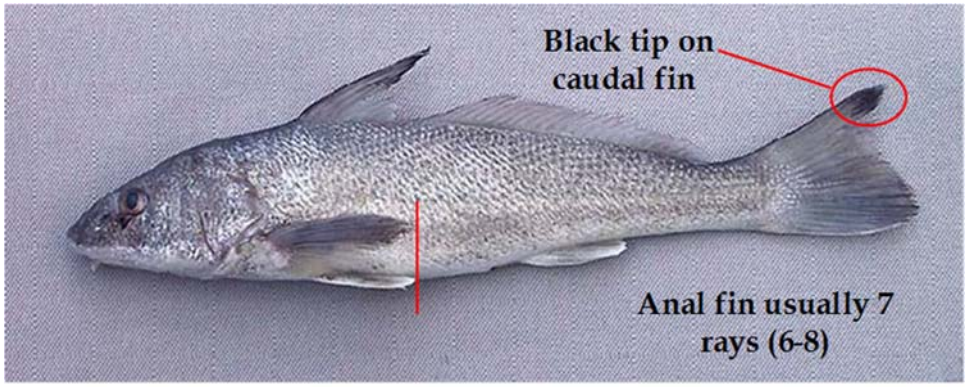

Figure 6.11 Adult Gulf kingfish with a key to morphological characters.

Northern kingfish have a large dorsal spine that extends approximately half way down the second (soft) dorsal fin, five to six oblique bars on both sides, and a longitudinal stripe beginning behind the pectoral fin that continues into the caudal fin (Figure 6.12). The second and third bars on the side form a V-shape under the spinous dorsal fin. The inner side of the gill cover is dusky (Carpenter 2002). The pectoral fin does not extend beyond the tip of the pelvic fin (Figure 6.12). The anal fin has seven to nine soft rays.

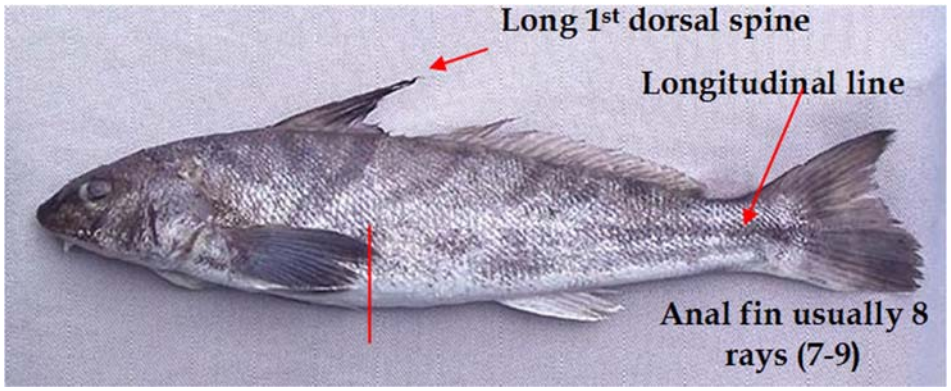

Figure 6.12 Adult northern kingfish with a key to morphological characters.

6.1.4.5 Age and Growth

Juvenile growth rates have been estimated using length frequencies. Kingfishes have rapid growth as juveniles. Growth has been documented to be as much as 2 mm/day (Miller et al. 2002). After the first winter, the growth rate decreases (Schaefer 1965; Smith and Wenner 1985).

Adult growth rates have been estimated using length frequency, scale aging, and otolith aging. An age and growth study conducted by the NCDMF estimated length at age using otolith-based ages. Von Bertalanffy growth curves were developed for males and females of each kingfish species because kingfishes exhibit a sexually dimorphic growth rate with female growth rates

increasing after age 1 and ultimately attaining a larger maximum size than males (Tables 6.2, 6.3).

Table 6.2 Predicted length (mm) at age estimated by von Bertalanffy growth curves for the Atlantic Coast kingfishes captured in North Carolina waters, 1997–2013 (Source: NCDMF, unpublished data).

	Southern				Gulf				Northern			
Age	Male		Female		Male		Female		Male		Female	
	(mm)	(inches)	(mm)	(inches)	(mm)	(inches)	(mm)	(inches)	(mm)	(inches)	(mm)	(inches)
1	204	8.0	196	7.7	202	8.0	192	7.6	222	8.7	219	8.6
2	239	9.4	265	10.4	267	10.5	305	12.0	306	12.0	306	12.0
3	265	10.4	303	11.9	301	11.9	342	13.5	324	12.8	341	13.4
4	284	11.2	324	12.8	318	12.5	354	13.9	328	12.9	356	14.0
5	298	11.7	335	13.2	327	12.9	358	14.1	329	13.0	362	14.3
6	308	12.1	342	13.5	332	13.1	359	14.1	329	13.0	364	14.3
7	315	12.4	345	13.6	334	13.1	360	14.2	329	13.0	365	14.4
8	321	12.6	347	13.7	335	13.2	360	14.2	329	13.0	366	14.4

Table 6.3 Estimated parameter values of the von Bertalanffy age-length model fit to kingfish data, 1997–2013 (Source: NCDMF, unpublished data).

Species	Sex	n	L_∞(mm)	L_∞(inches)	t_0	K
Southern	Male	712	329	13.0	-1.54	0.36
Southern	Female	2,449	354	13.9	-0.46	0.56
Gulf	Male	225	335	13.2	-0.37	0.66
Gulf	Female	448	359	14.1	0.37	1.16
Northern	Male	184	328	12.9	0.23	1.52
Northern	Female	535	367	14.4	-0.12	0.82

6.1.4.6 Length-Weight Relationship

A separate length-weight relationship was developed for each species and sex to compare with those developed from other studies (Table 6.4). Data from the NCDMF ageing study produces similar growth relationships as in other studies for southern kingfish (Smith and Wenner 1985; Harding and Chittenden 1987) and northern kingfish (Schaefer 1965; Wilk et al 1978). Northern and southern kingfish had similar growth rates with Gulf kingfish having the lowest growth rate. Among the three kingfish species, the male southern kingfish has the greatest growth coefficient (3.27), which indicates that southern kingfish males weigh more per unit length than northern and Gulf kingfish males (Table 6.4). Female southern and northern kingfishes had higher growth coefficients than female Gulf kingfishes. The weights for the kingfishes in the analysis were in grams and length in millimeters.

Table 6.4 Published length-weight*relationships for the three Atlantic Coast kingfish species.

Species	n	Sex	Equation	Reference
Southern Kingfish	2,170	Female	log W = -5.28 + 3.13 log TL	Smith and Wenner 1985
Southern Kingfish	1,462	Male	log W = -5.42 + 3.19 log TL	Smith and Wenner 1985
Southern Kingfish	1,697	Female	log W = -5.94 + 3.39 log TL	Harding and Chittenden 1987
Southern Kingfish	1,448	Male	log W = -5.94 + 3.40 log TL	Harding and Chittenden 1987
Southern Kingfish	3,007	Female	log W = -5.31 + 3.14 log TL	NCDMF, unpublished data
Southern Kingfish	813	Male	log W = -5.64 + 3.27 log TL	NCDMF, unpublished data
Northern Kingfish	275	Female	log W = -5.04 + 3.03 log TL	Schaefer 1965
Northern Kingfish	216	Male	log W = -5.39 + 3.16 log TL	Schaefer 1965
Northern Kingfish	110	Combined	log W = -5.20 + 3.11 log TL	Wilk et al 1978; c.f. Ralph 1982
Northern Kingfish	531	Female	log W = -5.36 + 3.14 log TL	NCDMF, unpublished data
Northern Kingfish	189	Male	log W = -5.24 + 3.09 log TL	NCDMF, unpublished data
Gulf Kingfish	413	Female	log W = -4.76 + 2.92 log TL	NCDMF, unpublished data
Gulf Kingfish	219	Male	log W = -4.48 + 2.80 log TL	NCDMF, unpublished data

*The variables length (mm TL) and weight (g) were log-transformed to linearize the data.

6.1.4.7 Maximum Size and Maximum Age

The International Gamefish Association records world record sizes for kingfishes caught recreationally. The current world record sizes are 18.0, 19.0, and 18.3 inches (457, 483, and 464 mm) for southern, Gulf, and northern kingfishes, respectively (http://wrec.igfa.org/). Harding and Chittenden (1987) reported a maximum size of 16.5 inches (419 mm) for southern kingfish in the Gulf of Mexico. The fish was aged using length frequency analysis and estimated to be four years old. The maximum size for southern kingfish recorded in the ageing study by the NCDMF was 17.7 inches (448 mm) and aged at four years old (Table 6.5). The maximum observed length for a southern kingfish in all NCDMF sampling was a 18.8 inches (478 mm) fish captured in a commercial beach seine (no aging sample was collected).

The maximum observed age of southern kingfish (using otoliths) from the NCDMF ageing study was a 13.3 inch (338 mm) male aged at nine years old collected from the Atlantic Ocean independent gill net study (Table 6.5). The oldest age class for females in the study was six years old and ranged from 12.2 to 14.3 inches (309–372 mm; n = 5).

The maximum age for Gulf kingfish males and females was seven (12.4–13.1 inches or 314–332 mm; n = 3) and six (11.2–12.6 inches or 285–320 mm, n = 2), respectively. The largest Gulf kingfish collected in the NCDMF ageing study was a female at 12.4 inches (435 mm) aged at three years old.

Northern kingfish were aged to a maximum of six years old for males (12.8 inches or 324 mm) and five years old for females (14.3–15.2 inches or 362–386 mm, n = 3). The largest northern kingfish aged by NCDMF was a 17.9 inches (454 mm) female at three years old.

Table 6.5 Average length at age and size range (mm) for North Carolina male and female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).

Species	Age	n	Mean	Size range		Age	n	Mean	Size range
Southern Kingfish									
Males	0	5	196	165–224	Female	0	53	200	121–330
	1	148	237	134–134		1	758	265	122–393
	2	190	270	217–342		2	971	303	205–403
	3	170	284	239–342		3	491	324	235–399
	4	115	293	255–332		4	152	342	230–448
	5	57	301	226–403		5	19	354	276–410
	6	21	313	281–440		6	5	344	309–372
	7	5	322	309–333		7	0	-	-
	8	0	-	-		8	0	-	-
	9	1	338	-		9	0	-	-
Gulf Kingfish									
Males	0	33	204	166–237	Female	0	36	221	167–354
	1	55	266	211–335		1	243	301	224–369
	2	41	297	242–329		2	105	340	222–415
	3	48	317	217–372		3	52	378	293–435
	4	32	322	290–357		4	8	390	350–412
	5	11	339	312–366		5	2	406	399–413
	6	2	348	341–355		6	2	303	285–320
	7	3	325	314–332		7	0	-	-
Northern Kingfish									
Males	0	20	239	197–288	Female	0	58	233	141–336
	1	51	309	232–377		1	196	311	192–405
	2	81	322	263–421		2	222	332	265–429
	3	22	340	256–428		3	45	357	271–454
	4	4	332	310–343		4	11	353	291–403
	5	5	320	281–393		5	3	373	362–386
	6	1	324	324		6	0	-	-

6.1.5 Movements and Migrations

In the surf zone, juvenile kingfishes are regarded as spring/summer residents (Tagatz and Dudley 1961; Bearden 1963; Dahlberg 1972; Modde 1980; Modde and Ross 1981; McMichael and Ross 1987). Abundance of juvenile southern and northern kingfishes (<150 mm) in the surf zone peaks during May throughout the SAB and Gulf of Mexico which is slightly before the peak abundance of juvenile Gulf kingfish (Irwin 1970; Modde 1980; Modde and Ross 1981; McMichael and Ross 1987). The difference in peak abundances of the kingfishes has been explained by interspecies resource partitioning or by varying temperature tolerances (Ross et al. 1987). Adult kingfishes (>150 mm) are most common at depths less than 26 m (Ralph 1982; Crowe 1984; Harding and Chittenden 1987), but have been reported in the ocean as deep as 99 m (Bearden 1963).

6.1.5.1 Larval Transport and Migration

Little is known about the spawning of kingfishes, and therefore, the mechanisms that transport larvae are poorly understood. The eggs of kingfishes are buoyant. Buoyant eggs and larvae of

other species are transported into estuaries by wind driven currents, Ekman transport, and advection pushing the buoyant eggs and larvae toward shore (Lawler et al. 1988). The spawning of kingfishes likely takes place in the nearshore ocean (Hoese 1965) with some kingfishes spawning in estuarine waters (Bourne and Govoni 1988). These nearshore and estuarine spawned kingfishes need to be retained within the nursery habitat for protection and food resources. Mechanisms to transport southern and northern kingfishes into estuaries and retention of kingfishes in the surf zone need to be studied to better understand the recruitment dynamics of kingfishes.

6.1.5.2 Young-of-the-Year and Juvenile Movement

Young-of-the-year (YOY) tend to be found in shallower water than adults are, but it varies among species. Northern kingfish juveniles used the surf zone in New Jersey and began to egress as the fish grew (Miller et al. 2002). A North Carolina study found Gulf kingfish to exhibit site fidelity in which Gulf kingfish remained in an area throughout summer (Ross and Lancaster 2002). As waters cool, YOY migrate from the surf zone to deeper water (Bearden 1963; Schaefer 1965; Miller et al. 2002).

6.1.5.3 Adult Movement and Migrations

Offshore trawl surveys observed that adult abundance is lowest in summer and peaks in the winter (Hoese 1965; Anderson 1968; Smith and Wenner 1985). A gradual increase in the abundance of kingfishes occurs with decreasing latitude during the winter along the Atlantic coast (Anderson 1968; Smith and Wenner 1985). The increase in abundance during the winter has been hypothesized to represent a southerly migration of kingfishes (Smith and Wenner 1985).

6.1.5.4 Tagging Studies

A tagging study was conducted in southeastern North Carolina to determine migration patterns of adult kingfishes off North Carolina, but the study had very few tag returns limiting the conclusions of the study (Beresoff and Schoolfield 2002).

6.2 PRESENT STOCK STATUS

The 2007 Kingfish FMP implemented the framework for the current management strategy. An update to the management framework is provided in Section 5.2.1, Updating Management Framework of North Carolina Kingfish Stock. For this Information Update, the trend analysis and management criteria were reviewed and refined based on using the most current information and techniques. A detailed summary of refinements made to management triggers is provided in Appendix 1, Evaluation of Management Triggers for Kingfish. Current management triggers are based on fishery independent indices of abundance (YOY, adult, and proportion of catch greater than size at L_{50}) and a relative fishing mortality (F) index. A formal quantitative stock assessment for kingfish is not available; therefore, no determination can be made relative to an overfishing and overfished status. Prior attempts at a stock assessment during the 2007 FMP process were not successful, primarily due to limited data. From these prior attempts, all reviewers noted a lack of migration (mixing) data to determine the movement patterns of kingfishes along North Carolina and the entire Atlantic coast. In this Information Update, after thorough evaluation of available data, the NCDMF determined data were still insufficient to perform a traditional quantitative stock assessment. A regional (multi-state) stock

assessment approach is likely needed to best determine the stock status for kingfish along the Atlantic coast including North Carolina.

The 2014 stock status for kingfish in North Carolina is viable. The stock status is based on an annual evaluation of trends in various fishery-independent abundance indices and relative fishing mortality (*F*). The trend analysis incorporates management triggers to alert NCDMF to the potential need for management action based on stock conditions. The activation of any two management triggers (regardless of trigger category) two years in a row warrants further data evaluation and potential management action. The analysis is updated annually and all trends relative to management triggers are provided annually as part of the annual FMP update provided to the NCMFC in August of each year. The FMP updates provides an update of data annually and can be found on the NCDMF website (http://portal.ncdenr.org/web/mf/fmps-under-development). No management triggers were activated in either 2013 or 2014.

7.0 STATUS OF THE FISHERIES

7.1 COMMERCIAL FISHERY

Landings reported in the following commercial sections will be reported for all three species as a single unit. Commercial fishermen rarely differentiate the kingfishes since all three species occur in the same general areas. Southern kingfish are the most common of the three species in North Carolina.

The gears that harvest the majority of the landed kingfishes are fish trawls, gill nets, and shrimp trawls. Historically, the fish trawl fishery landed the majority of landings from 1950 to 1979. The targeted gill net fishery for kingfishes became the dominant gear in 1981 and has since remained the dominant gear for commercial harvest of kingfishes in North Carolina.

7.1.1 Collection of Commercial Statistics

Commercial landings are defined as the amount of fish harvested from North Carolina coastal waters and brought to shore. Commercial landings do not include those fish discarded at sea or harvest that does not require reporting such as fish kept for personal use. Annual North Carolina landings data were collected by the Division of Commercial Fisheries (U.S. Fish and Wildlife Service, Department of the Interior) from 1880 to 1974 (Chestnut and Davis 1975). The National Marine Fisheries Service (NMFS) standardized the collection methods of landings statistics for U.S. South Atlantic fishery species in 1972. Landings were collected monthly from major seafood dealers, although reporting was not mandatory. The NCDMF and NMFS began a cooperative commercial fishery data collection program in 1978, maintaining the same methodology established in 1972. However, NCDMF assumed the primary role of data collection for the state and further improved data collection coverage with additional staff. Under-reported landings, however, were a growing concern due to the reliance on voluntary program cooperation from seafood dealers. The rising perception of deteriorating attitudes towards fisheries management by North Carolina fishermen in the late 1980s and early 1990s contributed to the reform of the NCDMF/NMFS cooperative statistics program (Lupton and Phalen 1996). With the support of the commercial fishing industry, NCDMF instituted a mandatory, dealer-based, trip-level, reporting system for all commercial species in 1994, which greatly improved reporting compliance. Improved collection methods that began in 1994 should be considered when comparing pre-1994 landings with post-1994 landings. This reporting system is still currently in place and is known as the North Carolina Trip Ticket Program (NCTTP).

7.1.2 Annual Landings and Value

Kingfishes are commercially important to the state of North Carolina due to the high quality of their flesh. Landings began increasing during the early 1900s reaching a peak in 1954 at 1.9 million lb (Figure 7.1). Landings declined after 1954 and fell to a low of 123,896 lb in 1976. Landings rebounded in the 1980s and 1990s when the price per pound was also increasing. Values peaked in 1997 and 2010 at $864,030 and $958,377, respectively. After 1993, landings have been variable from year to year averaging over 600,000 lb per year. These fluctuations may be due to changes in environmental conditions (i.e. water temperatures and salinities that prevail in nursery areas; Section 6.1 General Life History), fishing pressures, population size, and/or gear restrictions.

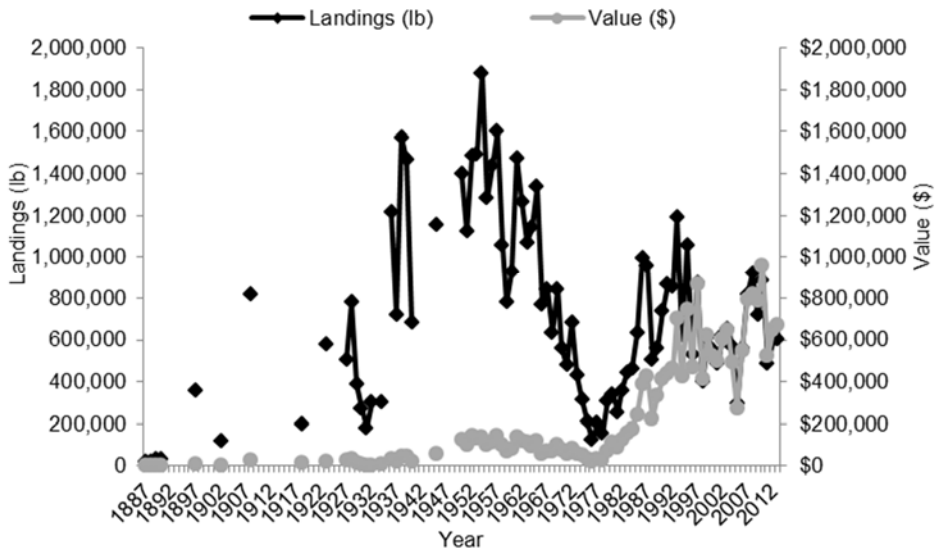

Figure 7.1 North Carolina commercial landings (lb) and dock side value ($) of kingfishes, 1887–2013 (Source: NMFS/NCDMF, unpublished data). Prior to 1950 data were not reported in every year.

7.1.3 Landings by Season

Landings of kingfishes and effort in the fishery are seasonal with peak landings and effort occurring in the spring and fall. Peak landings occurred in April (22%) and November (22%) between 1994 and 2013 (Figure 7.2). Effort, represented by the number of trips, peaked in April (16%) and October (16%). Peaks in landings that occur in April and November coincide with seasonal movements of kingfishes along the Atlantic coast (Smith and Wenner 1985).

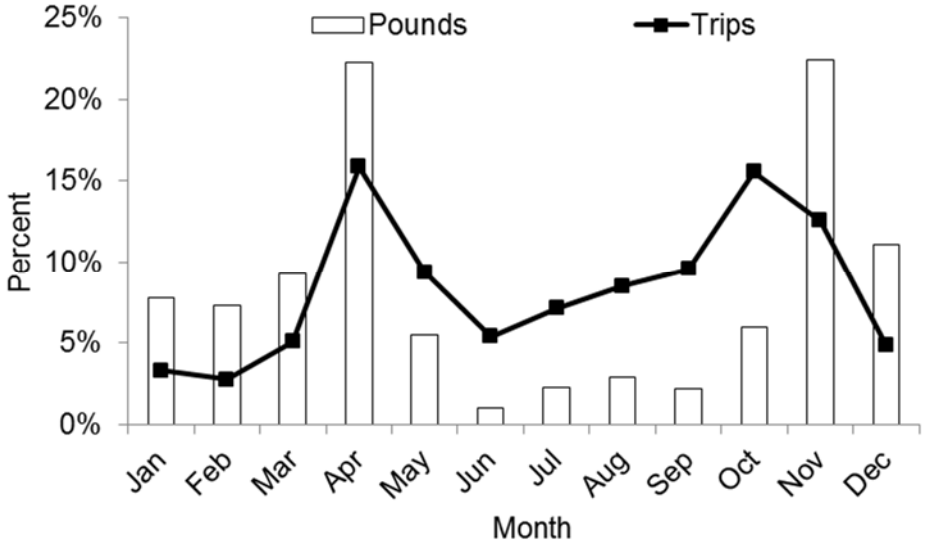

Figure 7.2 Percent of total landings and trips for kingfishes in North Carolina by month, 1994–2013 (Source: NCDMF, unpublished data).

7.1.4 Landings by County

The top five counties with landings of kingfishes between 1962 and 2013 (in descending order) were Carteret, Onslow, Dare, New Hanover, and Brunswick (Figure 7.3). Over time, Carteret County has consistently been the highest harvester of kingfishes averaging about 40% of the landings since 1962 but over the past 10 years, their proportion of landings has dropped to about 15% of the total landings per year. Landings by county are not available in 1967, 1969, and 1970.

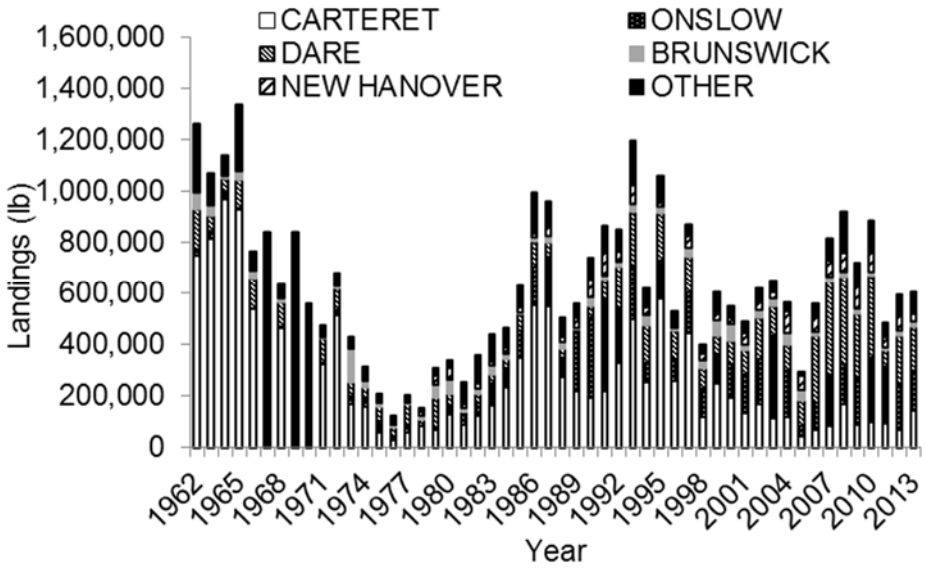

Figure 7.3 North Carolina landings of kingfishes by county of landing, 1962–2013 (Source: NCDMF, unpublished data). Landings by county are not available in 1967, 1969, and 1970.

7.1.5 Landings by Waterbody

The majority of kingfishes from 1962 to 2013 were harvested from the ocean (83%) and, to a lesser extent, Pamlico (10%) and Core (4%) sounds (Figure 7.4). Landings from other waterbodies only represented 3% of the total kingfishes landed. Since the inception of the NCTTP, these numbers changed little from historical percentages.

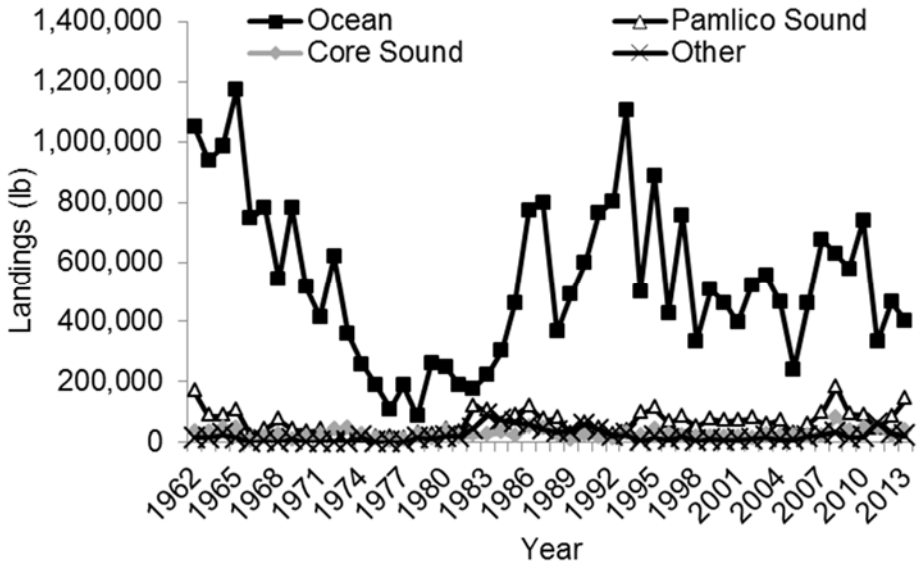

Figure 7.4 North Carolina landings of kingfishes by waterbody, 1962–2013 (Source: NCDMF, unpublished data).

7.1.6 Landings by Gear

Since 1962, fish trawls (flounder trawl and flynet), gill nets, shrimp trawls, and seines (long haul and beach seines) were the primary gears used to harvest kingfishes (Table 7.1; Figure 7.5). Over time, the major harvest gear has shifted from fish trawls to gill nets. Between 1962 and 2013, gill nets represented 45% of the total kingfish landings; followed by fish trawls (25%), shrimp trawls (15%), and seines (9%). Since the start of the NCTTP (1994–2013), the gillnet fishery has dominated the landings (70%) while shrimp trawls make up around 19% of the landings (Figure 7.6). Regulations on fish trawls instituted in 1993 and a ban on flynets south of Cape Hatteras in 1996 has greatly contributed to the decline in fish trawl landings. Commercial hook-and-line landings of kingfishes are very sparse and only make up 0.04% of the total landings since 1994.

Table 7.1 North Carolina commercial landings of kingfishes (lb) by gear, 1962–2013 (Source: NMFS/NCTTP, unpublished data).

Year	Gill Net	Fish Trawl	Shrimp Trawl	Trawl*	Seines	Others	Total
1962	222,400			877,500	151,900	10,500	1,262,300
1963	202,300			729,300	134,700	5,000	1,071,300
1964	157,400	729,500	120,400		134,000		1,141,300
1965	163,800	912,500	124,700		136,000		1,337,000
1966	11,400	553,200	93,900		105,100	3,000	766,600
1967	95,600	591,600	83,700		60,400	8,000	839,300
1968	3,600	411,400	106,100		107,600	6,700	635,400
1969	93,300	532,000	69,900		137,600	9,900	842,700
1970	127,200	198,300	56,000		173,000	8,500	563,000
1971	87,800	256,500	51,200		79,800	2,900	478,200
1972	164,812	287,979	114,950		91,232	24,075	683,048
1973	57,565	191,901	90,999		83,876	4,306	428,647
1974	64,918	136,641	70,755		39,898	2,372	314,584
1975	11,743	111,067	48,596		38,887	2,237	212,530
1976	1,906	68,459	31,068		20,242	2,221	123,896
1977	9,972	124,426	56,540		12,601	1,064	204,603
1978	25,126	41,574	38,286		43,898	5,070	153,954
1979	17,855	183,348	83,755		19,268	6,277	310,503
1980	62,165	77,081	139,103		54,842	9,414	342,605
1981	130,831	49,787	43,026		27,809	3,198	254,651
1982	80,927	74,573	133,508		54,692	17,352	361,052
1983	129,925	78,781	158,945		63,522	10,708	441,881
1984	175,815	109,917	114,745		56,804	7,070	464,351
1985	225,199	199,811	160,075		42,567	4,788	632,440
1986	387,691	349,175	162,440		88,327	5,757	993,390
1987	536,566	167,130	137,750		110,333	8,149	959,928
1988	208,958	144,644	75,218		72,033	3,096	503,949
1989	351,193	138,338	54,143		17,608	1,142	562,424
1990	451,023	115,625	117,732		50,355	3,877	738,612
1991	622,381	121,753	73,913		44,147	2,457	864,651
1992	606,721	192,143	38,006		12,519	2,319	851,708
1993	534,047	490,679	80,652		86,398	2,448	1,194,224
1994	265,730	204,606	94,668		51,264	4,572	620,841
1995	643,322	102,694	243,210		65,966	3,593	1,058,785
1996	219,150	46,363	203,158		57,062	2,528	528,260
1997	484,872	109,552	229,096		46,050	3,318	872,888
1998	263,834	17,295	80,470		34,393	3,321	399,313
1999	339,097	7,146	237,542		20,907	2,774	607,465
2000	335,063	11,702	156,961		45,806	2,409	551,940
2001	384,821	17,024	47,564		37,224	3,109	489,743
2002	468,308	9,239	115,078		25,189	1,922	619,737
2003	532,742	3,785	68,093		39,175	8,841	652,636
2004	408,870	4,515	109,009		43,372	1,893	567,659
2005	241,553	8,346	14,658		30,921	785	296,263
2006	464,774	10,530	46,236		34,519	3,382	559,440
2007	635,739	23,566	132,033		25,119	1,131	817,588
2008	594,360	55,064	216,551		46,202	8,943	921,120
2009	583,484	21,129	87,123		27,045	3,143	721,924
2010	726,654	28,945	79,589		50,367	1,286	886,841
2011	429,271	276	23,692		32,239	1,376	486,853
2012	505,595	3,411	57,368		28,115	1,760	596,249
2013	436,397	***	144,643		19,696	2,450	603,186

*Trawl fisheries were not distinguished between shrimp and fish trawls in 1962 and 1963.
*** indicates confidential data; confidential landings were added to the “Other” column.

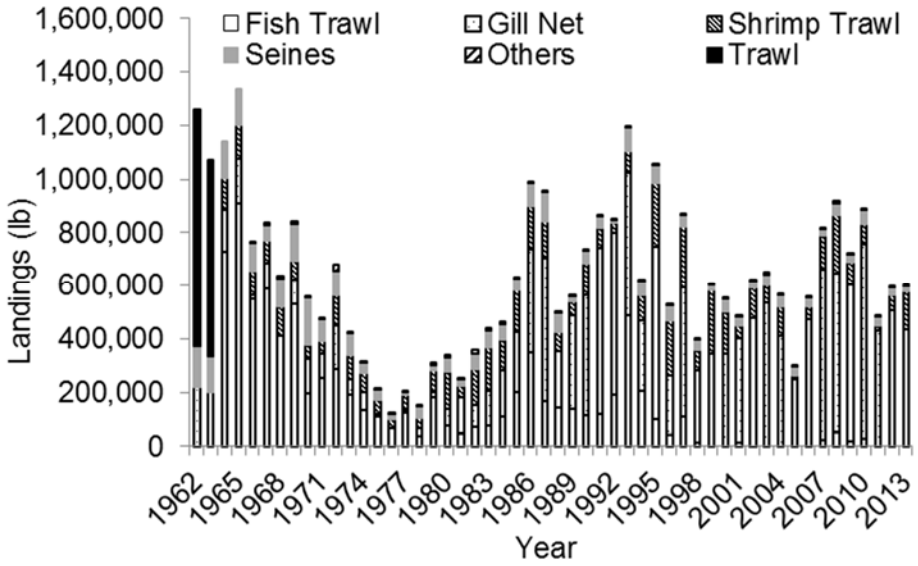

Figure 7.5 North Carolina landings of kingfishes (lb) by gear, 1962–2013 (Source: NCDMF, unpublished data). The trawl fisheries were not distinguished between shrimp and fish trawls in 1962 and 1963.

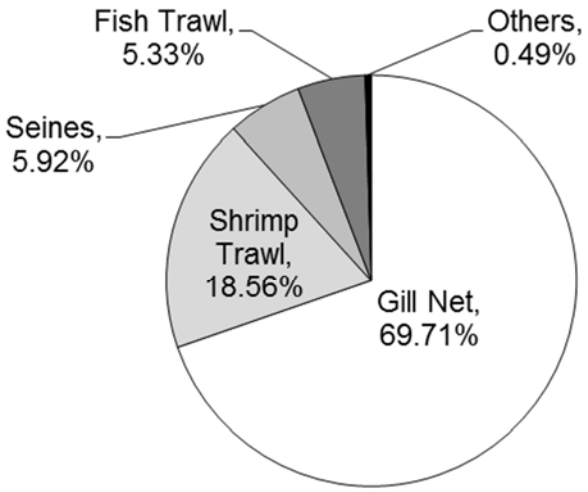

Figure 7.6 Percent of North Carolina kingfish landings by gear, 1994–2013 (Source: NCDMF, unpublished data).

7.1.6.1 Gill Net Fishery

Most kingfishes are captured in the small mesh (<5 inches) ocean gill net fishery, but a few are taken incidentally in the large mesh (≥5 inches) estuarine gill net fishery. Primary species harvested in the ocean with small mesh gear include Atlantic croaker, bluefish, kingfishes, spot, and weakfish. Most of the fish are captured with stretched mesh sizes between 2½ to 3 inches. Gill nets dominated the commercial landings of kingfishes from 1994 to 2013 accounting for 70% of the total landings and 63% of the total trips landing kingfishes. Landings from the gill net fishery have fluctuated widely over time with an overall increase from 1998 to 2010 when landings peaked at almost 727,000 lb. Landings between 2011 and 2013 dropped to an

average of around 457,000 lb per year (Table 7.1; Figure 7.7). The number of trips landing kingfishes has shown a declining trend since 1994 but increased sharply in 2012 and 2013 (Figure 7.7).

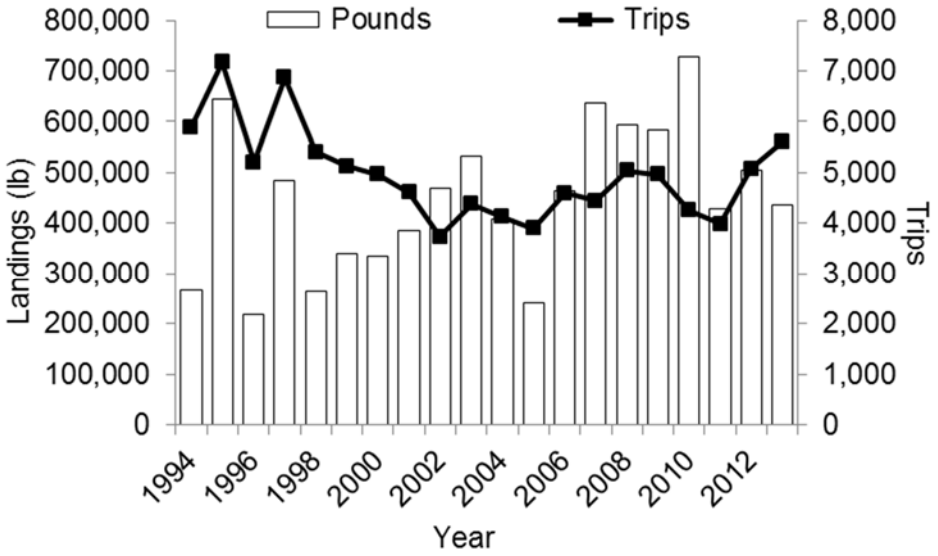

Figure 7.7 North Carolina commercial landings (lb) and trips for kingfishes from the commercial gill net fishery, 1994–2013 (Source: NCTTP, unpublished data).

The vast majority of the gill net harvest of kingfishes occurred in the ocean with most of the catch occurring in April and November as the fish were intercepted during their seasonal migration offshore (Figure 7.8). The three counties with the highest percentage of gill net landings between 1994 and 2013 were Onslow (32%), Dare (30%), and Carteret (14%) counties.

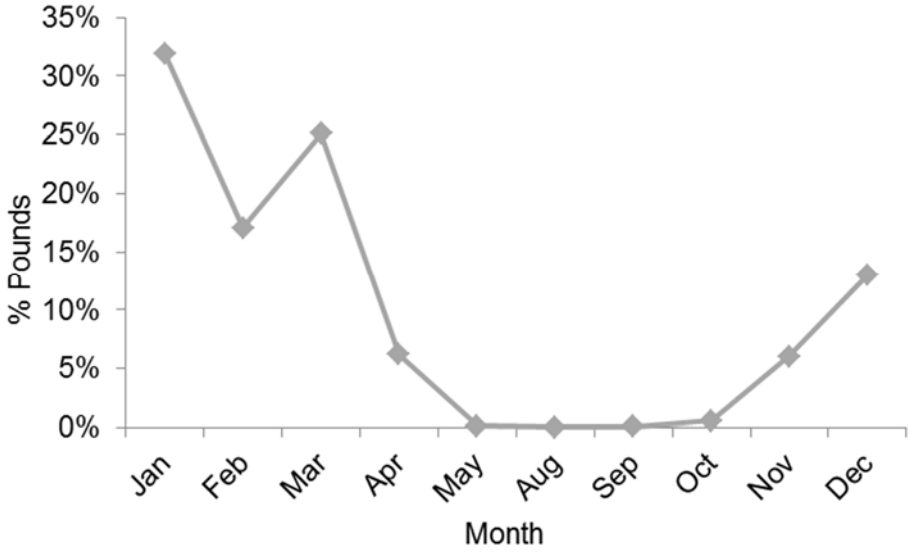

Figure 7.8 Percent of commercial gill net landings of kingfishes in North Carolina by month, 1994–2013 (Source: NCTTP, unpublished data).

Landings were categorized into 50-lb bins based on the weight of kingfishes landed for each trip (Bin >0 = Trips with 1-49 lb, Bin 50 = Trips with 50–99 lb, etc., Bin ≥1000 = Trips with 1000 lb or more). The percentage of pounds and trips was then pooled across the years from 1994 to 2013 for each bin (Figure 7.9). The trips that had the highest percent landings were trips that landed over 1,000 lb or greater per trip. These trips accounted for 31% of the total harvest but just 2% of the total gill net trips taken. Trips that landed less than 50 lb made up 76% of the total gill net trips but only landed 6% of the harvest (Figure 7.9).

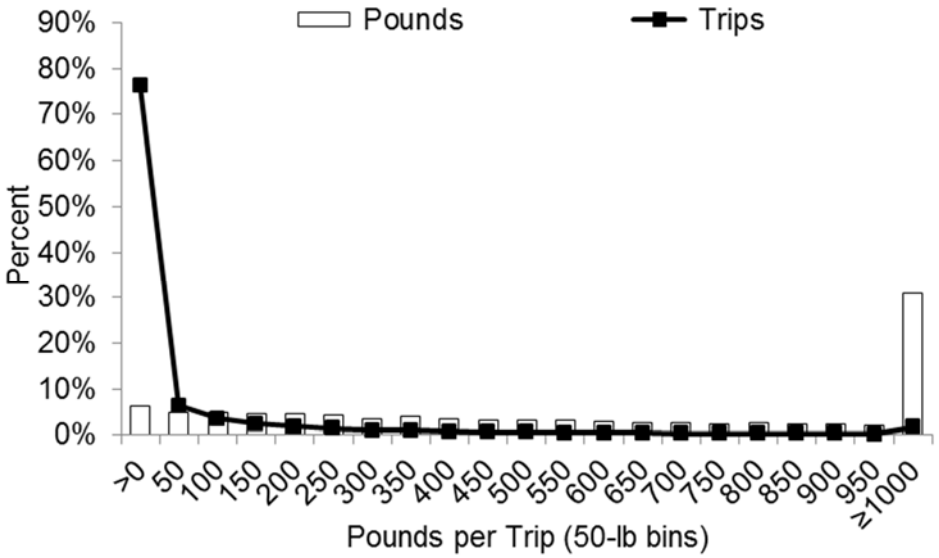

Figure 7.9 North Carolina landings (lb) and trips of kingfishes from the commercial gill net fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

NCDMF fish house sampling programs 434 and 444 provided length information for southern kingfish landed by ocean gill nets. Data from the ocean gill net fishery have been available since 1983; however, data from the estuarine gill net fishery were not available until 1992. From 1983 to 2013, the lengths of southern kingfish landed by commercial gill nets in the ocean ranged from 7.1 inches (180 mm) to 18.9 inches TL (480 mm) with a median of 11.8 inches TL (300 mm; Figure 7.10). From 2003 to 2013, there was a slight contraction of size classes in southern kingfish landed in the ocean by commercial gill nets (Figure 7.10).

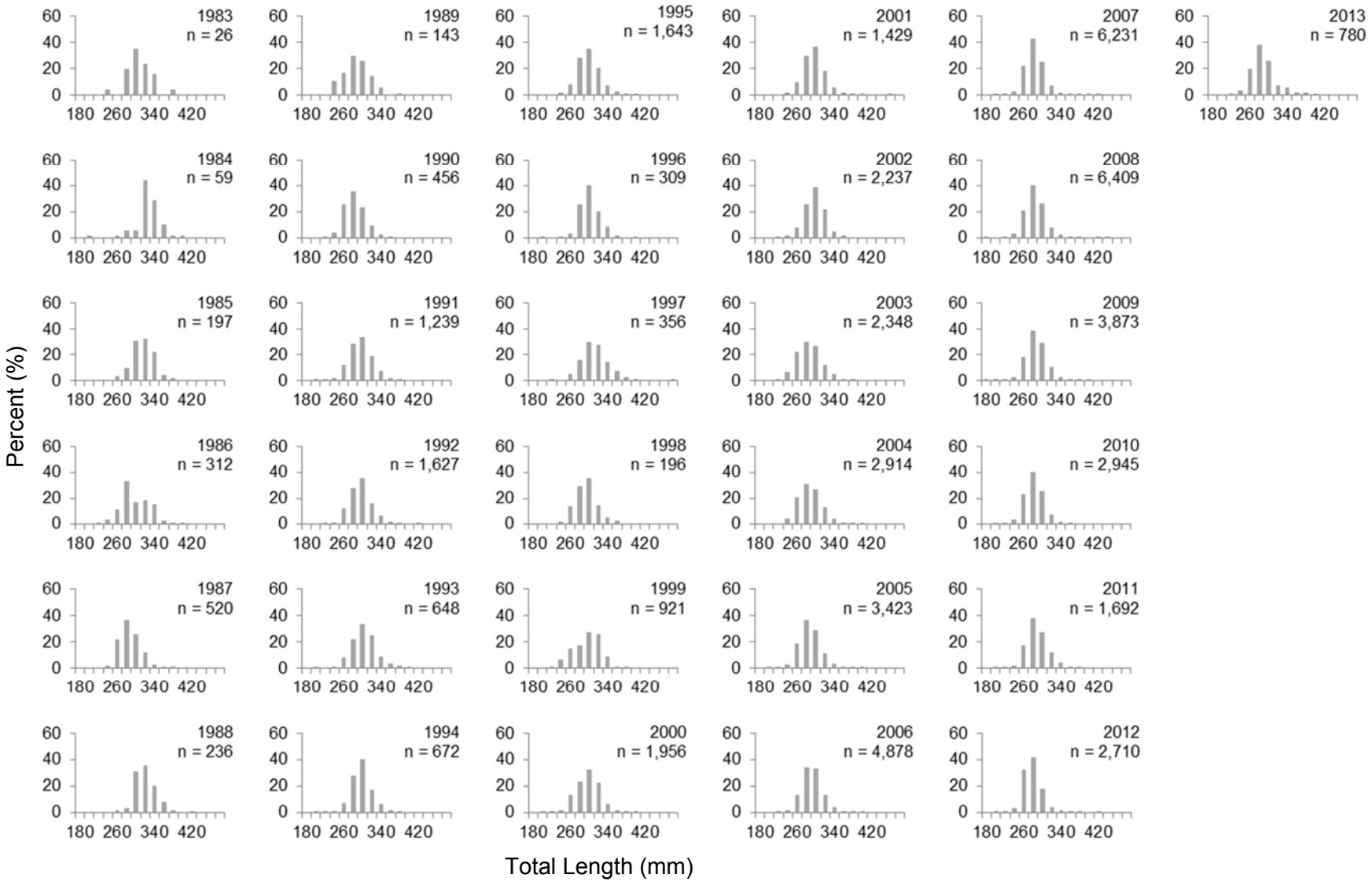

Figure 7.10 Length distributions for kingfish sampled from the commercial ocean gill net fishery, 1983–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

NCDMF fish house sampling programs 460 and 461 provide length information for southern kingfish landed by estuarine gill nets. From 1998 to 2013, the lengths for southern kingfish landed by commercial gill nets in the estuary ranged from 7.9 inches (200 mm) to 17.3 inches TL (440 mm) with a median of 11.8 inches TL (300 mm; Figure 7.11). From 1998 to 2003, the commercial southern kingfish estuarine gill net fishery also experienced a slight contraction of size classes.

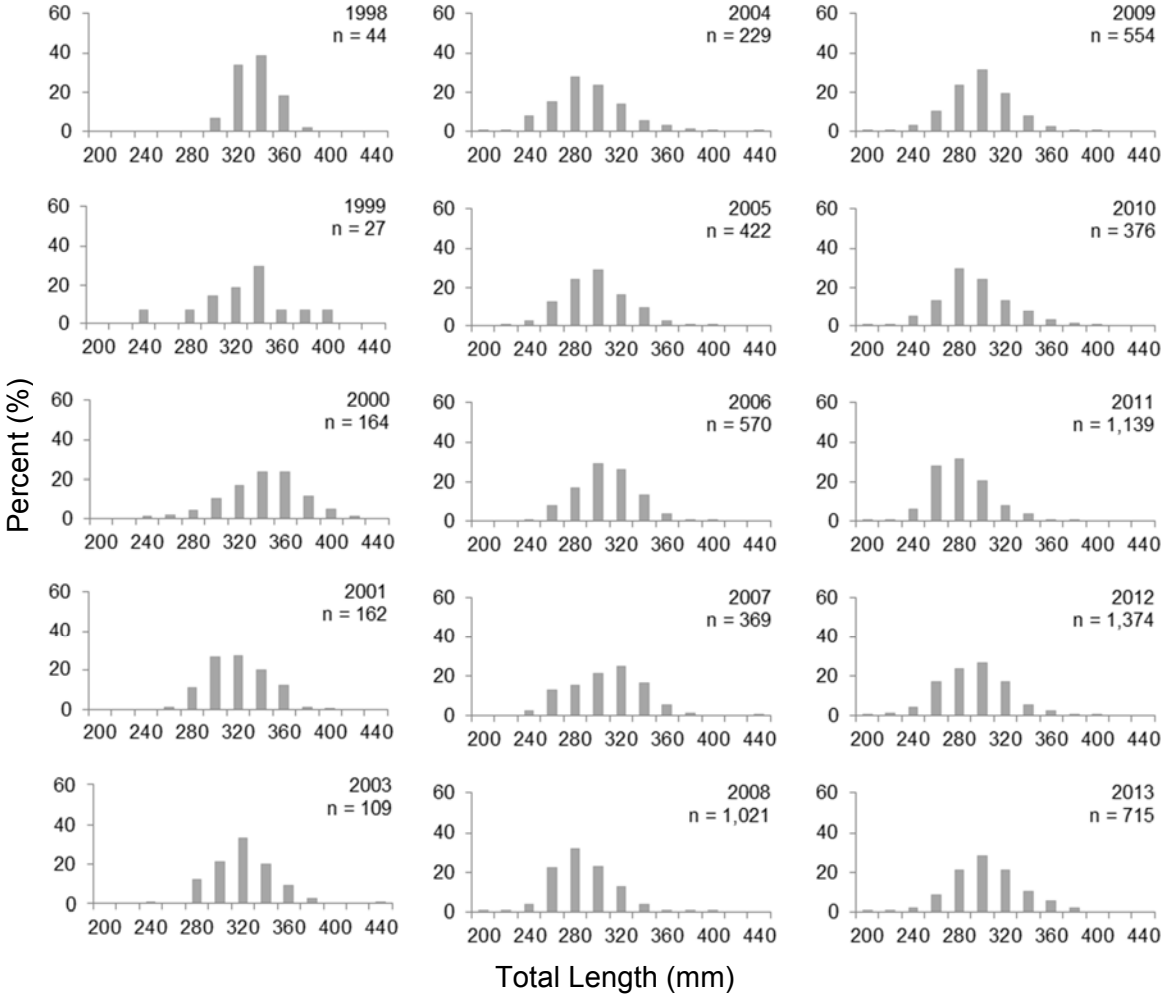

Figure 7.11 Length distributions for kingfish sampled from the commercial estuarine gill net fishery, 1998–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

7.1.6.2 Shrimp Trawl Fishery

The gear and effort used to catch shrimp depends on the target species and area fished. Conventional two-seam otter trawls are used for pink and brown shrimp in the spring and summer. White shrimp are harvested with four-seam and tongue trawls during the fall. Large Pamlico Sound vessels stay out four or five days and typically tow from one to three hours, often working day and night. Smaller vessels make daily trips and employ shorter tow times. In the Core Sound area, the fishery occurs mainly at night, with trips typically lasting one night. In the southern area, fishing is conducted in the ocean and estuarine waters. Day-trips are common and most activity occurs during daylight hours.

Historically, the shrimp trawl fishery has been a significant contributor to landings of kingfishes in North Carolina. Since 1994, shrimp trawls have accounted for 19% of the total landings of kingfishes and 25% of the total trips landing kingfishes. Annual shrimp trawl landings of kingfishes have fluctuated greatly since 1994 (Figure 7.12), likely caused by the availability of kingfishes in a given year, the amount of effort in the spring fisheries for pink shrimp (*Farfantepenaeus duorarum*) and brown shrimp (*F. aztecus*) and the fall/winter fishery for white shrimp (*Litopenaeus setiferus*), and/or regulation changes. The banning of flynets south of Cape Hatteras in March 1996 (15A NCAC 03J .0202(4)) caused some fishermen to modify shrimp trawls in order to target finfish south of Cape Hatteras. This targeting of finfish by shrimp trawls led to higher landings of kingfishes in 1996 and 1997 and resulted in the NCMFC passing the fifty-fifty rule for shrimp and finfish that was implemented in December 1997 (15A NCAC 03J .0202(5); see Section 5.1.1, Management Authority). High ocean catches of kingfishes in 1999 coincided with a strong white shrimp in the fall of that year. Shrimp trawl landings of kingfishes from 1994 to 2013 by waterbody indicate that 63% of the fish were harvested from the Atlantic Ocean while 32% were harvested from the Pamlico Sound. Small amounts of kingfishes were landed from Core Sound (1%) and other estuarine waterbodies.

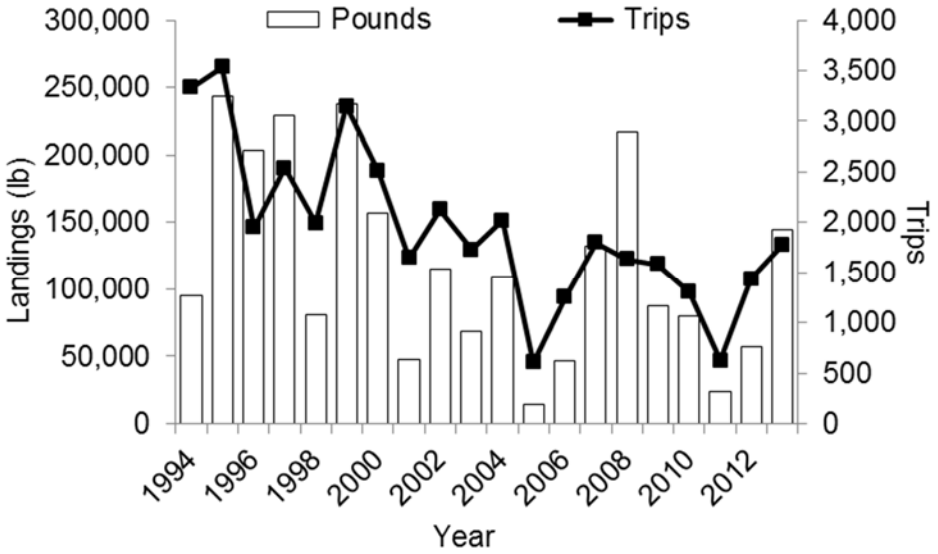

Figure 7.12 North Carolina landings (lb) and trips with kingfishes from the commercial shrimp trawl fishery, 1994–2013 (Source: NCTTP, unpublished data).

The shrimp trawl fishery in the ocean had the highest landings of kingfishes while fishing for white shrimp in the fall and winter months. Catches of kingfishes were low in the Pamlico Sound until the brown and pink shrimp fisheries started in June. Pamlico Sound shrimp trawl landings peaked in August and gradually decreased as the estuarine shrimp fishery subsided (Figure 7.13).

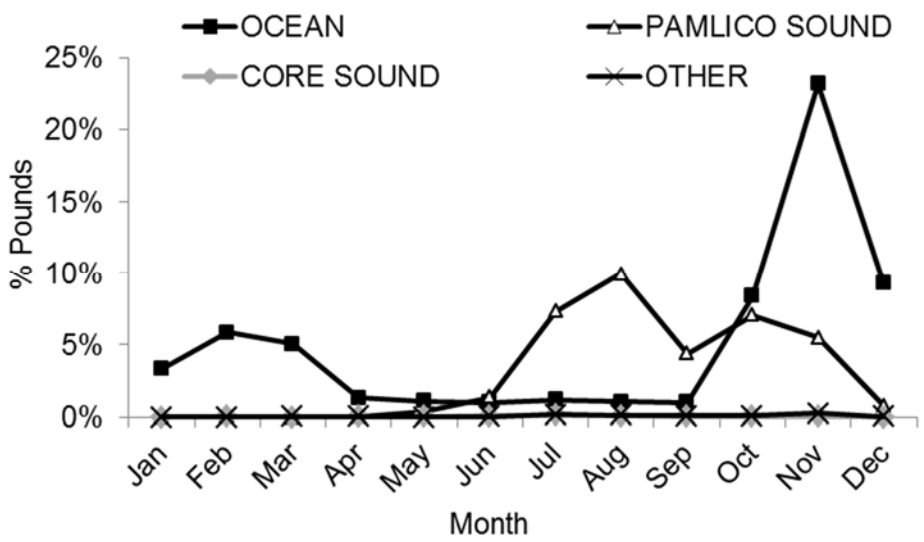

Figure 7.13 Percent of kingfishes in commercial shrimp trawl from North Carolina by month and waterbody, 1994–2013 (Source: NCTTP, unpublished data).

Most (75%) of the shrimp trawl trips with landings of kingfishes caught less than 50 lb of kingfishes accounting for only 17% of the total kingfishes landed in shrimp trawl fisheries. A large portion of the landings between 1994 and 2013 came from trips harvesting greater than 1,000 lb of kingfishes. These trips with large catches of kingfishes made up nearly 30% of the total landings for this time period (Figure 7.14). Many of these were from Carteret County during 1996 and 1997 when shrimp trawls were used to target finfish by some boats that were circumventing flynet rules for the Atlantic Ocean (Figure 7.15). The majority of kingfishes caught in shrimp trawls are landed in Carteret County followed by Onslow and Pamlico counties.

NCDMF does not target the shrimp trawl fishery for finfish sampling; therefore, a length distribution over time for kingfish caught in shrimp trawls is not available.

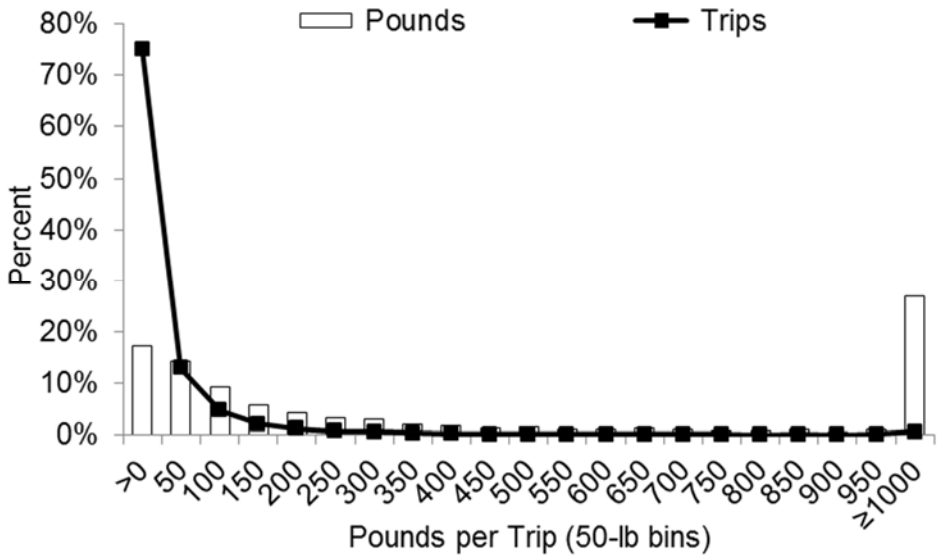

Figure 7.14 North Carolina landings (lb) and trips of kingfishes from the commercial shrimp trawl fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

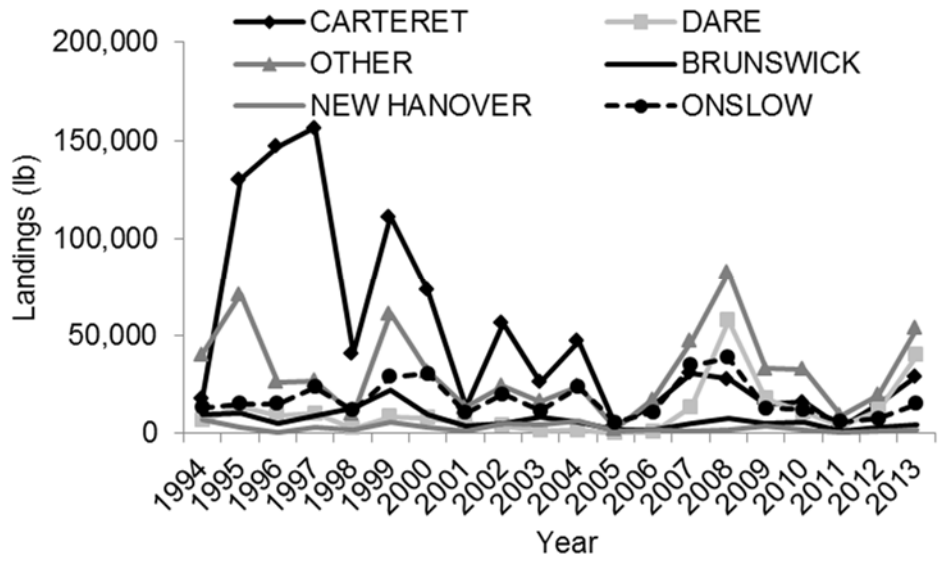

Figure 7.15 North Carolina commercial shrimp trawl landings of kingfishes by county, 1994–2013 (Source: NCTTP, unpublished data).

7.1.6.3 Fish Trawl Fishery

Fish trawls (composed of flounder trawls and flynets) were the dominant gear used to harvest kingfishes prior to 1980 (Table 7.1; Figure 7.5). The flynet fishery occurs in the ocean by trawlers fishing for weakfish, Atlantic croaker, bluefish, butterfish and kingfishes. Kingfish landings have been low since 1996, a decrease that directly corresponds to the area closures to flynet gears south of Hatteras. This fishery predominately takes place from October through April in waters less than 36 m (118 ft) from Oregon Inlet to Cape Hatteras. The flounder trawl fishery targets summer flounder and black sea bass in ocean waters typically from November to April. Kingfish landings from fish trawls declined after 1993 due to area closures in the flynet

fishery to protect weakfish leading to a shift towards gill nets and shrimp trawls (Figure 7.16). Flynets were banned west of Cape Lookout in 1993 (Proclamation FF-6-93). In 1995, the flynet fishery was also banned south of Cape Hatteras with the exception of the first three weeks of January, February, and March (Proclamation FF-18-94 and FF-31-94). After 1995, the flynet fishery was banned south of Cape Hatteras via proclamation (Proclamation FF-22-95) and then by rule in March 1996 (15A NCAC 03J .0202(4)).

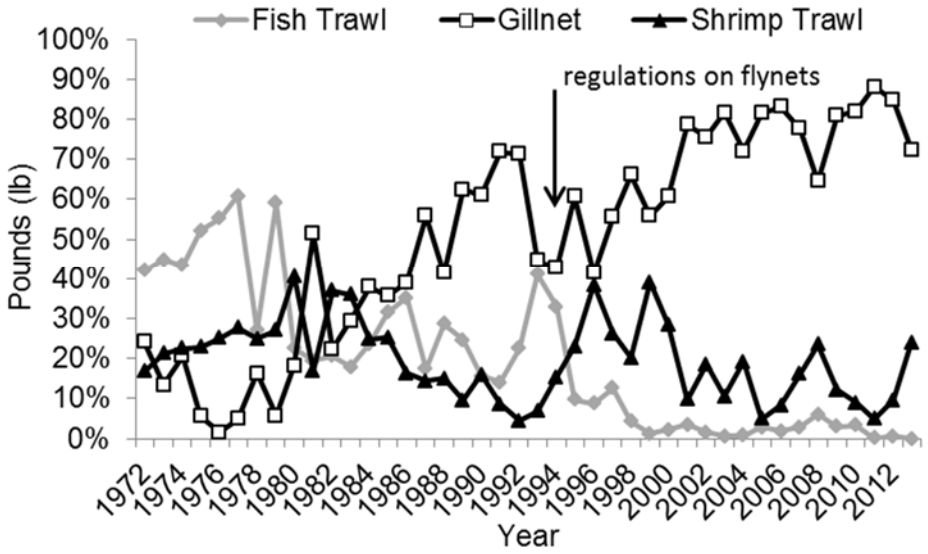

Figure 7.16 Percent of kingfishes in North Carolina from the three dominant gears, 1972–2013 (Source: NCTTP, unpublished data).

Landings of kingfishes in fish trawls decreased from 204,606 lb in 1994 to zero in 2013 (Table 7.1; Figure 7.17). The decreased ability of the trawlers to pass through Oregon Inlet to land fish in North Carolina could explain the zero landings in 2013. Since 1996, landings from this gear have been less than 50,000 lb with the exception of 1997 and 2008. In many years since 1994, landings from fish trawls have not exceeded 10,000 lb. The winter months (December–March) accounted for 87% of the harvest of kingfishes from fish trawls (Figure 7.18) as this gear generally targets fish in the ocean that have moved out of the sounds or are migrating southward during the winter.

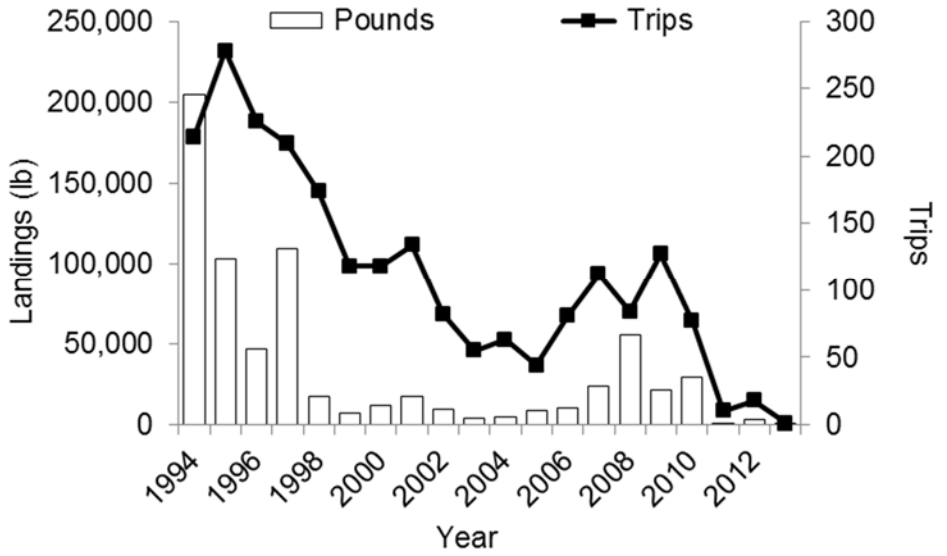

Figure 7.17 North Carolina landings (lb) and trips for kingfishes from the fish trawl fishery, 1994–2013 (Source: NCTTP, unpublished data).

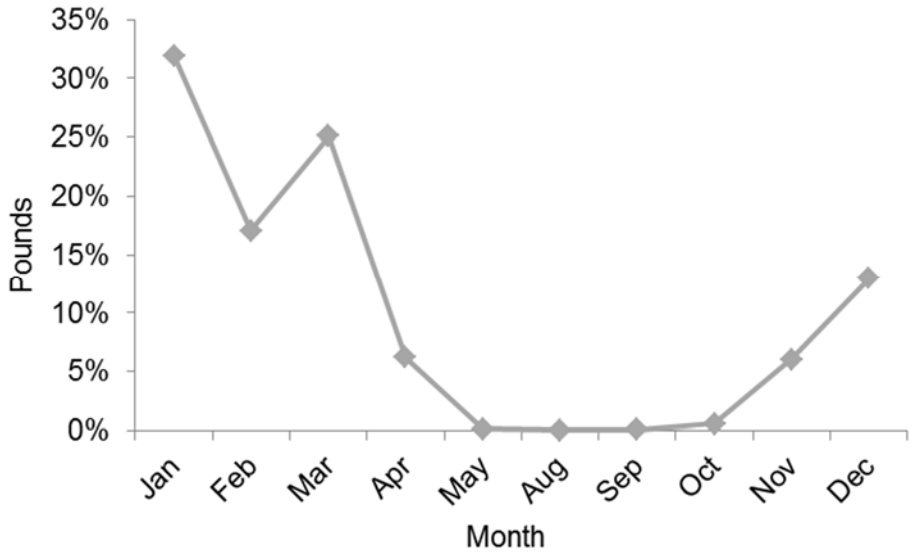

Figure 7.18 Percent of fish trawl landings of kingfishes in North Carolina by month, 1994–2013 (Source: NCTTP, unpublished data).

Between 1994 and 1997, 84% of the harvest of kingfishes from fish trawls was reported in Carteret County, followed by Dare County with 7%. Since 1997, the proportion of landings in Dare County has increased to 78% while landings of kingfishes in Carteret County were only 15% of the total. This shift coincides with regulations banning flynets south of Cape Hatteras (Figure 7.19). From 1994 to 2013, fish trawl trips harvesting greater than 1,000 lb of kingfishes accounted for only 5% of the trips that landed kingfish but accounted for 64% of the total landings (Figure 7.20). This can be attributed to five years in the time series (1994, 1995, 1997, 2008, and 2010) in which more than 50% of the annual landings came from trips with greater than 1,000 lb.

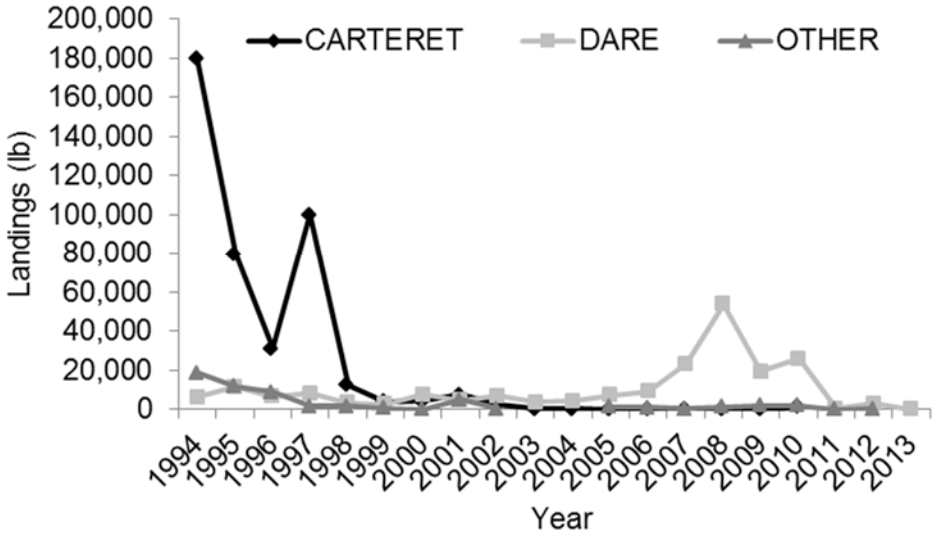

Figure 7.19 Fish trawl landings of kingfishes in North Carolina by county, 1994–2013 (Source: NCTTP, unpublished data).

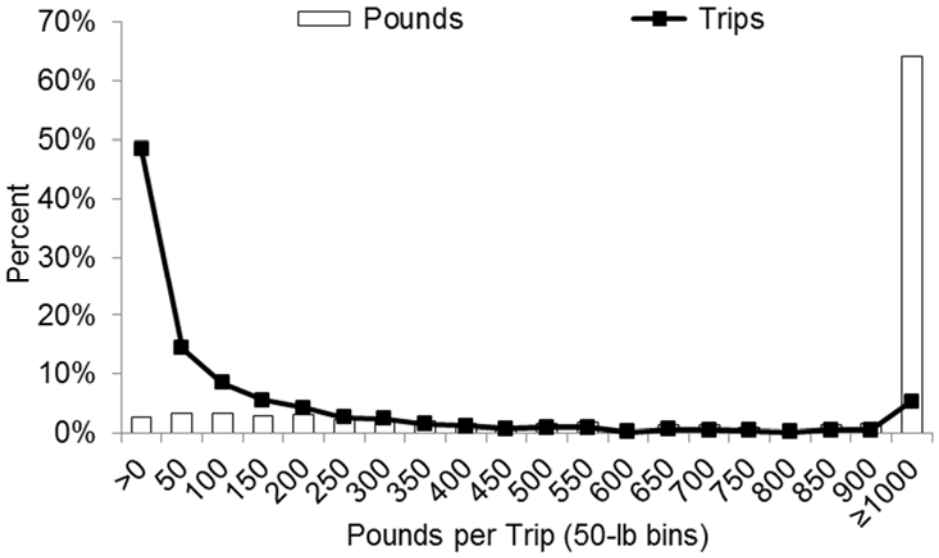

Figure 7.20 North Carolina landings (lb) and trips of kingfishes from the fish trawl fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

NCDMF fish house sampling programs 433 and 443 provided length information for southern kingfish landed by fish trawls. Samples from trips using fish trawls have been available since 1983. From 1983 to 2013, the length frequency distribution of fish trawl landed southern kingfish ranged from 7.1 inches (180 mm) to 17.3 inches TL (440 mm) with a median of 11.0 inches TL (280 mm; Figure 7.21). The length distributions of southern kingfish landed by fish trawls have fluctuated slightly over the time series (Figure 7.21).

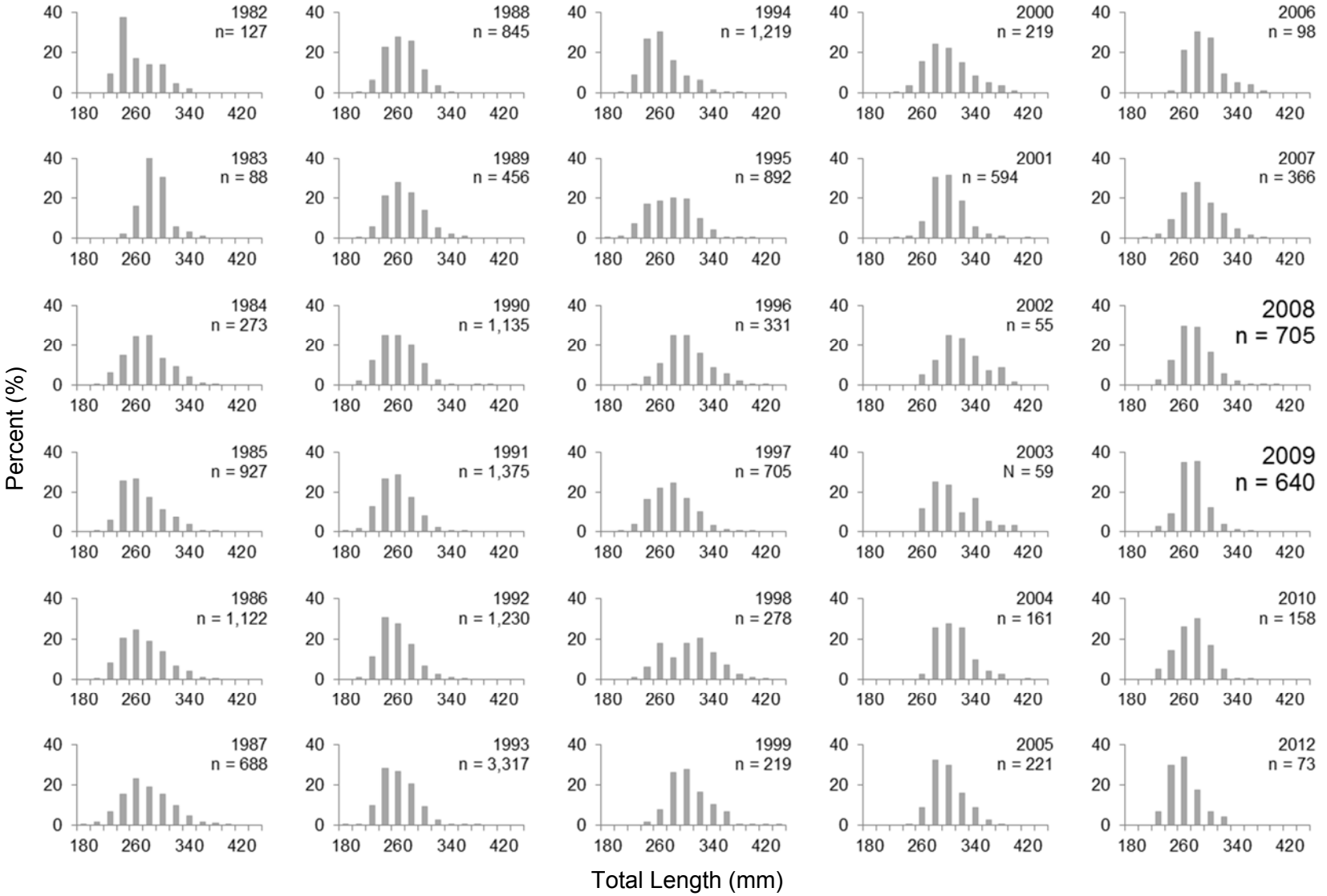

Figure 7.21 Length distributions for kingfish from commercial fish trawl fishery, 1982–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

7.1.6.4 Seine Fishery

Seines (beach seines and long haul seines) have accounted for 6% of the total landings of kingfishes between 1994 and 2013 (Table 7.1; Figure 7.6). Landings of kingfishes in the seine fisheries showed a steep decline from 1994 to 1999 before somewhat leveling off through 2013. Trips landing kingfishes have been on an overall decline since 1994 (Figure 7.22).

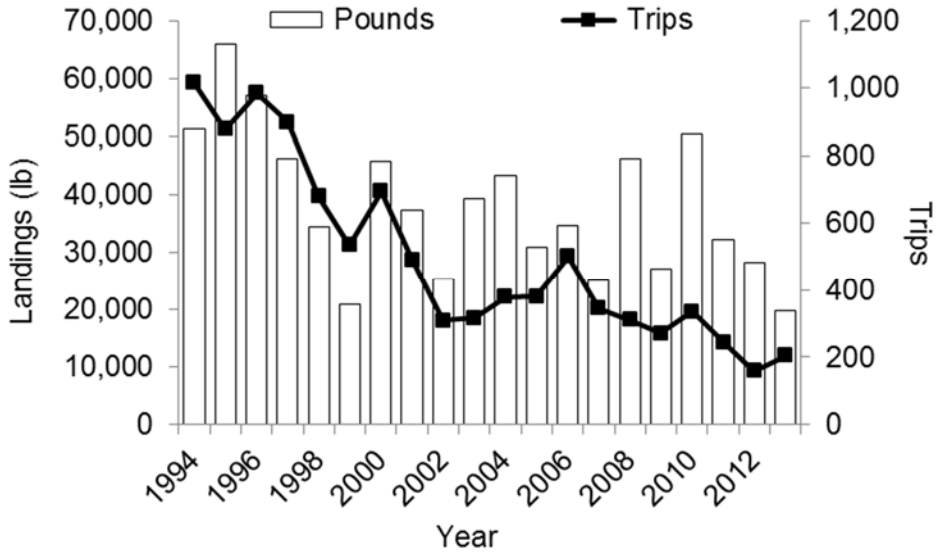

Figure 7.22 North Carolina landings (lb) and trips for kingfishes from the seine fishery, 1994–2013 (Source: NCTTP, unpublished data).

The North Carolina long haul seine fishery operates primarily in Core and Pamlico sounds, with most of the activity occurring in northern and southern Pamlico Sound (Wright 2012). The fishery is prosecuted using a seine net (usually between 1,000 and 1,500 yards) that is stretched and pulled between two boats for a distance before the boats come together and close a circle with the net. As the net is hauled, the fish are forced into the bunt section, where they are removed. The long haul seine fishery harvests fish between April and November. It is a multi-species fishery with target species consisting of Atlantic croaker, spot, weakfish, and occasionally bluefish and spotted seatrout. Kingfishes are landed incidentally to the target species.

The beach seine fishery operates in ocean waters along the beach in the northern coastal counties of North Carolina. Target species include Atlantic croaker, bluefish, butterfish, spot, weakfish, striped mullet, and striped bass (during a limited season). The beach seine fishery involves deploying and hauling a seine toward the shore to intercept nearshore migrating fish populations. Beach seines are set perpendicular to shore using dories (small boats) launched from the beach (Atlantic Ocean) and then hauled back to the beach with 4-wheel drive trucks. Beach seines are also referred to as “stop” nets defined as stationary nets not intended to gill fish, are used to impede the movement of schooling fish so that they can be harvested with the seine. The fishery presently operates primarily along the northeastern North Carolina coast, from the North Carolina/Virginia border to Cape Hatteras.

The beach seine may consist of a wash net, bunt, and wing. The most common beach seine is a “hybrid net”, constructed of monofilament-nylon net (wash net and wings) and a multifilament-nylon bunt, but some beach seiners use nets that are constructed of monofilament-nylon throughout (wash net, wing, and bunt). Small mesh beach seines range in length from 600 to

1,500 ft but are restricted to a total length of 1,000 ft from May 1 to October 31, North Carolina/Virginia border to Cape Lookout, North Carolina (BNDTRP, Final Rule, April 26, 2006, FR, Vol 71, No. 80).

Kingfishes are landed in long haul seines from April through December; whereas, most of the beach seine catch occurs in April and May with a smaller seasonal peak in October and November (Figure 7.23). The majority of trips (85%) using seines landed >150 lb of kingfishes (Figure 7.24). These trips only accounted for 36% of the total landings of kingfishes in the seine fishery from 1994 to 2013.

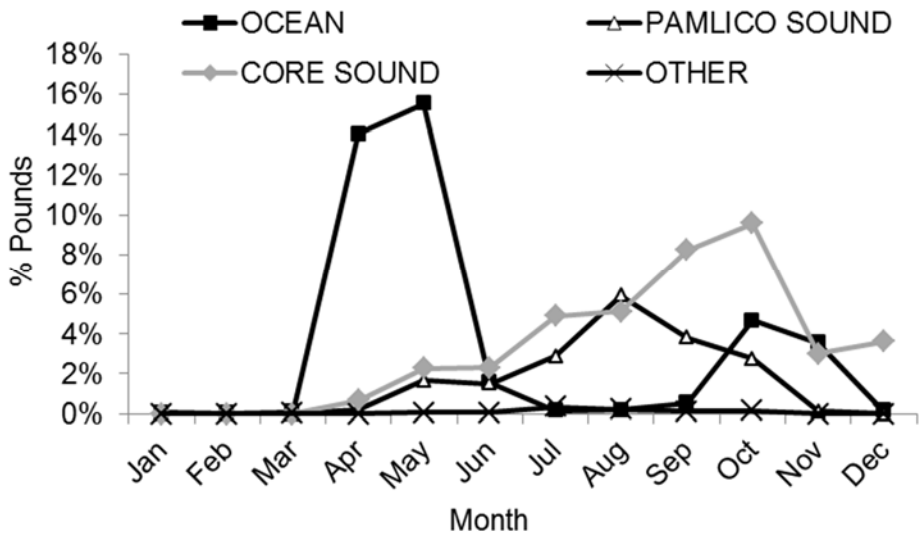

Figure 7.23 Percent of kingfishes in seines from North Carolina by month and waterbody, 1994–2013 (Source: NCTTP, unpublished data).

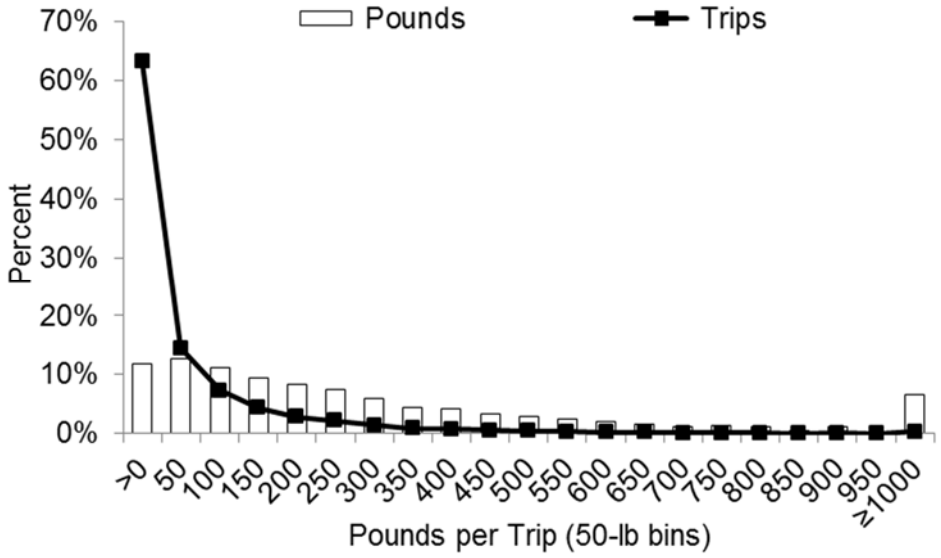

Figure 7.24 North Carolina landings (lb) and trips of kingfishes from the seine fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

NCDMF fish house sampling programs 457, 437, and 447 provide length information for southern kingfish landed by long haul seines. Samples from trips using long haul seines have been available since 1979. From 1979 to 2013, the length distribution of southern kingfish landed in the commercial long haul seine fishery ranged from 4.7 inches (120 mm) to 18.1 inches TL (460 mm) with a median of 10.2 inches TL (260 mm). The length distributions of southern kingfish landed by commercial long haul seines fluctuated with a slight shift towards larger size classes since the early 2000s (Figure 7.25).

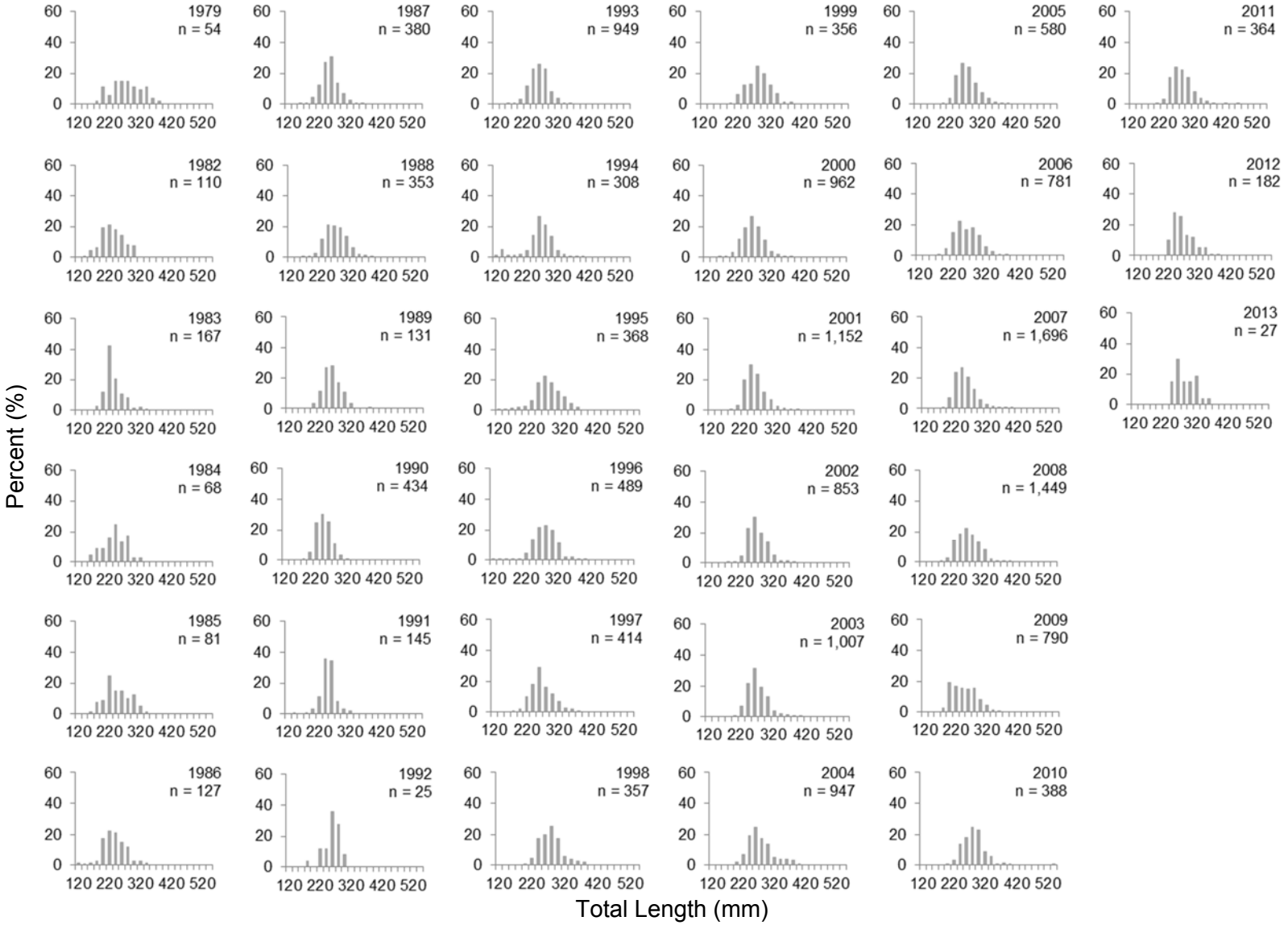

Figure 7.25 Length distributions for kingfish from commercial long haul fishery, 1979–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

NCDMF fish house sampling programs 435 and 445 provide length information for southern kingfish landed by beach seines. Samples from trips using beach seines have only been available since 1997. From 1997 to 2013, lengths of commercial beach seine landing southern kingfish ranged from 7.8 inches (200 mm) to 18.9 inches TL (480 mm) with a median of 11.8 inches TL (300 mm; Figure 7.26). During this time series, the length distributions of southern kingfish landed by commercial beach seines have had little variation (Figure 7.26).

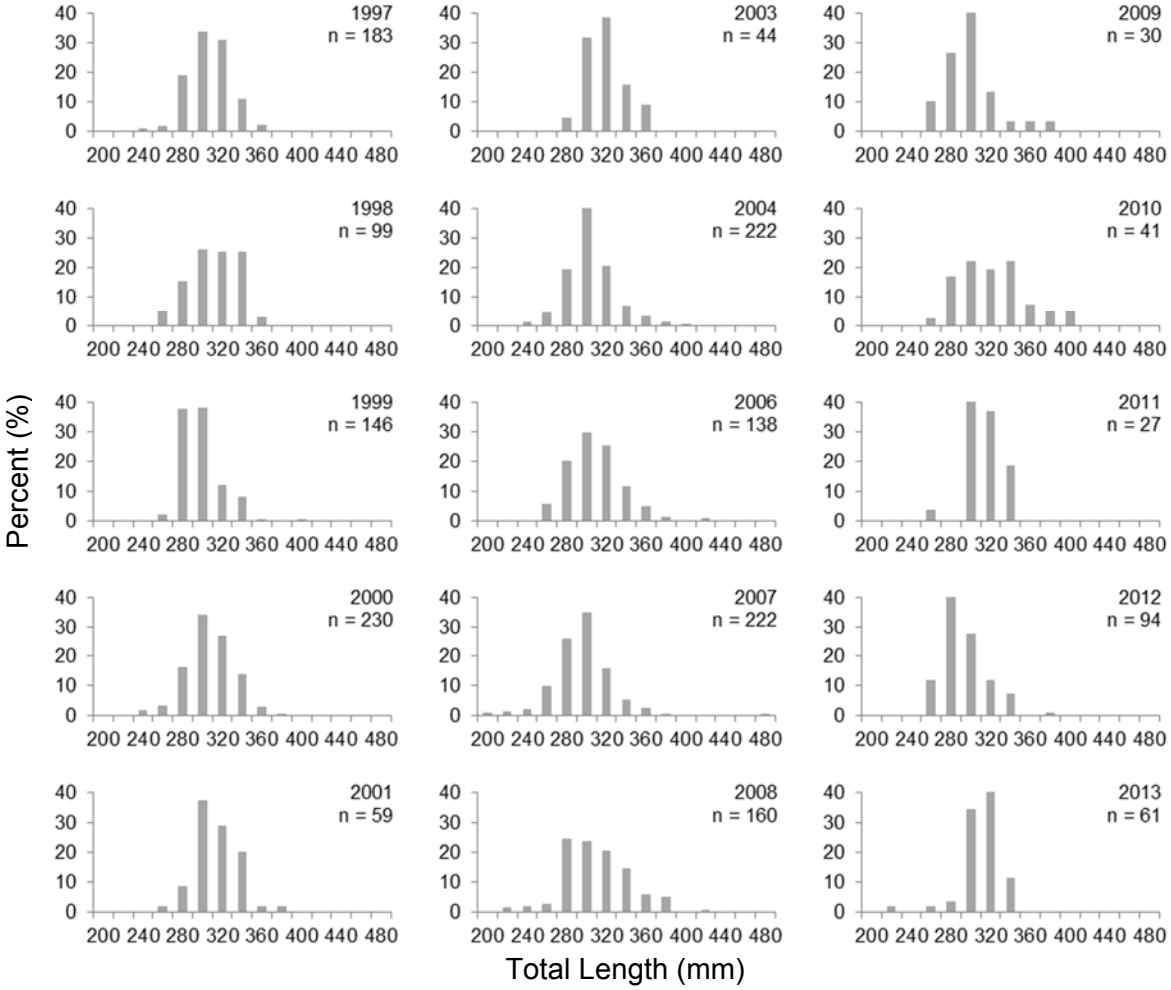

Figure 7.26 Length distributions for kingfish from commercial beach seine fishery, 1997–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

7.1.6.5 Other gears

Other commercial gears (gears other than gill nets, fish trawl, shrimp trawl, and seines) fished in North Carolina accounted for an average of less than 1% of the total landings of kingfishes. Hook-and-line landings of kingfishes made up 0.04% of the total landings between 1994 and 2013.

7.1.7 Bycatch Associated with Commercial Catches

Fishery managers continually face the issue of bycatch and discards in fisheries throughout the world (Gray 2002). Discards affect fishery yields and fishery managers' ability to accurately

assess fishery stocks (Fennessy 1994; Hall 1999). The NCMFC adopted a policy in November 1991 directing the NCDMF to establish the goal of reducing bycatch to the absolute minimum and incorporate that goal into actions. Bycatch is defined as "the portion of a catch taken incidentally to the targeted catch because of non-selectivity of the fishing gear to either species or size differences" (ASMFC 1994). Bycatch can be divided into two components: incidental catch and discarded catch. Incidental catch refers to retained or marketable catch of non-targeted species, while discarded catch (unmarketable bycatch) is that portion of the catch returned to the sea because of regulatory, economic, or personal considerations. For the remainder of this section these two bycatch components are referred to as marketable and unmarketable bycatch.

While it is becoming increasingly apparent to scientists, natural resource managers, and much of the general public that bycatch is an important issue that must be addressed, characterizing the nature and extent of bycatch has proven extremely difficult. These difficulties are generally attributed to inadequate monitoring of many pertinent characteristics including actual bycatch levels, effort of the directed fishery, distribution of the bycatch species, and the mortality rate of the discarded species. The problem is exacerbated by the patchy distribution of effort and finfish in both time and space. The amount of bycatch in a particular trip is usually skewed, with many tows having some bycatch and very few tows with high bycatch. Additionally, available effort data are often inadequate. Although research indicates that tow duration is often a significant factor when estimating bycatch losses (Alverson et al. 1994; Murawski 1996), the NCDMF and most other agencies typically record effort data by trip without any accompanying information on tow duration or the number of tows made during a trip. Mortality of bycatch captured in commercial gear varies by species, in addition to tow time, water temperature, fishing location, and gear configuration.

To explore marketable bycatch in the gears landing kingfishes, only trips reporting one gear and landing at least 1 lb of kingfish were selected. These trips were used to determine which finfish species were typically landed in each gear type as well as how kingfish ranked among the other finfish species in regards to the percent of landings from 1994 to 2013 (Table 7.2). Up to three gears can be reported to NCTTP for each trip. Using only single gear trips eliminates the chance that a different gear other than the first gear recorded on the trip ticket was the actual gear contributing to the finfish landings. For trips landing kingfish, 99.2% of the landings were reported on single gear trips.

Table 7.2 Percent of total commercial landings by species for select gears from single gear trips landing at least 1 lb of kingfish, 1994–2013 (Source: NCTTP, unpublished data).

Species	Beach Seine	Crab Pot	Crab Trawl	Flynet	Gill Net	Long Haul Seine	Shrimp Trawl
Atlantic Croaker	3%	2%	6%	88%	12%	3%	18%
Spot	30%	17%	5%	0%	13%	58%	11%
Weakfish	15%	7%	1%	5%	18%	17%	4%
Kingfishes	5%	28%	15%	1%	15%	3%	50%
Flounders	0%	10%	70%	0%	4%	0%	11%
Bluefish	11%	11%	0%	2%	11%	2%	0%
Menhaden Bait	4%	1%	0%	1%	5%	8%	0%
Mackerel, Spanish	1%	0%	0%	0%	7%	0%	0%
Dogfish, Spiny	0%	0%	0%	0%	3%	0%	0%
Mullets, Jumping	14%	1%	0%	0%	1%	0%	0%
Bait	2%	0%	0%	1%	1%	1%	0%
Butterfish	1%	0%	0%	1%	2%	1%	4%
Other Species	15%	24%	2%	1%	9%	8%	6%
Average	3%	3%	0%	0%	4%	2%	1%

7.1.7.1 Shrimp Trawl Bycatch

7.1.7.1.1 Marketable Bycatch

From 1994 to 2013, an average of 303,503 lb of finfish were landed annually by shrimp trawls. Kingfishes are the most common finfish species landed with shrimp trawls, accounting for 50% of the total finfish landed (Table 7.2). Although most kingfishes captured are incidental to shrimp trawling, a directed fishery using shrimp trawls occurred in the Atlantic Ocean in 1996 and 1997. In 1996, 34% of the kingfishes landed by shrimp trawls were from trips that had no shrimp landings (Table 7.3). This number increased to 54% in 1997 (NCDMF 2007).

Table 7.3 Comparison of kingfish landings from shrimp trawls with and without shrimp landings, 1994–2013 (Source: NCTTP, unpublished data).

Year	Total reported kingfish landings from shrimp trawls	Kingfish landings from shrimp trawls with no reported shrimp landings	Percent difference
1994	94,477	1,233	1.3%
1995	243,084	16,505	6.8%
1996	202,326	69,373	34.3%
1997	229,079	123,931	54.1%
1998	80,470	1,627	2.0%
1999	237,427	6,353	2.7%
2000	156,870	2,170	1.4%
2001	47,542	128	0.3%
2002	114,416	711	0.6%
2003	68,088	229	0.3%
2004	108,825	1,296	1.2%
2005	14,642	243	1.7%
2006	46,152	464	1.0%
2007	131,266	1,950	1.5%
2008	216,421	4,475	2.1%
2009	87,032	479	0.6%
2010	79,588	838	1.1%
2011	23,692	160	0.7%
2012	57,368	742	1.3%
2013	144,527	562	0.4%
Total	2,383,293	233,467	9.8%
Average	119,165	11,673	5.8%

7.1.7.1.2 Unmarketable Bycatch

Although a long-term characterization study of bycatch in the shrimp trawl fishery has not been conducted for North Carolina waters, preliminary investigations were conducted in 1995 (Diamond-Tissue 1999) and 1999 (Johnson 2003). Two FRGs were funded by North Carolina Sea Grant to compare bycatch rates between day and night fishing in the southern portion of the state (Taylor and Donello 2000; Ingraham 2003). Two more recent studies were conducted in 2008 (Brown 2009) and 2009 (Brown 2010a), and an additional study, currently underway, began in 2012, to characterize the commercial shrimp trawl fishery in North Carolina (Brown unpublished).

Diamond-Tissue's (1999) characterization study examined 52 tows conducted over 15 trips. Sampled boats had one or two nets, and all nets contained the required TED (Turtle Excluder Device) and BRD. Ninety-two different species, including 66 species of finfish, 10 species of crabs, and 13 other invertebrates were identified. Number and weight for each waterbody provided data for the top ten species. These top ten species accounted for between 85% and 95% of the total catch by number and weight in each waterbody. Kingfishes were not part of the top ten species in any waterbody.

Johnson (2003) quantified the catch of shrimp trawlers working in Core Sound (n = 46 tows) and the Neuse River (n = 8 tows) during the summers of 1999 and 2000. Three species of finfish—

spot (48%), Atlantic croaker (13%), and pinfish (12%)—accounted for 73% of the finfish bycatch from Core Sound. In the Neuse River, Atlantic croaker (44%) and spot (33%) accounted for 77% of the finfish bycatch. No kingfishes were observed in either area.

Taylor and Donello (2000) examined shrimp trawl catches from estuarine waters in the southern portion of the state (New River to Ocean Isle Beach Bridge, North Carolina) from May through November, with the exception of no tows in July. Catches from fifty-four 45-minute tows were examined. Data were only provided for species whose combined catch weight exceeded four kilograms. No data were reported for kingfishes, so if captured, the combined total weight was less than four kilograms.

Ingraham (2003) examined ocean (0–3 miles) shrimp trawl catches from Topsail Inlet to Little River Inlet, North Carolina. Catches from 40 tows (20 daytime and 20 nighttime) collected during May–June and September–December were analyzed. Kingfishes were the eighth most abundant category, accounting for <2% of the total catch weight. Kingfish catches were significantly higher in December than any other month and nighttime catch rates were significantly higher than daytime catch rates (0.14 lb/minute night and 0.04 lb/minute daytime).

Brown's (2009) characterization study in 2008 examined 314 tows conducted over 143 trips in the near-shore (<3 miles) commercial shrimp trawl fishery off North Carolina. Two different net types were observed: double seamed nets and tongue nets. All observed vessels were double rigged or quad rigged. There were more than 100 different species observed throughout the study. Kingfish species accounted for <2% of the observed species catch by weight.

Brown's (2010b) characterization study in 2009 examined 191 tows conducted over 66 trips in the inshore commercial shrimp trawl fishery in North Carolina. Three different net types were observed: double seamed, four seamed, and tongue nets. Single rigged, double rigged, and quad rigged vessels were observed. There were 69 species observed throughout the study in all net types. Kingfish species accounted for <1% of all of the observed species catch by weight.

Brown's (unpublished) 2012 to 2015 study is a three-year statewide characterization of the commercial shrimp trawl fishery in North Carolina. Preliminary data indicate similar amounts of kingfish bycatch as previous studies (Brown 2009; Brown 2010a). Results of this study will be available in the fall of 2015.

The NMFS, along with the Gulf and South Atlantic Fisheries Development Foundation (GSAFDF), began a cooperative bycatch research program in 1992. Beginning in February 1992 and continuing until December 1996, observers were placed aboard cooperating vessels to characterize bycatch and to test BRDs during normal commercial shrimp trawling (Nance 1998). More than 150 taxa have been identified from shrimp trawl catches in the South Atlantic and the average overall catch rate was 62 lb per hour. Finfish comprised 51% of the catch by weight, shrimp 18%, non-crustacean invertebrates 18%, and 13% were non-commercial shrimp crustaceans. Seasonal distribution of finfish bycatch in the South Atlantic indicates that the highest percentage by weight occurred in the summer but by number, the highest was in the spring.

Numerous gear evaluation studies have been conducted in North Carolina waters (McKenna and Monaghan 1993; Coale et al. 1994; Murray et al. 1995; McKenna et al. 1996; Brown 2010b); however, these data should not be used for characterization analysis of the shrimp trawl fishery since these studies were often conducted during times of low shrimp catch rates. Therefore, the bycatch data are not representative of typical shrimp trawl trips. For example,

the fish to shrimp ratio for gear studies conducted in 1994 (McKenna et al. 1996) was 5.5 to 1.0, while characterization studies conducted in 1995 by Diamond-Tissue (1999) calculated the fish to shrimp ratio to be 1.6 to 1.0. Although these data should not be used for characterization analysis, catches provide information on presence or absence and size of species.

Gear testing was conducted on a commercial trawler in Pamlico Sound in 1991 (McKenna and Monaghan 1993). Data were collected from forty-one 90-minute tows during May (n = 6), August (n = 18), and September (n = 17). Kingfishes comprised 2% of the total finfish catch and averaged 3 lb per tow. May catches accounted for the highest average catch per tow (5 lb) and represented 4.5% of the total finfish catch. August and September had the same percent contribution of kingfishes to total finfish (1%). On average, a total of 4 lb of kingfishes was captured per tow in August and 3 lb in September.

Gear testing in 1994 was conducted in Pamlico, Croatan, and Core sounds and the Newport, New, and Cape Fear rivers (McKenna et al. 1996). Work in the Pamlico Sound complex (Pamlico and Croatan sounds) was performed aboard commercial and state vessels. All work in the other areas was conducted aboard commercial trawlers. New River had the highest overall CPUE of kingfishes (2 lb/tow), followed by the Cape Fear River (1 lb/tow) and Pamlico Sound (1 lb/tow; Table 7.4). Overall, kingfishes were observed in 24% of the sampled catches. The Cape Fear River had the highest percentage (62%) of kingfishes, while Core Sound and the Newport River had the lowest (2%).

Table 7.4 Kingfish data for control nets from gear testing conducted in North Carolina in 1994 (Source: McKenna et al. 1996).

		lb				Percentage of tows	
Area	Number of tows	Finfish	Kingfish	Percent kingfish	Kingfish CPUE (lb/tow)	Without kingfish	With kingfish
Cape Fear River	32	2,033	19	1%	1	38%	62%
New River	115	8,551	160	2%	2	51%	49%
Core Sound	165	3,772	0	<1%	0	98%	2%
Newport River	60	137	0	<1%	0	98%	2%
Pamlico Sound	129	16,690	71	<1%	1	69%	31%
Croatan Sound	43	2,576	1	<1%	<1	90%	10%
Total	544	33,759	252	<1%	<1	76%	24%

Brown (2010b) conducted independent gear testing of five experimental otter trawls in the Neuse River and Pamlico Sound, North Carolina aboard the R/V Carolina Coast. Kingfish species accounted for less than 1% of the catch by weight in all net types.

The length frequency of kingfishes captured during gear testing in 1994 is shown in Figure 7.27 and is overlapped with the length frequency of kingfishes captured during the NCDMF Pamlico Sound Survey (PSS) from 1987 through 2005 (NCDMF 2007). The PSS is a fishery-independent survey conducted in June and September of each year. This survey uses two 30-foot mongoose trawls with a 1½-inch stretched mesh tailbag, which is the minimum required mesh size for shrimp trawls. The distribution of fish lengths in both studies was similar even though sample sizes were much higher in the PSS. The similarity of the lengths reflects the selectivity to the gears. Since the gear configuration of the PSS has not changed over time, this comparison was not updated with data after 2005.

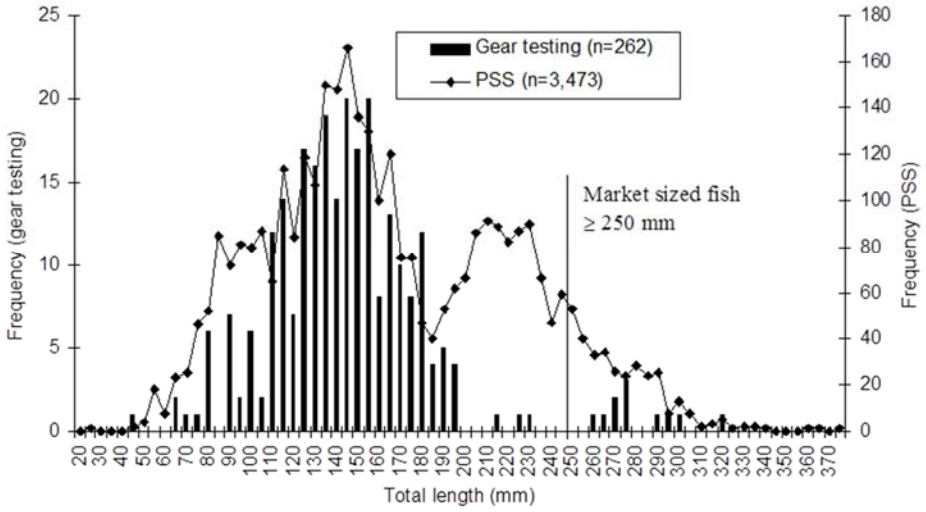

Figure 7.27 Length (mm) frequency distribution of kingfishes captured during gear testing in Pamlico Sound (1994) and the NCDMF Pamlico Sound Survey, 1987–2005 (Source: NCDMF 2007).

7.1.7.1.3 Implications

Kingfishes are the most common finfish species landed by shrimp trawls by weight. However, in observer studies in the field, they represented a much lower percentage of total finfish captured (landed and discards). Most of the kingfishes observed would be marketable bycatch based on the observed lengths and conversations with fish house dealers. The contradiction between documented NCTTP landings and observer studies may indicate that most other finfish bycatch species may not be marketable sizes, but is most likely due to small sample sizes of observed data exacerbated by the limited spatial and temporal coverage. The limited data available on discarded bycatch indicate that the bycatch of these species is highly variable. Various management measures have been implemented by the NCMFC to address bycatch in the shrimp trawl fishery including: trip limits, BRDs, area closures, time restrictions, and phasing out of otter trawls in the New River. Fishery-dependent information on the number and size of kingfishes in this fishery needs to be collected across a broad range of waterbodies and seasons.

The effect of shrimp trawl bycatch on kingfish stocks is unknown; however, a reduction of fishing mortality on unmarketable juvenile finfish stocks might result in more individuals recruiting into the spawning stock therein increasing the number of fish recruiting into recreational and commercial fisheries.

7.1.7.2 Flynet Bycatch

7.1.7.2.1 Marketable Bycatch

From 1994 to 2013, Atlantic croaker and weakfish were the top two species (by weight) harvested in flynets from trips where kingfishes were also captured. Atlantic croaker made up 88% of the flynet landings from trips landing at least 1 lb of kingfish between 1994 and 2013 (Table 7.2). Both effort and species composition of flynet trips capturing kingfishes has changed between the periods of 1994 to 1997 and 1998 to 2013. This change was attributed to regulations that eliminated flynets fishing south of Cape Hatteras. Average landings of Atlantic

croaker from 1998 to 2013 decreased 22% compared to the 1994 to 1997, and the average number of trips decreased 52% during the same time. Other species indicated similar trends in effort and catch rates. The average number of trips that caught kingfishes dropped from 127 trips to 53 trips per year.

7.1.7.2.2 Unmarketable Bycatch

All estimations of unmarketable fish landings were based on NCDMF fish house sampling of the catches and these estimated landings have changed little since 1997. The flynet fishery has an unmarketable fish component that accounted for between 4% and 23% of the total flynet landings from 2000 to 2012 (Burns 2004; Batsavage 2007; Batsavage et al. 2012). Unmarketable fish landings were dominated by Atlantic croaker, weakfish, Atlantic menhaden, and spot. Atlantic croaker made up between 52% and 84% of the unmarketable fish sampled. Kingfishes represented from <1% to 2% of the unmarketable fish landings between 2000 and 2012.

7.1.7.2.3 Implications

The contribution of flynets to kingfish landings has decreased to the point where this gear only contributed <1% to total landings in 2012. There were near zero landings of kingfish from flynets in 2013. When the contribution of flynet landings in recent years is compared to percentage of kingfish in flynets in 1994 (32%), the effect of the flynet ban south of Cape Hatteras is apparent. This decrease in effort and landings may have had a positive impact on kingfish populations; however, the impact may have been offset by increased catches in the gill net fishery.

7.1.7.3 Seine Bycatch

7.1.7.3.1 Marketable Bycatch

The long haul seine represented only 4% of the total kingfish landings from 1994 to 2013. Kingfish landings in this gear are typically incidental representing 3% of the total landings from trips reporting long haul seines and at least 1 lb of kingfish (Table 7.2). The most common species caught in long haul seines were spot (58%), weakfish (17%), and Atlantic menhaden (8%).

The dominant species taken in the beach seine fishery included spot (30.0%), weakfish (15%), striped mullet (14%), and bluefish (11%; Table 7.2). Kingfish made up 5% of the total landings of all species caught with beach seines from trips that also caught at least 1 lb of kingfish. The type of species caught in this gear is opportunistic and depends on the seasonal presence of migratory fish (Bowman and Tork 1998). For kingfish, the beach seine only represents 2% of the total landings from 1994 to 2013.

7.1.7.3.2 Unmarketable Bycatch

Significant portions of long haul catches are sold as unmarketable fish (bait). Between 2003 and 2011, 26% to 59% by weight of landed catch by long hauls was unmarketable fish (Potthoff 2004; Fitzpatrick 2007; Wright 2012). The dominant species in the unmarketable fish category landings each year were Atlantic croaker, spot, Atlantic menhaden, and pinfish accounting for nearly 90% of the unmarketable fish total by weight and number from 2003 to 2011, with the exception of 2009 which had a large percentage of bluefish (16%). Kingfishes constituted only a trace amount of the long haul unmarketable fishery ranging from 0% to 2%. The NCDMF

sampled the unmarketable fish component from 365 long haul catches between 2003 and 2011. The mean weight of kingfishes per catch ranged from 0.1 to 0.2 lb. No kingfish were observed in 2003, 2010, and 2011.

The amount of unmarketable fish (bait) in the beach seine fishery is minimal, with most or all of the unmarketable catch discarded while on the beach. When bait fishes were encountered, it was primarily composed of Atlantic menhaden, but sometimes included, small bluefish, spot, and/or striped mullet. Species discarded on the beach were most often skates and rays, along with some regulatory discards including small weakfish, spotted seatrout, and/or red drum or hickory shad that cannot be landed out of season (January 1–April 15). Of all the beach seine catches sampled from 1994 to 2004 (n = 58), only one unmarketable kingfish was encountered. NCDMF sampled the unmarketable fish component of 20 beach seine catches and the mean weight of kingfish was only <1% of the total catch weight (NCDMF 2007).

7.1.7.3.3 Implications

Commercial landings of kingfishes in long haul seines and beach seines were less than 5% of the total kingfish landings from 1994 to 2013. Unmarketable fish landings of kingfishes were negligible in both fisheries with the majority of the fish landed sold as food fish. Anytime a fishery lands a large percentage of unmarketable fish relative to the total catch, there is a reason for fishery managers to be concerned. However, concerning kingfishes, the amount of small unmarketable fish was so few that it would have little impact on the health of these stocks.

7.1.7.4 Gill Net Bycatch

7.1.7.4.1 Marketable Bycatch

Kingfishes harvested in gill nets were primarily captured in ocean waters from 1994 to 2013. The gill net fishery averaged 2,900,747 lb of marketable catch per year from trips landing at least 1 lb of kingfish. Weakfish (18%) had the highest landings on these trips followed by kingfishes (15%), spot (13%), Atlantic croaker (12%), and bluefish (11%; Table 7.2). Most of the trips in the gill net fishery that harvested kingfishes were multi-species trips with the top five species contributing in similar amounts to the total landings.

7.1.7.4.2 Unmarketable Bycatch

Essentially all kingfish taken in this fishery were marketable (Collier 2012). The amount of unmarketable finfish landed by gill nets is negligible due to the size selectivity of this gear. Species of interest are targeted preventing an abundance of undersized and unmarketable fish (Batsavage 2004a; Batsavage 2004b; Burns 2007; White 2012).

7.1.7.4.3 Implications

Currently, the dominant commercial gear capturing kingfishes is small mesh gill nets. Kingfishes were not the sole targeted species in most trips but rather one of the targeted species in a multi-species fishery. Landings associated with kingfishes were most often Atlantic croaker, bluefish, spot, weakfish, and Spanish mackerel. Management measures directed towards any one of these species in the gill net fishery would certainly affect kingfishes. Most kingfishes landed in the gill net fishery were sold. NCDMF data indicated insignificant amounts of kingfishes were discarded in the gill net fishery. This was because the fishers generally used nets that selected for marketable fish.

7.1.7.5 Crab Trawl Bycatch

The crab trawl fishery has received a large amount of attention due to the bycatch of finfish (mainly southern flounder) and sub-legal crabs, but few trawlers that target blue crabs in North Carolina's internal coastal waters.

7.1.7.5.1 Marketable Bycatch

From 1994 to 2013, the average finfish landings from crab trawls (hard and peeler) was 48,104 lb per year. The main finfish species landed on trips with at least 1 lb of kingfish was southern flounder accounting for 70% of the total (Table 7.2). Kingfish landings accounted for 15% of total finfish landings from this gear and averaged 1,178 lb per year. Atlantic croaker and spot were the only other species caught in more than 5% of trips using crab trawls.

7.1.7.5.2 Unmarketable Bycatch

McKenna and Camp (1992) assessed the finfish bycatch of the crab trawl fishery in the Pamlico River. During this study, 15 trips were made during March through June aboard commercial crab trawlers. The mean number of tows made during a trip was 3.3 and ranged from one to five tows. Tow times ranged from one to four hours and averaged 2.87 hours per tow. An average trip consisted of 9.46 hours of towing. No kingfishes were captured in 50 tows.

Two gear studies conducted to determine the feasibility of reducing crab trawl bycatch through the alteration of the tailbag mesh size provided some limited data on kingfish bycatch (McKenna and Clark 1993; Lupton 1996). McKenna and Clark (1993) tested the effects of different tailbag mesh sizes on reducing bycatch in the crab trawl fishery. This study was performed by the NCDMF between November 1991 and November 1992. The testing was conducted in the Pamlico, Pungo, and Neuse rivers during the fall and winter and in Adam's Creek during the summer using three, four, and 4½-inch (stretched mesh) tailbags. Seventy-one tows were conducted aboard a research vessel towing two nets at a time, the control net with a 3-inch tailbag and the test net with either a 4-inch tailbag (31 tows) or 4½-inch tailbag (40 tows). Tow times were one hour at night during the winter and spring and 30 minutes during the day in the summer. During this study, a total of 587 lb of finfish were captured of which 0.5 lb (0.1%) were kingfishes.

Lupton (1996) conducted another study between June 1995 and May 1996 on different tailbag mesh sizes for crab trawls. Two hundred twenty tows were conducted during the day in Bay River aboard a research vessel towing two 30-foot nets, the control net with a 3-inch tailbag and the test net with either a 4-inch tailbag (110 tows) or 4½-inch (110 tows) tailbag. Tow times were one hour during the winter and spring and 30 minutes in the summer. Eight hundred and sixty-eight pound of finfish were captured of which 9 lb were kingfishes. Kingfishes comprised 1% of the finfish catch and averaged <1 lb per tow.

7.1.7.5.3 Implications

NCTTP data and studies assessing kingfish bycatch (incidental and discarded) in the crab trawl fishery revealed minimal and insignificant catches of kingfishes. Even though, kingfish made up over 15% of the finfish catch from crab trawl trips landing at least 1 lb of kingfish, the average annual landings were less than 1,500 lb per year. Considering these data, the bycatch of kingfishes, both marketable and unmarketable, does not appear to be a significant issue in the crab trawl fishery.

7.1.7.6 Crab Pot Bycatch

Issues related to finfish bycatch in crab pots are twofold: 1) the composition, quantity, and fate of the marketable and unmarketable discarded bycatch in actively fished pots; and 2) the composition, quantity, and fate of finfish bycatch in "ghost pots". The NCTTP was used to determine marketable bycatch in crab pots and various North Carolina Fishery Resource Grant (FRG) studies were used to assess the unmarketable bycatch of kingfishes.

Ghost crab pots are defined as those pots that, either through abandonment or loss (float lines cut by boats, storm events, etc.) are left to continue to catch crabs and finfish. Concern stemmed from the significant increase in the numbers of crab pots, the long life of vinyl coated pots, and the pot's ability to continue to trap crabs and finfish. While data exist on the fate and quantity of blue crabs in ghost pots, little information is available on finfish bycatch since dead fish are quickly consumed by blue crabs, leaving only bones and fins (Guillory 1993; NCDMF unpublished data).

7.1.7.6.1 Marketable Bycatch

From 1994 to 2013, the average annual landings of the marketable portion of the incidental finfish bycatch from crab pots (hard and peeler) was 115,908 lb. Kingfishes were the most common finfish species landed in this gear with 28% of the finfish landings coming from single gear trips that landed at least 1 lb of kingfish (Table 7.2). Annual landings of kingfishes from crab pots averaged 275 lb. Other finfish commonly caught in crab pots include spot (17%), flounders (10%), and bluefish (11%).

7.1.7.6.2 Unmarketable Bycatch

Four crab pot fishermen kept records of bycatch in their hard and peeler pots from March through October 1999 in the Neuse River (Doxey 2000). Hard crab pot data were collected from 283 trips during which 149,649 hard crab pots were fished. Peeler pot data were collected from 11 trips taken in May during which 1,950 peeler pots were fished. Seventeen finfish species were observed in the hard crab pots and nine different finfish in peeler pots. No kingfishes were observed in any of the pots examined.

Thorpe et al. (2004) reported hard crab pot bycatch data (May–December 2003) from Core Sound (28 trips) and Brunswick County (28 trips). The number of pots fished per trip ranged from 68 to 84, with average soak times of 2½ and 2¾ days, respectively. A total of 19 finfish species were observed. No kingfishes were captured.

7.1.7.6.3 Implications

Crab pots (hard and peeler) did not appear to be a source of significant bycatch for kingfishes. Through the NCTTP and various studies assessing the bycatch in hard crab and peeler pot fisheries, very few kingfishes were observed. Specifically, commercial kingfish landings in crab pots were less than 300 lb per year representing only 5% of the total finfish catch in crab pots. Overall, kingfish bycatch does not appear to be a significant problem in the crab pot fisheries.

7.2 RECREATIONAL FISHERY

Kingfishes are highly sought after recreational fishes along the Atlantic coast. They are generally caught by anglers with bottom fishing rigs using natural baits such as sand fleas,

bloodworms, or shrimp. North Carolina has four surveys that collect or collected data on the recreational finfish harvest: 1) the Marine Recreational Information Program (MRIP), 2) the Central and Southern Management Area (CSMA) creel survey, 3) the Recreational Commercial Gear License (RCGL) survey, and 4) the Coastal Recreational Fishing License (CRFL) recreational cast net and seine use survey.

The MRIP is the primary survey used to collect data on angler catches from the ocean and estuarine waters from the Virginia border south to the South Carolina border, excluding the Albemarle Sound. The CSMA creel survey, which began in 2004, is primarily used to collect data on angler catch and effort of anadromous striped bass in the Neuse, Pamlico, and Pungo rivers; however, the CSMA survey also collects harvest data on all finfish species reported by anglers. The RCGL survey was conducted from 2002 to 2008 to collect data from recreational fishermen who are allowed to harvest recreational limits of finfish while using commercial gear if they possess a RCGL. The CRFL recreational cast net and seine use survey began in November 2010 and is a monthly mail survey conducted to determine participation and effort of CRFL holders in recreational cast net and seine use.

No kingfish landings have been reported in the CSMA creel survey. The CRFL cast net and seine use survey just began in late 2010 so the data are still considered preliminary. Therefore, this section will focus on the data from recreational fishing of kingfishes derived from the MRIP survey and the RGCL survey.

7.2.1 Recreational Fishing Data Collection

The MRIP provides the primary data used to estimate the impact of marine recreational fishing on marine resources in North Carolina. The MRIP evolved from the Marine Recreational Fisheries Statistics Survey (MRFSS), which was initiated in 1981 by the NMFS to gather information from the recreational fishing community and to provide estimates of catch and effort at a regional level (NRC 2006). The NCDMF began conducting the dockside survey in 1987 and by 1989, had increased sample sizes significantly in order to provide better regional estimates and estimates useable at the state level. In 2011, the NMFS began using a new method to calculate estimates that are more accurate by weighting estimates based on high or low catch rates at high-activity versus low-activity sites (NMFS 2012). This new method was used to recalculate previous estimates dating back to 2004. Estimates prior to 2004 used in this section have been calibrated using a calibration factor calculated using the “ratio of means” procedure (Cochran 1977).

The MRIP consists of two components: the Access-Point Angler Intercept Survey (APAIS) and the Coastal Household Telephone Survey (CHTS). The CHTS uses a random digit dialing (RDD) telephone survey approach to collect marine recreational fishing effort information from residential households located in coastal counties. APAIS, an onsite intercept survey conducted at fishing access-sites, is used for collection of individual catch and discard data for calculation of catch rate at the species level. Recreational port agents collect intercept data from January through December (in two-month waves) by interviewing anglers completing fishing trips in one of four fishing modes (man-made structures, beaches and shorelines, private/rental vessels, and for-hire vessels). Man-made structures include piers, jetties, or bridges and for-hire vessels include charter vessels and head boats. Data derived from the telephone survey are used to estimate the number of recreational fishing trips (effort) for each stratum. The intercept data are used to estimate catch per trip for each species encountered. The estimated number of angler trips is multiplied by the estimated average catch-per-trip to calculate an estimate of total catch of each species for each survey stratum.

Another source of recreational landings of kingfishes came from the RCGL survey that the NCDMF conducted between 2002 and 2008 with the purpose of obtaining catch and effort estimates for the RCGL user group. The RCGL allows people to use a limited amount of commercial gear for personal use. The survey questionnaires were distributed monthly to 30% of the RCGL population from each county and requested data such as waterbodies commonly fished, types and amounts of gear used, number and weight of individual species kept, and number of individual species discarded at sea. Demographic information obtained at the time the licenses were sold was used to examine if the returned surveys were representative of the RCGL population and to ensure the samples taken could be used to generalize about the total RCGL population. Additionally, the survey responses for total catch and number of trips were examined for possible outliers using standard statistical methods. Monthly effort and catch reported by the survey respondents were extrapolated to the total RCGL population.

7.2.2 Marine Recreational Information Program

Recreational harvest of all kingfishes fluctuated with a slight upward trend (Figure 7.28). During the period from 1989 to 2013, the kingfish recreational harvest has equaled, on average, 43.5% of the commercial catch with an average of 297,037 lb landed by anglers. During the same time period, recreational landings of kingfish fluctuated from a minimum of 98,240 lb (17.5% of commercial catch) in 1989 to a maximum of 527,877 lb (93.1%) in 2004.

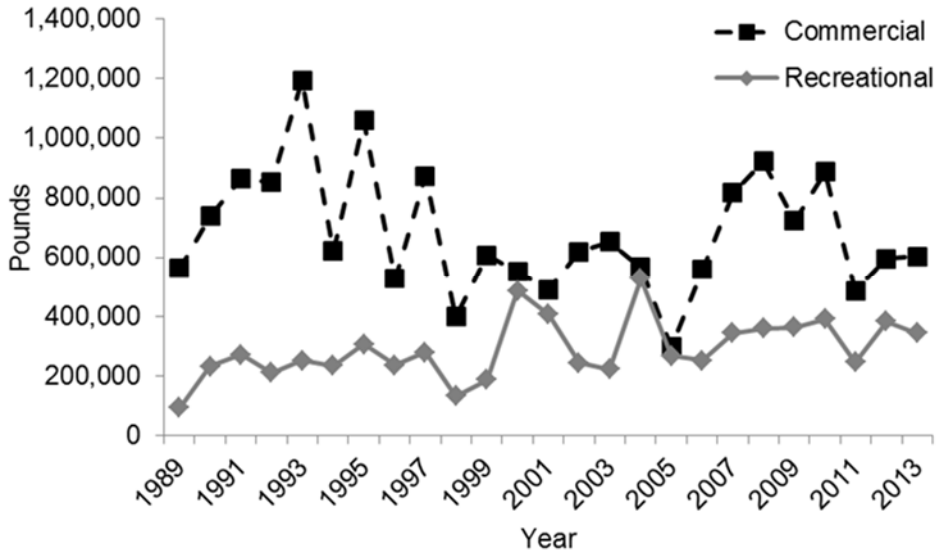

Figure 7.28 Recreational and commercial Landings for North Carolina for all kingfishes in North Carolina, 1989–2013 (Source: MRIP).

The NCDMF awards citations for hook-and-line caught kingfish that weigh 1.5 lb or greater. While fluctuating, the number of citations issued since 1991 has shown a generally increasing trend (Figure 7.29).

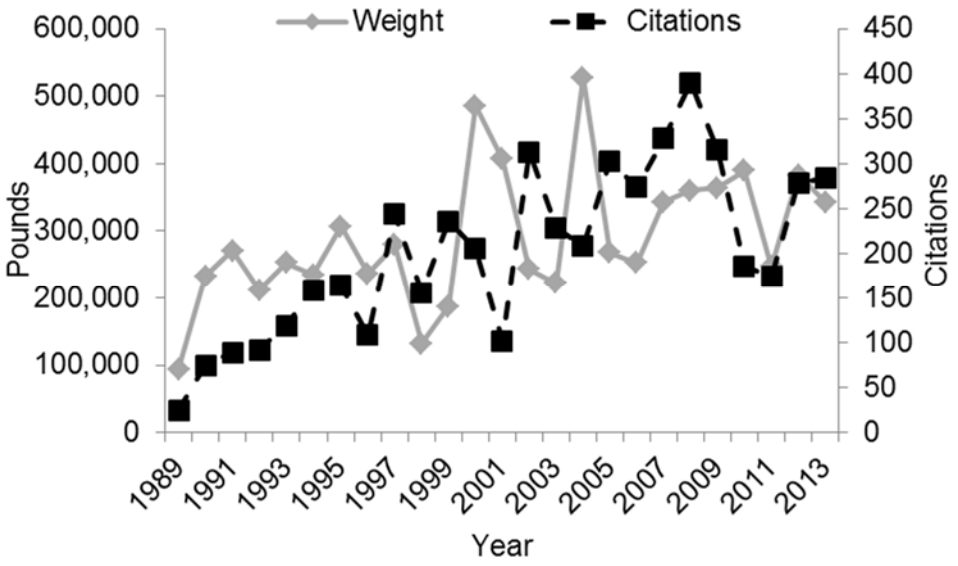

Figure 7.29 North Carolina recreational kingfish landings, 1989–2013 (Source: MRIP) and citations, 1991–2013 (Source: NC Saltwater Fishing Tournament).

Unlike the NCTTP, the MRIP survey collects kingfish data at the species level. However, there is potential for misidentification since kingfish species are morphologically and meristically similar, and fish may become discolored or fins can become broken and tattered in the field. By number, southern kingfish accounted for 63.1% of the fish harvested while Gulf kingfish constituted 19.5%, and northern kingfish the remaining 17.4% (Figure 7.30). Species composition is variable among years in ocean and estuarine waters (Figures 7.31 and 7.32). Southern kingfish were the most common species in both ocean and estuarine waters. Northern kingfish were the next most common in estuarine waters, while Gulf kingfish were the next most common in ocean waters. The length of all kingfishes measured in the MRIP survey from 1989 to 2013 combined ranged from 3.9 inches (100 mm) to 18.9 inches TL (480 mm) with a modal peak at 11.0 inches TL (280 mm; Figure 7.33).

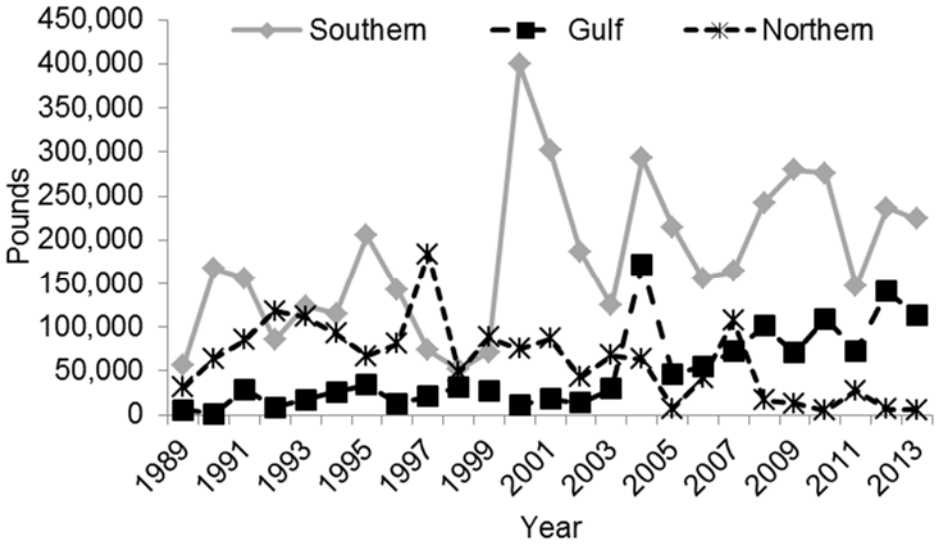

Figure 7.30 North Carolina recreational harvest (pounds) of the three kingfish species, 1989–2013 (Source: MRIP).

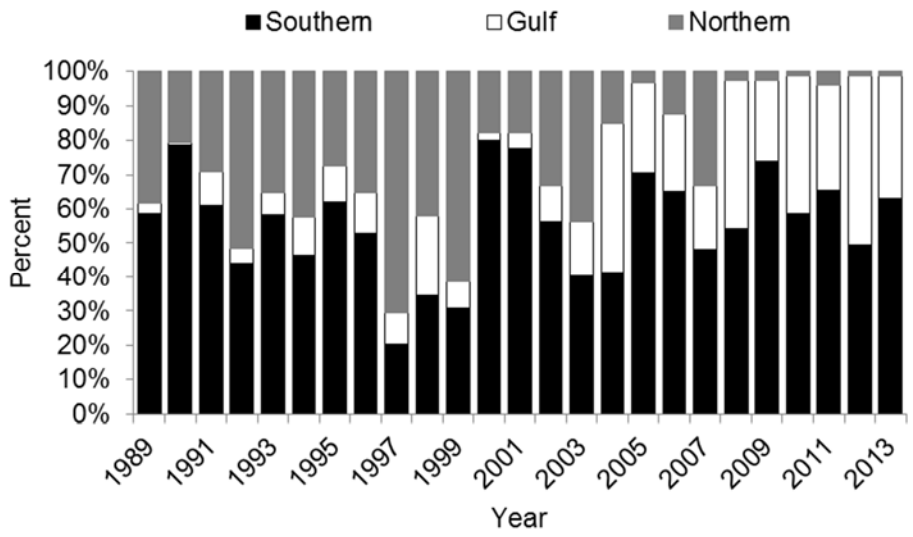

Figure 7.31 Species composition of coastal ocean captured kingfishes, 1989–2013 (Source: MRIP).

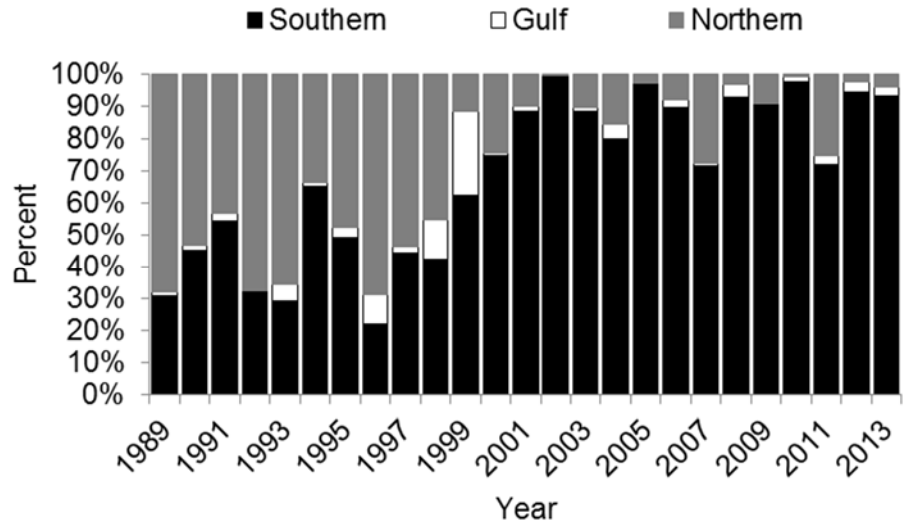

Figure 7.32 Species composition of kingfishes captured in estuarine waters of North Carolina, 1989–2013 (Source: MRIP).

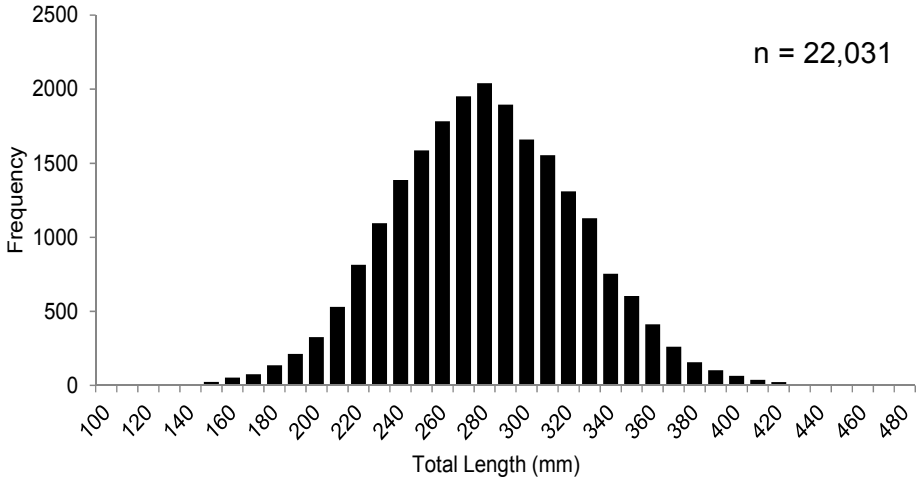

Figure 7.33 North Carolina total length frequency of all kingfishes sampled from the recreational fishery, 1989–2013 (Source: MRIP).

Estimates of angler CPUE in North Carolina were calculated by analyzing areas and modes that consistently contributed to the kingfishes harvested from 1989 to 2013. Estimates of catch and fishing trips were calculated by areas including: the ocean less than three miles from shore (state waters), ocean beyond 3 miles from shore (federal waters), and inland waters (sounds and rivers). Data indicate that most kingfishes are caught by anglers fishing in the ocean, within 3 miles from shore, from either beaches or man-made structures. Therefore, the CPUE presented values are based on the number of kingfishes harvested per angler per fishing trips in near shore ocean waters from beaches or man-made structures. From 1989 to 2013, the MRIP CPUE data have fluctuated showing a decreasing trend from 1990 to 1999 (Figure 7.34). However, the data show an increasing trend since 2005.

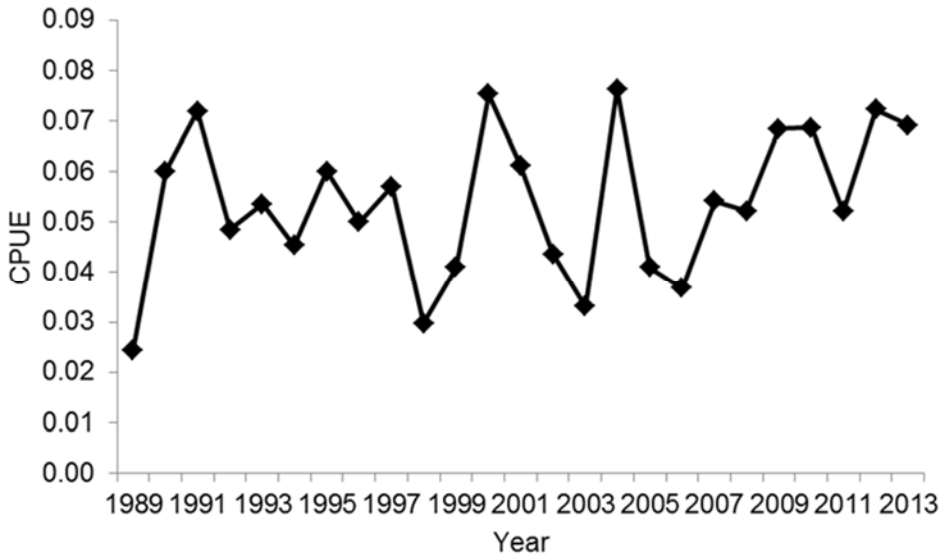

Figure 7.34 North Carolina Kingfish catch-per-unit-effort (CPUE), 1989–2013 (Source: MRIP).

7.2.2.1 Southern Kingfish

From 1989 to 2013 recreational harvest of southern kingfish has fluctuated averaging 179,777 lb, and ranged from 51,994 lb in 1998 to 399,354 lb in 2000 (Table 7.5). During the same time series, average lengths of southern kingfish ranged from 9.7 inches TL (264 mm) in 1990 to 11.8 inches TL (300 mm) in 2004, and mean weights ranged from 0.4 lb in 1994 to 0.7 lb in 1997, 2000, 2003, and 2004.

Table 7.5 North Carolina southern kingfish recreational harvest, 1989–2013 (Source: MRIP).

Year	Harvest Number	PSE	Weight (lb)	PSE	Average Length (inches)	Average Weight (lb)	Live Releases
1989	99,233	20	57,247	23	10.2	0.6	33,279
1990	371,955	27	166,990	26	9.7	0.5	189,723
1991	345,332	24	156,084	22	9.9	0.5	61,139
1992	162,455	23	85,204	25	10.3	0.5	16,508
1993	281,986	27	123,834	21	9.9	0.4	10,453
1994	239,724	17	115,505	18	10.4	0.5	2,178
1995	348,695	22	205,270	22	11.1	0.6	20,060
1996	233,066	38	142,957	42	11.4	0.6	18,203
1997	111,730	22	73,969	21	11.2	0.7	4,077
1998	82,718	20	51,994	19	11.5	0.6	342
1999	129,677	34	71,231	33	11.4	0.6	0
2000	582,842	26	399,354	28	11.6	0.7	861
2001	566,428	31	301,779	29	11.0	0.5	4,488
2002	298,389	38	186,414	37	11.5	0.6	0
2003	180,748	21	124,827	22	11.5	0.7	0
2004	414,986	21	292,739	21	11.8	0.7	0
2005	375,736	24	214,297	23	11.2	0.6	617
2006	287,519	19	155,893	18	11.1	0.5	21,615
2007	293,083	21	163,947	19	11.0	0.6	14,546
2008	432,782	20	242,437	20	10.9	0.6	4,095
2009	514,867	28	279,512	30	10.9	0.5	719
2010	462,931	15	275,848	16	11.1	0.6	0
2011	281,253	18	146,662	19	10.9	0.5	1,088
2012	397,750	16	236,425	18	11.1	0.6	2,070
2013	455,837	20	223,995	20	10.5	0.5	252

The majority (76%) of southern kingfish captured from 1989 to 2013 in North Carolina waters were by anglers fishing in ocean waters (Figure 7.35). Of the ocean caught kingfish, over half were caught from man-made structures (52%) with the other half being caught from beaches (29%) or private/rental vessels (19%). Of the 24% of southern kingfish captured from estuarine waters in North Carolina during the same time period, the vast majority were captured from anglers fishing from private/rental vessels (94%).

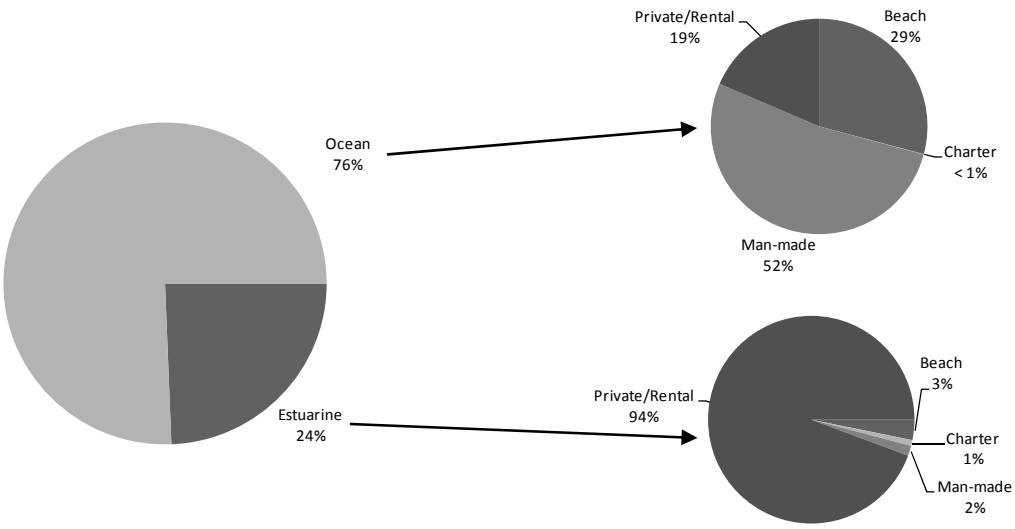

Figure 7.35 Southern kingfish landings (lb) by area and mode, 1989–2013 (Source: MRIP).

From 1989 to 2013, coast-wide average harvest of southern kingfish were variable (Table 7.6). With the exception of South Carolina and Georgia, catches tended to show a decreasing trend with increasing latitude. East Florida had the highest harvest rate accounting for 30%, followed by South Carolina (25%), Georgia (22%), North Carolina (17%), and Virginia (6%).

Table 7.6 Southern kingfish recreational harvest by state, 1989–2013 (Source: MRIP).

State	Average Harvest Number	Average PSE	Average Weight (lb)	Average PSE	Percent	Average Length (inches)
East Florida	563,821	26	326,894	25	30	11.3
South Carolina	483,396	26	245,333	26	25	10.5
Georgia	425,797	20	240,171	21	22	11.0
North Carolina	318,069	24	179,777	24	17	10.9
Virginia	111,259	33	68,271	45	6	10.4

Southern kingfish caught in estuarine and ocean waters from 1989 to 2013 were measured by recreational port agents, and unweighted length frequency distributions were developed based on these measurements. Southern kingfish sampled from the recreational ocean fishery ranged in length from 3.9 inches (100 mm) to 18.9 inches TL (480 mm) with a modal peak at 11.0 inches TL (280 mm; Figure 7.36). A total of 9,458 ocean landed southern kingfish were measured during the time series.

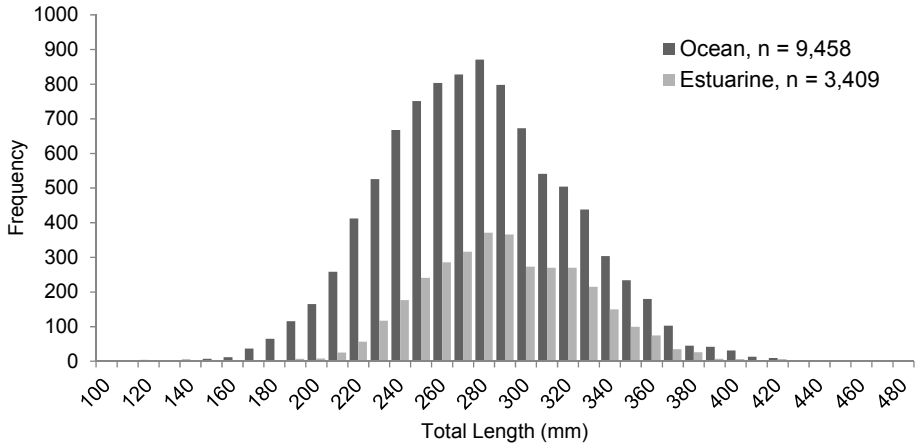

Figure 7.36 Unweighted length frequencies of North Carolina ocean and estuarine caught southern kingfish, 1989–2013 (Source: MRIP).

Southern kingfish that were captured in the estuarine waters of North Carolina over the same time period showed a similar length frequency distribution with lengths ranging from 6.3 inches (160 mm) to 18.9 inches TL (480 mm) with a modal peak of 11.0 inches TL (280 mm; Figure 7.36). A total of 3,409 fish were measured during the time series.

Catch-by-wave data were examined from 1989 to 2013 (Figure 7.37). Southern kingfish catches indicated a consistent pattern with peak harvests in the fall (Wave 6, Nov–Dec) followed by the spring (Wave 3, May–Jun). The lowest harvest occurred during the summer (Wave 4, Jul–Aug).

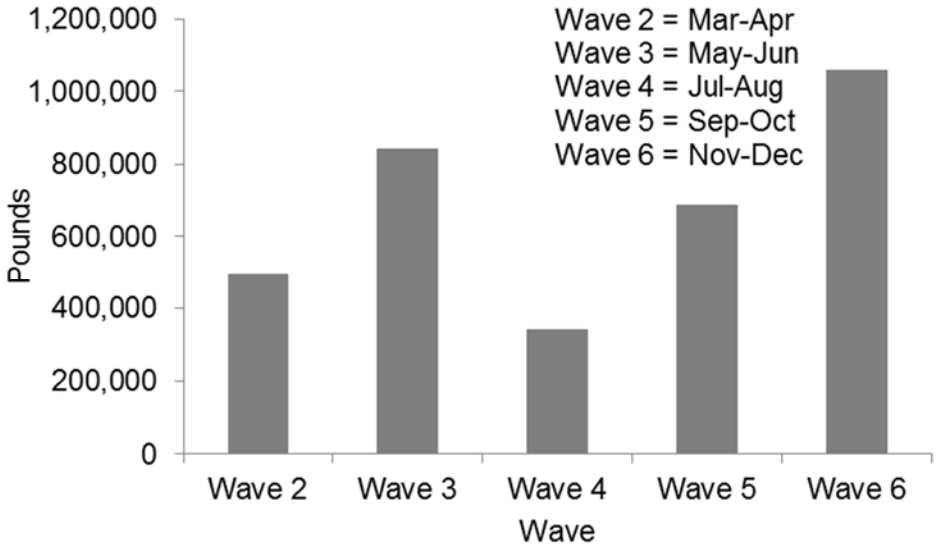

Figure 7.37 North Carolina harvest of southern kingfish (lb) by wave, 1989–2013 (Source: MRIP).

7.2.2.2 Gulf Kingfish

From 1989 to 2013, there has been an increasing trend in recreational landings for Gulf kingfish. During this time series, recreational harvest of Gulf kingfish averaged 49,737 lb ranging from 1,471 lb in 1990 to 171,660 lb in 2004 (Table 7.7; Figure 7.30). From 2004 to 2013, harvest has consistently stayed above the time series average.

Table 7.7 North Carolina Gulf kingfish recreational harvest, 1989–2013 (Source: MRIP).

Year	Harvest Number	PSE	Weight (lb)	PSE	Average Length (inches)	Average Weight (lb)	Live Releases
1989	7,877	57	5,842	65	11.2	0.7	0
1990	3,309	89	1,471	84	9.9	0.4	7,864
1991	58,883	26	29,083	30	9.6	0.5	32,975
1992	17,505	38	8,523	45	10.4	0.5	5,893
1993	33,720	35	17,511	40	10.5	0.5	10,406
1994	59,572	38	26,167	45	9.9	0.4	0
1995	62,571	82	34,455	98	10.4	0.5	17,240
1996	50,833	33	13,210	73	10.3	0.3	37,048
1997	43,182	40	21,318	49	9.3	0.5	13,386
1998	48,967	64	31,743	81	10.6	0.6	26,554
1999	38,320	51	27,063	79	9.8	0.7	15,610
2000	17,695	54	11,511	63	10.6	0.6	0
2001	35,119	37	18,179	41	10.6	0.5	0
2002	34,325	42	14,172	49	9.9	0.4	0
2003	54,194	34	29,643	40	10.4	0.5	0
2004	265,671	29	171,660	34	11.2	0.6	4,141
2005	83,461	37	46,048	39	10.4	0.6	256
2006	81,631	60	55,301	66	11.5	0.7	0
2007	90,511	32	71,902	33	11.8	0.8	0
2008	198,064	17	101,343	18	10.3	0.5	0
2009	131,665	28	70,800	29	10.0	0.5	0
2010	192,399	17	109,235	19	10.8	0.6	0
2011	102,475	24	72,694	27	11.7	0.7	0
2012	263,307	14	140,580	16	10.5	0.5	157
2013	214,853	22	113,964	22	10.4	0.5	0

From 1989 to 2013, average lengths of Gulf kingfish ranged from 9.3 inches (236 mm) in 1997 to 11.8 inches TL (300 mm) in 2007 and average weights ranged from 0.3 lb in 1996 to 0.8 lb in 2007 (Table 7.7).

Data from the MRIP survey indicates the vast majority (96%) of Gulf kingfish are captured in the ocean (Figure 7.38). Furthermore, the majority of ocean captured Gulf kingfish were captured by anglers fishing from beaches (48%) or man-made structures (47%). Of the small portion of Gulf kingfish captured from estuarine waters, most of those fish were caught by anglers fishing from private/rental vessels (94%).

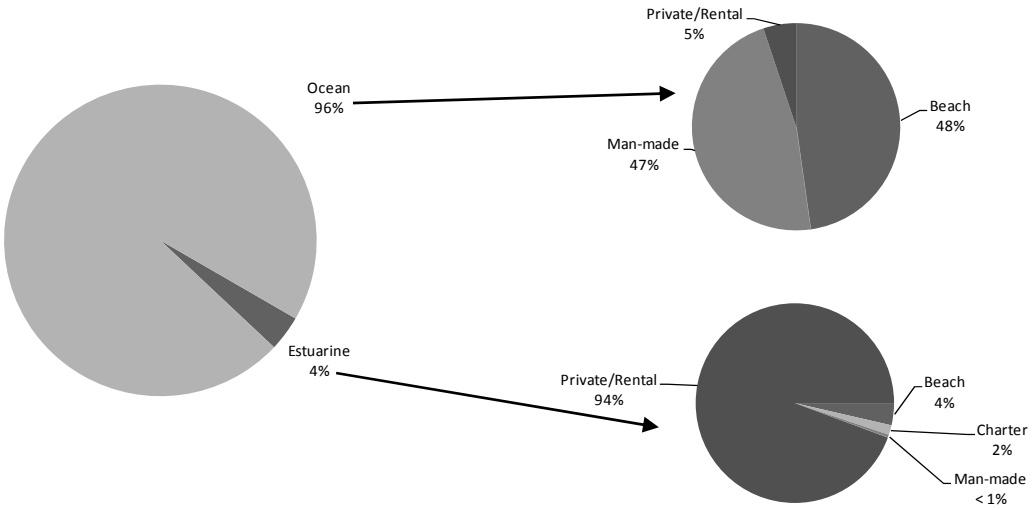

Figure 7.38 North Carolina Gulf kingfish landings (lb) by area and by mode, 1989–2013 (Source: MRIP).

According to the MRIP survey, North Carolina and Florida are the two states that harvest the greatest number of Gulf kingfish (Table 7.8). Other Atlantic coast states may harvest Gulf kingfish, but the data are only a small portion of the coast-wide harvest (<2%).

Table 7.8 Gulf kingfish recreational harvest by state, 1989–2013 (Source: MRIP).

State	Average Harvest Number	Average PSE	Average Weight (lb)	Average PSE	Percent	Average Length (inches)
East Florida	388,332	36	269,449	35	82.0	12.0
North Carolina	85,400	29	48,444	32	18.0	10.5

The lengths of Gulf kingfish landed by anglers from the ocean ranged from 4.3 inches (110 mm) to 18.9 inches TL (480 mm) with a single modal peak at 10.6 inches TL (270 mm; Figure 7.39). Since Gulf kingfish are found almost exclusively in the surf zone, shore based anglers catch very few fish in estuarine waters. From 1989 to 2013, recreational port agents in the intercept survey measured only 128 Gulf kingfish from estuarine waters therefore the length frequency distribution is not shown.

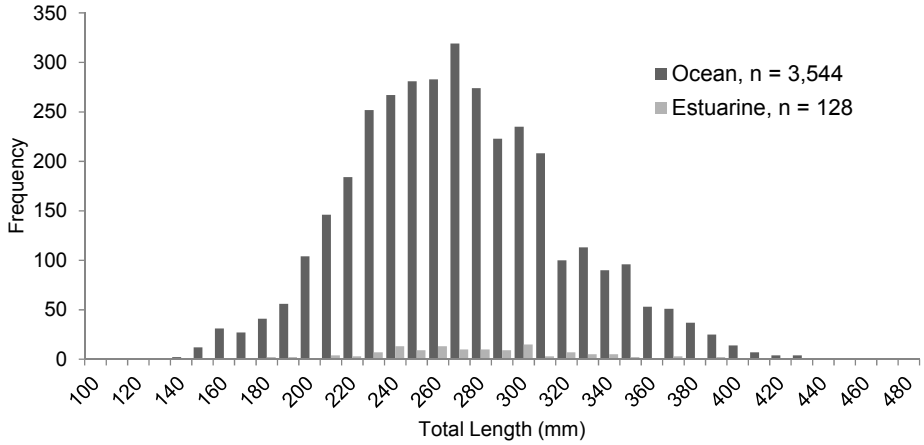

Figure 7.39 Unweighted length frequencies of North Carolina ocean and estuarine caught Gulf kingfish, 1989–2013 (Source: MRIP).

The catch-by-wave indicates that Gulf kingfish are harvested during all sampling regimes with the greatest harvest occurring during wave 5 (Sep–Oct) while wave 2 (Mar–Apr) had the lowest harvest rate (Figure 7.40).

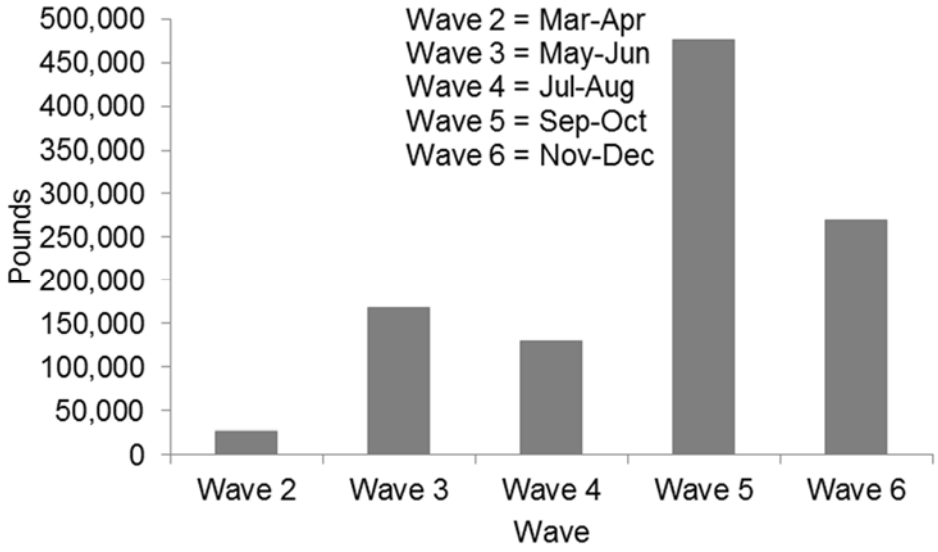

Figure 7.40 North Carolina Gulf kingfish catch by wave, 1989–2013 (Source: MRIP).

7.2.2.3 Northern Kingfish

From 1989 to 2013, recreational harvest of northern kingfish has fluctuated exhibiting a decreasing trend in later years with an average of 61,577 lb, ranging from 4,823 lb in 2010 to 183,983 lb in 1997 (Table 7.6). With the exception of 2007 (107,282 lb), northern kingfish recreational harvest from 2006 to 2013 has been well below the time series average (Table 7.9). From 1989 to 2013, the average lengths of retained fish ranged from 9.4 inches TL (239 mm) in 1989 to 12.6 inches TL (320 mm) in 2011, and average weights ranged from 0.4 lb in 1990 to 0.8 lb in 2011 (Table 7.9).

Table 7.9 North Carolina northern kingfish recreational harvest and releases, 1989–2013 (MRIP).

Year	Harvest Number	PSE	Weight (lb)	PSE	Average Length (inches)	Average Weight (lb)	Live Releases
1989	65,626	24	30,980	30	9.4	0.5	10,207
1990	136,676	27	63,992	29	10.5	0.4	9,636
1991	147,046	22	85,556	24	10.6	0.6	8,240
1992	162,483	24	118,372	26	11.7	0.7	18,565
1993	153,312	22	111,687	24	11.3	0.7	10,541
1994	157,749	21	92,865	23	11.3	0.6	622
1995	120,722	23	67,110	25	10.8	0.5	13,041
1996	140,136	24	80,907	27	11.3	0.6	1,620
1997	265,270	32	183,983	36	11.7	0.7	2,052
1998	76,551	30	48,659	34	11.3	0.6	0
1999	147,229	32	88,494	37	10.8	0.6	1,115
2000	104,901	23	75,144	26	12.0	0.7	0
2001	130,393	27	86,967	31	11.6	0.6	0
2002	70,846	32	42,903	35	11.6	0.6	0
2003	101,856	25	68,145	28	11.7	0.6	195
2004	119,057	23	63,478	23	10.8	0.5	3,806
2005	13,282	31	7,344	31	11.0	0.6	1,117
2006	57,083	30	41,374	31	11.8	0.7	1,733
2007	172,447	25	107,282	25	11.4	0.6	23,770
2008	31,239	48	16,625	46	10.1	0.5	0
2009	25,069	50	13,280	48	11.0	0.5	0
2010	8,053	31	4,823	35	11.2	0.6	0
2011	35,412	35	27,531	41	12.6	0.8	2,168
2012	10,683	36	6,421	38	11.7	0.6	0
2013	10,565	31	5,495	34	11.2	0.5	0

Northern kingfish were captured mainly in ocean waters (87.0%; Figure 7.41). Ocean captured northern kingfish were caught by anglers fishing from man-made structures (39.0%), beaches (34.0%), and private/rental vessels (27.0%). Of the estuarine captured northern kingfish, the vast majority were caught by anglers fishing from private/rental vessels (94.0%).

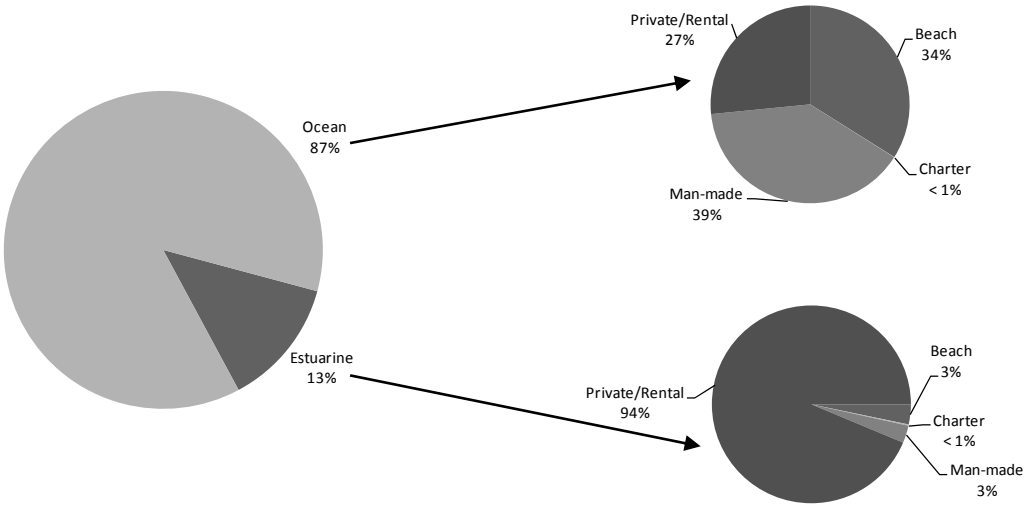

Figure 7.41 North Carolina northern kingfish landings (lb) by area and mode, 1989–2013 (Source: MRIP).

Along the Atlantic coast, northern kingfish harvest was concentrated in three states: New Jersey, Virginia, and North Carolina. North Carolina had the most harvest by weight of northern kingfish accounting for 39.5% of the harvest, followed by Virginia (30.9%), and New Jersey (29.7%; Table 7.10).

Table 7.10 North Carolina recreational northern kingfish harvest, 1989–2013 (Source: MRIP).

State	Average Harvest Number	Average PSE	Average Weight (lb)	Average PSE	Percent	Average Length (inches)
North Carolina	98,547	29	61,577	31	39.5	11.2
Virginia	77,032	46	42,480	45	30.9	10.6
New Jersey	74,028	45	48,984	44	29.7	11.8

From 1989 to 2013, 5,492 northern kingfish were measured and recorded by port agents and used to generate length frequencies distributions for the ocean and estuarine fisheries (Figure 7.42). The unweighted length distribution for ocean captured northern kingfish contained lengths that ranged from 3.9 inches (100 mm) to 17.7 inches TL (450 mm) with bi-modal peaks at the 11.0 inches (280 mm) and 12.2 inches TL (310 mm). The unweighted length distribution for estuarine captured northern kingfish contained lengths that ranged from 6.3 inches (160 mm) to 17.3 inches TL (440 mm) with tri-modal peaks at the 11.8 inches (300 mm), 13.0 inches (330 mm), and 14.2 inches (360 mm) TL. The distribution of the estuarine caught northern kingfish is centered more towards larger fish. This may be a function of the size of fish in the estuary or it may be due to the smaller sample size.

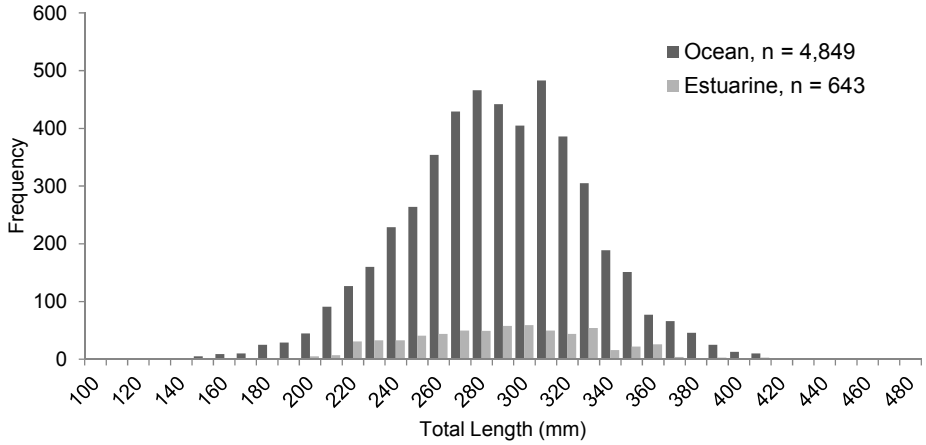

Figure 7.42 Unweighted length frequencies of North Carolina ocean and estuarine caught northern kingfish, 1989–2013 (Source: MRIP).

Catch-by-wave data for northern kingfish indicate most fish are caught in Wave 3 (May–Jun) followed by Wave 2 (Mar–Apr). The fewest number of fish were harvested during the summer (Wave 4, Jul–Aug; Figure 7.43).

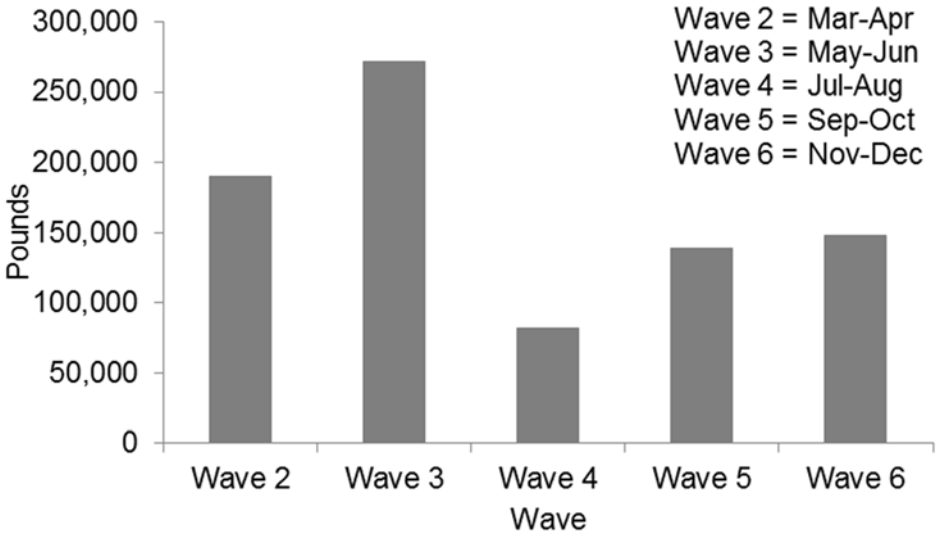

Figure 7.43 North Carolina northern kingfish harvest by wave, 1989–2013 (Source: MRIP).

7.2.3 Recreational Commercial Gear License

The RCGL survey data do not distinguish kingfish landings by species. Landings and trips using the RCGL were reported for years 2004 through 2006. All reported kingfish RCGL landings using this license came from gill nets; 82% of which were from small mesh gill nets (>5 inch stretched mesh; Table 7.11). In total, 953 lb of kingfish were by RCGL holders between 2004 and 2006.

Table 7.11 Number of trips, number of harvested and discarded kingfishes, and pounds of kingfish harvested by Recreational Commercial Gear License (RCGL) holders (Source: NCDMF, unpublished).

Year	Gear	Number of Trips	Number of Kingfish Harvested	Pounds of Kingfish Harvested	Number of Kingfish Discards
2004	Small Mesh Gill Nets	55	185	318	19
2005	Large Mesh Gill Nets	57	142	118	0
2005	Small Mesh Gill Nets	109	205	175	0
2006	Large Mesh Gill Nets	15	22	44	29
2006	Small Mesh Gill Nets	208	351	298	72

8.0 PROTECTED SPECIES

8.1 BACKGROUND

Protected species is a broad term that encompasses a host of species identified by federal or state protective statutes. The federal protective authorities are paramount and the dominant ones are the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and Migratory Bird Treaty Act (MBTA). Protected species in FMPs are generally discussed in relation to fisheries being prosecuted for the FMP species and specifically whether these fisheries have an incidental take of protected species. The protected species discussion herein intends to identify the principal fisheries, describe the various federal and state laws that deal with protected species, and discuss the ongoing management programs and implications of protected species incidental takes in the kingfish fisheries.

8.2 PROTECTED SPECIES LEGISLATION

8.2.1 Federal Endangered Species Act

The ESA was enacted in 1973, "to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, (and) to provide a program for the conservation of such endangered species and threatened species" (ESA 2012). The ESA is a comprehensive act with eighteen sections that cover many aspects of endangered species protection and management.

The ESA defines a species as threatened when it is likely to become an endangered species within the near future. An endangered species is defined as any species that is in danger of extinction throughout all or a significant part of its range. A take, as defined by the ESA, is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (ESA 2012). Candidate species are those that appear to warrant consideration for addition to the federal ESA list. They are sometimes referred to as "species of special concern". These species receive no substantive or procedural protection under the ESA.

Section 10 of the ESA provides for exceptions to the take prohibitions in the form of Permits. Permits for scientific research or to enhance the propagation and survival of the species (ESA Section 10(a)(1)(A)), and Permits for taking species incidental to (not the purpose of) an otherwise lawful activity (ESA Section 10(a)(1)(B)). The latter must be accompanied by a Conservation Plan (CP), often referred to as a Habitat Conservation Plan (HCP) that outlines ways to reduce and minimize the impacts of potential takes. When a Section 10 permit application is reviewed and deemed appropriate, a permit is granted to authorize a specified level of takes. Along with the specified takes that are authorized, the permit includes reporting requirements, and often includes other conditions that must be met (tagging, handling guidelines, data analyses, conservation plans, etc.).

Section 7 of the ESA relates to interagency cooperation amongst federal agencies. There are two primary provisions to this section: 1) all federal agencies shall utilize their authorities towards the furtherance of the goals of the ESA; and 2) and each federal agency must consult with the Secretary [in practice NMFS or U.S. Fish and Wildlife Service (USFWS)] to insure that any action funded, authorized, or carried out by the agency is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse

modification of its critical habitat. Although this section relates to federal agency cooperation, it can affect state projects through a federal nexus. If a project has federal authorization, funding, or other participation, it is subject to Section 7 consultation between the federal agency and NMFS. The NCDMF has received biological opinions and incidental take statements in regards to Section 7 consultations on several federally funded division research projects. Fisheries such as the shrimp fishery that have federal compliance measures operate under a Section 7 agreement (NMFS 2014).

8.2.2 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 was enacted in response to increasing concerns by scientists and the public that significant declines in some species of marine mammals were caused by human activities. It established a national policy to prevent marine mammal species and population stocks from declining to a point where they ceased to be significant functioning elements of the ecosystem.

The Department of Commerce through the NMFS is charged with protecting whales, dolphins, porpoises, seals, and sea lions. Walruses, manatees, otters, and polar bears are protected by the Department of the Interior through the USFWS. The MMPA established a moratorium on the taking of marine mammals in U.S. waters. It defines "take" to mean "to hunt, harass, capture, or kill" any marine mammal or attempt to do so. Exceptions to the moratorium can be made through permitting actions for incidental takes to commercial fishing and other non-fishing activities, for scientific research, and for public display at licensed institutions such as aquaria and science centers.

The MMPA requires NMFS to categorize each commercial fishery into one of three categories based upon the level of serious injury and mortality to marine mammals that occurs incidental to each fishery. Category I are fisheries with frequent incidental mortality or serious injury; Category II are fisheries where occasional incidental mortality or serious injury; and Category III are fisheries with a remote likelihood of/no known incidental mortality or serious injury. The category in which a fishery is placed determines whether fishermen are subject to certain provisions of the MMPA, such as registration, observer coverage and take reduction plan requirements. According to the 2014 List of Fisheries (LOF) created by NOAA, several North Carolina fisheries are listed as Category II (occasional mortality or serious injury). These fisheries include: North Carolina inshore gill net fishery, North Carolina long haul seine fishery, Mid-Atlantic haul/beach seine fishery, Mid-Atlantic mid-water trawl, Mid-Atlantic bottom trawl, Southeastern U.S., Atlantic, Gulf of Mexico shrimp trawl, North Carolina roe mullet stop net fishery, and the Atlantic blue crab trap/pot fishery (Federal Register 2014).

8.2.3 Migratory Bird Treaty Act

The original 1918 statute for the protection of migratory birds was implemented by the 1916 Convention between the U.S. and Great Britain (for Canada). Later amendments implemented treaties between the U.S. and Mexico, the U.S. and Japan, and the U.S. and the Soviet Union (now Russia). The statute makes it unlawful, unless permitted by regulations, to pursue, hunt, take, capture, kill, or sell any migratory bird. The statute does not discriminate between live or dead birds and grants full protection to any bird parts including feathers, eggs, and nests. Over 800 species are currently on the list; migratory birds are managed federally by the USFWS.

8.2.4 North Carolina Endangered Species Act

Listing of protected species from a state perspective lies with the NCWRC (NC General Statutes – Chapter 113 Article 25). The NCWRC compiled state lists of animals deserving protection over 20 years ago based on guidance from Scientific Councils on mammals, birds, reptiles, amphibians, freshwater fishes, mollusks, and crustaceans. Endangered, Threatened, and Special Concern species of mammals, birds, reptiles, amphibians, freshwater fishes, freshwater and terrestrial mollusks, and crustaceans are protected by state law. Protection for crustaceans and certain venomous snakes was enacted in 2002. However, state law does not allow for protection of invertebrate groups other than mollusks and crustaceans.

Under the North Carolina Endangered Species Act, the NCWRC has the following powers and duties:

1) To adopt and publish an endangered species list, a threatened species list, and a list of species of special concern, as provided for in G.S. 113-334, identifying each entry by its scientific and common name.
2) To reconsider and revise the lists from time to time in response to public proposals or as the Commission deems necessary.
3) To coordinate development and implementation of conservation programs and plans for endangered and threatened species of wild animals and for species of special concern.
4) To adopt and implement conservation programs for endangered, threatened, and special concern species and to limit, regulate, or prevent the taking, collection, or sale of protected animals.
5) To conduct investigations to determine whether a wild animal should be on a protected animal list and to determine the requirements for conservation of protected wild animal species.
6) To adopt and implement rules to limit, regulate, or prohibit the taking, possession, collection, transportation, purchase or sale of those species of wild animals in the classes Amphibia and Reptilia that do not meet the criteria for listing pursuant to G.S. 113-334 if the Commission determines that the species requires conservation measures in order to prevent the addition of the species to the protected animal lists pursuant to G.S. 113-334. This subdivision does not authorize the Commission to prohibit the taking of any species of the classes Amphibia and Reptilia solely to protect persons, property, or habitat; to prohibit possession by any person of four or fewer individual reptiles; or to prohibit possession by any person of 24 or fewer individual amphibians.

The NCWRC develops conservation plans for the recovery of protected wild animal species, using the procedures set out in Article 2A of Chapter 150B of the General Statutes. The North Carolina Natural Heritage Program inventories, catalogues, and supports conservation of the rarest and the most outstanding elements of the natural diversity of our state. These elements of natural diversity include those plants and animals that are so rare or the natural communities that are so significant that they merit special consideration as land-use decisions are made.

Species that appear on the 2014 Natural Heritage Program List of the Rare Animal Species of North Carolina that may interact with gill nets, fish trawls, shrimp trawls, skimmer trawls, and channel nets are listed as endangered (E), threatened (T),special concern (SC) or significantly rare (SR). These species include the loggerhead sea turtle (T), leatherback sea

turtle (E), hawksbill sea turtle (E), Kemp's Ridley sea turtle (E), Green sea turtle (T), diamondback terrapin (SC), shortnose sturgeon (E), Atlantic sturgeon (SC), brown pelican (SR), and double-crested cormorant (SR).

8.3 SPECIES

The following protected species may be found in the same waters used by the North Carolina kingfishes fisheries. Many are listed under the ESA as endangered or threatened, while others are protected under the MMPA or MBTA. Although these species may be found in the general geographic area where the kingfish fishery occurs, the fishery may not affect them. Some species may inhabit areas other than those in which the fishery is prosecuted or may migrate through the area at times when effort is reduced in the fishery.

Most of the species listed as endangered or threatened fall under federal jurisdiction either with the NMFS or with the USFWS. The following is a list of some of the Endangered (E), Threatened (T), or Federal Species of Concern (FSC) or otherwise protected species that may occur in estuarine and ocean waters of North Carolina:

Fish
- Smalltooth sawfish (*Pristis pectinata*) E
- Shortnose sturgeon (*Acipenser brevirostrum*) E
- Atlantic sturgeon (*Acipenser oxyrinchus*) E

Reptiles
- Green sea turtle (*Chelonia mydas*) T
- Kemp's Ridley sea turtle (*Lepidochelys kempii*) E
- Hawksbill sea turtle (*Eretmochelys imbricate*) E
- Leatherback sea turtle (*Dermochelys coriacea*) E
- Loggerhead sea turtle (*Caretta caretta*) T/E
- Northern diamondback terrapin (*Malaclemys terrapin terrapin*) FSC in Dare, Pamlico, and Carteret counties in North Carolina

Mammals
- West Indian manatee (*Trichechus manatus)* E
- Fin whale (*Balaenoptera physalus*) E
- Humpback whale (*Megaptera novaeangliae*) E
- North Atlantic right whale (*Eubalaena glacialis*) E
- Sperm whale (*Physeter catodon*) E
- Sei whale (Balaenoptera borealis) E

Birds
- Double-crested cormorant (*Phalacrocorax auritus*)
- Common loon (*Gavia imner*)
- Ruddy duck (*Oxyura jamaicensis*)
- Red breasted merganser (*Mergus serrator*)
- Brown pelican (*Pelecanus occidentalis*)
- Lesser scaup duck (*Aythya affinis*)
- Hooded merganser (*Lophodytes cucullatus*)
- Great black-backed gull (*Larus marinus*)
- Bufflehead (*Bucephala albeola*)
- Surf scoter (*Melanitta perspicillata*)

- Herring gull (*Larus argentatus*)
- American black duck (*Anas rubripes*)
- Red throated loon (*Gavia stellata*)
- Pied-billed grebe (*Podilymbus podiceps*)

8.3.1 Protected Species Interactions in the Kingfish Fishery

Of the federal and state protected species listed above, bottlenose dolphins, sea turtles, diamondback terrapins, Atlantic sturgeon, North Atlantic right whale and several migratory bird species may interact with the kingfish fishery. The dominant gears for the harvest of kingfish in North Carolina waters are gill nets, fish trawls, shrimp trawls, hook-and-line, and seines. An in depth description of these fisheries may be found in the Section 7, Status of the Fisheries. Most research and documentation of protected species interactions for gears landing kingfish have focused on the set gill net fishery and the shrimp trawl fishery.

8.3.2 Bottlenose Dolphin

The bottlenose dolphin (*Tursiops truncatus*) inhabits temperate and tropical waters throughout the world. According to the 2013 U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment, nine bottlenose dolphin stocks have been identified in the nearshore waters of the Western North Atlantic (Waring et al. 2009). Two of these stocks are found in North Carolina estuaries and are identified as the Northern North Carolina Estuarine System Stock (NNCESS) and the Southern North Carolina Estuarine System Stock (SNCESS). Bottlenose dolphins have been observed throughout the year in North Carolina estuarine waters, but will migrate offshore when water temperatures fall below 10^{o}C.

From 2003 to 2007, 64 dolphins of the NNCESS were found stranded or entangled in fishing gear within the area from Beaufort to the North Carolina/Virginia border. This stock interacts with three known fisheries (blue crab trap/pot fishery, long haul seine fishery, and inshore gill net fishery). It is unknown how many of these were due to interactions with these fisheries (Waring et al. 2009).

A marine mammal species is designated as depleted if it falls below its optimum sustainable population. The MMPA requires that a Take Reduction Team (TRT) be convened for the purpose of recommending measures for inclusion in a Take Reduction Plan (TRP) to promote recovery of a depleted stock. The Bottlenose Dolphin Take Reduction Team (BDTRT) was convened in November 2001 and is made up of fishermen, managers, scientists, and environmental group representatives. The BDTRT focused on reducing serious injuries and deaths of coastal bottlenose dolphins incidental to several east coast fisheries including: the North Carolina inshore gill net, Southeast Atlantic gill net, Southeastern U.S. shark gill net, U.S. Mid-Atlantic coastal gill net, Atlantic blue crab trap/pot, Mid-Atlantic haul/beach seine, North Carolina long haul seine, North Carolina roe mullet stop net, and Virginia pound net. In April 2006, NMFS published a final rule implementing the BNDTRP effective May 26, 2006 that can be found here: http://www.nmfs.noaa.gov/pr/pdfs/fr/fr73-77531.pdf (FR Doc. 06-3909 Filed 4-25-06).

In 2013, the BDTRT recommended that anchored small mesh gill nets in the ocean off North Carolina must be set at least 100 yards from shore year round to prevent exceeding the stocks' Potential Biological Removal (PBR) thresholds. The BDTRT also recommended exempting the ocean waters from Cape Lookout to Bogue Inlet and from Carolina Beach

Inlet to the South Carolina state line from this provision. The NCDMF implemented these measures on September 15, 2013.

In November 2013, a dead bottlenose dolphin was found entangled in a stop net located in the exempted area from Cape Lookout to Bogue Inlet. There was also a substantial increase of small mesh gill net fishing in this area at the time of the entanglement. The BDTRT recommended modifications to minimum mesh sizes for stop nets, as well as to remove the areas exempt from the 100-yard shoreline setbacks. The NCDMF removed the areas exempt from the 100-yard shoreline setbacks on June 1, 2014 and implemented the mesh size changes for stop nets on October 1, 2014.

8.3.3 Shortnose Sturgeon

Documented reports of shortnose sturgeon in North Carolina are limited to two areas: western Albemarle Sound (1881 and 1998) and the Cape Fear River (1987, Ross et al. 1988; 1990-1992, Moser and Ross 1995; and 2012, NCDMF, Unpublished Data). Although these two areas likely harbor Distinct Population Segments (DPS), the Cape Fear River population may number less than 50 fish, and there has been only one adult male captured from the Albemarle region. Historical reports from the 19th century indicate that shortnose sturgeon inhabited the Pamlico and Neuse rivers, but obstructions and poor water quality may have eliminated shortnose sturgeon from these rivers since then (Moser et al. 1998, cited by SSSRT 2010). Occasional identification of shortnose sturgeon may actually be misidentified juvenile Atlantic sturgeon. No shortnose sturgeon has been documented from Albemarle Sound since 1998 (Moser et al. 1998, cited by SSSRT 2010).

8.3.4 Atlantic Sturgeon

The Atlantic sturgeon is an anadromous species found in Atlantic coastal waters of the United States, and major river basins from Labrador (Churchill River, George River, and Ungava Bay), to Port Canaveral and Hutchinson Island, Florida (Van den Avyle 1984). Atlantic sturgeon is a mobile, long-lived species that uses a wide variety of habitats. Atlantic sturgeon require freshwater habitats to reproduce and for development of early life stages, in addition to hard bottom substrate for spawning (Vladykov and Greeley 1963; Huff 1975; Smith 1985). Coastal migrations and frequent movements between the estuarine and upstream riverine habitats are characteristic of this species (ASMFC 1998). Juvenile and adult Atlantic sturgeon frequently congregate in upper estuarine habitats around the saltwater interface, and may travel upstream and downstream throughout the summer and fall, and during late winter and spring spawning periods. Historically, Atlantic sturgeon was abundant in most North Carolina coastal rivers and estuaries with most occurring in the Roanoke River/Albemarle Sound system and in the Cape Fear River (Kahnle et al. 1998; see Greene et al. 2009 for more information on Atlantic sturgeon).

Several studies have documented interactions with Atlantic sturgeon in set gill nets in North Carolina waters. Some of these studies focused on sturgeon specifically while others focused on comparing traditional and alternative methods of fishing or constructing gill nets and their effect on bycatch. White and Armstrong (2000) studied the survival of Atlantic sturgeon in flounder gill nets in Albemarle Sound. Williams (2000) documented bycatch of Atlantic sturgeon in the fall shallow water striped mullet gill net fishery in Albemarle Sound. Rose (2000, 2001, 2004) documented the bycatch of Atlantic sturgeon in the shad gill net fishery in Albemarle Sound. Thorpe et al. (2001) and Thorpe and Beresoff (2005) documented bycatch of Atlantic sturgeon in southern area of the state in the flounder gill net

fishery, and Hassell (2007) documented bycatch of Atlantic sturgeon in the flounder gill net fishery in the Pamlico River.

8.3.5 Sea Turtles

Sea turtles are air-breathing reptiles with streamlined bodies and large flippers that inhabit tropical, subtropical, and temperate ocean waters throughout the world. Of the seven species of sea turtle worldwide, five occur in North Carolina. They include the Kemp's Ridley sea turtle (*Lepidochelys kempii*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), green sea turtle (*Chelonia mydas*), and the loggerhead sea turtle (*Caretta caretta*). Although sea turtles live most of their lives in the ocean, adult females must return to land to lay their eggs on sandy beaches. They often migrate long distances between foraging grounds and nesting beaches. Kemp's Ridley, green, and loggerhead sea turtles are known to move into North Carolina coastal waters as large juveniles to forage on crustaceans, mollusks, or grasses (Snover 2002, cited by STAC 2006). The loggerhead and green sea turtles are federally listed as threatened, while the others are listed as endangered.

The geographic distribution of loggerhead sea turtles includes the subtropical and tropical waters, continental shelves and estuaries along the margins of the Atlantic, Pacific, and Indian oceans. Loggerhead sea turtles are rare or absent far from mainland shores. In the Western Hemisphere, their range extends as far north as Newfoundland and as far south as Argentina. Green sea turtles have a global distribution in tropical and subtropical waters. In U.S. Atlantic waters, green sea turtles occur around the Virgin Islands and Puerto Rico and from Texas to Massachusetts. Leatherback sea turtles occupy the open seas, although they are occasionally seen in coastal waters. Leatherbacks prefer warmer waters; however, they frequently appear in New England waters north to Newfoundland during the summer months. Hawksbill sea turtles are typically a tropical species, found throughout the Caribbean. They are commonly observed in the Florida Keys, Bahamas, and the southwestern Gulf of Mexico. Hawksbill stragglers have been reported as far north as Massachusetts and as far south as northern Argentina. This species is infrequently found in shallow coastal estuarine systems. Kemp's Ridley sea turtles occur most frequently in the Gulf of Mexico, but they also occur along the Atlantic coast as far north as Long Island, New York and Cape Cod, Massachusetts.

As water temperatures begin to rise during the spring months, sea turtles migrate northward along the coast and into estuarine waters (Shoop and Kenney 1992; Thompson and Huang 1993; Musick et al. 1994; Witzell and Azarovitz 1996; Braun-McNeill and Epperly 2004; Mansfield et al. 2009). When waters begin cooling during the fall, many sea turtles migrate southward out of the temperate latitudes to warmer waters. Others move offshore to warm waters in or near the Gulf Stream (McClellan and Read 2007; Mansfield et al. 2009). In 1988, researchers with the NMFS Laboratory in Beaufort, NC began monitoring the distribution of sea turtles in North Carolina estuarine and nearshore waters, employing three complementary methods to assess turtle distributions: aerial surveys, public sightings, and mark-recapture studies (Epperly et al. 1995a and 1995b). This research identified a distinct seasonal pattern of sea turtle distribution in the estuarine and near-shore ocean waters of North Carolina. In April, as coastal waters begin to warm, sea turtles enter North Carolina's estuaries. During summer months, sea turtles may be found from the Albemarle Sound to the Cape Fear River and as far west as the Neuse River estuary. The greatest densities of sea turtles occur in Core Sound and along the eastern shore of Pamlico Sound. In the fall, sea turtles leave the estuaries as water temperatures cool and are rarely seen inside the

barrier islands from January to March. Sea turtles are observed in offshore ocean waters throughout the year.

Females of all five species of sea turtles lay clutches of eggs in nests on coastal beaches. The adults aggregate offshore of the nesting beaches during the spring to mate. After mating, females move onshore to lay eggs. Up to seven clutches may be laid during a single nesting season. After an incubation period of two months, the hatchlings dig to the surface and move toward the ocean. The young swim offshore and spend their early life in offshore waters. After several years at sea, most species enter the coastal waters and move into bays, river mouths, and estuaries where they spend their juvenile life.

Hawksbill turtles have been reported off the coast of North Carolina during the months of June, July, October, and November. This species of turtle prefers shallow coastal water with depths usually less than 66 feet. Preferred habitat includes coral reefs, rocky bottoms, reefs, and coastal lagoons. Adult hawksbills primary food source is sponges, but they also eat sea urchins, algae, barnacles, mollusks, jellyfish, and fish. Hawksbills exhibit a wide tolerance for nesting substrate type and nests are typically placed under vegetation. Nesting occurs principally in Puerto Rico and the U.S. Virgin Islands but does occur in the southeast coast of Florida and the Florida Keys. The largest threat to the hawksbill is the loss of coral reef habitat. The extent to which hawksbills are killed or debilitated after becoming entangled in marine debris has not been quantified, but it is believed to be a serious and growing problem. Hawksbills (predominantly juveniles) have been reported entangled in gill nets, fishing line, and synthetic rope. Hawksbills are incidentally taken by several commercial and recreational fisheries. Fisheries known or suspected to incidentally capture hawksbills include those using trawls, gill nets, traps, driftnets, hooks, beach seines, spear guns, and nooses (NMFS/USFWS 1993b). There were no strandings reported of hawksbill sea turtles in North Carolina between 1986 and 2000, but there have been ten between 2001 and 2013 (NCWRC/NMFS Sea Turtle Stranding and Salvage Network (STSSN), unpublished data).

The leatherback sea turtle is the largest turtle in the world and has a worldwide distribution in tropical and temperate waters. This species is found off the coast of North Carolina from April to October with occasional sightings into the winter. The main prey species of leatherbacks are jellyfish and tunicates and occur almost exclusively in ocean waters (Epperly et al. 1995b). There is one record of a NC nesting site at Cape Lookout in 1966 (Lee and Socci 1989), and an additional nesting site was reported near Cape Hatteras in 2000. Leatherbacks become entangled often in long lines, fish trap, buoy anchor lines, and other ropes and cables (NMFS/USFWS 1992). Between 1986 and 2006 there have been 220 reported leatherback strandings in North Carolina with an additional 30 reported leatherback strandings from 2007 to 2013 (NCWRC/NMFS STSSN, unpublished data).

The Kemp's Ridley sea turtle occurs primarily in the Gulf of Mexico, but they also occur along the Atlantic coast as far north as New England. Juveniles occur year-round within the sounds, bays, and coastal waters of North Carolina. Adult Kemp's Ridley turtles are primarily a bottom feeder, feeding on crabs, shrimp, sea urchins, starfish, jellyfish, clams, snails, and squid. Incidental take by shrimp trawls has been identified as the largest source of mortality with between 500 and 5,000 killed annually (NMFS/USFWS 1993a). In North Carolina, 10.0% of the sea turtle strandings between 1986 and 2006 were Kemp's Ridley (NCWRC/NMFS STSSN; 1990–2000). There have been 754 strandings from 2007 through 2013, which represents 18.9% of the total sea turtle strandings (NCWRC/NMFS STSSN, unpublished data).

The green sea turtle has a global distribution in tropical and subtropical waters. In U.S. Atlantic waters, it occurs around the Virgin Islands and Puerto Rico and from Texas to Massachusetts. Green turtles are sighted in oceanic waters and within the sounds of North Carolina during the period from May through October. Due to their food preference for submerged aquatic vegetation, adult green turtles are normally found in lagoons, bays, and tidal inlets. No major nesting sites are located along the U.S. coastline however, limited annual nesting occurs in Florida from April to July. Green turtle nests in North Carolina have steadily increased from 0 to 3 per year before 2008 to 16-40 nests from 2008 to 2014 (NCWRC Sea Turtle Nest Monitoring System, unpublished data). In 1992, NMFS finalized regulations to require the use of Turtle Excluder Devices (TEDs) in shrimp trawl fisheries. A significant threat to the green turtle continues to be fishing gear, primarily gill nets, but also trawls, traps and pots, and dredges. Green sea turtles have been recovered entangled in trap lines with the trap in tow (NMFS/USFWS 1991a). Strandings have drastically increased since 2007. From 1986-2006, green turtles accounted for 12.4% of the sea turtle strandings in North Carolina and from 2007 to 2013, they made up 44.7% of total strandings (NCWRC/NMFS STSSN, unpublished data).

The loggerhead sea turtle has a subtropical (and occasionally tropical) distribution, including continental shelves and estuaries along the margins of the Atlantic, Pacific, and Indian oceans. It is rare or absent far from mainland shores. The loggerhead turtle is the most common sea turtle in North Carolina (STAC 2006) and is present throughout the year, with peak densities occurring from June to September. The loggerhead turtle diet includes algae, seaweeds, horseshoe crabs, barnacles, various shellfish, sponges, jellyfish, squid, urchins, and fish. Nesting occurs along the U.S. Atlantic coast from New Jersey to Florida, however, the majority of nesting activity occurs from South Carolina to Florida. In North Carolina, nesting activity has been reported from April to September. The highest nesting densities are reported south of Cape Lookout. Loggerhead turtle nests in North Carolina have steadily increased from less than 100 per year in the 1980s and 1990s to as many as 1,304 nests in 2013; a total of 1,261 loggerhead turtle nests were reported in 2013 (NCWRC STNNS, unpublished data).

The primary threat to loggerhead turtle populations worldwide is incidental capture in fishing gear, primarily in long lines and gill nets, but also in trawls, traps and pots, and dredges. While the impact of the crab pot fishery on loggerhead populations has not been quantified, this species may be particularly vulnerable since they feed on species caught in traps and on organisms growing on the traps, trap lines, and floats (NMFS/USFWS 1991b). Strandings have decreased since 2007. From 1998-2006, loggerhead turtles accounted for 65.6% of the sea turtle strandings in North Carolina and from 2007 to 2014, they made up 32.6% of total strandings (NCWRC/NMFS STSSN, unpublished data). Several studies have documented interactions with sea turtles in set gill nets in North Carolina waters. Some of these studies focused on sea turtles specifically while others focused on comparing traditional and alternative methods of fishing or constructing gill nets and their effect on bycatch. Thorpe et al. (2001), Thorpe and Beresoff (2005), and Kimel et al. (2008) documented bycatch of green, Kemp's Ridley, and loggerhead sea turtles in the southern area of the state in several gill net fisheries and Montgomery (2001, 2002) documented the bycatch of green and loggerhead sea turtles in the Core Sound area. Research has also been done in the trawl fishery to reduce interactions with turtles.

8.3.6 Diamondback Terrapins

Diamondback terrapins are found throughout North Carolina's high salinity coastal marshes. This species is listed federally as a species of concern (FSC) in Dare, Pamlico, and Carteret

counties in North Carolina, although it affords them no legal protection. The diamondback terrapin is listed as a "Special Concern" species by the NCWRC, making it protected under state regulations. The NCWRC Scientific Council on Amphibians and Reptiles (SCAR) is currently evaluating changing the listing of the diamond back terrapin to "Threatened" (SCAR 2011).

In a South Carolina study, terrapins were captured in salinities ranging from 4.3 to 22 ppt, with most captures in 10.1 to 15.0 ppt (Bishop 1983). Preferred habitats are the waters immediately adjacent to the marsh, small creeks, and mosquito control ditches. Terrapins are a long-lived species, probably surviving in excess of forty years. Females mature in seven to nine years, and fecundity is relatively low (Hildebrand 1932).

Populations of diamondback terrapins have declined throughout their range from Cape Cod, Massachusetts to southern Texas (Palmer and Cordes 1988; Seigel and Gibbons 1995). Possible reasons for this decline are: (1) degradation and loss of habitat (Grant 1997), (2) mortality on roads (Wood 1995), (3) raccoon predation (Seigel 1980), and (4) incidental drowning in trawls, nets, and crab pots (Bishop 1983and Wood 1995). Blue crab pots may account for more adult diamondback terrapin mortalities than any other single factor (Bishop 1983).

Several studies have documented interactions with diamondback terrapins in set gill nets in North Carolina waters. These studies focused on comparing traditional and alternative methods of fishing or constructing gill nets and their effect on bycatch. Thorpe et al. (2001) and Thorpe and Beresoff (2005) documented the bycatch of diamondback terrapins in the southern area of the state in several gill net fisheries, Montgomery (2001, 2002) documented the bycatch of diamondback terrapins in the Core Sound area, and Evans (2001) documented the bycatch of diamondback terrapins in the Ocracoke area of Pamlico Sound.

Various studies in New Jersey (Wood 1995), Maryland (Roosenburg et al. 1997), North Carolina [Grant 1997; Crowder et al. 2002; NCWRC unpublished; Tom Henson (NCWRC), pers. comm.], and South Carolina (Bishop 1983) have documented diamondback terrapin bycatch and mortality in crab pots. In South Carolina, few captured terrapins were drowned when crab pots were checked daily, and estimated capture mortality amounted to 10% (Bishop 1983). However, in a North Carolina study, Crowder et al. (2002) noted that terrapins can hold their breath for a maximum of 5 hours, and during the summer only 45 minutes. Of the 12 terrapins captured in the North Carolina study, 58% were dead (24–48 hour soak time; Crowder et al. 2002). Bishop (1983) noted that the occurrence of ghost pots is perhaps far more detrimental to terrapin populations than actively fished pots. Some observations suggest that once a terrapin is captured others may be attracted, particularly males to a female during the spring mating season.

Population size influences catchability. Estimates of capture rates and population size by Roosenburg et al. (1997) suggest that 15–78% of a local population may be captured annually. However, not all coastal areas contain suitable terrapin habitat as outlined by Palmer and Cordes (1988). Male terrapins do not grow as large (shell depth and length) as females, and may remain vulnerable to entrapment throughout their life. Female terrapins become too large to enter crab pots by the time they reach age eight (Roosenburg et al. 1997). However, small terrapins of either sex are vulnerable to capture.

Limiting factors affecting the catchability of terrapins in crab pots are:

(1) abundance of terrapins,

(2) terrapin size (depth of shell),
(3) vertical height of the crab pot funnel,
(4) distance of the crab pot from shore, and
(5) season.

8.3.7 Birds

Several species of diving ducks and seabirds are incidentally caught in gill nets, leading to mortalities. The USFWS completed a study to assess bird mortality in nearshore anchored gill nets in the ocean from New Jersey to Virginia and found that an estimated 2,387 birds were killed in the mid-Atlantic gill net fishery from February through April 1998 (Forsell 1999). A few studies have been conducted on seabird bycatch in the American shad gill net fishery (Rose 2000, 2001, 2004). These nets primarily caught diving birds such as loons, cormorants, and grebes. These studies took place over an entire fishing season, generally lasting more than 100 days. These nets had mesh sizes of 5.5 inches stretch mesh, and are larger than that used to catch kingfishes. Floating nets caught more birds than sinking nets overall (111 versus 61) and the most common bird caught in these nets was the red-throated loon (42% of the overall total).

Other studies have documented interactions with migratory birds in gill nets in North Carolina waters. These studies focused on comparing traditional and alternative methods of fishing or constructing gill nets and their effect on bycatch. Thorpe et al. (2001) and Thorpe and Beresoff (2005) documented bycatch of birds in the southern area of the state in several gill net fisheries. Montgomery (2001) documented the bycatch of cormorants and loons in the Core Sound area. Evans (2001) documented the bycatch of a loon in the Ocracoke area, and Darna (2000, 2002) documented the bycatch of cormorants, loons, and merganser's in the Neuse River area of Pamlico Sound.

8.4 NORTH CAROLINA DIVISION OF MARINE FISHERIES PROGRAMS

An agreement was established in 1979 with the NCWRC to exercise regulatory jurisdiction over any species of sea turtle, and their eggs and nests, consistent with designation of such species as endangered or threatened by the USFWS. In 1980, the NCMFC established a Sea Turtle Sanctuary off the coast of North Carolina to protect nesting beaches (NCMFC Rule – 15A NCAC 03R.0101). In 1983, proclamation authority was given to the director of NCDMF by NCMFC to close areas to protect endangered/threatened species (NCMFC Rule – 15A NCAC 03I.0107). In 1989, an addition was made to the MRFSS program (now MRIP) to include a sea turtle sightings query on the survey form. The NCDMF Observer Program began in 1999 in the Fisheries Management section when the Sea Turtle Stranding Network noted significant increases in sea turtle strandings in the southeastern portion of Pamlico Sound. The purpose of these observations was to begin the process of characterizing effort, catch, and bycatch by area and season in various fisheries. In addition, this program was established to monitor fisheries for the potential of protected species bycatch. The data collected is used for fisheries management decisions, stock assessments, and conservation efforts for protected species. Currently, the Observer Program primarily focuses on large and small mesh gill nets but data are also being collected in the recreational hook and line fishery. Data collected from observer trips include date, location, unit, time, season, gill net description (net length, number of net shots, mesh size, presence/absence of tie downs, vertical mesh height, and hanging ratio), soak time, and water depth. Additionally, environmental parameters (wind, tide stage and water quality data) are collected when feasible. Total catches of target species are estimated and final disposition (kept or discarded) is recorded. Sea turtle and sturgeon interaction information includes species,

condition, tag numbers, and final disposition. All interactions involving protected species are documented. All observers are required to adhere to these data collection parameters.

To maintain the gill net flounder fishery, NCDMF applied for and received an Incidental Take Permit (ITP #1259) under Section 10 of the ESA in 2000 (Gearhart 2001). The ITP authorized protected species interactions, allowing the fishery to operate under certain restrictions. The ITP contained a comprehensive Conservation Plan designed to reduce sea turtle interactions by establishing an authorized threshold of sea turtle takes, and intensive monitoring by fisheries observers, while allowing traditional gill net fisheries to be prosecuted. Observations in 2000 identified the deep water region of Pamlico Sound as the primary source for sea turtle interactions and subsequent mortality leading NMFS to establish a permanent rule for the 2001 fishing season that closed all potential fishing grounds utilized by the deep water large mesh gill net fisheries. In 2001, NCDMF applied for and received another ITP (# 1348) that implemented further restrictions by establishing prohibited fishing corridors and restricted areas throughout Pamlico Sound, known as the Pamlico Sound Gill Net Restricted Area (PSGNRA). NMFS then closed the rest of Pamlico Sound to gill nets annually from September 1 through December 15 with mesh sizes larger than 4.25 inch stretched mesh on September 27, 2001.

In 2003, NCDMF applied for and received a three-year ITP (#1398). This ITP contained a Habitat Conservation Plan (HCP), which implemented an intensive sea turtle observer and characterization program throughout the PSGNRA from September through December. These restricted areas remained unchanged and were monitored annually from September 1 through December 15 of each year. Observed levels of sea turtle interactions in the southern flounder gill net fishery remained below thresholds that were established by the ITP from 2002 through 2004 (Gearhart 2003; Price 2004; Price 2005).

The Sea Turtle Advisory Committee (STAC) was formed in 2003 by the NCMFC in response to continuing problems with protected species interactions in fisheries throughout the North Carolina coast. Their objective was to develop solutions for the reduction of sea turtle interactions in commercial (i.e., gill net, pound net) and recreational (i.e., hook and line) fishing gear, while maintaining economically viable fisheries throughout the estuarine waters of North Carolina. The STAC was comprised of stakeholders concerned with the bycatch of protected species in commercial and recreational fisheries. Stakeholders included recreational and commercial anglers and the scientific community representing state and federal agencies, academia, and an environmental organization. The committee summarized its findings in a report, which included a background summary about federal and state management, sea turtle natural history, sea turtle strandings, and characterization of North Carolina estuarine fisheries. The document concluded with identification of problems, development of solutions, and recommendations for the reduction of commercial and recreational fishery interactions with sea turtles, while maintaining North Carolina fisheries (STAC 2006).

Over a three-year effort, the STAC identified four inshore gears of primary concern with relation to sea turtle incidental catch throughout North Carolina. These gears were gill nets, pound nets, shrimp trawls, and recreational hook and line. Other gears were identified as gears of other concern, and many gears were identified as no concern (STAC 2006).

Recommendations were provided to the NCMFC following completion of this report, and many of the recommended actions are currently in place. Throughout the STAC process, the recommendation to implement observer coverage for multiple fisheries of either primary or other concern was made in order to gather information where it is limited. The STAC also

supported continued efforts for gear modification and testing with the objective of reducing sea turtle interactions.

STAC Recommendations for Gill Nets (>5-inch stretch mesh; STAC 2006):

1) Establish mandatory observer coverage of all large mesh (≥5-inch stretch mesh) gill nets throughout all estuarine waters. The level of coverage should have a minimum goal of 2% of the total effort by area. Coverage should increase (~10%) in areas when/where sea turtle interactions are occurring.
2) Provide education on sea turtle resuscitation to fishermen. Support outreach programs that encourage reporting sea turtles and compliance with regulations.
3) Implement state seasonal/area closures in identified problem areas.
4) Support continued efforts for gear modification and testing with the objective of reducing sea turtle interactions.

In 2005, NCDMF applied for and received a six-year ITP (# 1528) with a few changes to the PSGNRA management area including the establishment of a state closure on top of the federal closure, redirection of observer coverage, and the elimination of the permit requirements along the mainland side of Pamlico Sound (Price 2006). Management of the PSGNRA under this ITP has been consistent and has provided continued protection of sea turtles while allowing a shallow water gill net fishery to operate along the Outer Banks and mainland side of Pamlico Sound.

In addition to the gill net fishery observations in the PSGNRA since 2000, the NCDMF also obtained commercial gill net fishery observations outside of the PSGNRA since 2004 in order to characterize effort, catch, finfish bycatch, and protected species interactions (Brown and Price 2005; Price 2007; Price 2009). The NCDMF has conducted both inshore and nearshore shrimp trawl observations (Brown 2009, 2010b), and has obtained a limited number of pound net observations (Price 2007).

In the fall of 2010, the NCMFC reestablished the STAC to address sea turtle bycatch. The duties of the reestablished STAC include but are not limited to: reviewing observer reports, devising means for fishermen to report sea turtle interactions, assisting with fishermen education, determining measures to reduce the incidental take of sea turtles, monitor Observer Program issues, and review all future ITP provisions and take calculations prior to formal application to NMFS. The STAC provided recommendations and guidance to the NCMFC and NCDMF in addressing the protection of sea turtles in North Carolina.

In August 2010, NCDMF applied for a three year ITP under Section 10 of the ESA for the incidental take of sea turtles. After many revisions and two public comment periods, the NCDMF received a ten year Sea Turtle ITP (#16230) on September 11, 2013. This ITP authorized the implementation of adaptive management measures to protect threatened and endangered sea turtles and other ESA listed species, while allowing estuarine gill net fisheries prosecuted by commercial license holders to fish in the internal coastal (estuarine) waters of North Carolina.

The Conservation Plan includes managing inshore gill net fisheries by dividing estuarine waters into six management units (A, B, C, D1, D2, E; Figure 8.1). Each of the management units is monitored seasonally and by fishery. This permit applies only to the areas defined as follows:

Management Unit A: encompasses all estuarine waters north of 35° 46.30'N to the North Carolina/Virginia state line. This includes all of Albemarle, Currituck, Croatan, and

Roanoke sounds as well as the contributing river systems in this area. Most of this area is currently defined as the Albemarle Sound Management Area (ASMA).

Management Unit B: encompasses all estuarine waters south of 35° 46.30'N, east of 76° 30.00'W, and north of 34° 48.27'N. This Management Unit includes all of Pamlico Sound and the northern portion of Core Sound.

1) Shallow Water Gill Net Restricted Area (SGNRA) 1

The area from Wainwright Island to Ocracoke Inlet bound by the following points: Beginning at a point on Core Banks at 34° 58.7963'N - 76° 10.0013'W, running northwesterly to Marker # 2CS at the mouth of Wainwright Channel at 35° 00.2780'N - 76° 12.1682'W, then running northeasterly to Marker "HL" at 35° 01.5665'N - 76° 11.4277'W, then running northeasterly to Marker #1 at 35°09.7058'N - 76° 04.7528'W, then running southeasterly to a point at Beacon Island at 35°05.9352'N - 76° 02.7408'W, then running south to a point on the northeast corner of Portsmouth Island at 35° 03.7014'N - 76° 02.2595'W, then running southwesterly along the shore of Core Banks to the point of beginning.

2) SGNRA 2

The area from Ocracoke Inlet to Hatteras Inlet bound by the following points: Beginning at a point near Marker #7 at the mouth of Silver Lake at 35° 06.9091'N - 75° 59.3882'W, running north to Marker # 11 near Big Foot Slough Entrance at 35° 08.7890'N - 76° 00.3606'W, then running northeasterly to a point at 35° 13.4489'N'N - 75° 47.5531'W, then running south to a point northwest of the Ocracoke/Hatteras Ferry terminal on the Ocracoke side at 35° 11.5985'N - 75°47.0768'W, then southwesterly along the shore to a point of beginning.

3) SGNRA 3

The area from Hatteras to Avon Channel bound by the following points: The area from Hatteras to Avon Channel bound by the following points: Beginning at a point near Marker "HR" at 35° 13.3152'N – 75° 41.6694'W, running northwest near Marker "42 RC" at Hatteras Channel at 35° 16.7617'N – 75° 44.2341'W, then running easterly to a point off Marker #2 at Cape Channel at 35° 19.0380'N – 75° 36.2993'W, then running northeasterly near Marker #1 at the Avon Channel Entrance at 35° 22.8212'N – 75° 33.5984'W, then running southeasterly near Marker #6 on Avon Channel at 35° 20.8224'N - 75° 31.5708'W, then running easterly near Marker #8 at 35° 20.9412'N – 75° 30.9058'W, then running to a point on shore at 35° 20.9562'N - 75° 30.8472'W, then following the shoreline in a southerly and westerly direction to the point of beginning.

4) SGNRA 4

The area from Avon Channel to Rodanthe bound by the following points: Beginning at a point near Marker #1 at the Avon Channel Entrance at 35° 22.8212'N - 75° 33.5984'W, then running northerly to a Point on Gull Island at 35° 28.4495'N - 75° 31.3247'W, then running north near Marker "ICC" at 35° 35.9891'N – 75° 31.2419'W, then running northwesterly to a point at 35° 41.0000'N – 75° 33.8397'N – 75° 29.3271'W, then following the shoreline in a southerly direction to a point on shore near Avon Harbor at 35° 20.9562'N - 75° 30.8472'W, then running westerly near Marker #8 at 35° 20.9412'N - 75° 30.9058'W, then running westerly near Marker #6 on Avon Channel at 35° 20.8224'N - 75° 31.5708'W, then running northwesterly to the point of beginning.

5) Mainland Gill Net Restricted Area (MGNRA)
The area on the mainland side of Pamlico Sound, from the shoreline of Dare, Hyde, Pamlico and Carteret counties out to 200 yards between 76° 30'W and 75° 42'W.

6) Core Sound Gill Net Restricted Area (CGNRA)
All Internal Coastal waters south of latitude 35° 00.00'N and north of latitude 34° 48.27'N which runs approximately from the Club House on Core Banks westerly to a point on the shore at Davis near Marker "1".

Management Unit C: includes the Pamlico, Pungo, and Neuse river drainages west of 76° 30.00'W.

Management Unit D: divided into two areas, D-1 and D-2, to allow the NCDMF to effectively address areas of high sea turtle abundance or "hot spots".

Management Unit D-1: encompasses all estuarine waters south of 34° 48.27'N and east of a line running from 34° 40.6750'N – 76° 37.00'W to 34° 42.48'N – 76° 37.00"W then to the head of Turner Creek, and northerly up the western shoreline of the North River. Management Unit D-1 includes Southern Core Sound, Back Sound, and North River.

Management Unit D-2: encompasses all estuarine waters west of a line running from 34° 40.6750'N – 76° 37.00'W to 34° 42.48'N – 76° 37.00"W, then to the head of Turner Creek, and northerly up the western shoreline of the North River; and east of the NC Hwy 58 Bridge. Management Unit D-2 includes Newport River (including the Atlantic Intracoastal Waterway and Harlowe Creek up to the NC Hwy 101 Bridge) and Bogue Sound.

Management Unit E: encompasses all estuarine waters south and west of the Hwy 58 Bridge to the North Carolina/South Carolina state line. This includes the Atlantic Intracoastal Waterway (ICW) and adjacent sounds and the New, Cape Fear, Lockwood Folly, White Oak, and Shallotte rivers.

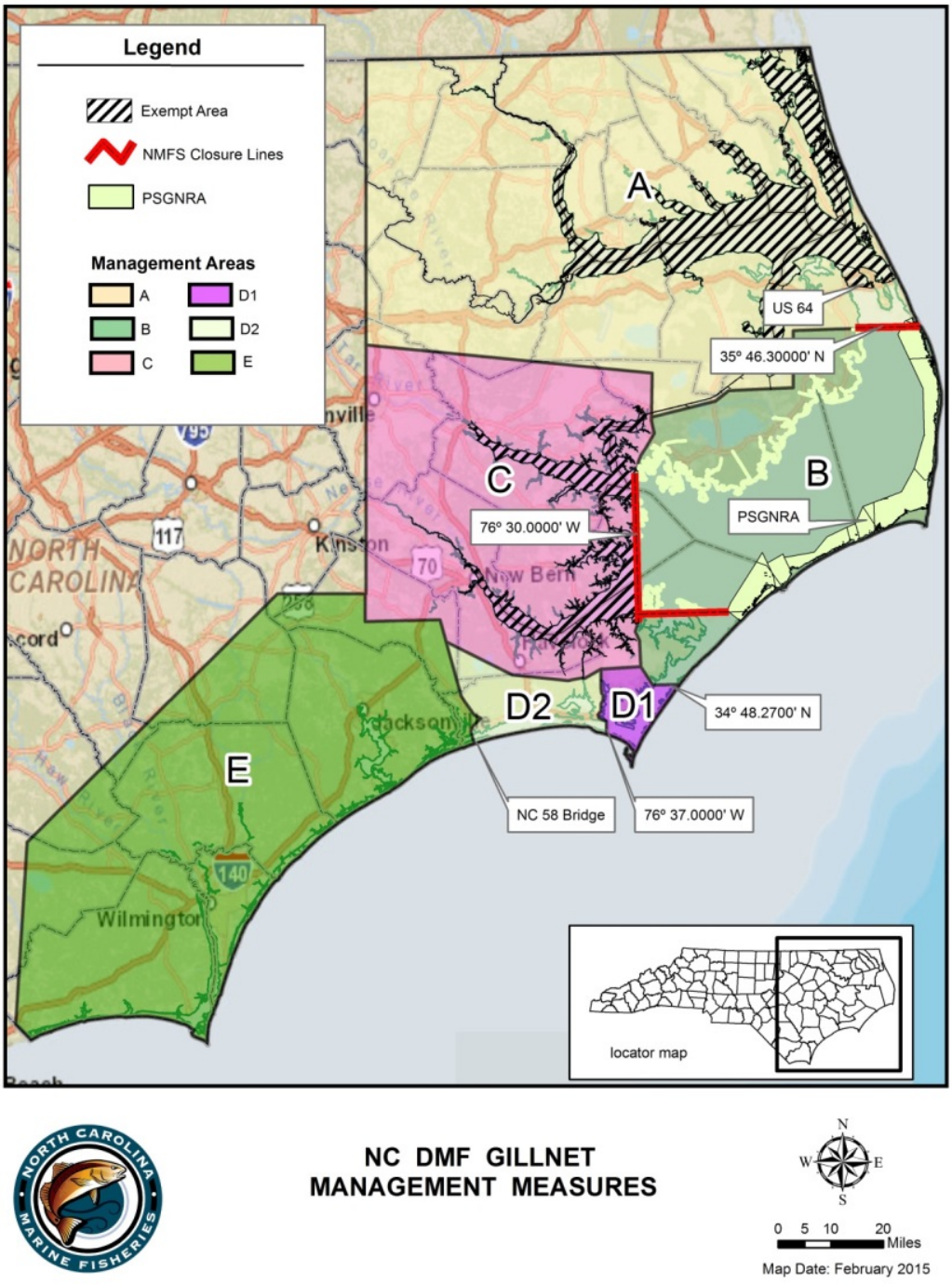

Figure 8.1 Map of Sea Turtle Management Units for North Carolina's estuarine waters in Incidental Take Permit #16230.

In the latter part of 2010, NCDMF reallocated funds to establish the Protected Resources Section within the division and obtained funding to support a statewide at-sea observer program for the estuarine gill net fishery. The new Protected Resources Section is the lead for division actions involving protected species such as at-sea observer programs, marine mammal stranding responses and marine mammal take reduction teams, and other protected species issues that may arise.

Marine mammal stranding response along the central North Carolina coast, transitioned from North Carolina State University Center for Marine and Science Technology to the NCDMF in October of 2010. This project is funded year to year from the John H. Prescott Marine Mammal Rescue Assistance Foundation, pending successful proposal review and acceptance. A full-time stranding coordinator was hired and stranding personnel have responded to numerous marine mammal strandings. The North Carolina stranding response is divided into four areas: 1) University of North Carolina-Wilmington – personnel respond to all strandings in the southern part of the state up to and including Camp Lejeune; 2) NCDMF – personnel respond to strandings from Hammocks Beach State Park to Cape Lookout National Seashore and in Albemarle and Pamlico sounds; 3) Cape Hatteras National Seashore – personnel respond to strandings in Cape Hatteras National Seashore, and 4) DENR – personnel respond to strandings from Cape Hatteras north to the Virginia border. Stranding personnel conduct outreach by giving public seminars at marine mammal meetings, local museums, universities, and classrooms. Stranding personnel disseminate results and tissue samples from stranded animals to collaborating researchers and agencies.

On February 6, 2012, NMFS issued a final determination to list the Carolina DPS of Atlantic sturgeon as an endangered species under the ESA with a rule effective date of April 6, 2012 (77 FR 5914, 6 February 2012). In June 2012, NCDMF applied for a ten year ITP under Section 10 of the ESA for the incidental take of Atlantic sturgeon in inshore estuarine waters for the large and small mesh anchored gill net fisheries. In July 2014, NCDMF received ITP # 18102 for the incidental take of Atlantic sturgeon in inshore estuarine waters for the large and small mesh anchored gill net fisheries (NMFS 2014). The Conservation Plan prepared by NCDMF describes measures designed to monitor, minimize, and mitigate the incidental take of ESA-listed Atlantic sturgeon. The Conservation Plan includes managing inshore gill net fisheries by dividing estuarine waters into seven management units (A1, A2, A3, B, C, D, E; Figure 8.2). Each of the management units is monitored seasonally and by fishery. This permit only applies to the areas defined as follows:

Management Unit A is divided into three subunits—A-1, A-2, and A-3—to allow NCDMF to effectively address subunits where proactive management actions may be taken at a finer scale.

Management Subunit A-1 will encompass Albemarle Sound as well as contributing river systems in the unit not crossing a line 36° 4.30'N -75° 47.64'W east to a point 36° 2.50'N -75° 44.27'W in Currituck Sound or 35° 57.22'N -75° 48.26'W east to a point 35° 56.11'N -75°43.60'W in Croatan Sound and 36° 58.36'N -75° 40.07'W west to a point 35° 56.11'N -75°43.60'W in Roanoke Sound.

Management Subunit A-2 will encompass Currituck Sound north of a line beginning at 36° 4.30'N -75° 47.64' east to a point at 36° 2.50'N -75° 44.27'W as well as the contributing river systems in this unit.

Management Subunit A-3 will encompass Croatan Sound waters south from a point at 35° 57.22'N -75° 48.26'W east to a point 35° 56.11'N -75°43.60'W and Roanoke Sound waters south from a point 36° 58.36'N -75° 40.07'W west to a point 35° 56.11'N -75°43.60'W south to 35° 46.30'N.

Management Unit B will encompass all estuarine waters South of 35° 46.30'N, east of 76° 30.00'W and north of 34° 48.27'N. This management unit will include all of Pamlico Sound and the northern portion of Core Sound.

Management Unit C will include the Pamlico, Pungo, Bay, and Neuse river drainages west of 76° 30.00'W.

Management Unit D will encompass all estuarine waters south of 34° 48.27'N and west of a line running from 34° 40.6750'N – 76° 37.00'W to 34° 42.48'N – 76° 37.00"W to the NC Hwy 58 bridge. Management unit D includes southern Core Sound, Back and Bogue sounds, and North, and Newport rivers (including the Atlantic Intracoastal Waterway and Harlowe Creek up to the NC Hwy 101 Bridge).

Management Unit E will encompass all estuarine waters south and west of the NC Hwy 58 Bridge to the North Carolina/South Carolina state line. This includes the Atlantic Intracoastal Waterway (IWW) and adjacent sounds, and the White Oak, New, Cape Fear, Lockwood Folly, and Shallotte rivers.

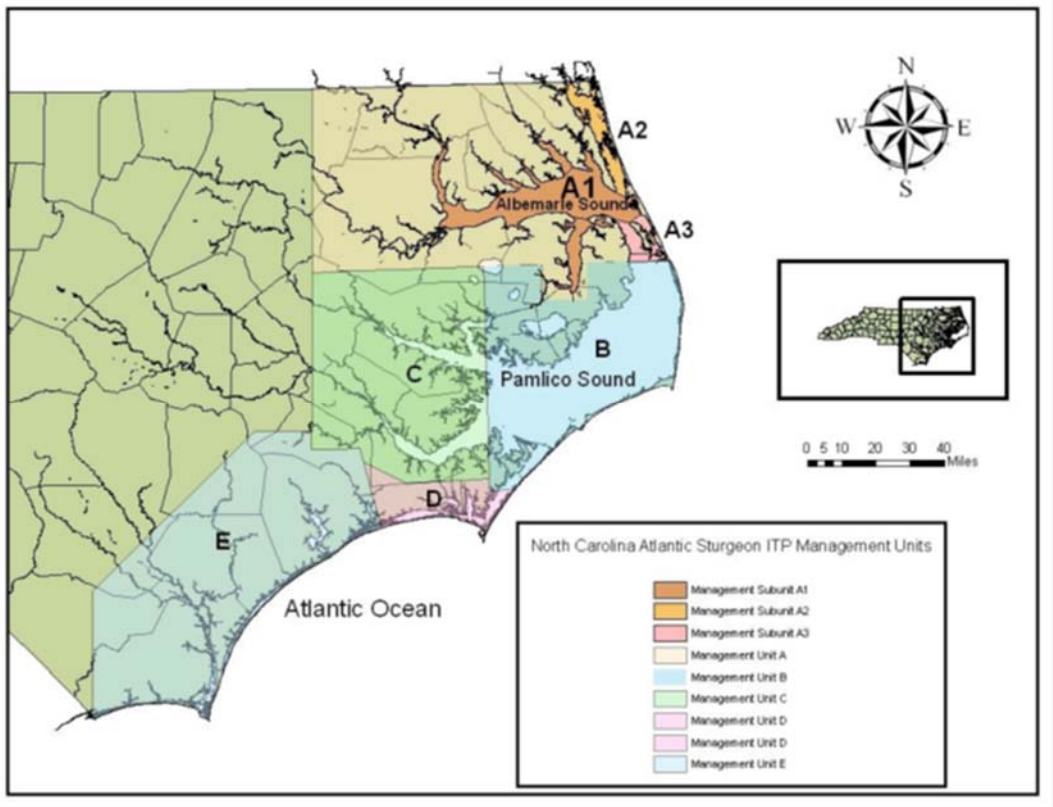

Figure 8.2. Atlantic Sturgeon Management Units for North Carolina's estuarine waters in Incidental Take Permit #18102.

Since the 1970s, the NCDMF has been proactive in developing ways to minimize impacts to threatened and endangered marine species. The NCDMF works closely with NMFS and other state and federal agencies to develop regulations that minimize impacts to protected species while trying to allow the continuation of many economically important fisheries. In addition to the previously mentioned ITPs, the NCDMF has been issued ITPs for the shrimp trawl fishery off the North Carolina coast between Browns Inlet and Rich's Inlet allowing limited tow times in lieu of the use of TEDs because of high concentrations of algae which clog both shrimp trawl nets and TEDs.

The NCDMF has tested modified gill net designs for the purpose of reducing sea turtle interactions and still maintain acceptable levels of target species (Gearhart and Price 2003; Brown and Price 2005; Price and Van Salisbury 2007). These studies have identified low-profile gill net gear that can be used in the deep-water portion of Pamlico Sound to mitigate the bycatch of sea turtles. In addition, the 2007 study indicated the potential transference of this technology to other gill net fisheries where similar conditions and sea turtle bycatch issues exist (Price and Van Salisbury 2007; Gilman et al. 2010). The NCDMF will continue to be proactive in developing ways to minimize impacts to protected species within North Carolina waters.

9.0 PRIVATE CULTURE, AQUACULTURE, AND STOCK ENHANCEMENT

9.1 PRIVATE CULTURE

There is currently no NCDMF program to administer private culture of kingfishes. There are no known historical records of private culture having been conducted in the State of North Carolina, nor are there any known plans to privately culture kingfishes in the future.

9.2 AQUACULTURE

In North Carolina, aquaculture is currently defined under the Aquaculture Development Act (ADA) (G.S. Chapter 106 Article 63) as the propagation and rearing of aquatic species in controlled or selected environments, including but not limited to, ocean ranching (G.S. 106-758(1)). The North Carolina Department of Agriculture and Consumer Services (NCDACS), NCWRC, and NCDMF all share the responsibilities in permitting aquaculture facilities and operations. Determining the jurisdiction for these facilities is based on the species of fish, where it is found in its natural settings (e.g. marine, estuarine, or freshwater), and the location of the facility (e.g. inland or coastal).

The ADA considers aquaculture a form of agriculture and thus designates NCDACS the lead state agency in matters pertaining to aquaculture (G.S. 106-759). The ADA gives the NCDACS and the Board of Agriculture the responsibility for registration and licensing of freshwater aquaculture facilities. In addition, the Act states NCDACS authority shall not include authority of the wild fishery resource managed under the authority of the NCWRC (G.S 106-761). Outside of the ADA, the General Assembly also gives the NCMFC jurisdiction over shellfish aquaculture (G.S. 113-201), as well as the conservation of marine and estuarine resources including the regulation of aquaculture facilities, which cultivate or rear marine and estuarine resources (G.S. 113-132).

9.2.1 North Carolina Department of Agriculture and Consumer Services and Board of Agriculture Authority

The ADA assigns NCDACS the power and duties to:

- provide aquaculturalists with information and assistance in obtaining permits related to aquaculture activities;
- promote investment in aquaculture facilities in order to expand production and processing capacity; and
- work with appropriate State and Federal agencies to review, develop and implement policies and procedures to facilitate aquacultural development (G.S. 106-759).

The ADA also gives NCDACS the authority to regulate the production and sale of commercially raised freshwater fish and freshwater crustacean species. Rules have been developed by the Board of Agriculture to register facilities for the production and sale of freshwater aquaculturally raised species, and set standards under which the commercially reared species may be transported, possessed, bought, and sold. The NCDACS and the Board of Agriculture authority are limited to commercially reared fish and do not include authority over the wild fishery resource that is managed under authority of the NCWRC (G.S. 106-761(a)).

The NCDACS, with the authorization of the Board of Agriculture, can issue two types of licenses and one permit to aquaculturists: 1) Aquaculture Propagation and Production Facility License; 2) Commercial Catchout Facility License; and 3) Holding Pond/Tank Permit.

The Aquaculture Propagation and Production Facility License is valid for five years for the operation of fish hatcheries and production facilities for the approved species only. The Commercial Catchout Facilities License allows the facility to only be stocked with species from hatcheries and production facilities, approved by the Department of Agriculture and only for the species listed in G.S. 106-761(b) to prevent the introduction of diseases, and is valid for five years. The catchout facility owner or operator is only authorized to sell fish taken by fishermen directly from the pond and must provide receipts of the sales. The angler may sell no fish taken from the catchout facility and there are no angler license requirements for anglers fishing in the licensed commercial catchout facilities. The Holding Pond/Tank Permit is for all facilities holding live food or bait species for sale. This permit is valid for two years for the approved species. Possession of either an Aquaculture Propagation and Production Facility License or a Commercial Catchout Facility License will serve in lieu of a Holding Pond/Tank Permit for possession both on and off their facilities premises.

9.2.2 North Carolina Wildlife Resources Commission Authority

The ADA provides a list of preapproved species that can be propagated and produced with a NCDACS Aquaculture License (G.S. 106-761(b)). The NCWRC can only place restrictions on the listed species when there is a disease concern. All other species are prohibited from propagation and production unless the applicant for the permit first obtains written permission from the NCWRC. In the past, the NCWRC has issued written authorization for species that spend any portion of their life in freshwater even though they may spend a majority of their life in estuarine or marine waters. NCWRC has no implementing rules for § 106-761, rather obtaining “letters of authorization” for culture of aquatic species not approved in the legislation is done by policy and the process steps may be found on the NCWRC website. To facilitate the review of such requests, NCWRC has an application and additional information available at:
http://www.ncwildlife.org/Licensing/OtherLicensesPermits/AuthorizationtoCultureNonApprovedFishSpecies.aspx

9.2.3 Division of Marine Fisheries and the Marine Fisheries Commission Authority

General Statue 113-132 states “the Marine Fisheries Commission (NCMFC) has jurisdiction over the conservation of marine and estuarine resources (G.S. 113-132). Except as may be otherwise provided by law, it has jurisdiction over all activities connected with the conservation and regulation of marine and estuarine resources, including the regulation of aquaculture facilities as defined in G.S. 106-758 which cultivate or rear marine and estuarine resources.” Implementing NCMFC rules deal with issuance of the aquaculture operation and collection permits (15A NCAC 03O .0503).

The NCDMF has regulatory authority over aquaculture through an Aquaculture Operation Permit. In order to operate an aquaculture facility that deals with estuarine or marine species the facility must obtain a permit from the NCDMF director (15A NCAC 03O .0501). If the applicant is collecting wild fish for the aquaculture facility, the NCDMF has regulatory authority over how the fish are collected.

9.3 STOCK ENHANCEMENT

Currently, there is no program or plan for stock enhancement of kingfishes in North Carolina.

10.0 SOCIOECONOMIC STATUS OF THE KINGFISH FISHERY

10.1 ECONOMIC ASPECTS OF THE COMMERCIAL FISHERY

10.1.1 Ex-vessel Value and Price

Landings and ex-vessel value data for kingfish are evaluated from 1972 to 2013. The NCTTP began in 1994 when it was mandated that all commercial landings sold to a licensed seafood dealer be reported to the NCDMF. Prior to 1994, landings were recorded through a NCDMF/NMFS survey program where landings were provided by seafood dealers. Reporting the ex-vessel price of seafood is voluntary, with multiple seafood dealers throughout the state regularly provide price data.

When examining data over several years, it can be useful from an economic perspective to tie the ex-vessel value of annual landings to an established baseline year to control for the effects of inflation. Changes in ex-vessel values from year to year can be more clearly understood after removing the influence of changing dollar values over time. To do so, nominal ex-vessel values and prices (the amount paid dockside to the fisherman) are adjusted by the U.S. Consumer Price Index (CPI) to the value of a U.S. dollar in 1972 in an attempt to remove the effects of inflation. For this reason, nominal and inflation adjusted ex-vessel values and prices are provided (Figures 10.1, 10.2; Table 10.1).

The nominal value (the value that is not adjusted for inflation) of North Carolina kingfish landings per year has generally shown an increasing trend between1972 and 2013 (Figure 10.1; Table 10.1). The lowest nominal value was observed in 1976, at $20,173, followed by an increasing trend through the 1980s and mid-1990s. Nominal ex-vessel value peaked in 2010 at $958,377, before falling to $668,480 in 2013. When adjusted for inflation, the highest ex-vessel value was observed in 1997, with the inflation-adjusted value falling thereafter but showing no-long term trend.

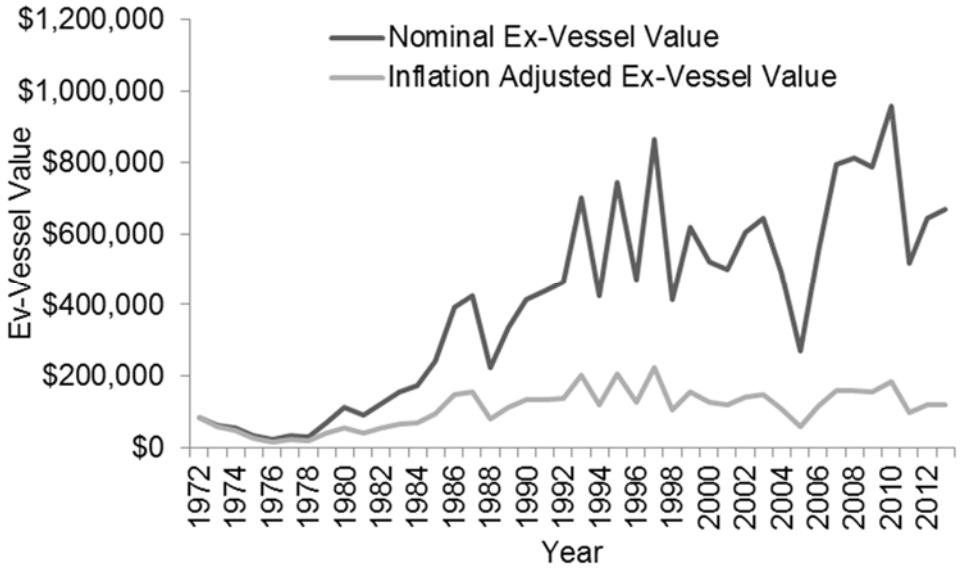

Figure 10.1 Ex-vessel value of kingfish landings in North Carolina, 1972–2013 (Source: NCTTP, unpublished data).

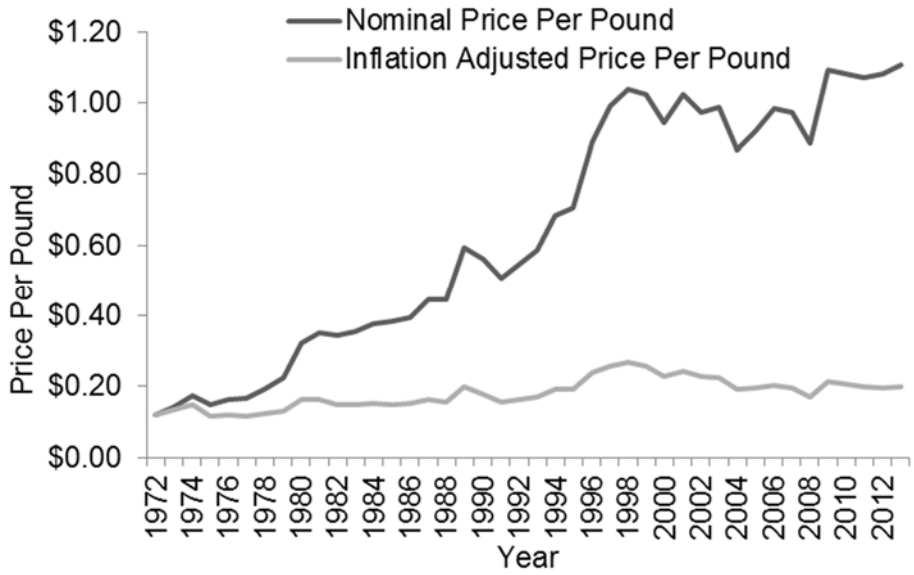

Figure 10.2 Annual average nominal and inflation-adjusted ex-vessel price per pound for kingfish landed in North Carolina, 1972–2013 (Source: NCTTP, unpublished data).

Table 10.1 Annual commercial landings, nominal ex-vessel value, inflation adjusted ex-vessel value, nominal price per pound, and inflation-adjusted price per pound of kingfish landed in North Carolina, 1972–2013 (Source: NCTTP, unpublished data).

Year	Pounds Landed	Nominal Ex-Vessel Value	Inflation Adjusted Ex-Vessel Value	Nominal Price Per Pound	Inflation Adjusted Price Per Pound
1972	683,048	$82,740	$82,740	$0.12	$0.12
1973	428,647	$60,556	$57,010	$0.14	$0.13
1974	314,584	$54,445	$46,162	$0.17	$0.15
1975	212,530	$31,635	$24,579	$0.15	$0.12
1976	123,896	$20,173	$14,820	$0.16	$0.12
1977	204,603	$33,926	$23,401	$0.17	$0.11
1978	153,954	$29,534	$18,934	$0.19	$0.12
1979	310,503	$69,580	$40,061	$0.22	$0.13
1980	342,605	$110,436	$56,022	$0.32	$0.16
1981	254,651	$89,396	$41,108	$0.35	$0.16
1982	361,052	$123,817	$53,633	$0.34	$0.15
1983	441,881	$155,857	$65,410	$0.35	$0.15
1984	464,351	$174,597	$70,242	$0.38	$0.15
1985	632,440	$241,653	$93,876	$0.38	$0.15
1986	993,390	$391,492	$149,310	$0.39	$0.15
1987	959,928	$426,366	$156,885	$0.44	$0.16
1988	503,949	$223,357	$78,921	$0.44	$0.16
1989	562,424	$334,358	$112,711	$0.59	$0.20
1990	738,612	$412,824	$132,028	$0.56	$0.18
1991	864,651	$439,283	$134,817	$0.51	$0.16
1992	851,708	$464,525	$138,397	$0.55	$0.16
1993	1,194,224	$701,314	$202,871	$0.59	$0.17
1994	620,841	$424,307	$119,676	$0.68	$0.19
1995	1,058,785	$746,603	$204,777	$0.71	$0.19
1996	528,260	$470,545	$125,359	$0.89	$0.24
1997	872,888	$864,030	$225,025	$0.99	$0.26
1998	399,313	$414,315	$106,248	$1.04	$0.27
1999	607,465	$621,078	$155,829	$1.02	$0.26
2000	551,940	$520,965	$126,460	$0.94	$0.23
2001	489,743	$501,999	$118,484	$1.03	$0.24
2002	619,737	$603,854	$140,306	$0.97	$0.23
2003	652,636	$644,920	$146,509	$0.99	$0.22
2004	567,659	$492,452	$108,970	$0.87	$0.19
2005	296,263	$271,731	$58,158	$0.92	$0.20
2006	559,440	$550,566	$114,155	$0.98	$0.20
2007	817,588	$795,412	$160,355	$0.97	$0.20
2008	921,120	$815,149	$158,257	$0.88	$0.17
2009	721,924	$789,000	$153,727	$1.09	$0.21
2010	886,841	$958,377	$183,715	$1.08	$0.21
2011	486,853	$520,413	$96,707	$1.07	$0.20
2012	596,249	$645,607	$117,539	$1.08	$0.20
2013	603,186	$668,480	$119,947	$1.11	$0.20

The nominal price per pound for kingfish showed an overall steady increase from the early 1970s through the late 1990s, regardless of the number of fish landed (Figure 10.2); however, in the late 1990s and mid-2000s there was a slight downward trend. At the time, many North Carolina fishermen attributed this trend to competition from a developing Florida fishery. Nominal prices rose again in the late 2000s and peaked in 2013 at $1.11 per pound. When adjusted for inflation, the price per pound exhibited an increasing trend from the 1970s through the mid-1990s, with a peak in 1998. Since then, inflation adjusted prices have gone slightly downward but remain relatively stable.

10.1.2 Gear and Price

From 1994 to 2013, gill nets accounted for the highest ex-vessel value among the gears used to catch kingfish (Table 10.2). On average, 71% of the total dockside value for kingfish landings was caught using gill nets. Fish trawls accounted for a large portion of kingfish landings early in the time series, but dropped off substantially after 1997. Shrimp trawls had the second highest landings value in most years followed by seines and “other” gears.

Table 10.2 Landings, nominal ex-vessel value, and average nominal price per pounds for kingfish by gear, 1994–2013 (Source: NCTTP, unpublished data).

	Fish Trawl			Gill Net			Seines			Shrimp Trawl			Other		
Year	Pounds	Ex-Vessel Value	Price per Pound	Pounds	Ex-Vessel Value	Price per Pound	Pounds	Ex-Vessel Value	Price per Pound	Pounds	Ex-Vessel Value	Price per Pound	Pounds	Ex-Vessel Value	Price per Pound
1994	204,606	$109,027	$0.53	265,730	$199,867	$0.75	51,264	$39,340	$0.77	94,668	$72,588	$0.77	4,572	$3,485	$0.76
1995	102,694	$78,656	$0.77	643,322	$449,404	$0.70	65,966	$46,127	$0.70	243,210	$169,891	$0.70	3,593	$2,526	$0.70
1996	46,363	$31,403	$0.68	219,150	$212,090	$0.97	57,062	$55,306	$0.97	203,158	$169,298	$0.83	2,528	$2,448	$0.97
1997	109,552	$95,912	$0.88	484,872	$489,979	$1.01	46,050	$46,819	$1.02	229,096	$227,967	$1.00	3,318	$3,353	$1.01
1998	17,295	$15,332	$0.89	263,834	$275,771	$1.05	34,393	$35,894	$1.04	80,470	$83,847	$1.04	3,321	$3,472	$1.05
1999	7,146	$6,119	$0.86	339,097	$347,236	$1.02	20,907	$21,543	$1.03	237,542	$243,323	$1.02	2,774	$2,857	$1.03
2000	11,702	$9,904	$0.85	335,063	$317,127	$0.95	45,806	$43,385	$0.95	156,961	$148,268	$0.94	2,409	$2,281	$0.95
2001	17,024	$21,607	$1.27	384,821	$391,051	$1.02	37,224	$37,795	$1.02	47,564	$48,389	$1.02	3,109	$3,157	$1.02
2002	9,239	$9,808	$1.06	468,308	$455,662	$0.97	25,189	$24,506	$0.97	115,078	$112,008	$0.97	1,922	$1,870	$0.97
2003	3,785	$4,053	$1.07	532,742	$526,194	$0.99	39,175	$38,690	$0.99	68,093	$67,251	$0.99	8,841	$8,731	$0.99
2004	4,515	$3,872	$0.86	408,870	$355,044	$0.87	43,372	$37,665	$0.87	109,009	$94,228	$0.86	1,893	$1,643	$0.87
2005	8,346	$8,027	$0.96	241,553	$221,261	$0.92	30,921	$28,302	$0.92	14,658	$13,424	$0.92	785	$718	$0.92
2006	10,530	$10,337	$0.98	464,774	$457,427	$0.98	34,519	$33,973	$0.98	46,236	$45,501	$0.98	3,382	$3,328	$0.98
2007	23,566	$22,544	$0.96	635,739	$618,822	$0.97	25,119	$24,445	$0.97	132,033	$128,501	$0.97	1,131	$1,101	$0.97
2008	55,064	$47,129	$0.86	594,360	$527,036	$0.89	46,202	$41,075	$0.89	216,551	$191,983	$0.89	8,943	$7,927	$0.89
2009	21,129	$23,125	$1.09	583,484	$637,740	$1.09	27,045	$29,570	$1.09	87,123	$95,127	$1.09	3,143	$3,438	$1.09
2010	28,945	$29,456	$1.02	726,654	$786,589	$1.08	50,367	$54,630	$1.08	79,589	$86,307	$1.08	1,286	$1,394	$1.08
2011	276	$295	$1.07	429,271	$458,932	$1.07	32,239	$34,489	$1.07	23,692	$25,231	$1.06	1,376	$1,466	$1.07
2012	3,411	$3,704	$1.09	505,595	$547,470	$1.08	28,115	$30,524	$1.09	57,368	$62,015	$1.08	1,760	$1,893	$1.08
2013	*	*	*	436,397	$483,910	$1.11	19,696	$21,798	$1.11	144,643	$159,979	$1.11	2,441	$2,784	$1.14

10.1.3 Waterbodies

Since the start of the NCTTP in 1994, the majority of the ex-vessel value of commercial kingfish landings has occurred in ocean waters, averaging 80% of the total ex-vessel value for all waters in the state (Figure 10.3; Table 10.3). This was generally followed by landings from the Pamlico Sound, Core Sound, and "other" waterbodies combined. In 2013, ocean waters dropped to their lowest level as a percent of total kingfish landings value, while landings in Pamlico Sound and Core Sound accounted for a greater percentage of the total landings value.

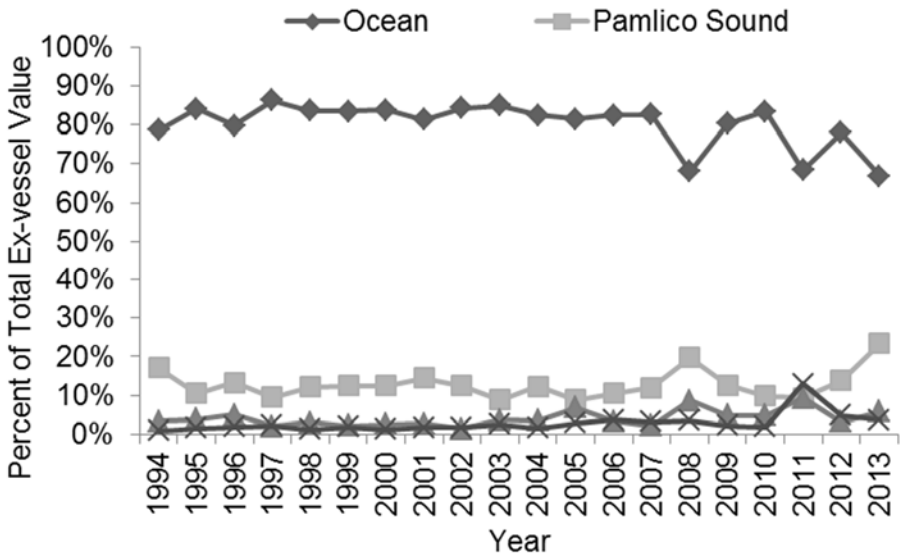

Figure 10.3 Percent of total annual commercial kingfish harvest value by waterbody, 1994–2013 (Source: NCTTP, unpublished data).

Table 10.3 Nominal ex-vessel value of commercial kingfish landings by waterbody, 1994–2013 (Source: NCTTP, unpublished data).

	Ocean		Pamlico Sound		Core Sound		Other		All Water Bodies
Year	Ex-Vessel Value	Percent of Total Value	Ex-Vessel Value	Percent of Total Value	Ex-Vessel Value	Percent of Total Value	Ex-Vessel Value	Percent of Total Value	Total Ex-Vessel Value
1994	$333,619	79%	$72,447	17%	$14,434	3%	$3,807	1%	$424,307
1995	$627,664	84%	$77,730	10%	$29,000	4%	$12,209	2%	$746,603
1996	$374,964	80%	$62,688	13%	$23,808	5%	$9,085	2%	$470,545
1997	$745,454	86%	$82,084	10%	$17,300	2%	$19,192	2%	$864,030
1998	$346,229	84%	$50,519	12%	$12,660	3%	$4,907	1%	$414,315
1999	$517,714	83%	$77,722	13%	$14,006	2%	$11,636	2%	$621,078
2000	$436,000	84%	$65,246	13%	$13,195	3%	$6,524	1%	$520,965
2001	$407,493	81%	$72,230	14%	$13,843	3%	$8,432	2%	$501,999
2002	$508,803	84%	$75,802	13%	$8,634	1%	$10,615	2%	$603,854
2003	$547,525	85%	$57,245	9%	$23,725	4%	$16,425	3%	$644,920
2004	$406,112	82%	$61,019	12%	$17,282	4%	$8,040	2%	$492,452
2005	$221,307	81%	$23,916	9%	$18,489	7%	$8,019	3%	$271,731
2006	$453,727	82%	$57,824	11%	$18,933	3%	$20,082	4%	$550,566
2007	$657,410	83%	$94,712	12%	$17,196	2%	$26,093	3%	$795,412
2008	$555,097	68%	$160,441	20%	$70,392	9%	$29,219	4%	$815,149
2009	$632,745	80%	$99,968	13%	$38,807	5%	$17,481	2%	$789,000
2010	$798,588	83%	$94,537	10%	$46,794	5%	$18,458	2%	$958,377
2011	$355,569	68%	$48,932	9%	$48,537	9%	$67,374	13%	$520,413
2012	$503,700	78%	$88,991	14%	$20,968	3%	$31,949	5%	$645,607
2013	$447,481	67%	$156,791	23%	$39,213	6%	$24,995	4%	$668,480
Average	-	80%	-	13%	-	4%	-	3%	-

10.1.4 Participants and Effort

Commercial fishermen in North Carolina often rely on multiple species to generate revenue at different times of the year and participate in several fisheries. When examining the total ex-vessel value of commercial landings from commercial participants reporting kingfish landings, it is clear that participants in the kingfish fishery often rely more on other species for fishing revenue. In 2013, participants in the commercial kingfish fishery reported seafood landings that were valued at $33.25 million, with brown shrimp and white shrimp accounting for the largest portion of the harvest value (16% for both species), followed by hard blue crab (15%), flounders (12%), croaker (5%), Spanish mackerel (3%), striped mullet (3%), oysters (2%), and finally kingfish (2%). While there is a directed commercial fishery for kingfish, when examining all trips where kingfish were landed, kingfish most often made up less than 5% of the total ex-vessel value of the trip. This reflects the notation that kingfish are often unintended species rather than the target of these fishing trips (Table 10.4). A similar trend is also reflected in Table 10.5, where the majority of commercial participants report kingfish landings worth less than $100 each year.

Table 10.4 Number of commercial trips landing kingfish sorted by percent of total trip ex-vessel value attributable to kingfish, 1994–2013 (Source: NCTTP, unpublished data).

Percent of total trip value	Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<5%	7,316	8,346	5,844	6,595	5,528	6,072	5,527	4,074	3,680	3,792	4,271
5%-9.9%	1,151	1,172	955	1,211	989	926	924	685	553	603	562
10%-24.9%	1,195	1,128	853	1,231	939	827	889	741	595	751	605
25%-49.9%	622	670	559	830	478	531	445	527	418	477	426
50%-74.9%	362	528	367	497	327	438	246	432	371	311	294
75%-99.9%	377	598	276	573	435	565	533	685	767	758	578
100%	65	54	54	84	72	87	148	116	127	102	117
Total trips	11,088	12,496	8,908	11,021	8,768	9,446	8,712	7,260	6,511	6,794	6,853

Percent of total trip value	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<5%	3,268	4,084	4,334	4,690	4,535	3,720	3,230	4,094	5,565	4,928
5%-9.9%	452	606	473	549	581	497	383	542	648	723
10%-24.9%	459	663	544	485	593	464	313	655	605	727
25%-49.9%	294	432	316	340	374	311	214	435	422	456
50%-74.9%	206	313	348	292	278	234	201	390	345	339
75%-99.9%	315	465	801	733	695	700	616	588	448	575
100%	130	84	115	164	174	234	87	156	106	114
Total trips	5,124	6,647	6,931	7,253	7,230	6,160	5,044	6,860	8,139	7,862

Table 10.5 Number of participants in the commercial kingfish fishery in North Carolina sorted by ex-vessel value of landings, 1994–2013 (Source: NCTTP, unpublished data).

	Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Under $100	508	538	503	504	449	458	451	385	370	344	407
% of total	61%	57%	61%	58%	60%	58%	60%	58%	56%	55%	61%
$100-$500	170	168	165	166	166	140	139	137	136	139	119
% of total	20%	18%	20%	19%	22%	18%	19%	21%	21%	22%	18%
$501-$1,000	69	83	58	63	47	48	45	40	50	49	52
% of total	8%	9%	7%	7%	6%	6%	6%	6%	8%	8%	8%
$1,001-$2,000	38	55	53	46	40	65	54	36	39	32	38
% of total	5%	6%	6%	5%	5%	8%	7%	5%	6%	5%	6%
$2,001-$5,000	34	58	36	54	26	41	34	42	38	27	23
% of total	4%	6%	4%	6%	3%	5%	5%	6%	6%	4%	3%
$5,001-$10,000	8	23	8	23	9	21	19	13	17	16	12
% of total	1%	2%	1%	3%	1%	3%	3%	2%	3%	3%	2%
More than $10,000	3	12	7	15	8	10	8	9	13	13	14
% of total	0%	1%	1%	2%	1%	1%	1%	1%	2%	2%	2%
Total	830	937	830	871	745	783	750	662	663	620	665

	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Under $100	414	424	396	467	478	376	411	429	444	438
% of total	72%	65%	60%	61%	64%	58%	68%	63%	60%	61%
$100-$500	90	111	114	117	118	122	93	115	128	133
% of total	16%	17%	17%	15%	16%	19%	15%	17%	17%	18%
$501-$1,000	19	47	52	57	48	47	36	53	48	51
% of total	3%	7%	8%	8%	6%	7%	6%	8%	6%	7%
$1,001-$2,000	17	25	34	41	36	32	19	28	50	39
% of total	3%	4%	5%	5%	5%	5%	3%	4%	7%	5%
$2,001-$5,000	24	18	25	30	32	27	20	24	40	33
% of total	4%	3%	4%	4%	4%	4%	3%	4%	5%	4%
$5,001-$10,000	5	12	21	22	18	24	15	13	19	16
% of total	1%	2%	3%	3%	2%	4%	2%	2%	3%	2%
More than $10,000	7	16	20	26	21	25	13	16	13	13
% of total	1%	2%	3%	3%	3%	4%	2%	2%	2%	2%
Total	576	653	662	760	751	653	607	678	742	722

The number of participants in the kingfish fishery has varied while the number of seafood dealers has remained relatively steady from 1994 to 2013 (Figure 10.4). The number of commercial participants tended to drop from the mid-1990s to the mid-2000s. This was followed by a rise in participant counts until 2008. Participation fell again for several years before recovering towards the end of the time series, with 742 commercial fishermen reporting kingfish landings in 2013. Despite the directed fishery for kingfish, many of the participants likely caught kingfish as bycatch in other fisheries, such as the shrimp fishery, indicating that other fisheries heavily influence the total number of participants reporting kingfish landings from year to year.

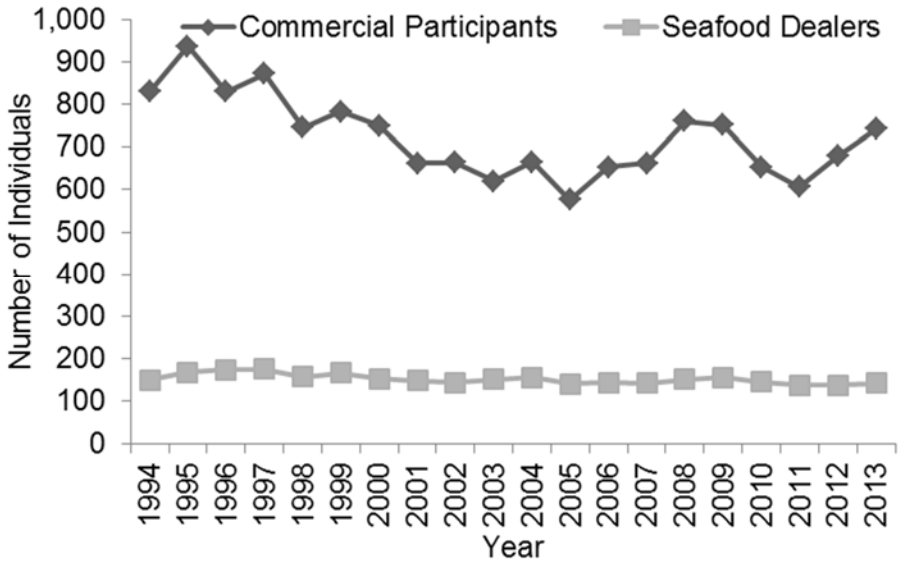

Figure 10.4 Number of commercial participants and seafood dealers reporting kingfish landings in North Carolina, 1994–2013 (Source: NCTTP, unpublished data).

Table 10.6 shows the total number of seafood dealers reporting landings of kingfish by ex-vessel value. As mentioned, the number of dealers selling kingfish has not changed drastically over the time series. While variable from year to year, the total percentage of dealers selling kingfish has tended to shift more to the extreme values in the table of ”Under $100” and ”More than $20,000”, with 2013 percentages coming in above the long-term average for both categories. Brunswick County had the largest number of dealers selling kingfish in 2013, followed by Carteret, Dare, New Hanover, and Onslow counties (Table 10.7).

Table 10.6 Number of seafood dealers involved in the commercial kingfish fishery in North Carolina sorted by ex-vessel value of landings, 1994–2013 (Source: NCTTP, unpublished data).

	Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Under $100	47	65	78	73	62	61	58	64	52	55	54
% of total	31%	39%	45%	41%	39%	37%	38%	43%	36%	36%	35%
$100-$500	30	27	33	29	28	25	20	19	23	32	38
% of total	20%	16%	19%	16%	18%	15%	13%	13%	16%	21%	24%
$501-$1,000	11	15	6	12	16	11	17	7	6	13	12
% of total	7%	9%	3%	7%	10%	7%	11%	5%	4%	9%	8%
$1,001-$2,000	20	14	14	8	15	13	11	10	13	11	12
% of total	13%	8%	8%	5%	10%	8%	7%	7%	9%	7%	8%
$2,001-$5,000	18	18	17	17	11	18	18	22	23	14	11
% of total	12%	11%	10%	10%	7%	11%	12%	15%	16%	9%	7%
$5,001-$10,000	14	7	11	15	8	17	15	13	11	14	13
% of total	9%	4%	6%	9%	5%	10%	10%	9%	8%	9%	8%
$10,001-$20,000	7	12	11	6	11	16	6	7	6	4	11
% of total	5%	7%	6%	3%	7%	10%	4%	5%	4%	3%	7%
More than $20,000	3	10	4	16	6	6	7	6	9	8	5
% of total	2%	6%	2%	9%	4%	4%	5%	4%	6%	5%	3%
Total	150	168	174	176	157	167	152	148	143	151	156

	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Under $100	66	65	58	62	67	54	66	67	64	62
% of total	47%	45%	41%	41%	43%	37%	48%	49%	45%	41%
$100-$500	28	28	25	24	32	26	23	19	26	27
% of total	20%	20%	18%	16%	21%	18%	17%	14%	18%	18%
$501-$1,000	8	8	11	12	5	13	9	7	8	10
% of total	6%	6%	8%	8%	3%	9%	7%	5%	6%	7%
$1,001-$2,000	11	8	11	9	11	12	11	7	5	11
% of total	8%	6%	8%	6%	7%	8%	8%	5%	4%	7%
$2,001-$5,000	10	16	8	12	16	12	7	11	8	14
% of total	7%	11%	6%	8%	10%	8%	5%	8%	6%	9%
$5,001-$10,000	8	5	10	8	5	6	8	6	13	10
% of total	6%	3%	7%	5%	3%	4%	6%	4%	9%	7%
$10,001-$20,000	7	7	9	13	9	8	6	10	3	8
% of total	5%	5%	6%	9%	6%	6%	4%	7%	2%	6%
More than $20,000	2	6	10	11	11	14	8	10	15	8
% of total	1%	4%	7%	7%	7%	10%	6%	7%	11%	6%
Total	140	143	142	151	156	145	138	137	142	152

Table 10.7 Number of seafood dealers reporting kingfish landings by county in North Carolina, 1994–2013 (Source: NCTTP, unpublished data).

	Year										
County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Brunswick	24	28	28	33	28	30	32	23	23	28	29
Carteret	25	28	26	32	30	32	27	24	27	25	27
Dare	31	34	37	30	26	24	23	22	21	22	19
New Hanover	15	15	16	16	15	15	13	16	15	19	16
Onslow	11	12	11	11	11	10	10	12	14	12	18
Other	44	51	56	54	47	56	47	51	43	45	47
Total	150	168	174	176	157	167	152	148	143	151	156

	Year									
County	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Brunswick	22	20	23	23	31	26	26	29	31	27
Carteret	24	25	24	29	23	29	27	24	24	27
Dare	21	17	21	17	17	15	13	16	15	22
New Hanover	17	15	16	16	12	15	11	10	12	15
Onslow	12	16	14	17	18	16	15	14	13	13
Other	44	50	44	49	55	44	46	44	47	48
Total	140	143	142	151	156	145	138	137	142	152

10.1.5 Economic Impact of the Commercial Fishery

The expenditures and income within the commercial fishing industry and related businesses produce ripple effects as money is spent and re-spent in the state economy. Each dollar spent generates additional economic impacts by stimulating further economic activity that supports jobs, income, industry output and business sales. The estimated economic impact of commercial kingfish landings can be found in Table 10.8.

Table 10.8 Economic impacts associated with commercial landings of kingfish in North Carolina, 2013.

				Estimated Economic Impacts	
Participants[1]	Trips[1]	Ex-vessel value[1]	Jobs[2,3]	Income impacts (thousands of dollars)[3]	Sales impacts (thousands of dollars)[3]
742	8,139	$668,480	57	$1,079.2	$2,579.9

[1]As reported by the NCTTP
[2]Represents average monthly number of full-time and part-time jobs over a 12 month period
[3]Economic impacts calculated using the NCDMF commercial fishing economic impact model and IMPLAN economic impact modeling software; all economic impact estimates are for the state economy of North Carolina

The presented economic impact estimates represent those of commercial seafood harvesters, dealers, processors, wholesalers, distributors, and retailers. These estimates are a product of the NCDMF economic impact model for commercial fishing which uses IMPLAN economic impact modeling software customized with data from the NCDMF as well as economic multipliers originating from the NMFS Commercial Fishing and Seafood Industry Input/Output Model (NOAA 2011). Commercial landings data from the NCTTP are used as the primary input as well as data from North Carolina commercial fishermen and

seafood dealers collected during surveys that have been carried out by the NCDMF Fisheries Economics Program examining fishing business expenditures (Crosson 2007, 2009, 2010a; Hadley and Crosson 2010; Hadley and Wiegand 2014). Economic multipliers for commercial harvesters as well as seafood dealers and processors are derived from NCDMF data while multipliers for seafood wholesalers, distributors, and retailers originate from the NMFS model.

10.2 ECONOMIC ASPECTS OF THE RECREATIONAL FISHERY

Kingfish are a commonly caught and targeted recreational species among nearshore, pier, and beach anglers in North Carolina. Information on recreational fishing for kingfish is collected by the NCDMF in conjunction with the MRIP. The effort estimates produced by the MRIP can be used to estimate total recreational fishing trip expenditures and economic impacts stemming from directed trips (caught and targeted) for kingfish (Table 10.9). As with the commercial sector, these expenditures produce ripple effects as money is spent and re-spent in the state economy. This economic activity supports jobs, income, industry output and business sales in the state.

Table 10.9 Economic impacts associated with directed recreational fishing trips for kingfish, 2013.

			Estimated Economic Impacts	
Trips[1]	Trip expenditures (thousands of dollars)[2]	Jobs[3,4]	Income Impacts (thousands of dollars)[4]	Sales Impacts (thousands of dollars)[4]
301,091	$18,337.1	269	$8,159.40	$21,633.60

[1]Trip estimates as reported by the MRIP
[2]Expenditures estimated using the NCDMF economic impact model for coastal recreational fishing.
[3]Represents average monthly number of full-time and part-time jobs over a 12-month period
[4]Economic impacts calculated using the NCDMF economic impact model for coastal recreational fishing and IMPLAN economic impact modeling software.

Estimates of the economic impacts occurring from recreational fishing trips for kingfish are conducted using the NCDMF economic impact model for coastal recreational fishing and IMPLAN software. The NCDMF economic impact model combines effort data by mode (charter boat, private/rental boat, beach/bank, and man-made structures) with inflation adjusted angler expenditures per trip by expenditure category. These expenditures are derived from information collected from recreational anglers in North Carolina during surveys that have been carried out by the NCDMF Fisheries Economics Program and for North Carolina Sea Grant to provide estimated total coastal recreational fishing trip expenditures (Dumas et al. 2009; Crosson 2010; Hadley 2012).

Determining the economic impact of recreational fishing for a specific species involves a level of uncertainty given that multiple species are often targeted and caught on a recreational fishing trip. The nature of the MRIP trip data that must be used to provide the inputs to examine economic impacts of coastal recreational fishing makes it difficult to distinguish the percentage of expenditures that should be dedicated to a single species. As such, the presented economic impacts are a conservatively high estimate of the trip impacts that can be attributed solely to kingfish, since other desirable species are at times targeted or caught by those fishing recreationally for kingfish. If other desirable species are caught or targeted on a fishing trip, such as southern flounder or spot, some portion of the angler's expense for the trip would likely be dedicated towards these species as well. Due to the

nature of the effort data that is used, an analysis cannot be performed at this time that removes the impact of other species from directed trips for kingfish. Therefore, all trip expenses occurring on directed trips for kingfish are fully dedicated to this group of species. Of the directed recreational trips included in this analysis, 62% of the trips list kingfish as a primary or secondary target, with the remaining 38% of trips indicating catching or harvesting kingfish but not listing the species as the primary or secondary target.

Conversely, the economic impacts presented may represent a conservatively low estimate for the recreational kingfish fishery, as this analysis solely examines impacts derived from recreational fishing trip expenditures (gas, groceries, bait, etc.). The analyzed expenditures do not include those that are made on durable goods related to recreational fishing such as rods, reels, boats, or towing vehicles. While some durable goods are purchased with the intention of being used in the kingfish fishery, these durable goods often have a usable lifespan of several years and may be utilized in multiple other fisheries as well as in other activities (recreational boating, waterfowl hunting, transportation, etc.). General information on durable goods expenditures for coastal recreational fishing in North Carolina do exist, but data are not available that would allow an analysis to devote these expenditures specifically to the recreational kingfish fishery.

10.3 SOCIAL ASPECTS OF THE FISHERY

10.3.1 Commercial Fishery

The NCDMF Fisheries Economics Program has been conducting in-depth socioeconomic surveys of commercial fishermen since 1999 that gather information on fishing business characteristics, expenditures, and general perceptions about community reliance on commercial fishing, fisheries management, and conflict. The surveys are conducted in five different regions of the state. These survey responses can be used to provide insight into the social importance of specific species from a commercial fishing perspective. The current dataset has a relatively small number of survey responses from commercial fishermen that identify themselves as participants in the kingfish fishery (n = 22)[1].

10.3.1.1 Demographics and fishing characteristics of commercial fishermen

Table 10.10 shows the demographic and fishing characteristics of the 22 commercial fishermen that identified themselves as participants in the kingfish fishery. Nearly all were Caucasian males, with an average age of 50 years and had 30 years of commercial fishing experience. Most had at least a high school education and over a third had some college education. On average, commercial fishing accounted for the 80% of their personal income and the majority of survey respondents (64%) reported that fishing accounted for all of their personal income.

[1] Surveys utilized in this analysis consist of those conducted with commercial fishermen who use the waters of Core Sound (last surveyed in 2007), the Albemarle and Pamlico sounds (last surveyed in 2014), and the Atlantic Ocean (last surveyed in 2009).

Table 10.10 Demographic and fishing characteristics of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

	Number	Percent
Gender		
Male	22	100%
Race		
Caucasian	21	95%
African American	1	5%
Education		
Less than high school	2	9%
High school graduate	12	55%
Some college	7	32%
College graduate	1	5%
Age		
Average	50	
Minimum	34	
Maximum	66	
Years fishing		
Average	30	
Minimum	5	
Maximum	50	

	Number	Percent
Marital Status		
Married	18	82%
Divorced	3	14%
Separated	1	5%
Household Size		
1	2	10%
2	9	43%
3	4	19%
4	4	19%
5	1	5%
>5	1	5%
Fishing status		
Full Time	17	77%
Part Time	5	23%
% of personal income from fishing		
Average		80%
Minimum		15%
Maximum		100%

10.3.1.2 Historical Importance and Community Reliance on Commercial Fishing

North Carolina coastal communities have historically been strongly dependent on the commercial fishing and tourism industries. A historical overview of the commercial kingfish fishery can be found in Section 7.0, Status of the Fisheries. The NCDMF socioeconomic surveys collect information from commercial fishermen on their opinion as to how historically important commercial fishing is to their community and how important commercial fishing is currently to their community's local economy. On a scale of one to ten in regards to particular survey questions, with one being "not at all" and ten being "extremely", the average rating across all kingfish fishermen interviewed was 9.9 in regards to commercial fishing being historically important to their community. On the same scale, the statement "commercial fishing is important economically in my current community" generated a slightly lower average response of 8.2. Table 10.11 shows the communities that were most often cited by survey respondents.

Table 10.11 Communities of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

Community	Number of Respondents
Hatteras, NC	6
Frisco, NC	2
Sneads Ferry, NC	2
Kitty Hawk, NC	1
Nags Head, NC	1
Accomac, VA	1
Hubert, NC	1
Wanchese, NC	1

Hampstead, NC	1
Stumpy Point, NC	1
Southport, NC	1
Beaufort, NC	1
Atlantic, NC	1
Otway, NC	1
Harkers Island, NC	1

10.3.1.3 Perceived Conflicts

Commercial fishermen were asked about conflicts or negative experiences occurring in the previous year with other commercial fishermen, recreational fishermen, state regulations, and federal regulations. The majority of survey participants involved in the kingfish fishery (64%) did not indicate any conflicts or negative experiences within the survey categories (Figure 10.5). The most common conflict reported was with recreational fishermen (27%), followed by federal regulations (23%), state regulations (23%), and other commercial fishermen (14%). Several fishermen reported more than one type of conflict; therefore the reported percentages do not add up to 100%.

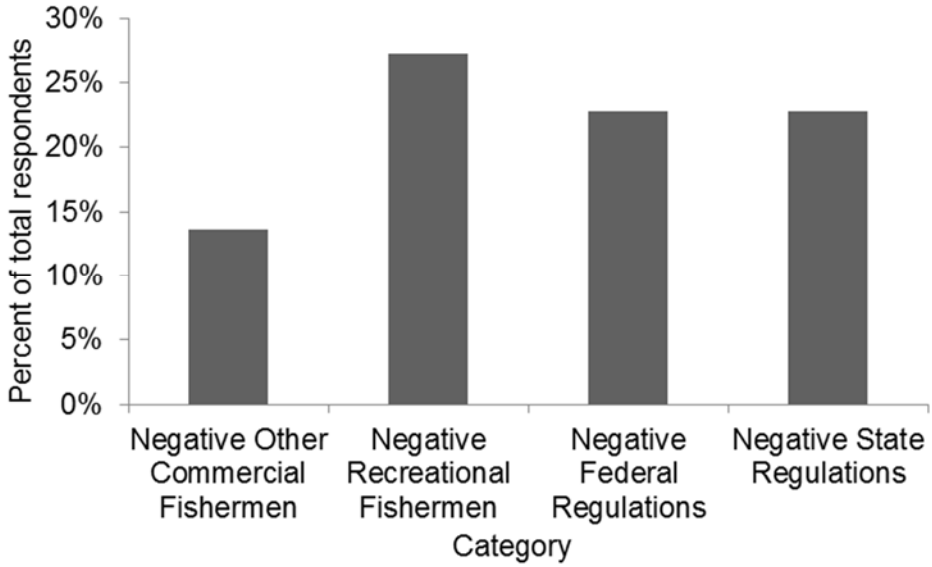

Figure 10.5 Reported conflicts of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

10.3.1.4 Perception of Important Issues

Commercial participants involved in the kingfish fishery interviewed by the NCDMF were asked to rate how important certain issues were in relation to their fishing business. The most important issue to these fishermen was the price of fuel. This was followed by coastal development, low prices for seafood, anticipating future business conditions, and losing working waterfronts. Of least concern were trip limits, overfishing, quotas, size limits, and state regulations (Table 10.12). The lack of concern over the previously stated issues is intuitive, as there are few regulations on kingfish compared to other species found in coastal North Carolina.

Table 10.12 Fishing business related issues considered most important to survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

Ranking	Issue
1	Price of fuel
2	Coastal development
3	Low prices for seafood
4	Anticipating future business conditions
5	Losing working waterfronts
6	Competition from imported seafood
7	Gear restrictions
8	Federal regulations
9	Weather
10	Rules and proclamations
11	Closed season
12	State regulations
13	Size limits
14	Quotas
15	Overfishing
16	Trip limits

10.3.2 Recreational Fishery

The NCDMF Fisheries Economics Program conducted a socioeconomic survey of CRFL holders in 2009 (Crosson 2010b). This survey collected information on fishing trip expenditures, fishing behavior, and general perceptions on fisheries management, issues effecting saltwater fishing, and conflict. These survey responses can be used to provide insight into the demographics and perceptions of recreational anglers on a species-specific basis. Of the 608 anglers that were surveyed, a total of 285 identified themselves as participants in the kingfish fishery.

10.3.2.1 Demographic and Fishing Characteristics of Recreational Anglers

Table 10.13 shows the demographic and fishing characteristics of the 285 CRFL holders that identified themselves as participants in the kingfish fishery. Nearly all were Caucasian males, with an average age of 49 years and 30 years of recreational fishing experience. Almost all had at least a high school education (94%) and two thirds had at least some college education. Surveyed anglers most commonly had an annual household income between $50,001 and $75,000.

Table 10.13 Demographic and fishing characteristics of survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

	Number	Percent
Gender		
Male	258	92%
Female	23	8%
Marital Status		
Currently married	232	83%
Never married	30	11%
Divorced	12	4%
Separated	4	1%
Widowed	3	1%
Race		
Caucasian	258	93%
African American	11	4%
Native American	6	2%
Latino	2	1%
Age		
Average	49	
Minimum	19	
Maximum	73	
Years fishing		
Average	30	
Minimum	2	
Maximum	60	

	Number	Percent
Number of people in household		
1	24	9%
2	137	49%
3	48	17%
4	54	19%
5	11	4%
> 5	5	2%
Household income		
Less than $15,000	6	2%
$15,001-$30,000	21	8%
$30,001-$50,000	49	18%
$50,001-$75,000	58	21%
$75,001-$100,000	49	18%
More than $100,000	40	14%
Prefer not to answer	55	20%
Education		
Less than high school	18	6%
High school graduate	78	28%
Some college	90	32%
College graduate	71	25%
Graduate degree	25	9%

10.3.2.2 Common Target Species

Surveyed CRFL holders were asked to list the species that they targeted when recreational fishing. Table 10.14 shows the top 10 most commonly targeted species of surveyed kingfish anglers. Flounder were the most commonly mentioned species (92%), followed closely by spot (91%), spotted sea trout (81%), Atlantic croaker (81%), bluefish (78%), and red drum (72%).

Table 10.14 Top 10 most common other target species of survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

Species	Percent of respondents
Flounder	92%
Spot	91%
Spotted sea trout	81%
Atlantic croaker	81%
Bluefish	78%
Red drum	72%
Black drum	68%
Pompano	60%
Gray trout	57%
Striped bass	49%

10.3.2.3 Perceived Conflicts

Recreational anglers were asked about conflicts or negative experiences occurring in the previous year with other recreational fishermen, commercial fishermen, state regulations, and federal regulations. Most anglers did not report any conflicts or negative experiences within the surveyed categories. The most common conflict reported was with commercial fishermen (14%) followed by other recreational fishermen (9%), state regulations (3%), and federal regulations (1%; Figure 10.6).

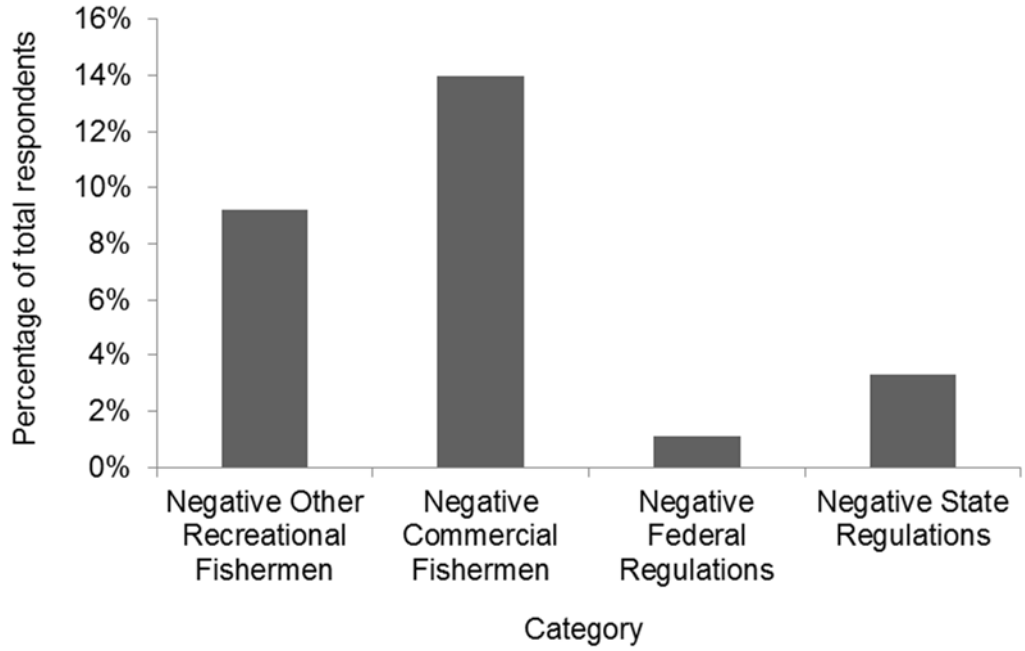

Figure 10.6 Reported conflicts of survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

10.3.2.4 Perception of Important Issues

Recreational kingfish anglers interviewed by the NCDMF were asked to rate how important certain issues were in relation to their fishing activity. The most important issue to these fishermen was water quality (Table 10.15). This was followed by keeping up with regulations, finding time to go fishing, the price of fuel, and overfishing. Of least concern was competition from other recreational fishermen, competition from commercial fishermen, bag and size limits, weather, and access to boat ramps, beaches, and piers.

Table 10.15 Fishing related issues considered most important to survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

Ranking	Issue
1	Water Quality
2	Keeping up with regulations
3	Finding time to go fishing
4	Price of fuel
5	Overfishing
6	Losing fishing piers
7	Access to boat ramps, beaches, and piers
8	Weather
9	Bag and size limits
10	Competition from commercial fishermen
11	Competition from other recreational fishermen

11.0 ENVIRONMENTAL FACTORS

11.1 HABITAT

Kingfishes have diverse habitat preferences that shift due to season and ontogenetic stage (Section 6.1 General Life History). Kingfishes are found in most habitats defined by the North Carolina Coastal Habitat Protection Plan (CHPP) including water column, soft bottom, submerged aquatic vegetation, and hard bottom (Deaton et al. 2010). Wetlands and shell bottom habitat, although not directly connected to habitats of kingfishes, are critical to kingfishes because they provide nursery areas for prey items and are important to the health of aquatic ecosystems. Protection of each habitat type is vital to maintaining a productive coastal ecosystem, which in turn is essential for a sustainable stock of kingfishes. Much of the information below was taken from the CHPP (Deaton et al. 2010).

11.1.1 Water Column

The water column habitat is defined as "the water covering a submerged surface and its physical, chemical, and biological characteristics" (Deaton et al. 2010). Kingfishes make use of the water column throughout each life stage. The water column is a transport mechanism for eggs, which are buoyant due to oil globules (Welsh and Breder 1923). As described in the life history section, spawning occurs in the nearshore ocean or possibly inshore waters. Eggs are transported to the surf zone and into estuaries by prevailing wind-driven currents (Welsh and Breder 1923; Hoese 1965; Irwin 1970; Bourne and Govoni 1988). Additionally, larval behavioral responses such as directional swimming or movement in the water column further increase the chance of recruitment into estuaries, entrainment in an estuary, or recruitment to the surf zone (Boehlert and Mundy 1988; Churchill et al. 1999). Alterations of a natural system due to inlet stabilization or dredging of navigational channels will affect egg and larvae transport into estuaries (Epifanio 1988). Jetties have been shown to limit the scope of flood tide prisms (focusing flood waters to between jetties; Seabergh 1988; Blanton et al. 1999), which may reduce the numbers of eggs and larvae transported into the system, particularly for ocean-spawned fishes (Epifanio 1988; Lawler et al. 1988; Hare et al. 1999).

The water column provides an important source of food items for juvenile kingfishes, which primarily feed on epibenthic or planktonic prey such as copepods (Bearden 1963; Irwin 1970; Delancey 1984; McMichael and Ross 1987). The resuspension and retention of inorganic nutrients in the surf zone, an important nursery area for kingfishes, creates a food rich environment for larva and juveniles and supports large concentrations of fishes that use this area seasonally (Hackney et al. 1996).

Adult kingfishes are most common in high salinity waters (>18 ppt; Bearden 1963; Irwin 1970; Deaton et al. 2010). Salinity, which is an important factor in determining species distribution, is affected by rainfall, season, estuarine morphology, wind, lunar tides, and freshwater discharge (Deaton et al. 2010). Other important water quality factors determining species distribution include water temperature, dissolved oxygen (DO), flow, and pH. Kingfishes tolerate a wide range of temperatures but are generally regarded as spring and summer residents of North Carolina (Ross and Lancaster 2002). Kingfishes have been reported to migrate southward in the nearshore ocean during the fall and winter when the temperature decreases (Smith and Wenner 1985).

11.1.2 Soft Bottom

The soft bottom habitat is defined as "unconsolidated, unvegetated sediment that occurs in freshwater, estuarine, and marine environments" (Deaton et al. 2010). The soft bottom habitat is separated into freshwater, estuarine, and marine habitats due to differing geomorphology, salinity regime, sediment type, hydrography, and/or water depth. Estuarine sediment types include sand, peat, inorganic mud, and organic rich mud. Courser sandy sediments are concentrated along eroding or high-energy shorelines and the shallower perimeter of water bodies, while finer mud sediments are in the deeper center of water bodies (Wells 1989; Riggs 1996). Intertidal flats, ocean beaches, and inlets are dynamic soft bottom features, comprised of shifting sands. Soft bottom habitat in the estuary and ocean is highly valuable as a foraging area for kingfishes and other organisms.

All three kingfish species appear to be associated with soft bottom more than other benthic habitat types. Southern and northern kingfishes occur over sand and mud bottoms of estuarine and marine habitats (Hildebrand and Cable 1934; Bearden 1963; Irwin 1970; Dahlberg 1972; Ralph 1982; Crowe 1984; Harding and Chittenden 1987). Southern kingfish inhabit deep channels with mud bottoms (Viosca 1959) and mud bottoms in the ocean (Irwin 1970) and Pamlico Sound (J. Schoolfield, NCDMF, pers. com.). Northern kingfish are common in shallow bays as juveniles, and the adults are associated with mud bottom in the ocean as well as with hard substrate in the ocean (Irwin 1970; Miller et al. 2002). Juvenile and adult Gulf kingfish are most common in the nearshore marine habitat over a sandy bottom (Irwin 1970; Dahlberg 1972; Modde and Ross 1981). The use of distinct topographical features such as shoals, sandbars, and sloughs by kingfishes has not been described. More research is needed to confirm spawning and nursery use of soft bottom habitat by these species.

Soft bottom habitat plays a key role as a foraging area for herbivores, detritivores, invertebrate, feeding fish (including kingfishes), and larger predators because of the high concentrations of organic matter and infauna that occurs there (Peterson and Peterson 1979). The sediment type and energy regime will affect the primary and secondary productivity of the bottom, and therefore the benthic microalgae (benthic diatoms and blue-green algae), demersal zooplankton, and invertebrate prey available for kingfishes and other organisms. Primary production in bottom sediments is also derived from deposition of detrital matter from marsh vegetation, submerged grasses, and macroalgae that settles on soft bottoms (Currin et al. 1995). The soft bottom environment of the estuary supports a high diversity of benthic fauna [300 spp. (Hackney et al. 1996)]. Two important prey taxa for kingfishes, polychaete worms and pelecypods, inhabit the soft bottom in the estuary (Irwin 1970; McMichael and Ross 1987; Miller et al. 1996). Kingfishes will nip off pelecypod siphons and prey on mobile invertebrates that use the soft bottom such as penaeid shrimp (*Penaeus* spp., *Farfantepenaeus* spp., and *Litopenaeus* spp.) and hermit crabs (*Pagurus* spp., *Petrochirus* spp., and *Clibanarius vittatus*; Irwin 1970; McMichael and Ross 1987; Miller et al. 1996).

Two distinct areas of the marine soft bottom habitat include the surf zone (intertidal) and subtidal bottom (Deaton et al. 2010). Juvenile kingfishes of all three species use the surf zone as a nursery area. Kingfishes are summer residents of the surf zone, with Gulf kingfish generally ranking in the top five in number of individuals collected in surf zone studies (Tagatz and Dudley 1961; Cupka 1972; Ross and Lancaster 2002). Although species diversity is reduced in the marine intertidal bottom compared to the estuary and subtidal marine bottom, the habitat includes two of the more common prey species for kingfishes; the

mole crab (*Emerita talpoida*) and coquina clams (*Donax variables*, *D. parvula;* McMichael and Ross 1987; Hackney et al. 1996).

The offshore sand bottom along coastal North Carolina has a diverse benthic community comprised of polychaete worms, crustaceans, mollusks, and fishes (Posey and Ambrose 1994; Van Dolah et al. 1994). The infaunal species such as tube dwelling worms and permanent burrow dwelling worms are most impacted by beach renourishment and sand mining (Hackney et al. 1996). These soft bottom species tend to be opportunistic and recover relatively quickly after disturbances, depending on time of year, sediment compatibility, and other factors (Posey and Alphin 2001).

Kingfishes can use shallow unvegetated estuarine shoreline as a corridor to migrate within the estuary with reduced risk of predation (Peterson and Peterson 1979). Although there is little benthic structure associated with soft bottom, kingfishes can find refuge from predators by remaining on very shallow flats that are inaccessible to predators. Kingfishes are also somewhat camouflaged against the sand substrate. Adult kingfishes migrating in fall will feed on intertidal flats.

Soft bottom also plays a very important role in the ecology of estuarine ecosystems as a storage reservoir of nutrients, chemicals, and microbes. Intense biogeochemical processing and recycling establishes a filter to trap and reprocess natural and human-induced nutrients and toxic substances. These materials may pass through an estuary (Matoura and Woodward 1983), become trapped in the organic rich low salinity zone (Sigels et al. 1982; Imberger 1983), or migrate within the estuary over seasonal cycles (Uncles et al. 1988).

Estuarine soft bottom habitat may be affected by marina and dock facilities through alteration of the shoreline configuration, circulation patterns, and changes in bottom sediment characteristics (Wendt et al. 1990). Because benthic microalgae, an important component of primary production in soft bottom habitat, are light dependent, bottom sediments in dredged marinas will have reduced light availability due to the deeper water depth and shading from docking structures. Operation of a marina can also affect productivity of the soft bottom community due to introduction of heavy metals, hydrocarbons, and bacteria (Chmura and Ross 1978; Marcus and Stokes 1985; Voudrias and Smith 1986). Heavy metals and hydrocarbons are toxic to many soft bottom dwelling invertebrates and benthic feeding fish (Weis and Weis 1989). Additionally, dissolved oxygen (DO) may become depleted or below biotic thresholds in dredged marina basins and channels. A North Carolina study found significantly lower DO concentrations (less than 5.0 mg/l) inside some marinas compared to outside marinas (DEHNR 1990).

Fishing related impacts to soft bottom and other habitats have been reviewed and compiled in federal FMPs for managed species, and have been summarized in fishery management plans by the South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC), as well as by the Moratorium Steering Committee (MSC 1996; Auster and Langton 1999; NCDMF 1999; Collie et al. 2000). A legislative report to the MSC (1996) compiled a list of the gears used in North Carolina waters and their probable impacts. The gears with the greatest potential for damage to soft bottom or other habitats include dredges and trawls. The extent of habitat damage from fishing gear varies greatly with the gear type, habitat complexity, and amount of gear contact.

Because of the severe bottom disturbance to structured habitat, crab dredging, hydraulic clam dredging, and clam kicking are restricted to open sand and mud bottoms, including areas frequently dredged as navigational channels. Bottom trawling is used more

extensively than dredges on soft bottom habitat in both estuarine and coastal ocean waters. Dredge and trawl damage to soft bottom includes removing or damaging epifauna, reducing diversity and abundance of the benthic community, smoothing sediment features, and increasing exposure to predators (Auster and Langton 1999; Collie et al. 2000). Dredges and trawls resuspend sediment, which can clog fish gills, smother benthic prey of kingfishes, and reduce light dependent benthic productivity, which in turn affects the benthic food web (SAFMC 2009). No studies have looked at the effect of trawling on the benthic community of Pamlico or other sounds in North Carolina, which is a key food source for kingfish. Maps of areas prohibited to dredging or trawling in North Carolina waters are included in Figures 11.1, 11.2, and 11.3.

While the NCMFC rules are designed to minimize commercial fishing gear impacts to fish habitat, these restrictions primarily focus on restricting the use of highly destructive bottom disturbing gear from most structural habitats such as oyster or submerged aquatic vegetation (SAV) beds. Soft bottom habitat, because of its low structure and dynamic nature, has historically been considered the most appropriate location to use bottom-disturbing gear. Oyster dredges are restricted to subtidal waters in Pamlico Sound and deeper portions of bays and tributaries adjacent to Pamlico Sound and is prohibited in Primary Nursery Areas, Shellfish Management Areas, portions of Secondary Nursery Areas, and SAV habitat.

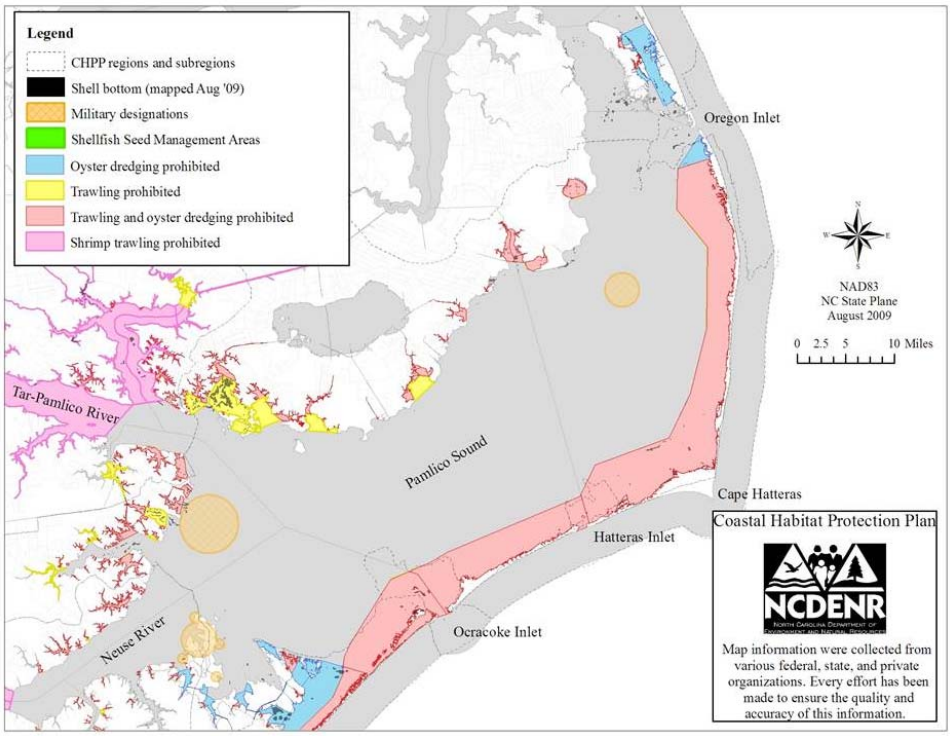

Figure 11.1 Areas prohibited to dredging or trawling in northern coastal waters of North Carolina.

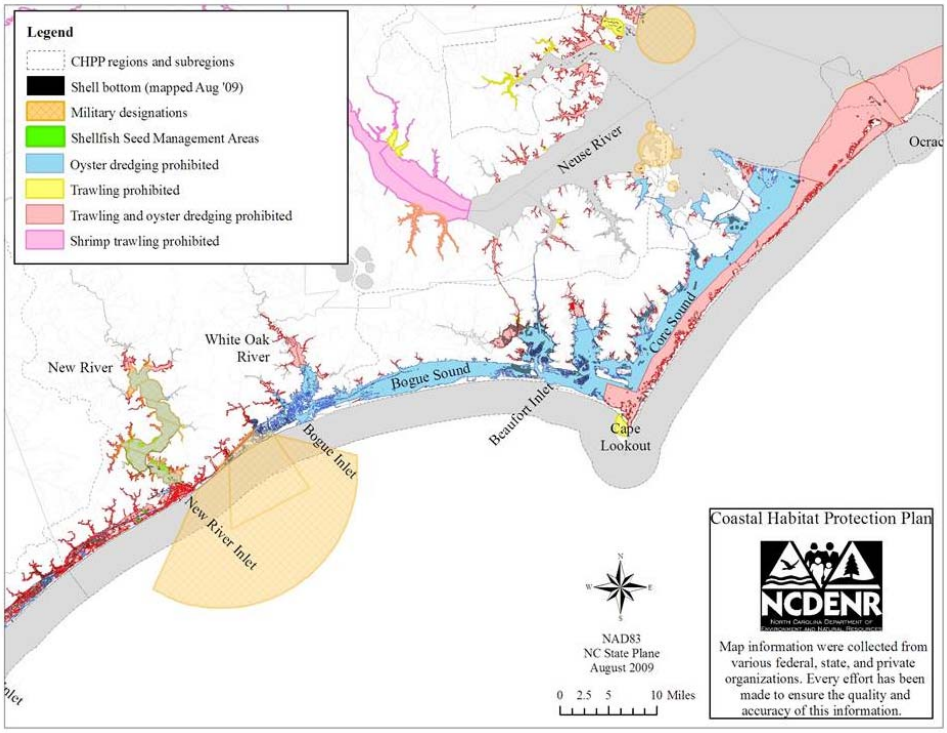

Figure 11.2 Areas prohibited to dredging or trawling in central coastal waters of North Carolina.

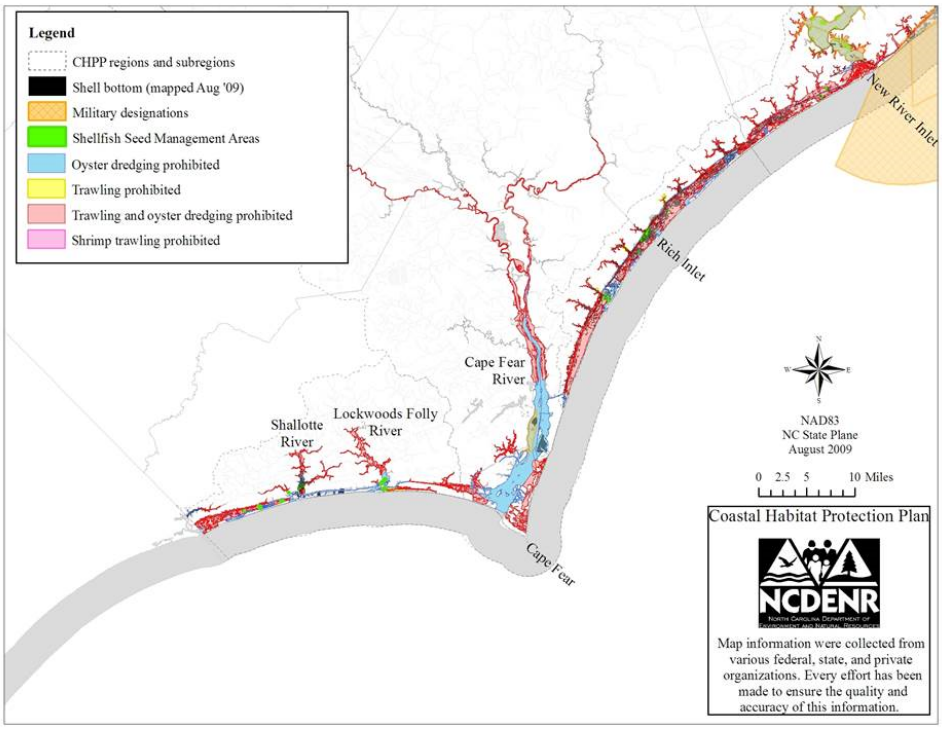

Figure 11.3 Areas prohibited to dredging or trawling in southern coastal waters of North Carolina.

Beach nourishment, and subsequent renourishment, can threaten the quality of intertidal and shallow subtidal ocean bottom habitat, which is important nursery and foraging grounds for kingfishes. When sand is put on the intertidal beach, the existing benthos is buried, killing the prey available for kingfishes (Hackney et al. 1996). The reported recovery time of the benthic community generally ranges from one month to one year, although longer in some cases (Reilly and Bellis 1983; Van Dolah et al. 1992; Rackocinski et al. 1993; Donoghue 1999; Jutte et al. 1999; Peterson et al. 2000; Lindquist and Manning 2001; USACE 2001). Factors that affect the recovery time include compatibility of deposited material with native sand, volume, depth, and length of filler area, time of year, frequency of renourishment events, and specific site conditions. In addition to reduction in available food, beach renourishment can affect kingfishes and other fish species by altering preferred topographic features such as ebb tide deltas and nearshore muddy sloughs or reducing visibility (Deaton et al. 2010). Demersal feeding fish that feed in the surf zone, such as kingfishes and Florida pompano (*Trachinotus carolinus*), would be the most vulnerable to these effects of beach nourishment. Since Gulf and northern kingfish exhibit strong site fidelity, localized disturbances may negatively affect abundance of Gulf and northern kingfishes (Miller et al. 2002; Ross and Lancaster 2002).

In North Carolina, the effects of a Brunswick County beach nourishment project on surf fish, benthic invertebrates, and water quality were evaluated from March 2001 to May 2002 (USACE 2003). Sand from the lower Cape Fear River dredging project was placed on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach. Sampling conducted before and after the project found no significant differences in fish abundance or diversity among disturbed, undisturbed, and reference sites during any season. Although not statistically significant, Gulf kingfish were less abundant at the disturbed sites than the undisturbed sites. The decline was thought to be at least partially due to the reduced availability of benthic invertebrates preferred by Gulf kingfish. However, the high mobility and schooling behavior of the dominant fish species (anchovies and drum family) and insufficient and uneven sampling size made statistical detection difficult.

In a beach nourishment study conducted in New Jersey, abundance of bluefish, a visual feeder, decreased while northern kingfish, a benthic feeder, appeared to increase (USACE 2001); however, no long-term trends were detected in distribution or abundance. This study concluded that the inter-annual fluctuations in surf zone fish populations were too large to accurately detect change from such a project, unless the change was completely catastrophic. In addition, the cumulative impacts when beach nourishment is conducted over a wide area may have a greater impact on kingfishes since kingfishes exhibit little movement along the intertidal zone as juveniles (Miller et al. 2002; Ross and Lancaster 2002). Adequate monitoring of the effects of beach nourishment on the soft bottom community and associated surf fish populations is increasingly important as the number of beach nourishment projects increase and should be required for all large-scale or long-term nourishment projects.

A study in New Hanover County investigated the effects of beach nourishment on the nursery function of the surf zone by comparing fish and invertebrate assemblages, density, and nutritional condition of juvenile Florida pompano and Gulf kingfish. Findings indicated that fish composition and diet differed significantly at nourished beaches compared to unnourished beaches, potentially affecting diet and growth (Lipton et al. 2010; Perillo and Lankford 2010).

The frequency and magnitude of beach nourishment on developed beaches have increased over time. From the 1960s to 2000, only nine miles of beach (3% of the ocean shoreline) had ongoing storm damage reduction projects at three municipalities: Wrightsville Beach, Carolina Beach, and Kure Beach. In 2015, practically all municipalities with oceanfront development had or were pursuing long-term beach nourishment projects (storm damage reduction projects). Exceptions include the oceanfront communities in Currituck County, Hatteras Village, and Sunset Beach (approximately 27 mi). Approximately 160 mi (50%) of oceanfront beaches are federally or state owned. Consequently, once permits for beach nourishment have been obtained by the developed oceanfront communities seeking them, a potential of 41% of North Carolina's beaches could be nourished (Table 11.1). Due to federal budget shortfalls, many of these projects are moving forward without federal funding. In addition, some portion of federally-owned land could be nourished also.

Table 11.1 Storm damage reduction projects permitted or in the planning stages.

Beach community	Status	Federally authorized [1]
Duck	Preparing permit application information	N
Kitty Hawk	Preparing permit application information	N
Kill Devil Hills	Preparing permit application information	N
Nags Head	Completed in 2011	N
Rodanthe	Completed one time emergency nourishment in 2014	N
Buxton	Preparing permit application information	N
Bogue Banks	Carteret County Beach Commission was formed to plan and coordinate nourishment and develop a programatic EIS for all projects on Bogue Island. Sand sources primarily from different dredging projects and funded locally.	Y
North Topsail Beach	Project using offshore borrow areas in 2015. Excessive amount of rock was dredged onto the beach, requiring beach raking.	N
Surf City	Preparing permit application information	N
Topsail Beach	Preparing permit application information	N
Wrightsville Beach	Last done spring 2014	Y
Carolina Beach	Last done winter 2012/2013	Y
Bald Head	Receives sand regularly from Wilmington Harbor dredging	N
Caswell, Oak Islands	Receives sand regularly from Wilmington Harbor dredging	Y
Holden Beach	Last done in 2009; planning for sand and groin on east end	Y
Ocean Isle	Last done in 2014; planning for sand and groin on east end	Y

[1] Federal funds are not always available for federally authorized projects.

North Carolina's ocean shorelines are primarily unhardened. However, in 2011, SB110 was passed into law amending North Carolina Coastal Resources Commission (NCCRC) rules to allow for the permitting of up to four terminal groins. These would be treated as a pilot program to determine the effectiveness of terminal groins in North Carolina. The four communities moving forward to construct a terminal groin are Bald Head Island, Ocean Isle Beach, Figure 8 Island, and Holden Beach. Carteret County and North Topsail Beach have also expressed interest. Jetties and groins, alter barrier island migration processes, and can

accelerate erosion on downdrift beaches. These structures can potentially interfere with the passage of larvae and early juveniles from offshore spawning grounds into estuarine nursery areas because successful transport through the inlet occurs within a narrow zone parallel to the shoreline and are highly dependent on along-shore transport processes (Blanton et al. 1999; Churchill et al. 1999; Hare et al. 1999).

Given the increasing interest in ocean shoreline stabilization, the cumulative impacts of activities on the intertidal and subtidal communities are expected to increase. To adequately assess the direct and cumulative impacts of beach nourishment activities on fish, their habitat, and biological recovery rates, thorough monitoring must be conducted. The NCMFC adopted a beach nourishment policy in 2000 in order to guide the permitting process to fully consider fish habitat impacts (NCDMF 2007). All beach nourishment projects should adhere to the guidelines provided in that policy. The policy is a tool for the NCMFC to use, should they decide to comment on a project. In addition, regulatory agencies should incorporate guidelines to minimize long-term impacts to soft bottom habitat, benefiting kingfishes and other surf zone species.

11.1.3 Submerged Aquatic Vegetation

Submerged aquatic vegetation (SAV) is a fish habitat dominated by one or more species of underwater vascular plants. The NCMFC defines SAV habitat as submerged lands that:

"(i) are vegetated with one or more species of submerged aquatic vegetation including bushy pondweed or southern naiad (*Najas guadalupensis*), coontail (*Ceratophyllum demersum*), eelgrass (*Zostera marina*), horned pondweed (*Zannichellia palustris*), naiads (*Najas* spp.), redhead grass (*Potamogeton perfoliatus*), sago pondweed (*Stuckenia pectinata*, formerly *Potamogeton pectinatus*), shoalgrass (*Halodule wrightii*), slender pondweed (*Potamogeton pusillus*), water stargrass (*Heteranthera dubia*), water starwort (*Callitriche heterophylla*), waterweeds (*Elodea* spp.), widgeon grass (*Ruppia maritima*) and wild celery (*Vallisneria americana*). These areas may be identified by the presence of above-ground leaves, below-ground rhizomes, or reproductive structures associated with one or more SAV species and include the sediment within these areas; or

(ii) have been vegetated by one or more of the species identified in Sub-item (4)(i)(i) of this Rule within the past 10 annual growing seasons and that meet the average physical requirements of water depth (six feet or less), average light availability (secchi depth of one foot or more), and limited wave exposure that characterize the environment suitable for growth of SAV. The past presence of SAV may be demonstrated by aerial photography, SAV survey, map, or other documentation. An extension of the past 10 annual growing season's criteria may be considered when average environmental conditions are altered by drought, rainfall, or storm force winds." [2009 MFC rule 15A NCAC 03I .0101 (4)(i)].

High salinity SAV beds are present primarily in Pamlico, Core, and Bogue sounds (Ferguson and Wood 1994). Smaller patches of seagrass occur from New River through northern New Hanover County (Deaton et al. 2010). Seagrasses provide habitat for an array of species including kingfishes and prey of kingfishes (Ross and Noble 1990). Sampling by NCDMF in grass beds behind the Outer Banks documented southern and northern kingfish in low densities (NCDMF 1990). Over 150 other species of fish and invertebrates were found in seagrass beds in eastern Pamlico and Core sounds.

SAV enhances the ecosystem by stabilizing and trapping sediment, reducing wave energy, and cycling nutrients within the system (Thayer et al. 1984). The three-dimensional structure provides a surface for small plants and animals to attach to and provides a safe refuge and foraging area for a large number of juvenile fish and invertebrates (SAFMC 1998). Beds of SAV also produce large quantities of organic matter, which supports a complex food base for numerous fish and other organisms (Thayer et al. 1984). SAV provides a structure that enhances safe corridor between habitats, reducing predation, and providing food for kingfishes and other species (Micheli and Peterson 1999).

Along the Atlantic coast, North Carolina supports more SAV than any other state with the exception of Florida (Funderburk et al. 1991; Sargent et al. 1995). Based on aerial photography, North Carolina was estimated to have between 134,000 and 200,000 acres of SAV in 1990 (Ferguson and Wood 1994). Aerial photography underestimates SAV coverage in low salinity waters (western Albemarle-Pamlico system) where water clarity is limited. Other mapping efforts have been done using field surveys to document SAV distribution in these areas (Davis and Brinson 1990; NCDWQ 1998). The need for repeated mapping of SAV to monitor and assess distribution changes has been identified and resources were allocated toward coast-wide mapping in 2006-2008. This last coast-wide mapping delineated 137,951 acres of SAV, of which approximately half was classified as dense and half as patchy (APNEP 2012). These numbers are considered conservative since they likely underestimate SAV in western Pamlico Sound tributaries and Albemarle Sound. The high salinity grass beds from the northern Outer Banks to Bogue Inlet were remapped in 2013 using aerial photography. Researchers have developed a more accurate and feasible means to map the low salinity SAV habitat in Albemarle Sound and western Pamlico Sound tributaries and researchers at East Carolina University are currently working on mapping portions of these areas. In 2015, high salinity SAV was remapped in the southern portion of the coast, from Bogue Sound to Mason's Inlet.

The primary factors controlling distribution of SAV are water depth, sediment composition, currents/wave energy, and light penetration through the water column (Goldsborough and Kemp 1988; Duarte 1991; Kenworthy and Haunert 1991; Dennison et al. 1993; Gallegos 1994; Moore et al. 1996; Virnstein and Morris 1996; Moore et al. 1997; Koch 2001; French and Moore 2003; Havens 2003; Kemp et al. 2004; Cho and Poirrier 2005; Biber et al. 2008). At a minimum, high salinity SAV leaves require 15 – 25% of incident light to survive (Dennison and Alberte 1986; Kenworthy and Haunert 1991; Bulthius 1994; Fonseca et al. 1998).

Decreases in abundance of SAV are attributed to nutrient enrichment and sediment loading (Twilley et al. 1985; Durako 1994), both of which increase the turbidity in the water column, decreasing light availability for SAV (Kenworthy and Haunert 1991). Increased sediment and nutrient loading in the water column can enter coastal waters from point source discharges, nonpoint source stormwater runoff, or resuspension of bottom sediments. Specific sources that contribute to increased sediment loading include construction activities, unpaved roads, road construction, golf courses, uncontrolled urban runoff, mining, silviculture, row crop agriculture, and livestock operations (NCDWQ 2000a). Specific sources that contribute to increased nutrient loading include agricultural and urban runoff, wastewater treatment plants, forestry activities, and atmospheric deposition. Nutrients in point source discharges are from human waste, food residues, cleaning agents, and industrial processes. The primary contributors of nutrients from nonpoint sources are fertilizer and animal wastes (NCDWQ 2000b).

Dredging, shading by docks, and trawling can also decrease SAV abundance. Dredging for navigational channels, marinas, or other infrastructure can physically damage or remove SAV, while shade from docks over grass beds can lead to gradual loss of SAV beneath the structures. Use of bottom disturbing gear, (e.g., crab and oyster dredges, shrimp trawls) can also damage SAV beds, but NCDMF regulations restrict such gears over most SAV habitat. Protection of the SAV grass beds is critical.

11.1.4 Hard Bottom

Hard bottom as defined by the CHPP is an "exposed area of rock or unconsolidated sediments, distinguished from surrounding unconsolidated sediments, which may or may not be characterized by live or dead biota, generally located in the ocean rather than in the estuary" (Deaton et al. 2010). Hard bottom provides habitat for kingfishes on reefs in waters less than 30 m. Anecdotal evidence supports the claim that kingfishes use hard bottom areas. Northern kingfish's Latin name, *saxatilis,* means "among the rocks" (FishBase 2015) and fishermen suggest an increase in northern kingfish catch near rocky bottom habitat. More information is needed on the use of hard bottom habitat by kingfishes.

Shallow hard bottom habitats in North Carolina state waters are threatened in some areas by beach nourishment since the added sand can be transported seaward with cross shelf currents over time, covering hard bottom structures (Thieler et al. 1995; Thieler et al. 1998; Reed and Wells 2000). As the hard bottom area decreases, the number of species and abundance decrease (Lindeman and Snyder 1999; Ojeda et al. 2001).

Other impacts to hard bottom habitats include commercial fishing, infrastructure, and water quality degradation (Deaton et al. 2010). Commercial fishing gear, mainly trawls, impacts the hard bottom habitat by breaking or detaching organisms, and causes reductions in the abundance of benthic invertebrates often consumed as prey (Watling and Norse 1998). Infrastructure for pipelines, fiber optic cable, and sonar testing (Navy) impacts hard bottom habitats by cable movement, seismic testing, geophysical mapping activities, repairs to broken cables, directional drilling, sedimentation, or a physical barrier to movement (SEAMAP 2001; Deaton et al. 2010).

11.1.5 Wetlands

Wetlands are defined as "…areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Deaton et al. 2010). Wetlands are one of the most biologically productive ecosystems (Teal 1962). The productivity is transported into the estuarine system as decayed plant matter (detritus) and microalgae growing on or between marsh plants (Peterson and Howarth 1987). While kingfishes are rarely found in shallow wetlands, common prey items such as shrimp and crabs rely on wetlands as nursery areas and foraging habitat. Wetlands also provide many ecosystem functions that benefit the waters and habitats that kingfishes use, such as trapping and filtering toxins and sediments from stormwater runoff and stabilizing the shoreline by slowing wave energy (Mitsch and Gosselink 1993).

According to the 2011 National Land Cover Data (NLCD), there were approximately 3,759,729 acres of woody and emergent herbaceous wetlands within the CHPP regions (Jin et al. 2013). This represents a 2.7% decrease in woody wetlands and an 18.9% increase in emergent herbaceous wetlands since 2001. According to National Wetland Inventory data,

which consists of imagery data from 1977 to 2010, there are approximately 228,146 acres of salt/brackish marsh within the CHPP region, with the greatest acreage in the Pamlico system.

In 1993, it was estimated that approximately 66% (4.7 million acres) of North Carolina's original wetlands remain (NCDWQ 2000a). Human activities that result in wetland habitat loss include ditching, channelization, filling for agriculture and development, and shoreline stabilization (NCDWQ 2000b). Prior to the 1990s, the major impact on the wetlands was agriculture and forestry. After 1990, the threats to wetlands have shifted to dredging, filling, water control projects, and shoreline stabilization associated with development. Reducing wetland losses is critical to long-term protection of the coastal ecosystem.

11.2 WATER QUALITY DEGRADATION

Adequate water quality is necessary to maintain the chemical properties of the water column that are needed by kingfishes, as well as sustain the other habitats that kingfishes rely on. Human activities can alter the chemistry and flow characteristics of the water column in ways that are not optimal for growth or survival of kingfishes. For example if salinity or DO concentrations are altered beyond the known preferences of kingfishes, their distribution, or growth rates may be affected. The most common causes of water quality impairment in North Carolina's coastal river basins are excessive sediment loading and low DO (NCDWQ 2000a). Since kingfishes are demersal bottom feeders, low DO and toxin bioaccumulation are probably the greatest water quality concerns for these species. Because southern kingfish spend more time in North Carolina's estuarine waters than northern or Gulf kingfish, it is more vulnerable to estuarine water quality degradation.

Water pollution sources are classified into two categories: point and nonpoint source pollution. Point source pollution is defined as pollution from a defined point such as a pipe while nonpoint source pollution is pollution from a non-defined point of entry such as stormwater runoff. Both source types contribute to oxygen consuming wastes, excessive nutrients, increased sediment, as well as toxins, pesticides, and heavy metals. Point source dischargers (municipal and industrial wastewater treatment plants, small domestic wastewater treatment system for schools, commercial offices, residential subdivisions, and individual homes) in North Carolina must apply for and obtain a National Pollutant Discharge Elimination System (NPDES) permit from the North Carolina Division of Water Quality (NCDWQ 2000a).

Sediment and nutrients are the major pollution substances associated with nonpoint source pollution. However, bacteria, heavy metals, oil, and grease can also be carried into surface waters by runoff. Several activities are associated with nonpoint source pollution. These include land clearing, plowing, drainage ditch construction, pesticide and fertilizer use, as well as concentrated livestock operations (NCDWQ 2000a).

NLCD within coastal draining waterbodies provides an indication of how potential pollutant sources from various land uses are changing over time. The 2015 CHPP summarizes this information in detail (Deaton et al. 2010). Agricultural lands include cropland, pastureland, animal operations, and land-based aquaculture. According to the U.S. Department of Agriculture's 2007 census, farmland in North Carolina has declined from ~9.0 to ~8.4 million acres during 2002-2012. For animal operations, the number of swine has dropped from ~10 million in 2002 to ~8 million in 2012; there has been a steady increase in poultry production (http://www.nass.usda.gov/Statistics_by_State/North_Carolina/index.asp). It is estimated

that over two million acres of land have been drained and developed for agriculture and silviculture along the North Carolina coast. Within every square mile of agricultural land in coastal North Carolina, there are estimated to be more than 20 miles of field ditches, collector canals, and main canals (Heath 1975; Daniel 1978).

Ditching and drainage is also associated with residential development and infrastructure. Many roads on the Albemarle-Pamlico Peninsula were constructed atop spoil piles between canals to prevent flooding. In urban coastal areas, ditches are constructed along subdivision streets, draining to coastal waters. These drainage features often connect to headwaters, altering the natural hydrology of downstream systems. Ditching accelerates the rate that stormwater enters coastal waters and reduces the amount of pollutant filtration that occurs. Unlike agriculture and silviculture, developed land uses have been steadily increasing. Over the past 15 years (1997-2012), the percent increase in urban built-up/transportation has ranged from 28.2 to 137.7%. While there has been an overall increase in developed area since 1997, the rate of new development, based on stormwater permit data, increased sharply from 2001 to 2007, but slowed between 2007 and 2013 (Deaton et al. 2010).

Ambient water quality monitoring data are available for some estuarine waters from the NCDWQ and are summarized in the appropriate river basin plans (Lumber, Cape Fear, White Oak, Neuse, Tar-Pamlico, and Pasquotank). The NCDWQ does not monitor benthic community or sediments in estuarine areas. There is negligible sampling by the NCDWQ in the larger sounds. However, the FerryMon program is a program in which NC ferries collect water quality information in three - four transects along Ferry routes. The routes are located in southeast Pamlico Sound (Cedar Island to Ocracoke), across central Pamlico Sound (Swan Quarter to Ocracoke), across the Neuse River (Minnesott Beach to Cherry Branch), and across the Pamlico River (Aurora to Bayview). Budget and ferry status have limited data collection on some routes during certain time periods. Information collected includes temperature, salinity, DO, pH, turbidity, and chlorophyll a. Data from FerryMon have been coupled with remote sensing efforts by the United State Environmental Protection Agency (EPA) to determine suspended phytoplankton composition and concentration in the sound. Refer to the FerryMon website to view data over different time periods: http://www.ferrymon.org

An additional source of data to determine water quality in North Carolina is the National Coastal Assessment Program conducted by the EPA. Coastal monitoring data (water and sediment quality, benthos, fish tissue, etc.) are compiled regionally in National Coastal Condition Reports (NCCR) to summarize overall condition of waters in the U.S. The last report, using data from 2003-2006, rated the overall condition of the southeast U.S. as fair (EPA 2012). From 2000 to 2006, the percent of area in the southeast with water quality rated as good has declined and the percent of area rated as poor has increased. Refer to http://water.epa.gov/type/oceb/assessmonitor/nccr/ to view the details of this assessment.

Information is sparse or lacking for water quality trends in ocean waters where kingfishes most commonly occur. The NCDWQ does not monitor ambient water quality in nearshore ocean waters. However, since 1997, the Shellfish Sanitation Office, Division of Environmental Health (now NCDMF), has been recording *Enterococcus* bacteria levels for safe swimming along ocean beaches and some estuarine areas. A total of 240 swimming sites are tested and the results are posted on program's website (http://portal.ncdenr.org/web/mf/recreational-water-quality). Although these bacteria will not harm kingfishes, this is an indicator that other pollutants associated with upland activity,

such as nutrients or toxins, may be present. Another source of ocean water quality monitoring is through the University of North Carolina at Wilmington's Coastal Ocean Research and Monitoring Program (CORMP). Continuous monitoring data on water temperature, wave height, water depth, and wind conditions are collected from piers and fixed moorings.

11.2.1 Nutrients

Nitrogen and phosphorus, components of fertilizers and animal and human wastes, are common nutrients that, in small quantities, are beneficial to aquatic life but can be detrimental in large quantities (Paerl 2002). In excessive amounts, nutrient loading leads to habitat degradation, toxicity, hypoxia, anoxia, algal blooms, fish kills, and loss of biodiversity. These are all signs of cultural eutrophication and water quality degradation (NCDWQ 2000a; Paerl 2002). Cultural eutrophication is the rapid process of the accumulation of nutrients and sediments caused by man (NCDWQ 2000a). Urban runoff, crop agriculture, animal operations, erosion, and industrial expansion in the coastal regions have led to the rise of nitrogen loading in our estuaries.

Recent research has shown atmospheric depositions of nitrogen (AD-N), previously considered a minor source of nitrogen input, to be a highly significant source of externally supplied nitrogen entering the estuaries (Paerl 2002). There also may be a link between acidic deposition (acid rain) and eutrophication of estuaries (Driscoll et al. 2003). Sources of both AD-N and acid rain are mostly from burning fossil fuels and by agricultural activities (Pearl 2002; Driscoll et al. 2003).

11.2.2 Oxygen Depletion

Survival of kingfishes and other organisms depends on an adequate supply of dissolved oxygen. Anoxia (no oxygen) and hypoxia (low oxygen) occur naturally but can increase in frequency due to anthropogenic causes. Stratification of the water column, particularly in summer, due to wind, temperature, and salinity conditions prevents mixing of bottom waters with more oxygenated surface waters. Algal blooms can result in lower DO levels in the water, especially at night, due to excessive plant respiration. When these blooms die, bacteria decomposing the dead plant material remove oxygen (NCDWQ 2000b). Shallow water estuaries with less frequent flushing often develop persistent stratification and bottom-water hypoxia that can last for weeks to months (Tenore 1972). Low oxygen levels, in turn, can lead to fish kills. Anthropogenic causes of oxygen depletion are often attributed to excessive loading of nutrients from stormwater runoff, heavy rainfall, and air deposition. Low oxygen events in coastal waters of the U.S. are becoming larger and longer lasting due to increasing eutrophication (Cooper and Brush 1991; Breitberg 1992; Lenihan and Peterson 1998).

Most demersal fishes experience mortality in waters having 1–2 mg/l of dissolved oxygen, altered metabolism where dissolved oxygen levels are <4 mg/l, and impaired larval growth where dissolved oxygen levels are <4.7 mg/l (Miller et al. 1985; Gray et al. 2002). Some estuarine species are capable of detecting and avoiding low oxygen waters, but there are species-specific differences in tolerance thresholds (Wannamaker and Rice. 2000). There are no reported oxygen tolerances for kingfishes. Of the species studied, Atlantic croaker (*Micropogonias undulatus*), which is similar to kingfishes in habitat and diet preferences, are more sensitive to moderate hypoxia than other species, and would move to waters with slightly greater oxygen levels (2 mg/l vs. 1 mg/l), suggesting they would be capable of avoiding hypoxia-related mortality. The migration of benthic organisms from hypoxic or

anoxic waters can result in high densities of organisms in oxygenated areas (habitat compression), increased competition, and increased predation by opportunistic predators (Eby et al. 2000).

Although mortality due to oxygen depletion does not appear to be a significant factor for kingfishes, prolonged periods of hypoxia could stress and alter the ecological successional patterns if the benthos is altered (Luettich et al. 1999). The various successional stages may influence or benefit different benthic feeders to various extents, with disturbed early successional benthic communities favoring small and juvenile benthic feeders and recovered benthic communities favoring larger adult species. Research is needed on kingfishes' tolerance levels of and behavioral responses to hypoxia and the effect of current conditions on populations.

According to the NCDWR Annual Report of Fish Kill Events, there were 13 events in 2013, with a mortality of 20,608,452 fish, and 19 events in 2014, with an estimated mortality of 2,659,000 fish (http://portal.ncdenr.org/web/wq/ess/fishkillsmain). The vast majority of the fish kills in 2013 and 2014 occurred within the Neuse and Tar-Pamlico estuaries beginning in late September and October. The lower Neuse, as well as the lower Pamlico estuary, has historically experienced adverse environmental conditions for fish populations, such as low DO, high water temperatures, and fluctuating salinities. The most common species affected by fish kills in coastal North Carolina waters is menhaden, being particularly sensitive to environmental stress from water temperature and oxygen levels, invasive pathogens, and other stress factors (http://portal.ncdenr.org/web/wq/ess/fishkillsmain).

Kingfishes have not been reported in fish kill investigations. However, the lack of a swim bladder and demersal nature of kingfishes may hinder ability of investigators to spot dead or dying kingfishes. Furthermore, since kingfishes occur on the bottom in estuaries where hypoxia and anoxia have been reported to occur, the species may be negatively affected by low oxygen events. Eby et al. (2000) estimated that up to 30-50% of the Neuse River estuary was unsuitable bottom habitat during summer due to hypoxia. Several studies have indicated that the frequency, duration, and spatial extent of low oxygen events have increased over the years due to increasing eutrophication of coastal waters from human and animal waste discharges, greater fertilizer use, loss of wetlands, and increased atmospheric nitrogen deposition (Cooper and Brush 1991; Dyer and Orth 1994; Paerl et al. 1995; Buzelli et al. 2002). More information is needed to understand the consequences on the estuarine food web and to what extent anoxia is affecting the soft bottom community. Efforts are needed to reduce anthropogenic nutrient loading, particularly in systems that have a history of hypoxia and anoxia.

11.2.3 Sedimentation and Turbidity

Sediment impacts on fish depend on the concentration of suspended sediment, type of sediment, and the duration of the sedimentation. These impacts can plug gills and reduce respiratory abilities (Wilber and Clarke 2001). This can lead to a reduced tolerance to disease, toxins, and turbidity as well as affect spawning and rearing habitat (NCDWQ 2000a).

Sediment loading usually results from nonpoint sources such as building and road construction. Stormwater runoff from urban areas, agriculture, silviculture, animal operations, as well as mining and removal of vegetated buffers accelerates sediment loading as well as increases turbidity in the water column (NCDWQ 2000a). Water activities such as dredging, boating and fishing with bottom disturbing gears also add to an increase

in turbidity. Of all of these sources, agriculture is one of the largest contributors of sedimentation in the southeastern U.S. (SAFMC 1998).

Another source of sediment of increased turbidity in estuaries is shoreline erosion. Erosion occurs when waves and currents erode shorelines and transport sediment into the waters, causing short- and long-term changes along the coast. While shoreline erosion is a natural process, like eutrophication, it has been accelerated because of human activities.

11.2.4 Toxic Chemicals

Toxic chemicals that are found in the water column include heavy metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons, polychlorinated biphenyls (PCBs), dioxins, antifoulants, chlorine, ammonia, and pesticides. Most of these chemicals come from localized point and nonpoint sources while activities contributing to heavy metal contamination include urban sprawl, dock and marina development, boating activity, dredge spoil disposal, automotive transportation, industrial shipping and industrial emissions (Wilbur and Pentony 1999). Studies have shown that fine-grained sediments act as a reservoir for heavy metals and are readily adsorbed on tiny sediment particles, particularly organic rich muds (Riggs et al. 1991). Chemicals such as dichlorodiphenyltrichloroethane (DDT), diedrin, and tributyltin (TBT) continue to contaminate sediments, even though they have been banned since 1977.

While toxins can fluctuate between the sediment and water column, concentrations of toxic chemicals tend to accumulate in sediments to several orders of greater magnitude than overlying waters (Kwon and Lee 2001). The bioavailability and transport of a toxin is affected by the physical and chemical conditions of the environment and the feeding habits and condition of aquatic organisms. Toxic chemicals can become active in soft bottom sediment or overlying waters through resuspension from natural weather events or human activities such as dredging and trawling. Resuspension of sediments with heavy metal contamination can be a problem in fine-grained areas such as sheltered creeks. Because low concentrations of heavy metals in the water column can be easily incorporated into fine-grained sediment, such as organic rich mud, toxicants levels can accumulate in the sediment and be resuspended into the water column (Riggs et al. 1991). This is of particular concern as the majority of North Carolina's soft bottom is composed of fine-grained organic sediments.

Toxins in sediments or the water column can affect benthic invertebrates by inhibiting or altering reproduction or growth or in some situations causing mortality (Weis and Weis 1989). Early life stages are most vulnerable to toxins (Funderburk et al. 1991). Food resources for benthic feeders, like kingfishes, may be limited in highly contaminated areas because macroinvertebrate diversity significantly declines with increasing sediment contamination (Weis et al. 1998; Brown et al. 2000; Dauer et al. 2000). While the survival of some aquatic organisms is affected by toxins, other organisms survive and bioaccumulate the chemicals to toxic levels, passing them along in the food chain. Multiple studies have shown clear connections between concentrations of toxins in sediments and those in benthic feeding fish and invertebrates (Kirby et al. 2001; Marburger et al. 2002). Heavy metal contamination of sediments has been documented to result in elevated trace metal concentrations in shrimp, striped mullet, oysters, and flounder (Kirby et al. 2001; Livingstone 2001). Fish can uptake metals in different ways, through the skin and gills and the wall of the digestive tract. Mzimela et al. (2003) found that the groovy mullet, *Liza dumerelii,* accumulated elevated levels of iron, aluminum, zinc, manganese, chromium, copper, and

lead (in that order) from discharges into Richards Bay, South Africa. Sources of contamination were industrial discharges from fertilizer, paper pulp, and aluminum smelter production.

Toxic chemicals come from localized point sources as well as diffuse nonpoint sources. Industrial and municipal waste discharges are point sources. Nonpoint sources of toxins include: urban runoff containing household and yard chemicals, roadways, marinas and docks, boating activity, runoff from agriculture and forestry, industrial emissions, spills from industrial shipping, and dredge spoil disposal (Wilbur and Pentony 1999).

The extent of sediment contamination in North Carolina coastal waters is not well known. Sediment sampling is not conducted by the NCDWQ since there are no sediment standards in the state. Sediment quality is assessed by the EPA through the National Coastal Assessment Program. From 2000 to 2006, the percent of area in the southeast with sediment quality rated as good declined to the lowest percent in 2003 and increased to 2001 levels by 2006, with the reverse trend for percentage of area with poor rating.

To better determine if contaminated sediment is a significant threat to coastal fish habitat, the distribution and concentration of heavy metals and other toxins in estuarine sediments need to be adequately assessed, as well as the condition of the benthic community, and the areas of greatest concern need to be identified. Continued minimization of point and nonpoint sources of toxic contaminants is vital for protecting not only soft bottom but also the other fish habitats.

11.3 HABITAT AND WATER QUALITY PROTECTION

11.3.1 North Carolina Marine Fisheries Commission Authority

Presently, the NCMFC has authority for the following actions with regard to marine and estuarine resources: manage, restore, develop, cultivate, conserve, protect, and regulate. Marine and estuarine resources are “All fish [including marine mammals, shellfish, and crustaceans], except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based upon such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or dependent upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life.” (G.S. 113-129).

Although the NCMFC’s primary responsibilities are management of fisheries (season, size and bag limits, licensing, etc.), the NCMFC has the authority to comment on state permit applications that may have an effect on marine and estuarine resources or water quality, regulator placement of fishing gear, develop and improve mariculture, and regulate location and utilization of artificial reefs. Authority for the NCMFC is found at G.S. 143B-289.51 and 52.

11.3.2 Authority of Other Agencies

The DENR has several divisions responsible for providing technical and financial assistance, planning, permitting, certification, monitoring, and regulatory activities, which affect the coastal water quality or habitat. NCDCM is responsible for development permits along the estuarine shoreline in 20 coastal counties. Wetland development activity throughout North Carolina is permitted through the USACE and the NCDWR) (NCDWR;

401-certification program). The NCDWR has established a water quality classification and standards program for "best usage" to promote protection of unique and special pristine waters with outstanding resource values. The High Quality Waters (HQW), Outstanding Resource Waters (ORW), Nutrient Sensitive Waters (NSW), and Water Supply (WS) classifications have outlined management strategies to control point and nonpoint source pollution. Various federal and state environmental and resource agencies, including the NCDMF, evaluate projects proposed for permitting and provide comments and recommendations to the NCDCM, NCDWR, and USACE on potential habitat and resource impacts. Habitat protection relies on enforcement, the efforts of commenting agencies to evaluate impacts, and the incorporation of recommendations into permitting decisions. Habitats are also protected through the acquisition and management of natural areas as parks, refuges, reserves, or protected lands by public agencies and/or private groups.

11.3.3 Coastal Habitat Protection Plan

The FRA of 1997 mandated the NCDENR to prepare CHPPs (CHPPs – G.S. 143B-279.8). The legislative goal for the CHPPs is long-term enhancement of the coastal fisheries associated with coastal habitats and provides a framework for management actions to protect and restore habitats critical to North Carolina's coastal fishery resources. There are three commissions that have regulatory jurisdiction over the coastal resources, water, and marine fishery resources including: NCMFC, North Carolina Coastal Resources Commission (NCCRC), and the North Carolina Environmental Management Commission (NCEMC). The CHPP was completed in December 2004 and implementation plans for each division and the department were approved in July 2005. The plan is to be reviewed every five years. Actions taken by all three commissions pertaining to the coastal area, including rule making, are to comply, "to the maximum extent practicable" with the plans. The CHPP helps to ensure consistent actions among these three commissions as well as their supporting NCDENR agencies.

The CHPP describes and documents the use of habitats by species supporting coastal fisheries, status of these habitats, and the impacts of human activities and natural events on those habitats. Fish habitat is defined as freshwater, estuarine, and marine areas that support juvenile and adult populations of economically important fish, shellfish, and crustacean species (commercial and recreational), as well as forage species important in the food chain (Deaton et al. 2010). Fish habitat also includes land areas that are adjacent to, and periodically flooded by, riverine and coastal waters. Six fish habitats are discussed and designated based on distinctive physical properties, ecological functions, and habitat requirements for living components of the habitat: wetlands, SAV, soft bottom, shell bottom, ocean hard bottom, and water column.

The CHPP recommends that some areas of fish habitat be designated as "Strategic Habitat Areas" (SHAs). SHAs are defined as specific locations of individual fish habitat or systems of habitat that have been identified to provide critical habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity. While all fish habitats are necessary for sustaining viable fish populations, some areas may be especially important to fish viability and productivity. Protection of these areas would therefore be a high priority (Deaton et al. 2010). The process of identifying SHAs began in 2005.

The CHPP focuses on the fish habitat and threats to the habitat. This FMP describes habitat conditions or needs for the various life stages of the kingfishes. The FRA gives precedent to the CHPP and stipulates habitat and water quality considerations in the FMP

be consistent with CHPP. Any recommendations will be considered and acted upon through the CHPP implementation process.

11.4 STATUS OF 2007 HABITAT RECOMMENDATIONS

The 2007 Kingfish FMP included habitat and water quality as principal issues citing the maintenance and improvement of suitable estuarine and marine habitat and water quality as important factors in maintaining sustainable stocks of kingfishes (NCDMF 2007). Many of the action items outlined in the 2007 Kingfish FMP Principal Issues and Management Options section have been implemented or are substantially underway and/or were also components of the CHPP implementation plan. They include:

Habitat

- NCCRC has revised dock rules to require review by resource agencies for general purpose dock applications located over SAV, shell bottom, or PNAs, and where water depth is less than 2 ft mean water level to avoid boating related impacts.
- NCDMF is in the process of Identifying and delineating SHAs that will enhance protection of southern, Gulf, and northern kingfishes.
- Wetland buffers along coastal streams and rivers have been used to enhance wetlands and improve water quality.
- Although North Carolina legislation has been passed to allow terminal groins to be built in coastal North Carolina, the NCDMF has been in talks with applicants to minimize the adverse impacts to fisheries. In addition, the NCDCM has created standards for beach nourishment projects. These standards include sediment size and moratorium periods to minimize impacts.
- Coast-wide imagery of SAV was taken in 2007/2008 and has been mapped.
- Identification and designation of strategic SAV areas is underway through the SHA process.
- Additional bottom disturbing gear restrictions have been implemented through the bay scallop and oyster fishery management plans to avoid damage to SAV and oysters.
- DENR staff has been cooperating to develop permit conditions for marsh sills to minimize the impacts of vertical shoreline stabilization methods.
- Loss of additional riparian wetlands has been minimized through the permitting process, land acquisition, and land use planning.

Water Quality

- Neuse and Tar-Pamlico NSW nutrient reduction measures have successfully reduced nutrient loading by more than their 30% reduction goals for point source dischargers and agriculture.
- NCDWR revised coastal storm water rules that limit impervious surface and run-off in coastal areas.
- Wetland buffers along coastal streams and rivers have been used to enhance wetlands and improve water quality.

12.0 PRINCIPAL ISSUES AND MANAGEMENT OPTIONS

As an Information Update, this plan refreshes the 2007 Kingfish FMP with the most current statistics, trends, research, etc. available at the time the information update is developed. An Information Update is developed without the assistance of an FMP advisory committee and does not require review by regional or standing advisory committees of the NCMFC. Potential issues were solicited from the public at the beginning of the Information Update process. The public was made aware of the comment period via a news release on January 26, 2015 with a deadline for comments by February 17, 2015. There were five comments received. The comments and the NCDMF responses are listed in Appendix 2, Solicitation of Public Comment on Kingfish Issues. Most commenters requested no changes to the current management for kingfishes. One commenter requested a size limit be placed on kingfishes, another commenter suggested aquaculture as a management option, and one commenter expressed concern over predation on kingfishes by spiny dogfishes. No new issues were recommended for development in the Kingfish FMP by either the NCDMF or the NCMFC based on the public comment received.

The 2007 Kingfish FMP addressed several issues. These included habitat and water quality issues, potential issues with protected species in the kingfish fishery, and a management strategy to ensure sustainable harvest. Issue papers and management options considered for each of these issues can be reviewed in the original 2007 Kingfish FMP (NCDMF 2007). Updated information on habitat and water quality along with related research recommendations can be found in Section 11, Environmental Factors. Updated information related to protected species can be found in Section 8, Protected Species. The updated management strategy can be found in Appendix 1, Evaluation of Management Triggers for Kingfish.

12.1 SUMMARY OF MANAGEMENT ACTIONS

12.1.1 Rules

No new rules required.

12.1.2 Legislative Action

No legislative action required.

13.0 RECOMMENDED MANAGEMENT STRATEGIES AND RESEARCH RECOMMENDATIONS

13.1 MANAGEMENT STRATEGIES

The 2007 Kingfish FMP selected the use of trend analysis and management triggers as the preferred management strategy to monitor the viability of the kingfish stock in North Carolina (NCDMF 2007). A second management strategy promotes work to enhance public information and education. As an FMP Information Update, this plan adheres to the management strategies set forth in the original 2007 plan. As a review of the original plan, best available data and techniques used for the trend analysis and management triggers were refined and modified to better assess population trends as part of this FMP Information Update (Appendix 1, Evaluations of Management Triggers for Kingfish). Changes to management triggers are considered to better inform management and do not alter the basic concept of trigger management set forth in the original 2007 FMP. Management triggers set forth in this plan will continue to be the management strategy used for maintaining the long-term sustainable harvest in the kingfish fishery. A coast-wide stock assessment is a long-term research need that will have to be addressed before any estimation of biological reference points related to sustainable harvest can be estimated.

The trend analysis and management triggers established for this plan, as outlined in Appendix 1, Evaluations of Management Triggers for Kingfish, will be updated annually and results will be presented to the NCMFC as part of the annual FMP Update. For reference, the 2015 annual update including data through 2014 is on the NCDMF website (http://portal.ncdenr.org/web/mf/fmps-under-development), 2015 Kingfish Fishery Management Plan Update.

The trend analysis incorporates triggers to alert managers to the potential need for management action based on stock conditions. The activation of any two management triggers two years in a row (regardless of category) warrants further data evaluation and potential management action. The NCMFC will be alerted should this criterion be met.

13.2 SUMMARY OF RESEARCH RECOMMENDATIONS

The following research recommendations were compiled to help achieve the goal and objectives of this FMP (see Section 5.2.1, Goal and Objectives). The division reviewed and prioritized the research recommendations. The prioritization of each research recommendation is designated as a high, medium, or low priority. A low ranking does not infer a lack of importance but is either already being addressed by others or provides limited information for aiding in management decisions. A high ranking indicates there is a substantial need, which may be time sensitive in nature, to provide information to help with management decisions.

13.2.1 Management Related Research Needs

- Conduct a coast-wide stock assessment of southern kingfish along the Atlantic Coast including estimation of biological reference points for sustainable harvest. (HIGH)
- Validate YOY and adult indices used in trend analysis. (HIGH)

- Develop a fisheries-independent survey in the ocean for juvenile and adult kingfishes. (HIGH)
- Collect observer data from commercial fishing operations to estimate at-sea species composition of the catch, discard rates, and lengths. (HIGH)
- Improve recreational data collection, particularly the species composition of discards, discard rates and associated biological data. (HIGH)
- Improve dependent commercial data collection of more sample sizes for life history information. (MEDIUM)
- Evaluate and potentially expand the NCDMF fishery-independent gill-net survey to provide data on species composition, abundance trends, and population age structure by including additional areas of North Carolina's estuarine and near-shore ocean waters. (MEDIUM)
- Continue bycatch reduction device studies in the shrimp trawl fishery to decrease bycatch. (MEDIUM)
- Determine stock structure using genetics of kingfishes along North Carolina and the Atlantic Coast. (LOW)

13.2.2 Biological Research Needs

- Develop tagging study to estimate natural and fishing mortality, to investigate stock structure, and to understand movement patterns. (HIGH)
- Collect histological data to develop maturity schedule with priority to southern kingfish. (HIGH)
- Conduct an age validation study with priority to southern kingfish. (HIGH)
- Conduct study to estimate fecundity with priority to southern kingfish. (MEDIUM)
- Conduct study to identify spawning areas with priority for southern kingfish. (MEDIUM)
- Sample inlets and river plumes to determine the importance of these areas for kingfishes and other estuarine-dependent species. (LOW)
- Determine the effects of beach re-nourishment on kingfishes and their prey. (LOW).
- Conduct a study to investigate how tidal stages and time of day influence feeding in kingfishes. (LOW)

13.2.3 Social and Economic Research Needs

- Increase the sample size of surveyed participants in the commercial kingfish fishery to better determine specific business characteristics and the economics of working in the fishery. (LOW)
- Update information on the participants in the recreational kingfish fishery. (LOW)

13.3 REVIEW CYCLE

As provided in the Fisheries Reform Act of 1997, the Kingfish FMP will be reviewed at least every five years.

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15.0 APPENDICES

15.1 APPENDIX 1. EVALUATION OF MANAGEMENT TRIGGERS FOR KINGFISH

November 2014
Updated January 2015

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BACKGROUND

Current management triggers for kingfish are organized into three groups: biological monitoring, fisheries-dependent catch per unit effort (CPUE), and fisheries-independent surveys. The triggers within each group are listed below:

Biological Monitoring

Mean fish length by fishery compared to last five years
Proportion of age one kingfishes greater than 50% of fish 11.0 to 11.8 inches TL

Fisheries-Dependent CPUE

Commercial < 2/3 of the mean harvest from 1999 to 2004
Recreational < 2/3 of the mean harvest from 1999 to 2004

Fisheries-Independent Surveys—Juvenile and Adult

Pamlico Sound Survey fall 2/3 below mean CPUE
Southeast Area Monitoring and Assessment Program (SEAMAP) fall 2/3 below mean CPUE

If **one** of the management triggers is "tripped" then the NCDMF will consider management action.

EVALUATION

The first issue that needs clarification is whether the triggers apply to southern kingfish only or all kingfish species separately or combined (see Follow Up section).

It is not clear how the indicator related to mean length by fishery will be judged. It simply states that it will be compared to the average length from the previous five years, but it does not specify what constitutes a good or bad result. It will be assumed that the intention was that a decrease in average length relative to the previous five years will trip the trigger.

It is expected that the average age of a fish population decreases with increasing fishing pressure because fewer fish survive to old age (Francis and Smith 1995; Francis and Jellyman 1999). Since age is often highly correlated with length it is not unreasonable to assume that average length would decrease with decreasing biomass; however, this is not always the case (Francis and Smith 1995). Additionally, natural variations in recruitment can cause substantial variation in annual average length, even when fishing pressure is constant

(Francis and Jellyman 1999). For these reasons, evaluation of average length alone may not be appropriate.

Since tracking average length is considered (incorrectly) an index of the fraction of the population that survives to relatively older ages, it might be more appropriate to identify another metric based on length frequencies that is expected to more accurately track the relative abundance of older fish. The loss of larger, presumably older fish from the population is expected to produce a signal in the tails of the length distribution rather than the center of the distribution; thus, some index that accounts for the tails of the annual length-frequency distribution is more appropriate. For example, if no fish greater than a certain size are observed for five years, that might be a management trigger. The same logic could be applied to age distributions in order to identify another trigger based on ages; however, if age samples are collected in a less random way with respect to length data collection, length data may be more accurate.

The triggers based on fisheries-dependent CPUE indices are not clear. As stated, the triggers suggest they will be tripped if the CPUE index is less than 2/3 of the average harvest from 1999 to 2004. It is assumed that the intention was that the trigger would be tripped if the CPUE index is less than 2/3 of the average CPUE index from 1999 to 2004.

Fisheries-dependent indices are associated with numerous biases. Relative indices are assumed to be proportional to stock size. In order for a fisheries-dependent index to be proportional to abundance, fishing effort must be random with respect to the distribution of the population and catchability must be constant over space and time. This is one of the benefits of fisheries-independent surveys for use as indices of abundance—they are designed to provide unbiased estimators and employ a standard methodology over time and space. Other factors affecting the proportionality of fisheries-dependent indices to stock size include changes in fishing power, gear selectivity, gear saturation and handling time, fishery regulations, gear configuration, fishermen skill, market prices, discarding, vulnerability and availability to the gear, distribution of fishing activity, seasonal and spatial patterns of stock distribution, changes in stock abundance, and environmental variables. Additionally, it is often difficult to define a standard unit of effort for fisheries-dependent data. Many agencies, including the NCDMF, don't require fishermen to report records of positive effort with zero catch; lack of these "zero catch" records in the calculation of indices can introduce further bias. Furthermore, fisheries-dependent indices are, at most, only reflective of trends in fished areas and apply only to individuals within the size range that is capable of being caught by the fishing gear. Both fisheries-dependent and fisheries-independent indices can be standardized to account for factors other than changes in abundance that affect the indices (Maunder and Punt 2004). This requires the collection of auxiliary data at the time of harvest or sampling event. Often, such data are not available for fisheries-dependent indices. Finally, fisheries-dependent indices tend to exhibit hyperstability (Harley 2001); that is, the CPUE index remains high while the population declines.

A further issue related to the recreational fishery CPUE index is the recent change in methodology that occurred in 2013 (see http://www.st.nmfs.noaa.gov/recreational-fisheries/index). Accounting for this change in the computation of the recreational fishery CPUE index will be a difficult task, if possible at all.

As mentioned above, fisheries-independent indices can be standardized to account for factors beyond abundance changes that impact the index. Other considerations for fisheries-independent survey series include length of time series, survey design,

consistency in methodology, catchability and availability to the gear, sample timing and spatial coverage, and precision. The minimum length for a survey index to be considered sufficient is the average lifespan of the species. Southern kingfish live approximately nine years so the Pamlico Sound Survey index is considered of adequate length (twenty-four years). The survey is based on a sound statistical design, so survey design is not thought to be an issue. There have been some changes in methodology over time; this can be accommodated by limiting the time series to those years in which the methods have been consistent. For the Pamlico Sound Survey, this would be from 1990 forward. Sample timing is not thought to be an issue as southern kingfish have been caught in the June and September components during every year of the survey. Spatial coverage is an issue as the southern kingfish extends beyond North Carolina waters.

Catchability and availability are more difficult to assess. One way this can be evaluated is by looking at the percentage of tows in which the species does not occur ("zero" tows). Consistently high proportions of tows with zero catch can indicate that there is low catchability and/or availability. The percentage of zero tows was calculated for southern kingfish observed in the Pamlico Sound Survey for both the June and September components of the survey. In many years the percentage of zero tows exceeds 60% for June (Table 1). The average number of zero tows per year for June is 59% and the average for September is 49%. A closer look at the data shows that there are three strata ('NR', 'PR', 'PUN') in which southern kingfish are infrequent or rare (Tables 2, 3). The calculation of an index based on these survey data could consider eliminating data collected from these strata. Alternatively, one could consider applying a zero-inflated model when constructing the index.

Precision is easily evaluated by computing the standard error associated with the annual index. A stratified-GLM approach was used to calculate standardized indices for June and September. The standard errors and proportional standard errors (PSEs) were also calculated. Most statistical texts recommend a PSE of 20% or less. The PSEs of the June and September indices are shown in Figures 1 and 2. PSE values exceed 20% in all but three years for the June index and all but one year for the September index. Elimination of the three strata suggested above may lead to improved precision.

RECOMMENDATION (accepted by NCDMF 1/7/2015)

Based on the evaluation, it is recommended that consideration of management action should not be based on any one trigger alone but some combination of two or more triggers. Management triggers based on average length should not be considered; instead a trigger based on the upper tail of the length and/or age distribution should be developed. Another recommendation is to eliminate the fisheries-dependent CPUE indices as management triggers. Finally, the Pamlico Sound Survey index should be computed for June and September separately and should not include data collected in the 'NR', 'PR', or 'PUN' strata.

JANUARY 2015 FOLLOW UP

The Kingfish PDT met on Wednesday, January 7 to discuss several issues including the evaluation of management triggers. Upon further review of prior plan and stock assessment report text, the recommendations put forward in this document, and review of the full time series of data through 2013, the PDT during its discussion accepted this report's initial recommendations and made further refinements. Additionally, the PDT clarified that

management triggers apply to southern kingfish. The PDT decided on the following management triggers (organized into three categories; see PDT minutes for 1/7/2015):

Biological Monitoring

Proportion of adults ≥ length at 50% maturity (L_{50}) for NCDMF Program 195 June
Proportion of adults ≥ L_{50} for NCDMF Program 915
Proportion of adults ≥ L_{50} for SEAMAP summer

→ If the proportion of adults ≥ L_{50} falls below 2/3 of the average proportion of adults ≥ L_{50} for the time series, then the trigger will be considered tripped.

Fisheries-Independent Surveys—Juvenile and Adult

NCDMF Pamlico Sound Survey September index of YOY relative abundance
SEAMAP summer index of adult relative abundance
SEAMAP fall index of YOY relative abundance

→ If a fisheries-independent survey falls below 2/3 of the average abundance for the time series (through 2013), then the trigger will be considered tripped.

Other

Relative fishing mortality rate (*F*)

→ If relative *F* rises above 66% of the average relative *F* for the time series (through 2013), the trigger will be considered tripped.

If any **two** triggers trip **two** years in a row (regardless of category), then data will be reevaluated and management action may be considered.

DETAILS

Peak spawning for southern kingfish occurs in April so data collected by the NCDMF during March and April were used to estimate the maturity schedule. The value for L_{50} was estimated using the standard logistic maturity curve (males and females pooled) and the estimate was 210 mm total length (TL; Figure 3). Adults collected during the June component of the Program 195 survey (excluding strata NR, PR, and PUN) were considered individuals > 150 mm TL. For the July through September component of Program 915 (Pamlico Sound deep strata only), adults were defined as individuals > 190 mm TL. For the summer component of the SEAMAP (Onslow, Raleigh, and Long bays, inner—shallow—strata) survey, adults were considered individuals > 150 mm TL.

Defining cut-offs for YOY and adults for the fisheries-independent surveys varied by survey and season. For the September component of the Pamlico Sound survey (excluding strata NR, PR, and PUN), YOY were defined as individuals ≤ 190 mm TL. For the summer component of the SEAMAP (Onslow, Raleigh, and Long bays, inner—shallow—strata) survey, adults were defined as above (>150 mm TL). For the fall component of the SEAMAP (Onslow, Raleigh, and Long bays, inner—shallow—strata) survey, YOY were considered individuals ≤ 205 mm TL. The relative index derived from the Program 195 survey was calculated using a stratified general linear model (GLM) approach. The indices derived from the SEAMAP survey were computed using standard (non-stratified) GLMs.

Relative *F* is a simple method for estimating trends in *F* (Sinclair 1998). It is estimated as catch divided by a fisheries-independent index of relative abundance. Here, catch (commercial landings plus recreational harvest) was divided by the SEAMAP spring index (Onslow, Raleigh, and Long bays, inner—shallow—strata) of relative abundance.

RESULTS

The management triggers based on the proportions of adults ≥ L_{50} are shown in Figures 4 through 6. The proportions of adults ≥ L_{50} derived from the NCDMF Program 915 survey were above the trigger threshold in all years throughout the respective time series (Figure 5). The management triggers based on the fisheries-independent survey indices are shown in Figures 7 through 9. The management trigger based on relative *F* is shown in Figure 10.

In 17 of the 27 years (1987–2013), at least one trigger was tripped in each of two categories (Table 4). There were eight instances when two triggers simultaneously tripped two years in a row (regardless of category). No triggers were tripped in 2013.

DISCUSSION AND RECOMMENDATIONS

The management triggers adopted in the 2007 Kingfish FMP were evaluated and recommendations were put forth in this document to improve and refine those triggers. Based on the evaluation of the newly proposed management triggers, consideration of management action is not warranted at this time. The results indicated that no triggers were tripped in 2013.

On January 20th, 2015, the Management Review Team (MRT) supported the recommendations of the PDT and therefore becoming the division recommendation.

At the August 2015 Marine Fisheries Commission (MFC) meeting, the commission members voted and approved the division recommended updated triggers.

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Table 1. Percentage of zero tows for southern kingfish occurring in the June and September components of the NCDMF Pamlico Sound Survey, 1990–2013.

Year	June	September
1990	79.6	45.1
1991	90.6	43.4
1992	64.2	59.6
1993	51.9	81.1
1994	69.8	44.9
1995	73.6	28.8
1996	63.5	81.1
1997	62.3	69.8
1998	88.5	66.7
1999	70.4	55.8
2000	50.9	47.2
2001	67.9	49.1
2002	71.7	48.1
2003	75.5	54.7
2004	57.4	43.4
2005	65.4	44.2
2006	42.6	46.3
2007	45.1	29.6
2008	50.0	44.4
2009	44.4	38.9
2010	24.1	51.9
2011	63.0	31.5
2012	20.4	46.3
2013	27.8	24.1

Table 2. Percentage of tows in which southern kingfish were present in the June component of the NCDMF Pamlico Sound Survey by strata, 1990–2013.

Year	NR	PDE	PDW	PR	PSE	PSW	PUN
1990	0	18	56	0	33	0	0
1991	0	4.5	13	0	29	33	0
1992	0	42	63	0	50	40	0
1993	0	76	44	0	71	25	0
1994	0	40	50	0	38	25	0
1995	0	36	29	0	43	25	0
1996	0	48	57	0	43	50	0
1997	20	64	29	0	17	40	0
1998	0	15	13	0	33	0	0
1999	0	26	30	0	57	80	0
2000	0	74	44	0	71	60	0
2001	0	53	45	0	14	33	0
2002	20	32	33	0	43	40	0
2003	0	30	36	0	50	0	0
2004	0	50	40	20	86	50	0
2005	0	53	44	0	50	20	0
2006	40	60	67	0	100	60	33
2007	0	78	44	20	83	60	33
2008	60	50	33	40	71	60	33
2009	0	65	44	40	86	100	0
2010	60	90	89	0	100	100	0
2011	20	60	22	0	43	40	0
2012	80	95	100	0	86	80	33
2013	20	85	89	40	86	100	0

Table 3. Percentage of tows in which southern kingfish were present in the September component of the NCDMF Pamlico Sound Survey by strata, 1990–2013.

Year	NR	PDE	PDW	PR	PSE	PSW	PUN
1990	0	70	60	0	86	100	0
1991	20	68	83	0	88	50	0
1992	0	60	0	0	75	100	0
1993	20	24	11	20	14	33	0
1994	0	79	57	20	83	50	0
1995	20	95	75	0	86	100	33
1996	20	14	13	0	67	25	0
1997	20	50	33	0	29	0	0
1998	20	39	33	0	63	33	0
1999	0	58	50	20	86	0	0
2000	0	95	10	0	100	33	0
2001	0	84	44	0	71	40	0
2002	0	95	44	0	29	50	33
2003	0	68	20	0	71	75	33
2004	0	70	56	40	86	75	0
2005	20	65	33	20	100	100	33
2006	0	65	56	40	71	80	0
2007	20	95	67	40	71	100	0
2008	20	60	56	20	86	100	0
2009	0	90	67	0	57	100	0
2010	0	45	67	40	71	60	33
2011	0	95	78	0	71	100	33
2012	20	85	44	20	43	40	33
2013	0	100	88	20	100	100	0

Table 4. Summary of management trigger organized by category. Bold values indicate values that exceed (and so would trip) the trigger.

	BIOLOGICAL MONITORING			FISHERIES-INDEPENDENT SURVEYS			OTHER
	Proportion of Adults >= L50			YOY Indices		Adult Index	Relative *F*
Year	Program 195 June	Program 915	SEAMAP Summer	Program 195 September	SEAMAP Fall	SEAMAP Summer	Relative *F*
1987	0.602			**0.538**			
1988	0.450			**0.926**			
1989	**0.300**		0.585	**1.31**	10.5	**7.63**	17,627
1990	0.529		0.463	**2.35**	9.93	29.1	**92,209**
1991	0.667		0.894	**3.45**	9.92	41.7	**31,107**
1992	0.429		0.622	**1.37**	**5.20**	15.7	**25,449**
1993	0.542		0.456	**0.106**	**4.70**	14.2	**59,442**
1994	0.794		0.917	5.07	11.3	**3.10**	**137,621**
1995	0.440		0.486	8.60	**2.36**	**11.1**	**49,097**
1996	0.872		0.780	**0.208**	9.77	**5.44**	**30,411**
1997	0.576		**0.373**	**0.452**	**4.00**	**11.0**	20,276
1998	1.00		0.769	**0.207**	10.6	**5.65**	9,743
1999	0.920		0.608	**3.79**	22.6	28.0	**24,813**
2000	0.733		0.929	8.21	8.31	**11.6**	**83,334**
2001	0.660	0.983	**0.303**	4.42	**5.15**	25.6	20,962
2002	0.704	0.978	0.882	6.30	14.2	**11.9**	**31,765**
2003	0.860	0.978	0.645	5.81	**4.24**	18.5	5,706
2004	0.513	0.963	**0.284**	**2.98**	13.2	45.0	5,579
2005	0.594	0.970	0.643	**1.52**	11.0	18.1	5,530
2006	0.541	0.979	0.423	20.4	**5.55**	23.7	13,604
2007	**0.338**	1.00	0.521	8.97	**6.59**	**8.42**	**45,254**
2008	0.480	0.987	0.577	8.79	9.56	**3.99**	**41,046**
2009	0.591	1.00	0.398	24.9	**3.75**	16.2	**33,941**
2010	0.508	0.981	0.786	**1.47**	16.9	**11.9**	20,169
2011	0.447	1.00	0.507	16.8	31.3	21.1	**31,533**
2012	0.523	1.00	**0.368**	5.02	9.22	61.9	8,052
2013	0.659	0.941	0.558	16.9	10.7	39.5	4,048
Threshold	0.402	0.654	0.394	3.97	6.68	13.1	22,396
Total Years	27	13	25	27	25	25	25
n Exceed	2	0	4	14	9	11	14

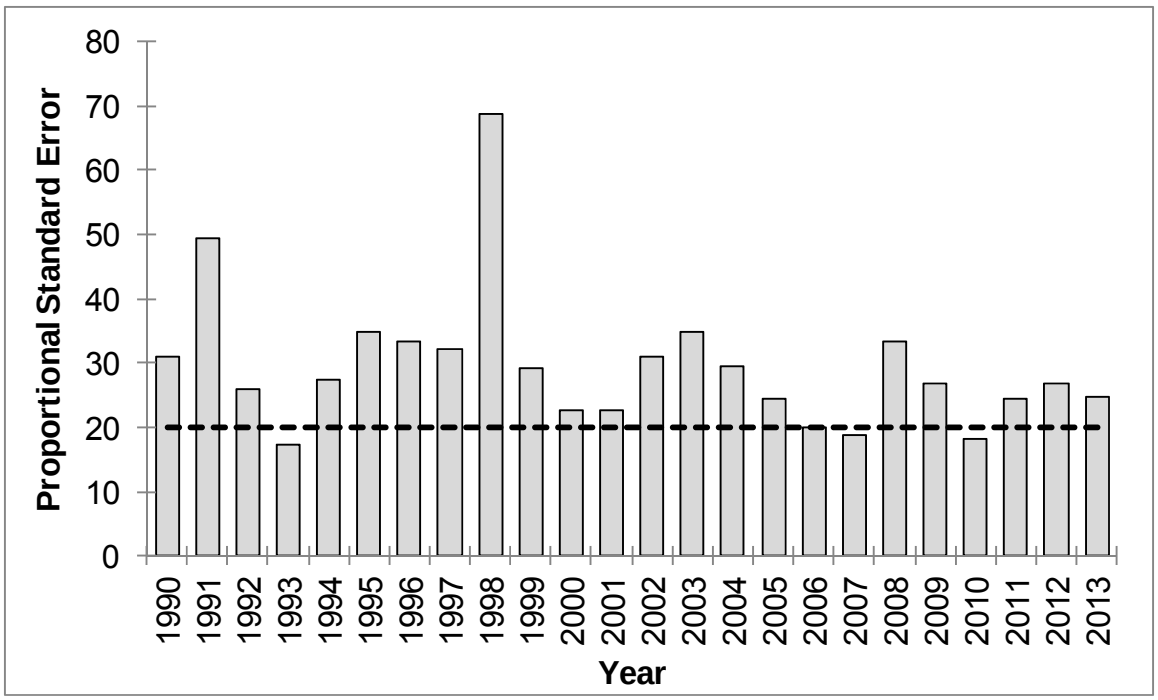

Figure 1. Annual PSE values associated with the GLM-standardized index of southern kingfish occurring in the June component of the Pamlico Sound Survey, 1990–2013. Dotted line represents 20% PSE.

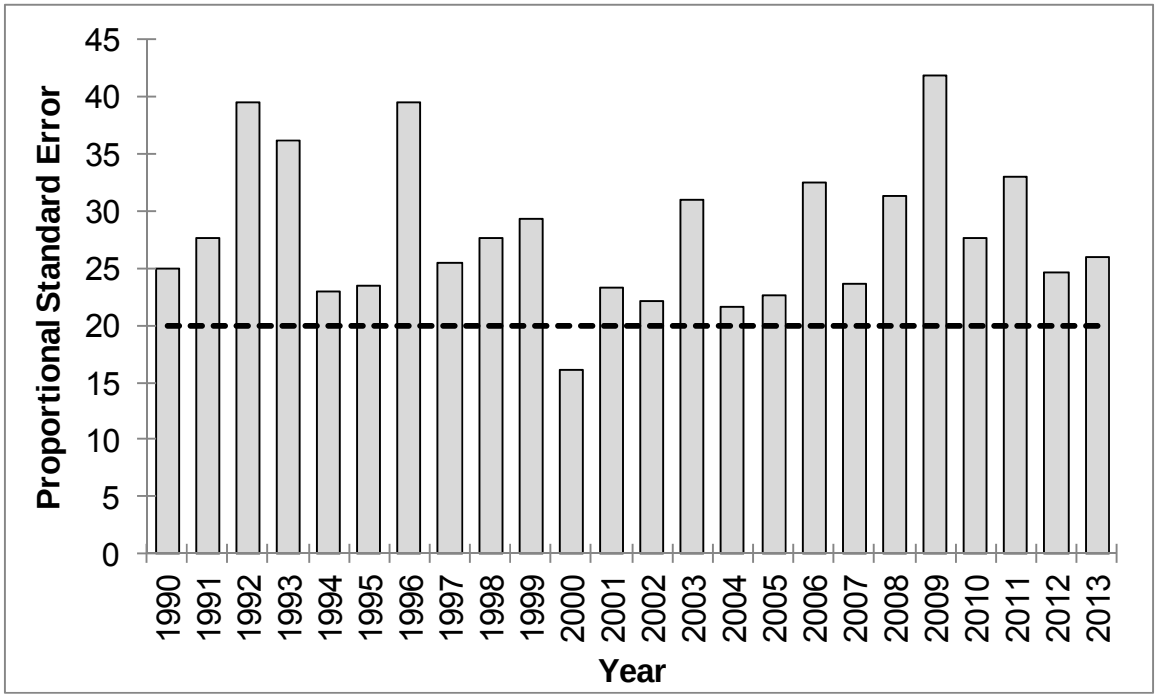

Figure 2. Annual PSE values associated with the GLM-standardized index of southern kingfish occurring in the September component of the Pamlico Sound Survey, 1990–2013. Dotted line represents 20% PSE.

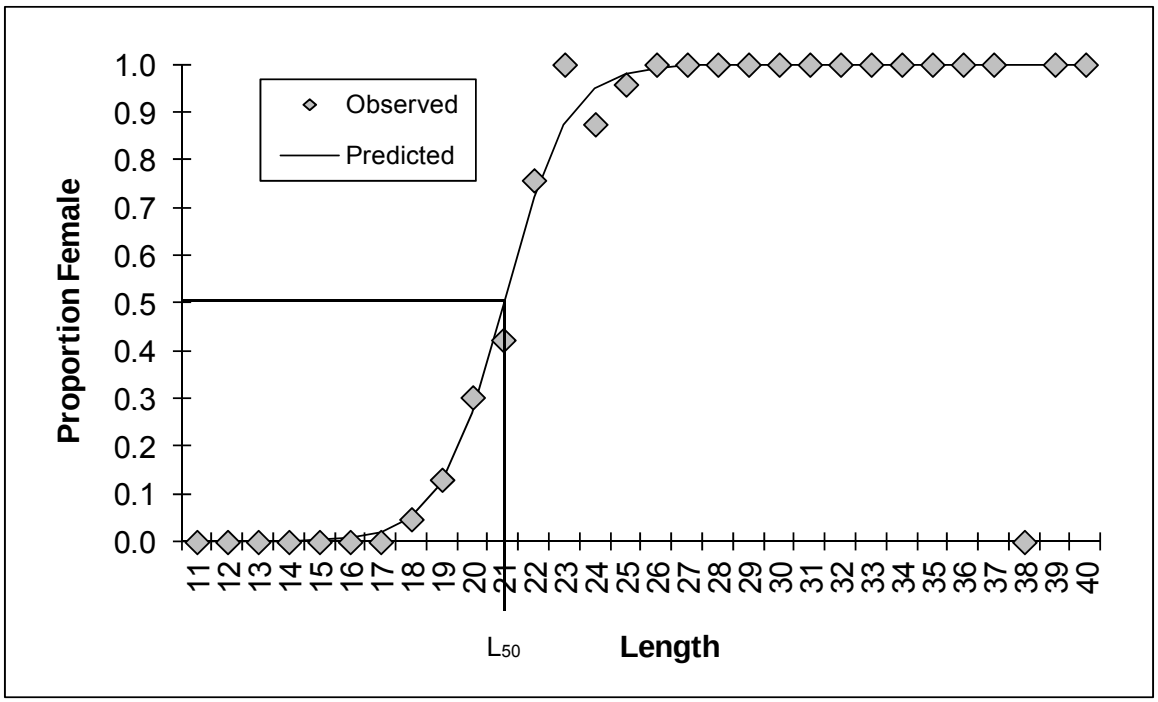

Figure 3. Predicted maturity schedule for male and female (pooled) southern kingfish.

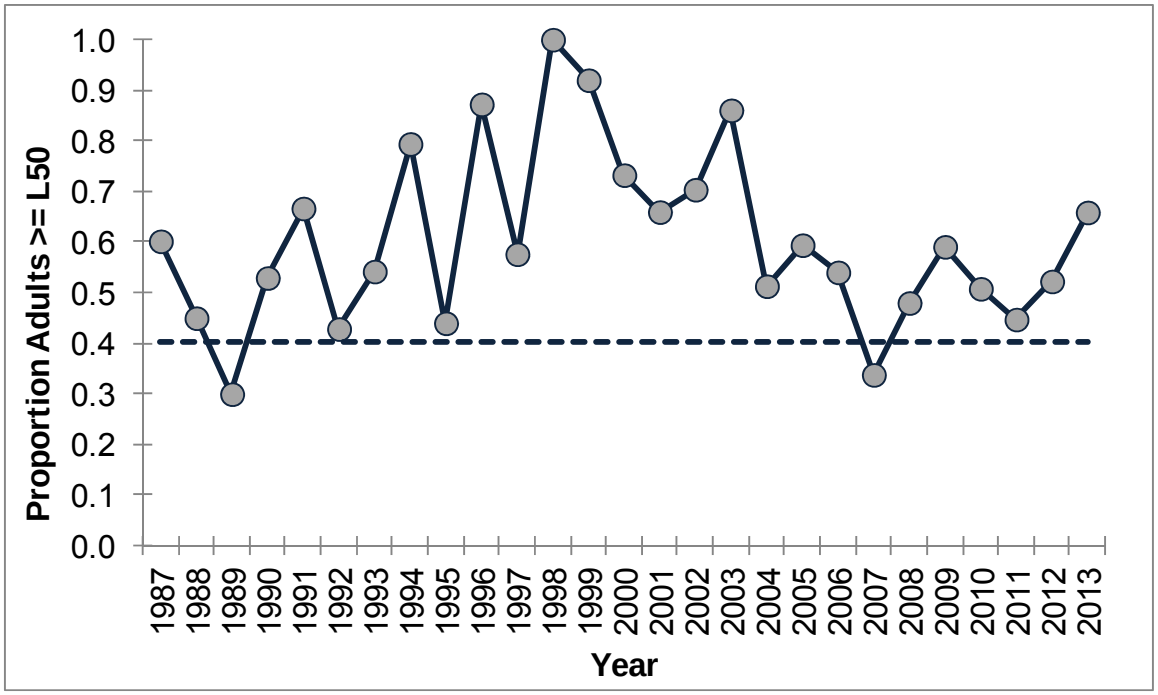

Figure 4. Annual proportions of adults greater than or equal to the length at 50% maturity occurring in the June component of the NCDMF Program 195 survey (excluding strata NR, PR, and PUN), 1987–2013. Dotted line represents 2/3 of the average of the time series.

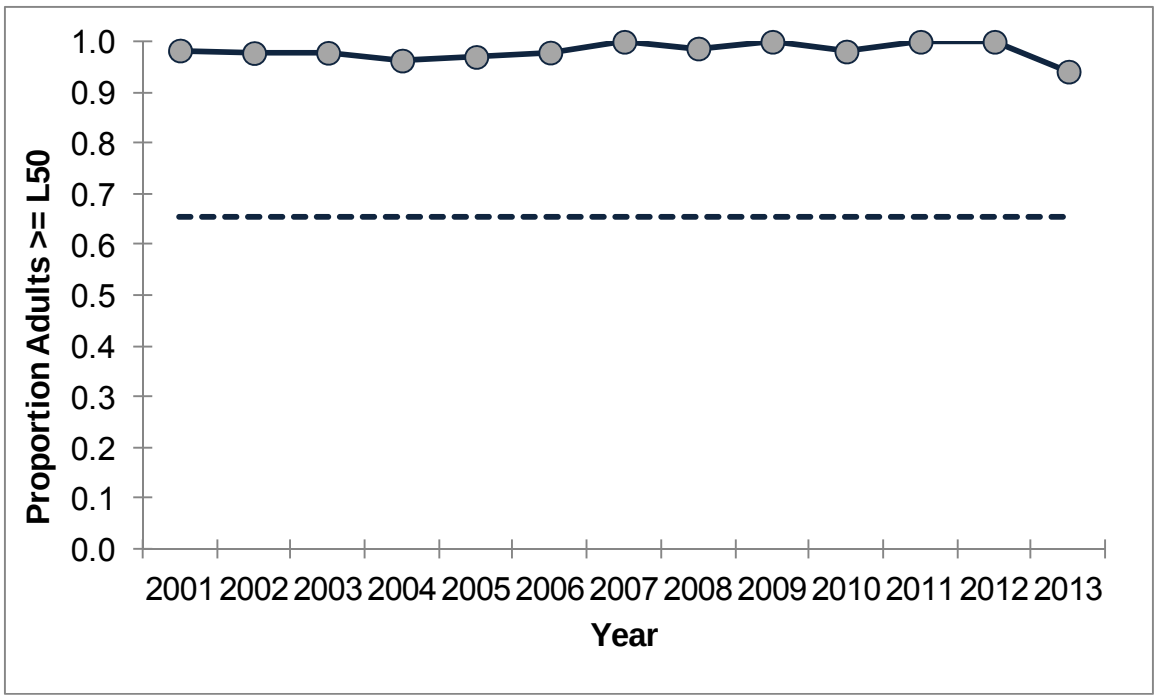

Figure 5. Annual proportions of adults greater than or equal to the length at 50% maturity occurring in the July–September component of the NCDMF Program 915 survey (Pamlico Sound deep strata only), 2001–2013. Dotted line represents 2/3 of the average of the time series.

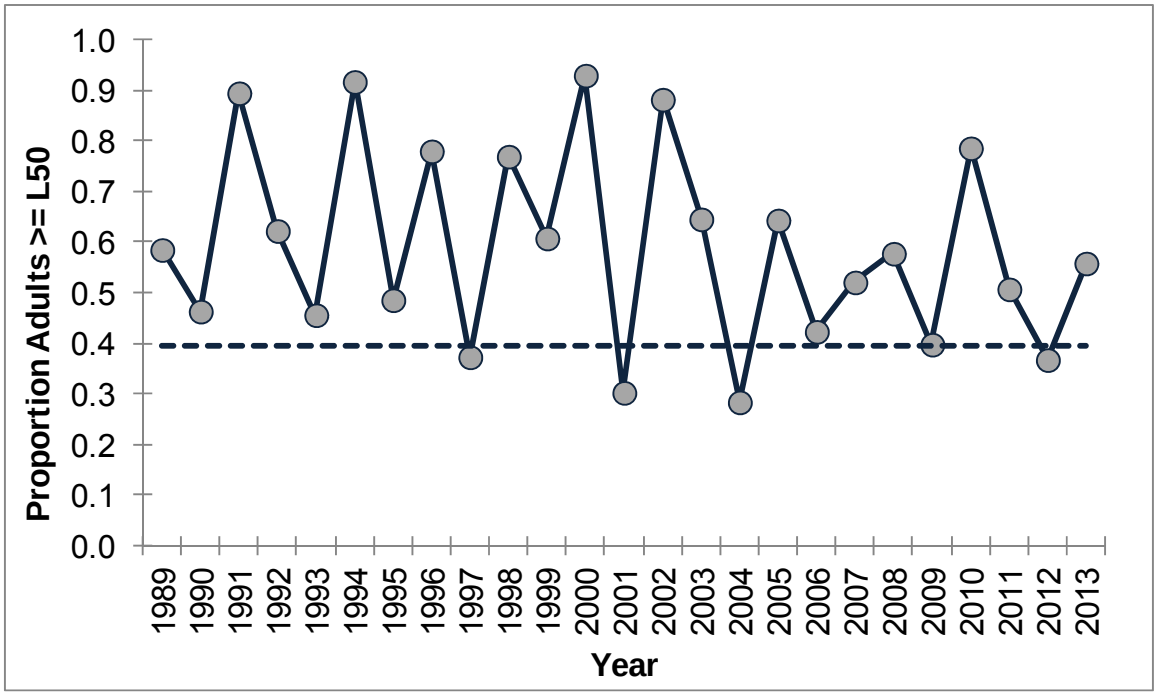

Figure 6. Annual proportions of adults greater than or equal to the length at 50% maturity occurring in the summer component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

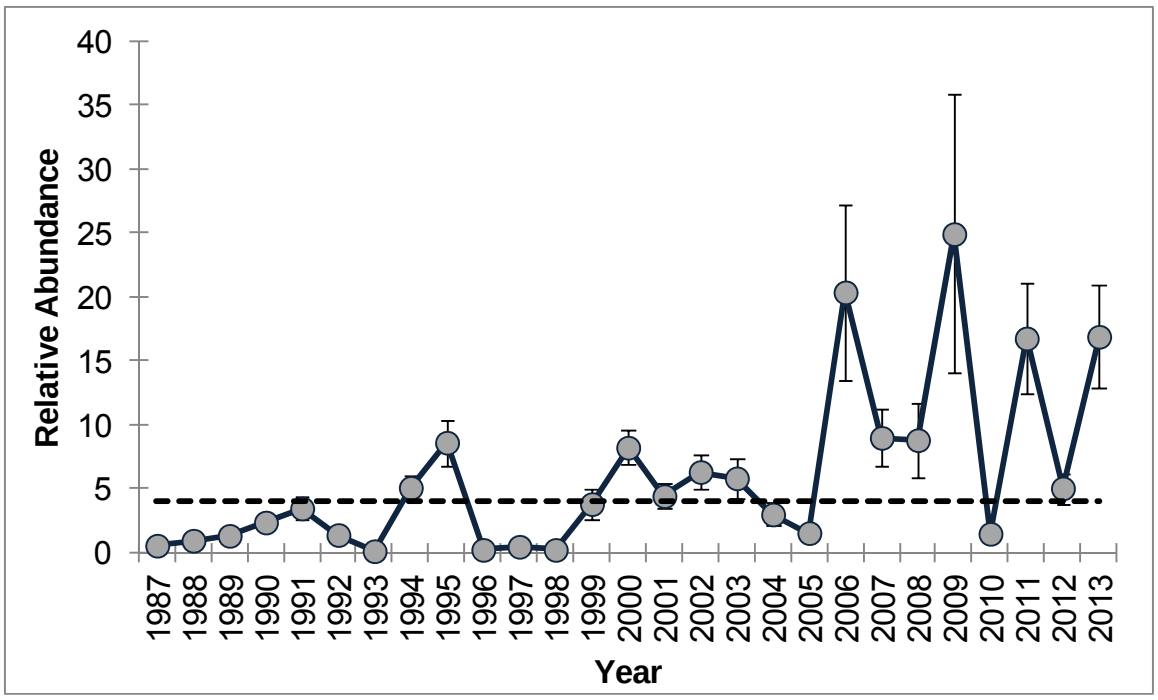

Figure 7. Annual index of relative YOY abundance derived from the September component of the NCDMF Program 195 survey (excluding strata NR, PR, and PUN), 1987–2013. Dotted line represents 2/3 of the average of the time series.

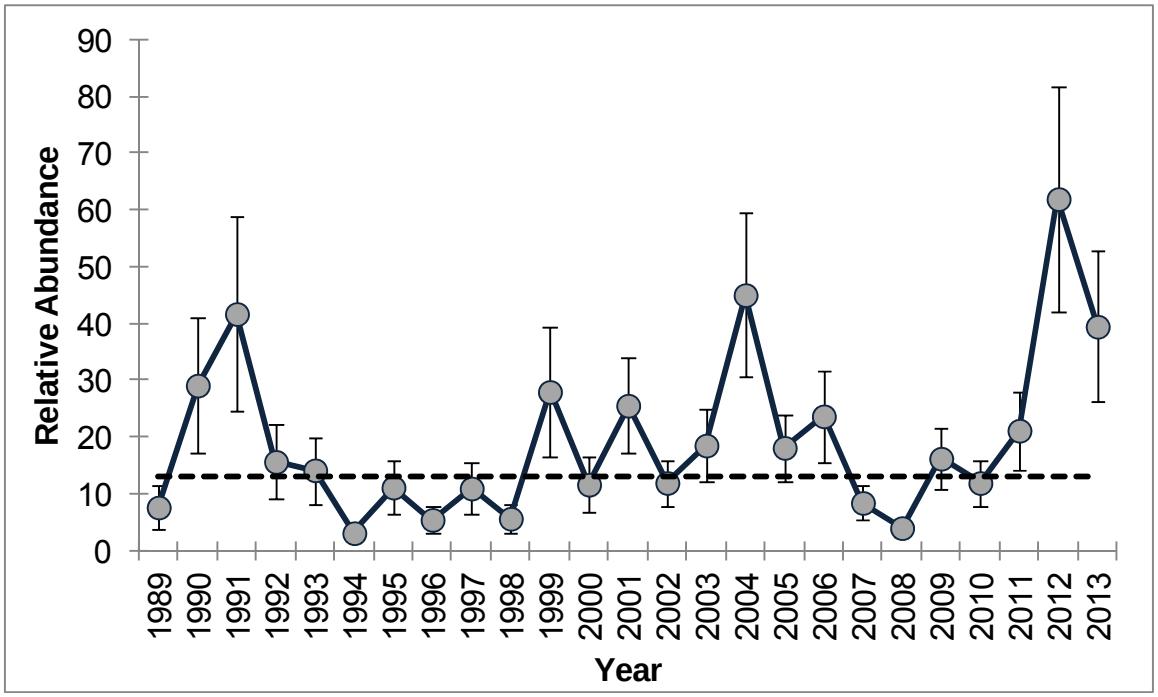

Figure 8. Annual index of relative adult abundance derived from the summer component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

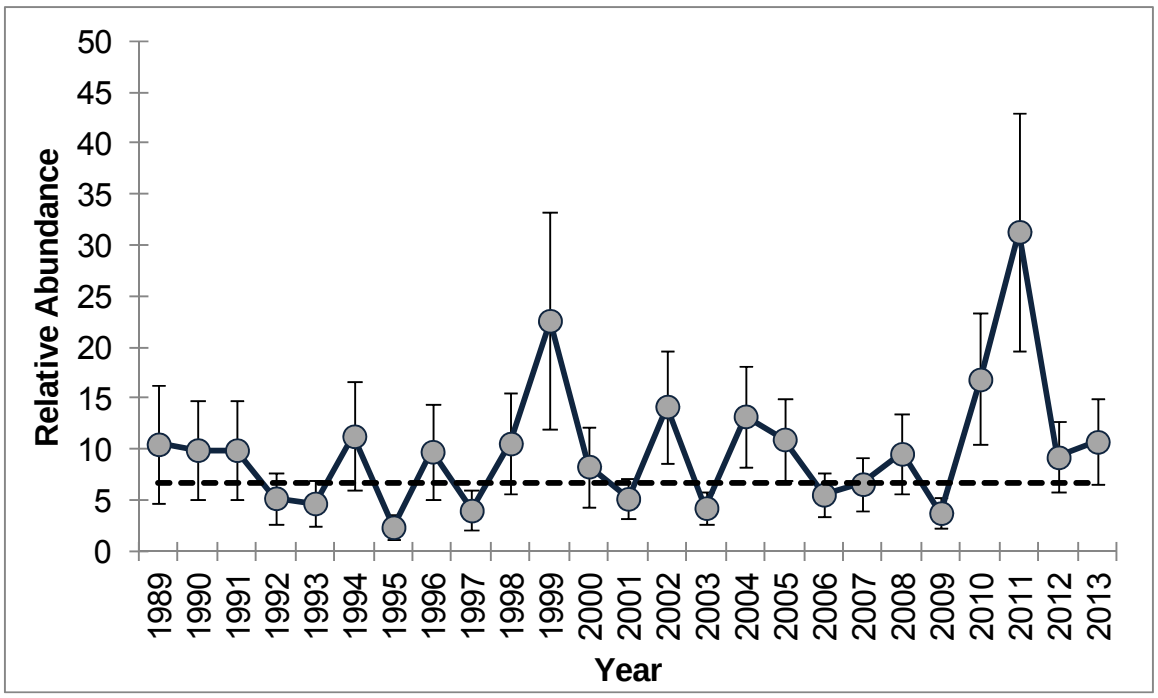

Figure 9. Annual index of relative YOY abundance derived from the fall component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

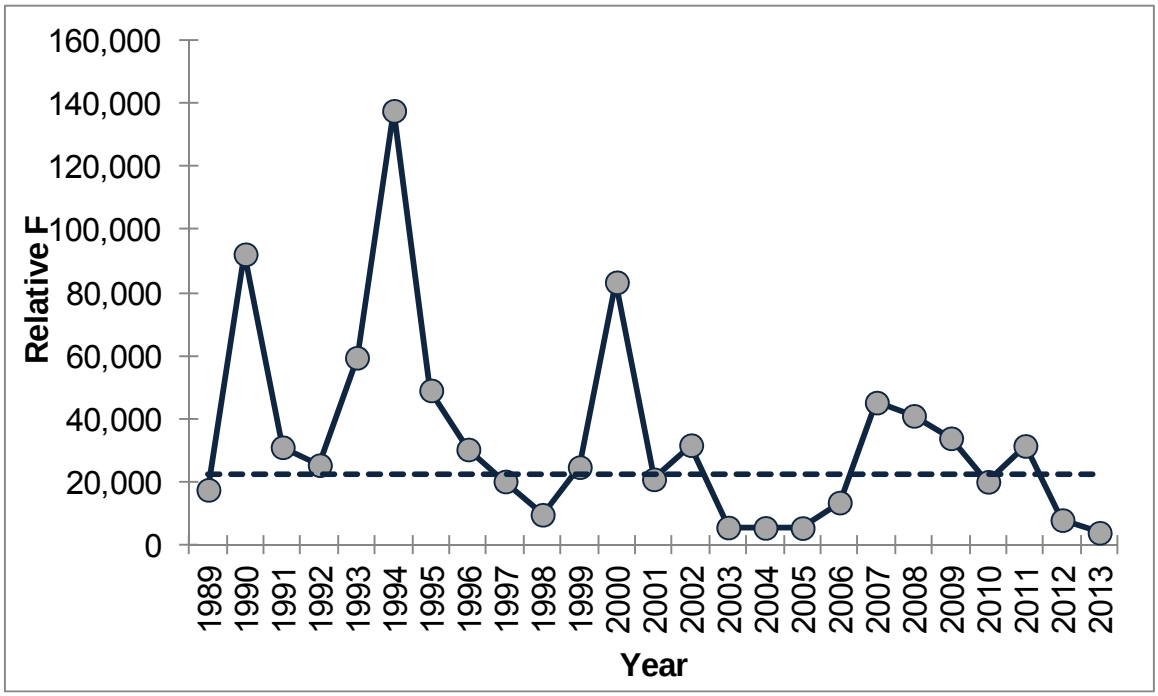

Figure 10. Annual estimates of relative fishing mortality rate (*F*), 1989–2013. Dotted line represents 66% of the average of the time series.

15.2 APPENDIX 2. SOLICITATION OF PUBLIC COMMENT ON KINGFISH ISSUES

News Release distributed Jan. 26, 2015

MOREHEAD CITY – The N.C. Division of Marine Fisheries is asking the public to submit comments on issues they would like to see addressed in an upcoming Kingfish Fishery Management Plan. State law requires the division to review each fishery management plan every five years

The division has begun a mandated review of the N.C. Kingfish Fishery Management Plan that was adopted by the N.C. Marine Fisheries Commission in 2007. The agency is soliciting public comment as part of an internal process to determine what procedural method to take in reviewing the plan.

If changes in management strategies or rules are needed, the division will pursue a plan amendment, where division staff and an advisory committee develop positions on specific issues that need to be addressed. If changes in management strategies are not required, the division will proceed with a revision, which is a more abbreviated process that involves updating data and fishery information contained in the plan.

Written comments will be accepted until February 17 and should be addressed to Beth Egbert, N.C. Division of Marine Fisheries, P.O. Box 1965, Manteo, N.C. 27954 or sent by email to Beth.Egbert@ncdenr.gov or to Kevin Brown, N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557 or sent by email to Kevin.H.Brown@ncdenr.gov.

State law requires the division to prepare a fishery management plan for adoption by the Marine Fisheries Commission for all commercially and recreationally significant species or fisheries that comprise state marine and estuarine resources. These plans provide management strategies designed to ensure long-term viability of the species.

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From the Public

Email received Jan. 26, 2015 from Dan Wood

I would like to see the state put a size limit on Kingfish (whiting). Right now thousands and thousands of small whiting are killed before they have a chance to reach eating size by netters as well as by both commercial and recreational fishermen. By putting a size limit on them they would at least reach spawning size before they can legally be taken.
Thanks for your consideration,
Dan Wood
Lexington, NC
e-mail: woodjd@lexcominc.net
phone: 336-239-2315

Division Response

The management strategy set forth under the 2007 Kingfish Fishery Management Plan is the use of management triggers where management actions may be considered based on trends in several indices (biological and fishery independent). Indices have been updated through 2013 and based on these the Division has determined there is no need for additional regulations for kingfish at this time. A size limit would increase regulatory discards of kingfishes. Some culling occurs at sea and has been documented in the shrimp

trawl fishery off South Carolina (DMF, unpublished data). Placing a nine-inch or greater size limit on kingfishes, which are bycatch in several fisheries, would result in additional regulatory discards in the shrimp trawl, long haul seine, beach seine, sciaenid pound net, winter trawl, and recreational fisheries as well as the gill net fishery. Heads of kingfishes are also used as bait in the recreational red drum fishery. Under North Carolina law, it is unlawful to possess aboard a vessel or while engaged in fishing from the shore or a pier any species of finfish that is subject to a size or harvest restriction without having head and tail attached (Marine Fisheries Commission Rule 15A NCAC 03M .0101).

The Division is not proposing any changes in management strategies or measures for the N.C. Kingfish Fishery Management Plan. Changes in factual and background data will be documented in the upcoming Information Update to the plan. The Marine Fisheries Commission will be advised of this at its May 2015 business meeting in New Bern. The commission is scheduled to vote on final approval of the Information Update to the fishery management plan at its November 2015 business meeting in Nags Head. Thank you for your interest in the State's fisheries.

N.C. Kingfish Fishery Management Plan 2007
http://portal.ncdenr.org/c/document_library/get_file?uuid=3882c28f-da09-4978-93ab-13ba38eb0414&groupId=38337

Email received Jan. 26, 2015 from Frank Folb (Northern Regional AC)

The Sea Mullet fishery is very important to both recreational and commercial fisherfolks.

Sea Mullet was in the olden days what brought families to the Outer Banks to fish to help feed their families.
Still today it is a highly sought after fish that is of high priority to fishing piers and surf fisherman along our coast and our neighboring states above and below us.
Because these fish are NOT a highly sought after species on recreational boats I suggest that little or no limits for recreational fisheries as to size and creel be made.
If a minimum size limit is considered it should no more 9-10 inches and the creel for recreational should be no less than 50-75 fish.

Commercial Limits
In the past we have gone to historical data to see what the largest catch of a fish was and given them at least that amount for a top limit of catch for the year.
If I am correct that at present the fishery is viable and healthy I suggest we at least double any historical high for the beginning limit. This fishery is very
important to the commercial sector in recent years and fills in a void when many other fisheries are closed. Until there is a need by research that a daily limit
is needed is suggest no limit be placed on amount of catch per day or seasons open.

I would appreciate your reactions to my suggestions and also would include me on what your scientific committee minutes so I can follow and be involved throughout its implementation.
Thanks
Frank Folb
Northern Advisory Committee
Frank & Fran's Tackle
Avon, NC

Division Response

The management strategy set forth under the 2007 Kingfish Fishery Management Plan is the use of management triggers where management actions may be considered based on trends in several indices (biological and fishery independent). Indices have been updated through 2013 and based on these the Division has determined there is no need for additional regulations for kingfish at this time. Currently, the only regulation for kingfishes in North Carolina relates to shrimp and crab trawls from December 1 through March 31. During this time it is unlawful to possess finfish caught incidental to shrimp and crab trawling in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish; except that an additional 300 pounds of kingfish may be taken by crab or shrimp trawlers working south of Bogue Inlet [Marine Fisheries Commission Rule 15A NCAC 03J .0202 (5)].

The Division is not proposing any changes in management strategies or measures for the N.C. Kingfish Fishery Management Plan. The upcoming Information Update will contain the most recent data to characterize the fishery and species of kingfish. The Marine Fisheries Commission will be advised of this at its May 2015 business meeting in New Bern. The commission is scheduled to vote on final approval of the Information Update to the fishery management plan at its November 2015 business meeting in Nags Head. Thank you for your interest in the State's fisheries.

N.C. Kingfish Fishery Management Plan 2007
http://portal.ncdenr.org/c/document_library/get_file?uuid=3882c28f-da09-4978-93ab-13ba38eb0414&groupId=38337

Email received Jan. 27, 2015 from Glenn Shivar

Hello! I have a few comments that I would like to express concerning sea mullet, aka kingfish.

--Are regulations really necessary? In my small part of the coast they seem larger and more numerous than I have seen and I'm 66 yrs old.

-- Make the creel limit generous, at least 30 / person.

-- Have no length requirement. Often used as bait. Big drum in the surf and for large flounder.

Thank You and have a Great Day - Glenn Shivar

Division Response

The management strategy set forth under the 2007 Kingfish Fishery Management Plan is the use of management triggers where management actions may be considered based on trends in several indices (biological and fishery independent). Indices have been updated through 2013 and based on these the Division has determined there is no need for additional regulations for kingfish at this time. Currently, the only regulation for kingfishes in North Carolina relates to shrimp and crab trawls from December 1 through March 31. During this time it is unlawful to possess finfish caught incidental to shrimp and crab trawling

in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish; except that an additional 300 pounds of kingfish may be taken by crab or shrimp trawlers working south of Bogue Inlet [Marine Fisheries Commission Rule 15A NCAC 03J .0202 (5)].

The Division is not proposing any changes in management strategies or measures for the N.C. Kingfish Fishery Management Plan. The upcoming Information Update will contain the most recent data to characterize the fishery and species of kingfish. The Marine Fisheries Commission will be advised of this at its May 2015 business meeting in New Bern. The commission is scheduled to vote on final approval of the Information Update to the fishery management plan at its November 2015 business meeting in Nags Head. Thank you for your interest in the State's fisheries.

N.C. Kingfish Fishery Management Plan 2007
http://portal.ncdenr.org/c/document_library/get_file?uuid=3882c28f-da09-4978-93ab-13ba38eb0414&groupId=38337

Email received February 12, 2015 from Chris McCaffity

Public Comments Regarding Kingfish Management

I am Chris McCaffity. Please keep an open mind as you think about these solutions that could be applied to managing most seafood including kingfish and herring.

Start by deciding how many kingfish their existing habitat can support. Establish reasonable recreational/charter and consumer/commercial quotas. Allow stakeholders to decide how each sector's annual quotas will be managed with a 2/3 majority vote from participating permit/license holders. Stock kingfish in rotation with other species as needed to support desired harvest levels. Take practical steps to enhance habitat so our waters can support more marine life. Reward fishermen and consumers with higher quotas as stocks reach desired levels. Process unmarketables from cleaned seafood into aquaculture feed.

Hatcheries and habitat enhancement could be the perfect union of mariculture and wild-caught seafood that lives free and self-sufficient until harvested. Stocked species would thrive and produce at Optimum Yield even as we harvest more. These proven solutions would feed more people while creating more recreational opportunity and generating more revenue. It is time to focus more on enhancing our fisheries than restricting access to them.

Thank you for your thoughtful consideration of these positive solutions. I am happy to answer any questions. freefish7@hotmail.com

Division Response

The management strategy set forth under the 2007 Kingfish FMP is the use of management triggers where management actions may be considered based on trends in several indices (biological and fishery independent). Indices have been updated through 2013 and based on these the Division has determined there is no need for additional regulations for kingfish at this time. Currently, the only regulation for kingfishes in North Carolina relates to shrimp and crab trawls from December 1 through March 31. During this time it is unlawful to possess finfish caught incidental to shrimp and crab trawling in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish; except

that an additional 300 pounds of kingfish may be taken by crab or shrimp trawlers working south of Bogue Inlet [15A NCAC 3J .0202 (5)].

The Division is not proposing any changes in management strategies or measures for the N.C. Kingfish Fishery Management Plan. The upcoming Information Update will contain the most recent data to characterize the fishery and species of kingfish. The Marine Fisheries Commission will be advised of this at its May 2015 business meeting in New Bern. The commission is scheduled to vote on final approval of the Information Update to the fishery management plan at its November 2015 business meeting in Nags Head. Thank you for your interest in the State's fisheries.

NC Fishery Management Plan Kingfish 2007
http://portal.ncdenr.org/c/document_library/get_file?uuid=3882c28f-da09-4978-93ab-13ba38eb0414&groupId=38337

Email received Feb. 16, 2015 from Adam Tyler

I would like to offer these comments on the proposed Kingfish FMP review. According to the DMF website these fish are fine. As noted in the copy and paste below from the DMF website. Commercial landing did decline in 2013 but I firmly believe that was due to the arrival of spiny dogfish in the region. Dogfish tend to eat what is available and run schools of fish out of the area. When this occurs obviously these fish leave the area. However this year 2014 was a banner year for all 3 species of Kingfish. We have caught them locally up to Super Bowl Sunday. The lack of large schools of Spiny Dogfish this year allowed us to catch king fish till later than normal due to natural predators being minimal this year. So I do not feel that any changes are currently needed in this plan. [Mr. Tyler also gave additional comments by phone concerning his interest in a correlation between dogfish abundance and kingfish abundance. He stated that he gillnets for both and when one is abundant the other is not. He asked if it would be possible for the division to investigate a correlation based on landings or other data (Kevin Brown personal communication.)]

Comments					
 Kingfishes (A)					A state fishery management plan completed in 2007 indicated a healthy age structure in the stock along with increasing trends in juvenile abundance, but commercial landings dropped in 2013.

Adam Tyler

Division Response
The management strategy set forth under the 2007 Kingfish Fishery Management Plan is the use of management triggers where management actions may be considered based on trends in several indices (biological and fishery independent). Indices have been updated through 2013 and based on these the Division has determined there is no need for additional regulations for kingfish at this time. Currently, the only regulation for kingfishes in North Carolina relates to shrimp and crab trawls from December 1 through March 31. During this time it is unlawful to possess finfish caught incidental to shrimp and crab trawling in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds

the weight of finfish; except that an additional 300 pounds of kingfish may be taken by crab or shrimp trawlers working south of Bogue Inlet [Marine Fisheries Commission Rule 15A NCAC 03J .0202 (5)].

While it would be interesting to investigate a correlation in the abundance of dogfish and kingfish, the division does not feel it is necessary for the Informational Update to the Kingfish Fishery Management Plan at this time.

The Division is not proposing any changes in management strategies or measures for the N.C. Kingfish Fishery Management Plan. The upcoming Information Update will contain the most recent data to characterize the fishery and species of kingfish. The Marine Fisheries Commission will be advised of this at its May 2015 business meeting in New Bern. The commission is scheduled to vote on final approval of the Information Update to the fishery management plan at its November 2015 business meeting in Nags Head. Thank you for your interest in the State's fisheries.

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North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Tom Wadsworth, Chris Stewart and Trish Murphey
N.C. Division of Marine Fisheries

DATE: July 24, 2015

SUBJECT: Summary of public comments on proposals for southern flounder management

The N.C. Marine Fisheries Commission accepted written public comment June 10 - July 10, 2015 on six proposals being considered by the commission for southern flounder management. Verbal comment was also accepted at a public meeting on July 17, 2015 (minutes attached). Comments included support and/or opposition for the commission's proposals, as well as suggestions not included in the six proposals. The vast majority of the comments received expressed concern for the fishery and supported action to ensure stock recovery.

All email and written comments received during the public comment period will be available online and included with other materials for the Aug. 19-21 commission business meeting.

Approximately 150 members of the public, seven members of the commission and several N.C. Division of Marine Fisheries staff attended the public meeting. There were 66 members of the public that spoke at the meeting. The majority of speakers supported action through the supplement process; however, a sizeable portion of speakers supported status quo or using the amendment process instead. Of those speakers that did not support the supplement process, several supported the use of solid scientific data and/or a new stock assessment to manage southern flounder. Of the small number of speakers that supported specific proposals in their entirety, Proposal 1 had the most support of the six commission proposals. Most speakers that supported action through the supplement process supported one or more of the following: increase the commercial size limit to 15 inches, implement a Total Allowable Catch (TAC) and/or quota for some portion of the fishery, reduce commercial harvest, prohibit harvest of flounder (or all species) by some or all forms of gill nets. A small group of speakers simply voiced support for the supplement or making decisions that benefit the resource. The remaining speakers mentioned a variety of other suggestions or concerns.

Written public comments received included 986 emails and 260 letters for a total of 1,246 written comments. While the vast majority of the written comments received did not specifically support the commission proposals, Proposal 1 did receive the most comments of support of the comments that specified a proposal. A limited number of comments were received that supported the other

proposals. Few emails or letters opposed specific proposals; however, Proposals 1, 2 and 4 did receive some opposition. Most written comment supported some measures contained within one or more of the commission proposals, but either supported additional measures beyond what the proposal contained or did not support some of the measures in the proposals. For example, some comments supported Proposal 1, but without further restrictions on the gig fishery.

Approximately three-quarters of the emails and letters received were form letters (i.e., copies of the same message from different senders) or included a form letter within the body of an email along with other comments. One form letter, expressing support for Proposal 1, was sent in 280 letters and emails from the Recreational Fishing Alliance (RFA), Cape Fear Fly Fishers, Cape Fear Chapter of N.C. Kayak Association and various individuals not affiliated with an organization. A second form letter was sent in 321 letters and emails requesting: a TAC that would reduce the total commercial harvest by 50 percent, a closure of the large mesh flounder gill net fishery, a universal 15-inch minimum size limit, a moratorium on new pound net sets and permits until the stock has recovered, and no change to the current recreational harvest limits. An additional 372 form letters called for: no change in the current recreational limits, a 40 percent reduction in total catch, a 15-inch minimum size limit for commercial fisheries, a TAC, pound net attendance requirements, and daily trip limits for the pound net and gig fisheries. Fifteen form letters requested: a 50 percent reduction in commercial harvest, implementation of a TAC that would be 50 percent lower than the average commercial southern flounder harvest of the last three years, and the suspension of southern flounder harvest by all gill nets.

The division also received comments from several organizations representing recreational and commercial fishing interests in North Carolina. These comments are summarized below:

The Coastal Conservation Association of North Carolina (CCA-NC) provided comment as well as a petition entitled “Restore Estuarine Finfish in North Carolina” with 1,654 signatures. The petition supported the commercial pound net and gig fishery, a 15-inch size limit for commercial and recreational fishermen, a daily creel limit of six fish for recreational anglers, an annual TAC on commercial harvest and a prohibition on large mesh monofilament gill nets in estuarine waters. Additional comments from the CCA-NC dated May 19, 2015 included recommendations to: close the southern flounder commercial and recreational large mesh gill net fisheries completely (or at a minimum from April 15 to Feb. 15), implement a commercial TAC or quota aimed at reducing total catch by 50 percent, increase the commercial size limit to 15 inches, place a moratorium on new pound nets, and not change recreational regulations. The CCA-NC also supported a 50/50 allocation for the two sectors once a coastwide stock assessment is complete. The CCA-NC also requested no change in the current recreational regulations. In a separate email, the CCA-NC also provided comments regarding the observer program and the Incidental Take Permit.

The North Carolina Guides Association (NCGA) requested the commission prohibit the use of large mesh gill nets beginning Jan. 1, 2016. The NCGA also recommended the commission pass Proposal 1 in its entirety with the modification to allow commercial gigging seven nights per week.

The North Carolina Wildlife Federation (NCWF) supported a 40 percent reduction in total southern flounder catch this year and recommended this should include a significant reduction in the commercial large mesh gill net fishery. The NCWF also supported the use of a TAC or quota for flounder beginning in 2016 and an increase in the commercial size limit to 15 inches.

The North Carolina Watermen United (NCWU) sent three letters. The first described landings data to show the commercial harvest of southern flounder is not declining. An additional letter expressed NCWU's position that they do not support the process, the science, the procedure or any of the six proposals. The NCWU requested no action be taken on the flounder fishery and that an independent review of supplemental management measures and a new stock assessment should be completed. A third letter questioned the division's conclusion that juvenile southern flounder are being caught in the fishery and reiterated the need for a new stock assessment before any new fishery management plan is adopted by the division.

The Ocracoke Working Waterman's Association (OWWA) supported a cooperative tagging study with commercial pound net fishermen and the division to tag southern flounder in late-November to enhance understanding of migration and recruitment. The OWWA supported the creation of a sanctuary in the fall for flounder using the division's blue crab sanctuary boundaries around inlets. It also recommended the commission not support Proposal 1 or 2 because they believe the supplement proposals should reflect the amendment that is being supplemented. OWWA supported Proposals 5 and 6 with the caveat that the cull panel modification (5-¾-inch stretch panels) not be put in place until Jan. 1, 2016. OWWA does not support 6-inch cull panels.

The Recreational Fishing Alliance (RFA-NC) supported Proposal 1 in its entirety. It also recommended the division: conduct a comprehensive study of flounder gigging, institute a monitoring program following the implementation of Proposal 1, and create an advisory group to evaluate the biological and economic impacts from the prohibition of large mesh gill nets. In addition, the RFA-NC recommended a moratorium be implemented on all gear permitted by the Recreational Commercial Gear License and to develop and implement species-specific reporting for all commercial fishermen in the southern and summer flounder fisheries.

Other associations and counties also provided comment. The Albemarle Fisherman's Association did not support the supplement, but supported the amendment process. The Cape Fear Chapter of the North Carolina Kayak Association sent a petition with eight signatures that supported Proposal 1. Nash County and the Town of Carolina Beach submitted resolutions that supported the use of the supplement process to implement reductions on southern flounder harvest. Pamlico County submitted a resolution that opposed the supplement process to implement reductions of southern flounder.

The remaining written comments were not form letters and did not represent organizations. Of these, most supported one or more of the following: increase the commercial size limit to 15 inches, implement a TAC and/or quota for some portion of the fishery, reduce commercial harvest, or prohibit harvest of flounder (or all species) using some or all forms of gill nets. Although much less common, multiple comments contained support for one or more of the following: a season closure for some or all gears that harvest flounder, a moratorium of some type on pound nets, use commercial trip limits, reduce size limits for recreational and/or commercial sectors, raise size limits above 15 inches, reduce the recreational bag limit, use best available science and/or complete a new stock assessment, use the amendment process instead of the supplement process, reduce or prohibit pound nets and/or gigging, prohibit the Recreational Commercial Gear License, increase net mesh sizes to reduce bycatch, or take any kind of action that will benefit the resource. There were a small number of comments that suggested there was no problem with the stock. A large number of comments preferred no new regulations for the recreational fishery and many of these comments cited declining catches. A small number of comments preferred no changes to

regulations for one or more commercial gears. A variety of other suggestions or concerns were expressed in other emails and letters.

Marine Fisheries Commission Public Meeting Minutes
Riverfront Convention Center, New Bern, North Carolina
June 17, 2015

The commission met at 1 p.m. on June 17, 2015 at the Riverfront Convention Center in New Bern, N.C. to take public comment on management proposals being considered for a supplement to the Southern Flounder Fishery Management Plan Amendment 1.

The following commission members were in attendance: Sammy Corbett-Chairman, Anna Beckwith-Vice Chair, Mikey Daniels, Mark Gorges, Chuck Laughridge, Joe Shute, and Mike Wicker. Kelly Darden and Alison Willis were absent.

Chairman Corbett called the meeting to order and reminded the commission of its conflict of interest requirements and reviewed the guidelines for public comment.
Following is a summary of comments that related to southern flounder and the supplement proposals:

Paul Walker from Hampstead supported Proposal 1, except he felt that large mesh gill nets should be removed from coastal waters immediately, rather than waiting until Jan. 1, 2016.

Ron McCoy from Hampstead supported Proposal 1and urged the commission to find common ground for growth of fisheries.

Paula Cannon from Hampstead provided comments for for-hire guide Capt. Dave Timpy, who supported Proposal 1, stating it would lead to the fastest recovery for flounder.

Earl Ward, Jr. from the Albemarle Sound area did not support any changes, saying commercial fishermen had been cut enough.

Riley Williams, member of the commission's Northern Regional Advisory Committee, did not support the supplement, saying any changes to southern flounder should be through an amendment to the fishery management plan.

Ray Brown, from Goldsboro and former commission adviser, supported using the supplement process to restore southern flounder stocks to abundant levels.

Hain Ficken from Wayne County wanted to restore flounder by getting rid of big nets, instituting a total allowable catch limit and having a 15- inch size limit for everyone.

Doris Morris from Plymouth did not support any of the proposals, saying the data did not indicate a problem because flounder catches had stayed constant, even though fishing effort and fishing time decreased.

Phil Rose from Gaston County and Arapahoe talked about declining catches in western Pamlico Sound and wanted gill nets to be licensed by area as a mechanism to more effectively manage the fishery and to help restore stocks.

David Bush, a biologist with the N.C. Fisheries Association, said there is no data to show an amendment to the fishery management plan would not be sufficient to address the issues with southern flounder.

Jerry Schill with the N.C. Fisheries Association said changes to southern flounder management should be through an amendment to the fishery management plan, not a supplement.

Jerry James from Duplin County and member of the commission's Finfish Advisory Committee supported Proposal 1, except for the gig and pound net aspects of the recommendation.

Tim Hergenrader of Pamlico County supported a large mesh gill net ban, a total allowable catch limit for pound nets and commercial gigging, a 15-inch size limit for everyone and a six-fish bag limit for recreational fishermen.

Mitchell Sawyer from New River felt the General Assembly needed to make this decision on flounder, not the Marine Fisheries Commission.

Alan Faircloth of Surf City did not support limiting the number of days for commercial gigging because weather decided when you could gig. He supported a 15-inch size limit for both recreational and commercial, an eight-fish recreational bag limit and a 100-fish commercial trip limit.

Art Smith from Belhaven said fast-tracking flounder measures through the supplement process was wrong and should not proceed.

Donald Willis from Craven County said in the past the commission had been too wrapped up in saving jobs rather than saving fish and urged the commission to do what was right and bring back the resource.

T.O. Hudgins from Pamlico County did not support management changes and said the problem in Pamlico County was from pollution.

Bruce MacLachlan from Onslow County supported a total allowable catch limit, a 15-inch size limit for both recreational and commercial fishermen and elimination of large mesh gill nets.

Lauren Morris with the N.C. Fisheries Association said the commission should follow its processes and address needed changes for southern flounder through an amendment to the fishery management plan.

Jon Whitehurst from Minnesott Beach felt large mesh gill nets needed to be removed from inland waters.

Jimmie Goodwin, Jr. said changes to flounder restrictions should go through the amendment process, that pound nets are a clean fishery, that pollution is a problem and that flounder should be grown in hatcheries.

Terry Pratt with the Albemarle Sound Fisherman's Association did not support the supplement process saying consideration of southern flounder restrictions should go through an amendment to the fishery management plan.

Stanley Warlen of Carteret County and retired scientist with the National Marine Fisheries Service said any restrictions for southern flounder should be based on good data and that a coast-wide stock assessment is needed to determine the stock status.

Chris Elkins, former Marine Fisheries Commissioner, supported a total allowable catch limit with a 50 percent decrease in harvest for the commercial fishery, closing large mesh gill nets, a 15-inch size limit for everyone, a moratorium on new pound nets and permits, and no changes in recreational harvest.

Ray Howell supported a total allowable catch limit with a 50 percent decrease in harvest for the commercial fishery, a 15-inch size limit for everyone and eliminating large mesh gill nets.

Emily Jordan, a college student who said she was speaking for young people, said how much she enjoyed fishing with her dad and urged the commission to ensure there are fish for future generations.

David Sneed with the Coastal Conservation Association – N.C. supported the supplement process, saying southern flounder was overfished and that too many juveniles were being harvested and that if the commission would take care of the fish, fishing will take care of itself.

Keith Johnson from Wake County supported the supplement process and said large mesh gill nets are why southern flounder have not recovered.

Ron Zielinski from Oriental supported Proposal 1, but said the total allowable catch limit for the commercial fishery should be a 40 percent reduction from 2013 landings, closures needed to be added from Proposal 2 if needed, and that the recreational bag limit should be reduced from six to five fish if necessary.

John Hudnall said fish run in cycles and that the last two to three years have been good and if a 15-inch size limit was implemented it would put him out of business.

Hodge Jordan from Onslow County said the supplement is needed, that large mesh gill nets should be removed from state waters and there needs to be a commercial total allowable catch limit.

Paul Biermann supported going through the fishery management plan amendment process to address issues with southern flounder.

Bradley Styron, former Marine Fisheries Commissioner, said changes to southern flounder management should be through an amendment to the fishery management plan, not a supplement.

Joe Romano from Wilmington said the supplement was circumventing the process, that there was not an emergency with southern flounder and we need positive, creative solutions and not political maneuvering.

Bud Abbott, President of the Coastal Conservation Association – NC, supported Proposals 1 and 2, and recommended using money that was designated for the Observer Program to help retrain fishermen for other jobs.

Randy King felt no changes were needed to existing flounder restrictions.

Bert Owens from Beaufort said the commission was focused on jobs and not the resource and encouraged the members to take courage and step across the line for the resource.

Ken Seigler, member of the commission's Finfish Advisory Committee, urged the commission to use the amendment process and sound science to address flounder issues, rather than going forward with a supplement.

John Hislop from Bear Creek thought the Fisheries Reform Act was a good process, but said the states seems to be moving backwards; he encouraged the commission to support the resource.

Bob Dillard from Oriental supported Proposal 1, eliminating large mesh gill nets from estuarine waters and creating a subsidy for commercial fishermen that were put out of work and/or providing their children a free education at community colleges.

Ricky Rose from Harkers Island supported a 15-inch size limit for everyone, but did not support limiting giggers to just four nights a week, saying the weather already limited the number of nights they could fish.

Hal James with the Coastal Carolina Tax Association supported minimum government, maximum freedom and free enterprise and urged the commission not to put commercial fishermen out of business.

Lonnie Brown said there were plenty of little flounder and there was no depletion of the stock.

Rena Jenkins supported a 15-inch size limit for everyone, but did not want a limit the number of nights they could flounder gig.

Raynor James from Craven County said that studies were inconclusive and that extraordinary decisions should not be made without sound data, saying user groups should decide what was best.

Joshua McGhee from Craven County said supplement proposals are rash and the commission was not looking at the data – that 2013 landings were the highest in 12 years. He urged the commission consider the economic impact of both commercial and recreational fisheries.

Jimmy Nobles from Greenville and former commission adviser opposed the supplement and talked about political agendas.

Adam Tyler, member of the Finfish and Sea Turtle advisory committees, called for a new stock assessment and an independent review to determine if a supplement is justified. He said the stock

has been viable for 30 years and it was trending in a conservative direction, and expressed a lack of confidence in the Division of Marine Fisheries' ability to do stock assessments.

Sally Jo Glendenning, member of the Recreational Fishing Alliance, supported Proposal 1 saying banning gill nets would allow flounder to reach breeding size to help the stock recover.

James Reilly from Newport supported Proposal 1, except for the four-day limit on gigs. He doesn't want to get rid of commercial fishermen, but wants to ban destructive gear like large mesh gill nets and feels fishermen using this gear should transition to other jobs.

Chad Davis, a for-hire guide, supports the need for a supplement and called for a total allowable catch limit, removal of large mesh gill nets, a 15-inch size limit, a moratorium on pound nets and no changes to recreational size or bag limits.

Gurney Lee Collins, III from Beaufort felt the supplement was not appropriate and that the commission should move forward with an amendment to the Southern Flounder Fishery Management Plan.

Mike Blanton with the Albemarle Sound Fishermen's Association supported status quo for commercial fishermen and a 14-inch size limit for recreational anglers, saying most of the state is closed to gill nets and that fishermen don't need to lose any more flounder. He said 14- and 15-inch fish go in the ocean to spawn and don't return based on tagging data.

Andrew Czanderna did not support the supplement process and felt an amendment should be pursued. He wants to see a real stock assessment based on science.

John Stone from Newport gigs flounder to feed his family and friends now, but he used to gill net. He said the larger flounder aren't caught in gill nets, but that they swim off.

Myron Smith did not support the supplement and supported a smaller size limit like eight inches, fishing seven days a week, gill nets set year-round, fishing until the quota is met and that trawlers needed to use TEDs to protect turtles. He did think there was an emergency with southern flounder.

Tyler Brewer did not agree with any of the proposals for the supplement.

Jarrett Moore said the recreational size limit should be 14 inches to reduce animosity between the user groups and that banning large mesh gill nets will increase predators like gar, sharks and grass carp.

Tim White from Blounts Creek did not support some of the proposals that limited weekend gigging because it would put him out of business.

Tom Roller, President of the N.C. Guides Association, supported Proposal 1, except that giggers should be able to fish seven days a week. He said the southern flounder stock was depleted and that gill nets are efficient at catching fish and that the stock cannot be rebuilt as long as gill nets are in the water.

Janet Rose from Moyock said that valid data was lacking for all six proposals and that a new stock assessment needed to be done. She said gill net closures due to turtles had reduced landings and that no changes were needed. She encouraged the commission to consider the impact its decisions could have on the ability to get fresh fish to consumers.

Fred Fulcher from Pine Knoll Shores did not support the supplement and felt many of the proposals would cause an increase in imported seafood. He said data and peer reviews were needed to identify a problem and solution and felt upstream polluters were causing water quality problems.

Jonathan Fulcher from New Bern said the supplement proposals would be devastating and recommended reducing the size limit from 15 inches to 13 inches.

Lee Craddock from Dare County said he had flounder fished for 45 years and last year he caught the prettiest fish he had ever caught. He did not see a reason for the proposals and felt they were just a way to get large mesh gill nets out of the water.

Johnny Stallings said no changes were needed.

The meeting adjourned.

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: Marine Fisheries Commission

THROUGH: Division of Marine Fisheries, Management Review Team

FROM: Louis Daniel

DATE: July 20, 2015

SUBJECT: PDT comments and estimated reductions for MFC proposals for Southern Flounder Supplement A to Amendment 1

The Southern Flounder FMP PDT met on June 5th primarily to discuss the proposals put forward by the MFC at the May 2015 business meeting in New Bern in regard to Southern Flounder FMP Supplement A to Amendment 1. The PDT found that clarification was needed for each proposal to be sure the intention was well understood. The PDTs comments are summarized below and the relevant proposals are listed for each.

1. Clarify whether pound net regulations (permit restrictions, escape panel mesh size) are for all pound nets (bait, shrimp, crab) or flounder pound nets only. Currently only flounder pound nets are required to have escape panels. (Proposals 1, 2, 3, 5, 6)

2. Clarify whether regulations apply to all flounder species, not just southern flounder. Note that most fishermen cannot readily distinguish the different flounder species. (Proposals 1-6)

3. Clarify whether regulations apply to all coastal and joint fishing waters or only internal coastal waters. Currently, different regulations are used for the commercial flounder fishery in the ocean vs. internal waters. In the recreational fishery, regulations currently apply to flounder equally in internal and ocean waters. (Proposals 1-6)

4. For pound nets we do not have discard estimates so we would not be able to monitor a TAC (total allowable catch). Also we need to be sure that a TAL (total allowable landings) will suffice for Proposal 1.

5. In reporting for TAC/TAL in Proposal 1, clarify if the requirement is for the fishermen or dealers to report. Currently, responsibility for permits is with fishermen and it would require a rule change to have dealers responsible for reporting. For other species monitored with daily quotas, dealers are responsible for the reporting. Limiting quota monitoring to electronic dealers could be a short-term approach to simplifying the process.

6. Gigging is highly dependent on the weather and tide, so the impact of limiting days will be unclear (Proposals 1 and 2).

7. Trip limits assigned for gigging may not accomplish what is intended. A trip ends when the vessel gets to shore so a fisherman could take multiple trips per day or night. Alternative wording (used in proclamation for flounder proclamation FF-29-2011): [number of fish] per person per day or per trip if trip occurs over more than one calendar day. (Proposals 1 and 2)

8. If multiple gears (including gigs and other gears such as nets) are used on a boat, clarify how trip limits would apply. (Proposals 1 and 2)

9. Retired Standard Commercial Fishing License (RSCFL) should be included when mentioning Standard Commercial Fishing License (SCFL) in Proposal 1.

10. In Proposal 1, Commercial Gig Option 2, clarify if the intention is to require one SCFL/RSCFL per limit (at least two) with a maximum of two limits per operation.

11. For regulations on large mesh gill nets clarify which mesh sizes are referred to and which mesh sizes would be prohibited (e.g., mesh sizes between 4 and 5 inches). The current rule prohibits mesh sizes between 5 and 5 ½ inches from Apr. 15- Dec. 15. Need to clarify if the mesh size prohibitions would apply to all gill nets and only for Apr. 15 – Dec. 15. (Proposals 1, 2, 3, 5, 6)

12. In Proposal 1 and 2, large mesh gill nets could be used for harvesting other species besides flounder (e.g., sharks, black drum, sheepshead, American shad, striped bass) when harvest is closed for flounder. This may result in large mesh being used along with small mesh and it would not be possible for enforcement to tell which gear caught flounder once they are removed from the nets.

13. Some proposals do not specify whether regulations on large mesh gill nets are limited to anchored gill nets or apply to all types of sets. Additionally, in Proposal 1 regulations are limited to anchored gill nets so fishermen may use large mesh run-around nets or other types of gill net sets to harvest flounder unless otherwise specified (Proposals 1, 2, 3, 5, 6).

14. In Proposal 2 we will need further clarification on the dividing line for separating northern and southern areas for the gill net closure.

15. In Proposal 2, it is unclear what the appropriate reductions are and what would trigger regulations for the recreational fishery.

16. In Proposal 2 clarify several items for the pound net moratorium, including: if it would be just for new sets, if it would limit the number of pounds in a set, if the criteria would be that a permit must have been in place for the last five years and if so which years these would represent (e.g., 2009-2014), how a transfer process would work if a permit holder dies or becomes disabled, and how disabled is defined.

17. In Proposal 4 it is not clear that it would be status quo for the commercial inshore flounder fishery. This proposal would result in a catch increase and therefore appears to not be within the

bounds set for Supplement A by the DENR Secretary (i.e. reduction in catch up to 60%). Also the proposed 60-day comment period was not chosen at the May MFC meeting.

18. Consider using 'minimum' size limit to distinguish from maximum size limit. (Proposals 1-5)

19. In Proposal 5 clarify that the minimum size and bag limits apply to the recreational 'flounder' fishery.

20. For Proposal 1, anchored gill nets do not currently have a definition in rule or statute.

21. For season closures, clarify which gears are intended to be closed and whether gear must be removed from water (i.e., no fishing for other species). If gears that catch southern flounder are left in water, southern flounder discards would be expected. (Proposals 2, 3, 5, 6)

The Southern Flounder PDT also estimated reductions for each of the MFC proposals for Southern Flounder FMP Supplement A to Amendment 1. The proposals are presented below along with catch reduction estimates and explanation in bold. All estimated reductions are from total fishery (recreational plus commercial) average for 2011-2014. Estimates for some proposals were more certain than others, please see notes. All estimates assume no recoupment and no change in effort from 2011-14 average.

Proposal 1 **(Estimated maximum reduction is 48-50% for 2016. Range includes potential reduction from increasing minimum mesh size on pound net escape panels. Reductions from each component of the proposal were summed due to complexity, representing maximum estimated reduction. Reduction for 2015 would be smaller as there would be no impact to gill nets.**)

Pound Net Set Permits (**Total pound net catch reductions 5-7%**):

- 15-inch minimum size for southern flounder (**4% reduction**)
- Escape panels shall be a minimum mesh size of (**~0-2% defined as the range between the catch and harvest reductions at 15 inch minimum size limit**)
    - Option 1: 5 ¾ inch
    - Option 2: 6 inch

  (all other escape panel requirements remain)
- Immediately initiate a Total Allowable Catch that represents a 25 percent reduction of the 2013 landings (highest landings on record since 2005). The 2013 landings represent a 79 percent jump in landings from the 2005 Fishery Management Plan landings level of concern. (**1% reduction from total fishery catch**)
- Total Allowable Catch = 625,626 pounds (higher than all but one year between 2005-2012)
- Active pound net set permits may be renewed, but no new permit applications will be processed after June 1, 2015, until the completion of the next amendment. (**assume no change from current harvest**)
- No pound net set permit transfers will occur until the completion of the next amendment, except upon death of the permittee pursuant to 15NCAC O3J .0504. (**assume no change from current harvest**)

- Daily reporting as a condition of the permit for flounder pound nets (**assume no change from current harvest**).

Commercial Gig (**Total gig catch reductions ~5%)**:

- Commercial gigging will only be allowed four days per week, beginning Monday at sunrise and ending on Friday at sunrise. (**~3% assumes all days have equal effort and harvest**)
- 15-inch size limit (**1%**)
- Trip limit of 36 flounder per valid Standard Commercial Fishing License with maximum of one limit per operation, regardless of the number of valid Standard Commercial Fishing Licenses present. (**~1% based on average weights applied to trip ticket data for trips with harvest above trip limit estimated in pounds**)
    - Option 1: A maximum of one limit per operation regardless of the number of valid Standard Commercial Fishing Licenses present.
    - Option 2: A maximum of two limits per operation regardless of the number of valid Standard Commercial Fishing Licenses present.

Anchored Large Mesh Gill Nets (commercial and recreational) (**Total large mesh gill net catch reductions ~38%**):

- 2015 season will remain status quo.
- Effective Jan. 1, 2016, anchored large mesh gill nets will be a prohibited gear in the taking and possession of flounder in internal waters. (**42% of overall catch in numbers of fish is from gill nets and harvest from gill nets other than anchored large mesh are ~4% of overall harvest based on trip ticket data = ~38% reduction for large mesh assuming no discards or harvest by any type of large mesh set, regardless of target species**)

Commercial harvest by other gear (**Total catch reduction for other gears is <1%**):

- 15-inch size limit **(< 1%**)

Proposal 2 **(Estimated maximum reduction is 23-38%. Range includes potential reductions from increasing minimum mesh size on pound net escape panels. Reductions from each component of the proposal were added due to complexity, representing maximum estimated reduction. Does not include any reduction for the recreational fishery**)

- All commercial fishing will observe a 15-inch size limit. (**4% from pound nets; see 4th bullet for gig reduction; 9% reduction for gill nets but when combined with two season closures the range is approximately: 17% to 30%**)
- N.C. large mesh gill nets in the southern flounder fishery will close Sept. 16 north of Cape Hatteras and will not open until Jan. 16. South of Cape Hatteras the closure would be Oct. 16 to Jan. 1. (**Cannot split as described for reductions. There would be a 23% reduction for all areas, all gill nets for a Sept 16-Jan 16 closure and a 9% with a Oct 16-Jan 1 closure. When combined with minimum size limit increase the reduction range is approximately: 17% to 30%**)
- Pound nets will be subject to the 15-inch size limit and to a 5¾-inch or 6-inch escape panel. (**~0-2% defined as the range between the catch and harvest reductions at 15 inch minimum size limit**)
- Commercial giggers will be subject to a 15-inch size limit and a 35-fish trip limit per boat. (**~2% from trip limit and size limit combination**)

- Recreational hook-and-line and giggers will have no reductions unless a closure from Nov. 1 to Dec. 31 is considered necessary to meet appropriate reductions. (1**% - not included in total reduction for Proposal 2**)
- There will be a moratorium on pound net sets and permits based on the past five years of activity, until the next amendment is adopted, unless death or disability of the owner is an issue. (**assume no change from current harvest**)

Proposal 3 (**Estimate reduction is 18-25%. Range includes potential reductions from increasing minimum mesh size on large mesh gill nets and pound net escape panels**)

- Retain the 15-inch size limit and 6-fish bag limit for recreational.
- Increase the size limit to 15 inches for commercial, with a 6-inch stretched mesh for large mesh gill nets, and escape panels in pound nets.
- Close all southern flounder fisheries from Nov. 16 –Dec. 31.

Proposal 4 (**~1% catch increase. Based on MRIP harvest data from 2003-2007. Assumes fishery has not changed since that time; assumes a small decrease in dead discards. Recreational gig data were not available for 2003-2007.**)

- Maintain status quo for commercial.
- Decrease recreational size limit to 14 inches.
- Observe 60-day comment period, with stakeholder input.

Proposal 5 (**Estimate reduction is 15-23% Range includes potential reductions from increasing minimum mesh size on large mesh gill nets and pound net escape panels**)

- Retain 15-inch size limit and 6-fish bag limit for recreational.
- Increase the size limit to 15 inches for commercial with a 5¾-inch stretched mesh for large mesh gill nets and escape panels in pound nets. (**14-22% - 5 ¾ inch mesh size will make reduction closer to 14% than if 6 inch was used**)
- Close commercial and recreational fisheries from Dec. 1 – 31. (**1% - doesn't overlap with commercial reduction due to size limit so is additive**)

Proposal 6 (**small reduction, not quantifiable**)

- Minimum mesh size limit of 5¾ inch stretch mesh for large mesh gill nets and escape panels in pound nets (**not quantifiable based on current data**).
- Dec. 1 – 31 closure for all gear types, both commercial and recreational (**1%**).

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: Marine Fisheries Commission

THROUGH: North Carolina Division of Marine Fisheries, Management Review Team

FROM: Louis Daniel

DATE: July 24, 2015

SUBJECT: PDT comments on potential initiation of a review of the Southern Flounder FMP

The Southern Flounder Plan Development Team (PDT) met July 16th, 2015. The main topic of discussion for the meeting was the potential for reviewing the Southern Flounder Fishery Management Plan (FMP) prior to the next scheduled review in 2018. This review could result in the initiation of a new amendment to the FMP. The PDT's recommendation is to wait for the initiation of a review of the FMP until after a quantitative method is approved for use in determining stock status of southern flounder in the South Atlantic. This is the best way to determine what, if any, changes to the fishery should be required to achieve sustainable harvest. This recommendation was made under the assumption that Supplement A to Amendment 1 will be adopted at the MFC's August 2015 business meeting and that legislative changes will not restrict the use of the supplement.

There is no method for determining stock status of southern flounder in the South Atlantic in the short-term (i.e., by the end of 2015). In the long-term, there are several stock assessment options the PDT feels may be viable for use in management of southern flounder. While these methods are being pursued by the NCDMF, they will take time to develop and the earliest any results could be ready is summer 2016. However, some of the most robust long-term options may not be available until spring 2017 or later. The PDT noted that although options for long-term analytical methods are promising, there is no guarantee that external peer reviewers or the NCDMF will find them adequate for determining stock status or aiding in management of southern flounder.

The only short-term quantitative method the PDT has discussed for use in management is a traffic light analysis. This method provides an analysis of trends in the available data but does not provide information on stock status, requires subjective decisions about when to be concerned, and is limited in the guidance it can provide about appropriate management measures for sustainable harvest. Due to these concerns, the PDT prefers not to rely on results from a traffic light analysis for management of southern flounder in a new amendment unless more robust assessment methods are not available. Although the PDT has begun working on a traffic light analysis for southern flounder, this will require further development if it is intended to be used for managing southern flounder.

Despite limitations, the traffic light method can be useful for management of some species, especially if alternative assessment methods are not available. The ASMFC uses the traffic light method to monitor trends in Atlantic croaker and spot and the NCDMF uses the method for blue crab. Management action is triggered if sustained negative trends occur between benchmark reviews.

A potential advantage to initiating a review of the FMP would be updating the data (e.g. harvest data, discards, indices) which in most cases only extend through 2007 in Amendment 1. However, Supplement A to Amendment 1 includes much of this information through 2014 and only a limited amount of new data would be available for the MFC to consider if a new amendment was initiated in 2015. Another potential benefit of an FMP review is the incorporation of further input from stakeholders through an Advisory Committee (AC). However, without further quantitative analysis on a regional scale that might provide stock status, the PDT did not feel the AC would be able to make informed decisions about how the stock should be managed.

In recommending a review of the FMP be delayed until a new stock assessment method can be developed, the PDT acknowledges any preferred management strategy decided at the August 2015 MFC business meeting will remain in place until a new amendment (or supplement) is developed.

FISHERY MANAGEMENT PLAN REVIEW SCHEDULE (July 2015 – June 2020) Revised August 2015					
SPECIES (Last FMP)	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
STRIPED MULLET (4/06)					
KINGFISHES (12/07)					
INTERJURISDICTIONAL (6/08)					
HARD CLAM (6/08)					
OYSTER (6/08)					
RED DRUM (11/08)					
SPOTTED SEA TROUT (3/12)					
SOUTHERN FLOUNDER (2/13)					
ESTUARINE STRIPED BASS (5/13)					
BLUE CRAB (11/13)					
BAY SCALLOP (3/15)					
SHRIMP (3/15)					
RIVER HERRING (4/15)					

N.C. Marine Fisheries Commission
2015-2016 Annual Rulemaking Cycle

August 2015

Time of Year	Action
January 2015	Last opportunity for a new issue to be presented to DMF Rules Advisory Team
February 2015	Second review by DMF Rules Advisory Team
February-April 2015	Fiscal analysis of rules prepared by DMF staff and approved by Office of State Budget and Management
May 2015	MFC considers approval of Notice of Text for Rulemaking
August 2015	Publication of proposed rules in the North Carolina Register
September 2015	Public hearing held *
November 2015	MFC considers approval of permanent rules
January 2016	Rules reviewed by Office of Administrative Hearings Rules Review Commission
(January)	(Last opportunity for a new issue to be presented to DMF Rules Advisory Team)
(February)	(Second review by DMF Rules Advisory Team)
February 1, 2016	Earliest possible effective date of rules
February/March 2016	Rulebook supplement prepared
April 1, 2016	Actual effective date of new rules
April 1, 2016	Rulebook supplement available online and for distribution
April 15, 2016	Commercial license sales begin

* Marine Fisheries Commission Public Hearing for Proposed Rules
Wed., Sept. 9, 2015, 6 p.m.
Division of Marine Fisheries
5285 Highway 70 West
Morehead City, NC 28557

N.C. Department of Environment and Natural Resources

Release: Immediate
Date: Aug. 3, 2015

Contact: Patricia Smith
Phone: 252-726-7021

Public comments sought on proposed rules for gill nets, mechanical oyster harvest

MOREHEAD CITY – The N.C. Marine Fisheries Commission is accepting public comments on proposed rule changes pertaining to gill nets and mechanical oyster harvesting.

The commission will hold a public hearing on the proposed rule changes at 6 p.m. Sept. 9 at the N.C. Division of Marine Fisheries Central District Office, 5285 U.S. 70 West, Morehead City.

The public may also comment on the proposed rules in writing to Catherine Blum, Rulemaking Coordinator, N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557 or send comments by email to Catherine.Blum@ncdenr.gov or fax to 252-726-0254. The public comment period will close at 5 p.m. Oct. 2.

Gill Nets

Two proposed rule changes impacting gill nets would implement Amendment 1 to the N.C. Striped Mullet Fishery Management Plan.

The first proposal would amend the Marine Fisheries Commission rule 15A NCAC 03J .0103 to establish one of the same restrictions for runaround or non-stationary gill nets as already exist for anchored gill nets. The change is meant to address user conflicts between gill net fishermen and shoreline residents and recreational hook-and-line fishermen in smaller coastal creeks by prohibiting non-stationary gill nets from blocking more than two-thirds of a water body or interfering with navigation or other traditional uses of the area.

The second proposal would amend rule 15A NCAC 03R .0112 to remove the Newport River Trawl Net Prohibited Area as a small mesh gill net attendance area, making attendance requirements consistent with similar areas of the state.

Mechanical Oyster Harvesting

The third proposed rule amends the existing rule for mechanical methods for oyster harvesting (15A NCAC 03R .0108) to clarify that it only applies to internal coastal waters, not the Atlantic Ocean.

The Marine Fisheries Commission is scheduled to vote on the proposed rules at its Nov. 18-20 meeting. It is anticipated the rules would become effective April 1, 2016.

For more information on the proposed rules, go to http://portal.ncdenr.org/web/mf/mfc-proposed-rules-links or contact Blum at 252-808-8014 or Catherine.Blum@ncdenr.gov.

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NORTH CAROLINA REGISTER

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Contact List for Rulemaking Questions or Concerns

For questions or concerns regarding the Administrative Procedure Act or any of its components, consult with the agencies below. The bolded headings are typical issues which the given agency can address, but are not inclusive.

Rule Notices, Filings, Register, Deadlines, Copies of Proposed Rules, etc.

Office of Administrative Hearings
Rules Division
1711 New Hope Church Road (919) 431-3000
Raleigh, North Carolina 27609 (919) 431-3104 FAX

contact:	Molly Masich, Codifier of Rules	molly.masich@oah.nc.gov	(919) 431-3071
	Dana Vojtko, Publications Coordinator	dana.vojtko@oah.nc.gov	(919) 431-3075
	Lindsay Woy, Editorial Assistant	lindsay.woy@oah.nc.gov	(919) 431-3078
	Kelly Bailey, Editorial Assistant	kelly.bailey@oah.nc.gov	(919) 431-3083

Rule Review and Legal Issues

Rules Review Commission
1711 New Hope Church Road (919) 431-3000
Raleigh, North Carolina 27609 (919) 431-3104 FAX

contact:	Abigail Hammond, Commission Counsel	abigail.hammond@oah.nc.gov	(919) 431-3076
	Amber Cronk May, Commission Counsel	amber.may@oah.nc.gov	(919) 431-3074
	Amanda Reeder, Commission Counsel	amanda.reeder@oah.nc.gov	(919) 431-3079
	Jason Thomas, Commission Counsel	jason.thomas@oah.nc.gov	(919) 431-3081
	Julie Brincefield, Administrative Assistant	julie.brincefield@oah.nc.gov	(919) 431-3073
	Alexander Burgos, Paralegal	alexander.burgos@oah.nc.gov	(919) 431-3080

Fiscal Notes & Economic Analysis and Governor's Review

Office of State Budget and Management
116 West Jones Street (919) 807-4700
Raleigh, North Carolina 27603-8005 (919) 733-0640 FAX
Contact: Anca Grozav, Economic Analyst osbmruleanalysis@osbm.nc.gov (919) 807-4740

NC Association of County Commissioners
215 North Dawson Street (919) 715-2893
Raleigh, North Carolina 27603
contact: Amy Bason amy.bason@ncacc.org

NC League of Municipalities (919) 715-4000
215 North Dawson Street
Raleigh, North Carolina 27603
contact: Sarah Collins scollins@nclm.org

Legislative Process Concerning Rule-making

Joint Legislative Administrative Procedure Oversight Committee
545 Legislative Office Building
300 North Salisbury Street (919) 733-2578
Raleigh, North Carolina 27611 (919) 715-5460 FAX

contact:	Karen Cochrane-Brown, Staff Attorney	Karen.cochrane-brown@ncleg.net
	Jeff Hudson, Staff Attorney	Jeffrey.hudson@ncleg.net

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NORTH CAROLINA REGISTER

Publication Schedule for January 2015 – December 2015

FILING DEADLINES			NOTICE OF TEXT		PERMANENT RULE			TEMPORARY RULES
Volume & issue number	Issue date	Last day for filing	Earliest date for public hearing	End of required comment Period	Deadline to submit to RRC for review at next meeting	Earliest Eff. Date of Permanent Rule	Delayed Eff. Date of Permanent Rule 31st legislative day of the session beginning:	270th day from publication in the Register
29:13	01/02/15	12/08/14	01/17/15	03/03/15	03/20/15	05/01/15	05/2016	09/29/15
29:14	01/15/15	12/19/14	01/30/15	03/16/15	03/20/15	05/01/15	05/2016	10/12/15
29:15	02/02/15	01/09/15	02/17/15	04/06/15	04/20/15	06/01/15	05/2016	10/30/15
29:16	02/16/15	01/26/15	03/03/15	04/17/15	04/20/15	06/01/15	05/2016	11/13/15
29:17	03/02/15	02/09/15	03/17/15	05/01/15	05/20/15	07/01/15	05/2016	11/27/15
29:18	03/16/15	02/23/15	03/31/15	05/15/15	05/20/15	07/01/15	05/2016	12/11/15
29:19	04/01/15	03/11/15	04/16/15	06/01/15	06/22/15	08/01/15	05/2016	12/27/15
29:20	04/15/15	03/24/15	04/30/15	06/15/15	06/22/15	08/01/15	05/2016	01/10/16
29:21	05/01/15	04/10/15	05/16/15	06/30/15	07/20/15	09/01/15	05/2016	01/26/16
29:22	05/15/15	04/24/15	05/30/15	07/14/15	07/20/15	09/01/15	05/2016	02/09/16
29:23	06/01/15	05/08/15	06/16/15	07/31/15	08/20/15	10/01/15	05/2016	02/26/16
29:24	06/15/15	05/22/15	06/30/15	08/14/15	08/20/15	10/01/15	05/2016	03/11/16
30:01	07/01/15	06/10/15	07/16/15	08/31/15	09/21/15	11/01/15	05/2016	03/27/16
30:02	07/15/15	06/23/15	07/30/15	09/14/15	09/21/15	11/01/15	05/2016	04/10/16
30:03	08/03/15	07/13/15	08/18/15	10/02/15	10/20/15	12/01/15	05/2016	04/29/16
30:04	08/17/15	07/27/15	09/01/15	10/16/15	10/20/15	12/01/15	05/2016	05/13/16
30:05	09/01/15	08/11/15	09/16/15	11/02/15	11/20/15	01/01/16	05/2016	05/28/16
30:06	09/15/15	08/24/15	09/30/15	11/16/15	11/20/15	01/01/16	05/2016	06/11/16
30:07	10/01/15	09/10/15	10/16/15	11/30/15	12/21/15	02/01/16	05/2016	06/27/16
30:08	10/15/15	09/24/15	10/30/15	12/14/15	12/21/15	02/01/16	05/2016	07/11/16
30:09	11/02/15	10/12/15	11/17/15	01/02/16	01/20/16	03/01/16	05/2016	07/29/16
30:10	11/16/15	10/23/15	12/01/15	01/15/16	01/20/16	03/01/16	05/2016	08/12/16
30:11	12/01/15	11/05/15	12/16/15	02/01/16	02/22/16	04/01/16	05/2016	08/27/16
30:12	12/15/15	11/20/15	12/30/15	02/15/16	02/22/16	04/01/16	05/2016	09/10/16

EXPLANATION OF THE PUBLICATION SCHEDULE

This Publication Schedule is prepared by the Office of Administrative Hearings as a public service and the computation of time periods are not to be deemed binding or controlling. Time is computed according to 26 NCAC 2C .0302 and the Rules of Civil Procedure, Rule 6.

GENERAL

The North Carolina Register shall be published twice a month and contains the following information submitted for publication by a state agency:

(1) temporary rules;
(2) text of proposed rules;
(3) text of permanent rules approved by the Rules Review Commission;
(4) emergency rules
(5) Executive Orders of the Governor;
(6) final decision letters from the U.S. Attorney General concerning changes in laws affecting voting in a jurisdiction subject of Section 5 of the Voting Rights Act of 1965, as required by G.S. 120-30.9H; and
(7) other information the Codifier of Rules determines to be helpful to the public.

COMPUTING TIME: In computing time in the schedule, the day of publication of the North Carolina Register is not included. The last day of the period so computed is included, unless it is a Saturday, Sunday, or State holiday, in which event the period runs until the preceding day which is not a Saturday, Sunday, or State holiday.

FILING DEADLINES

ISSUE DATE: The Register is published on the first and fifteen of each month if the first or fifteenth of the month is not a Saturday, Sunday, or State holiday for employees mandated by the State Personnel Commission. If the first or fifteenth of any month is a Saturday, Sunday, or a holiday for State employees, the North Carolina Register issue for that day will be published on the day of that month after the first or fifteenth that is not a Saturday, Sunday, or holiday for State employees.

LAST DAY FOR FILING: The last day for filing for any issue is 15 days before the issue date excluding Saturdays, Sundays, and holidays for State employees.

NOTICE OF TEXT

EARLIEST DATE FOR PUBLIC HEARING: The hearing date shall be at least 15 days after the date a notice of the hearing is published.

END OF REQUIRED COMMENT PERIOD An agency shall accept comments on the text of a proposed rule for at least 60 days after the text is published or until the date of any public hearings held on the proposed rule, whichever is longer.

DEADLINE TO SUBMIT TO THE RULES REVIEW COMMISSION: The Commission shall review a rule submitted to it on or before the twentieth of a month by the last day of the next month.

FIRST LEGISLATIVE DAY OF THE NEXT REGULAR SESSION OF THE GENERAL ASSEMBLY: This date is the first legislative day of the next regular session of the General Assembly following approval of the rule by the Rules Review Commission. See G.S. 150B-21.3, Effective date of rules.

This publication is printed on permanent, acid-free paper in compliance with G.S. 125-11.13

15A NCAC 02L .0515 DISCHARGES OR RELEASES FROM OTHER SOURCES

This Section shall not relieve any person responsible for assessment or cleanup of contamination from a source other than a non-UST petroleum release from its obligation to assess and clean up contamination resulting from such discharge or releases.

Authority G.S. 143-215.2; 143-215.3(a)(1); 143B-282.

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***Notice** is hereby given in accordance with G.S. 150B-21.2 that the Marine Fisheries Commission intends to amend the rules cited as 15A NCAC 03J .0103; 03R .0108, .0112.*

Link to agency website pursuant to G.S. 150B-19.1(c): *http://portal.ncdenr.org/web/mf/mfc-proposed-rules-links*

Proposed Effective Date: *April 1, 2016*

Public Hearing:
Date: *September 9, 2015*
Time: *6:00 p.m.*
Location: *NC Division of Marine Fisheries, 5285 Highway 70 West, Morehead City, NC 28557*

Reason for Proposed Action:
15A NCAC 03J .0103 GILL NETS, SEINES, INDENTIFICATION, RESTRICTIONS
In accordance with the NC Striped Mullet Fishery Management Plan Amendment 1, proposed amendments established restrictions for using runaround or non-stationary gill nets to address user conflicts.
15A NCAC 03R .0108 MECHANICAL METHODS PROHIBITED
Proposed amendments clarify that the rule for mechanical methods for oystering only applies to internal coastal waters, not the Atlantic Ocean.
15A NCAC 03R .0112 ATTENDED GILL NET AREAS
In accordance with the NC Striped Mullet Fishery Management Plan Amendment 1, proposed amendments remove the Newport River Trawl Net Prohibited Area as a small mesh gill net attendance area, making attendance requirements consistent with other similar areas of the state.

Comments may be submitted to: *Catherine Blum, P.O. Box 769, Morehead City, NC 28557, phone 252-808-8014, fax 252-726-0254, email Catherine.Blum@ncdenr.gov*

Comment period ends: *October 2, 2015*

Procedure for Subjecting a Proposed Rule to Legislative Review: If an objection is not resolved prior to the adoption of the Rule, a person may also submit written objections to the Rules Review Commission after the adoption of the Rule. If the Rules Review Commission receives written and signed objections after the adoption of the Rule in accordance with G.S. 150B-21.3(b2) from 10 or more persons clearly requesting review by the legislature and the Rules Review Commission approves the Rule, the Rule will become effective as provided in G.S. 150B-21.3(b1). The Commission will receive written objections until 5:00 p.m. on the day following the day the Commission approves the Rule. The Commission will receive those objections by mail, delivery service, hand delivery, or facsimile transmission. If you have any further questions concerning the submission of objections to the Commission, please call a Commission staff attorney at 919-431-3000.

Fiscal impact (check all that apply).
☐ **State funds affected**
☐ **Environmental permitting of DOT affected**
Analysis submitted to Board of Transportation
☐ **Local funds affected**
☐ **Substantial economic impact (≥$1,000,000)**
☐ **Approved by OSBM**
☒ **No fiscal note required by G.S. 150B-21.4**

CHAPTER 03 - MARINE FISHERIES

SUBCHAPTER 03J - NETS, POTS, DREDGES, AND OTHER FISHING DEVICES

SECTION .0100 - NET RULES, GENERAL

15A NCAC 03J .0103 GILL NETS, SEINES, IDENTIFICATION, RESTRICTIONS

(a) It is unlawful to use gill nets:
(1) ~~With~~ with a mesh length less than ~~2 ½~~ two and one-half inches.
(2) ~~In internal waters~~ in Internal Coastal Waters from April 15 through December 15, with a mesh length ~~5~~ five inches or greater and less than ~~5 ½~~ five and one-half inches.

(b) The Fisheries Director may, by proclamation, limit or prohibit the use of gill nets or seines in ~~coastal waters,~~ Coastal Fishing Waters, or any portion thereof, or impose any or all of the following restrictions on gill net or seine fishing operations:
~~(1) Specify area.~~
~~(2) Specify season.~~
~~(3) Specify gill net mesh length.~~
~~(4) Specify means/methods.~~
~~(5) Specify net number and length.~~
(1) specify time;
(2) specify area;
(3) specify means and methods, including:
(A) gill net mesh length, but the maximum length specified shall not exceed six and one-half inches in Internal Coastal Waters; and
(B) net number and length, but for gill nets with a mesh length four inches or greater, the maximum length specified shall not exceed 2,000 yards per vessel in Internal Coastal Waters regardless of the number of individuals involved; and

(4) specify season.

(c) It is unlawful to use fixed or stationary gill nets in the Atlantic Ocean, drift gill nets in the Atlantic Ocean for recreational purposes, or any gill nets in ~~internal waters~~ Internal Coastal Waters unless nets are marked by attaching to them at each end two separate yellow buoys which shall be of solid foam or other solid buoyant material no less than five inches in diameter and no less than five inches in length. Gill ~~nets, which~~ nets that are not connected together at the top ~~line,~~ line are considered as individual nets, requiring two buoys at each end of each individual net. Gill nets connected together at the top line are considered as a continuous net requiring two buoys at each end of the continuous net. Any other marking buoys on gill nets used for recreational purposes shall be yellow except one additional buoy, any shade of hot pink in color, constructed as specified in this Paragraph, shall be added at each end of each individual net. Any other marking buoys on gill nets used in commercial fishing operations shall be yellow except that one additional identification buoy of any color or any combination of colors, except any shade of hot pink, may be used at either or both ends. The owner shall be identified on a buoy on each end either by using engraved buoys or by attaching engraved metal or plastic tags to the buoys. Such identification shall include owner's last name and initials and if a vessel is used, one of the following:

(1) ~~Owner's~~ owner's N.C. motor boat registration ~~number,~~ number; or

(2) ~~Owner's~~ owner's U.S. vessel documentation name.

(d) It is unlawful to use gill nets:

(1) ~~Within~~ within 200 yards of any flounder or other finfish pound net set with lead and either pound or heart in use, except from August 15 through December 31 in all ~~coastal fishing waters~~ Coastal Fishing Waters of the Albemarle Sound, including its tributaries to the boundaries between ~~coastal and joint fishing waters,~~ Coastal and Joint Fishing Waters, west of a line beginning at a point 36° 04.5184' N - 75° 47.9095' W on Powell Point; running southerly to a point 35° 57.2681' N - 75° 48.3999' W on Caroon Point, it is unlawful to use gill nets within 500 yards of any pound net set with lead and either pound or heart in use; and

(2) ~~From~~ from March 1 through October 31 in the Intracoastal Waterway within 150 yards of any railroad or highway bridge.

(e) It is unlawful to use gill nets within 100 feet either side of the center line of the Intracoastal Waterway Channel south of the entrance to the Alligator-Pungo River Canal near Beacon "54" in Alligator River to the South Carolina line, unless such net is used in accordance with the following conditions:

(1) ~~No~~ no more than two gill nets per vessel may be used at any one time;

(2) ~~Any~~ any net used must be attended by the fisherman from a vessel who shall at no time be more than 100 yards from either net; and

(3) ~~Any~~ any individual setting such nets shall remove them, when necessary, in sufficient time to permit unrestricted ~~boat~~ vessel navigation.

(f) It is unlawful to use ~~drift gill nets in violation of 15A NCAC 03J .0101(2) and Paragraph (e) of this Rule.~~ runaround, drift, or other non-stationary gill nets, except as provided in Paragraph (e) of this Rule:

(1) to block more than two-thirds of any natural or manmade waterway, sound, bay, creek, inlet, or any other body of water; or

(2) in a location where it will interfere with navigation or with existing, traditional uses of the area other than navigation.

(g) It is unlawful to use unattended gill nets with a mesh length less than five inches in a commercial fishing operation in the gill net attended areas designated in 15A NCAC 03R .0112(a).

(h) It is unlawful to use unattended gill nets with a mesh length less than five inches in a commercial fishing operation from May 1 through November 30 in the ~~internal coastal and joint waters~~ Internal Coastal Waters and Joint Fishing Waters of the state designated in 15A NCAC 03R .0112(b).

~~(i) For gill nets with a mesh length five inches or greater, it is unlawful:~~

~~(1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved.~~

~~(2) From June through October, for any portion of the net to be within 10 feet of any point on the shoreline while set or deployed, unless the net is attended.~~

(i) It is unlawful for any portion of a gill net with a mesh length five inches or greater to be within 10 feet of any point on the shoreline while set or deployed, unless the net is attended from June through October in Internal Coastal Waters.

(j) For the purpose of this Rule and 15A NCAC 03R .0112, ~~shoreline~~ "shoreline" is defined as the mean high water line or marsh line, whichever is more seaward.

Authority G.S. 113-134; 113-173; 113-182; 113-221.1; 143B-289.52.

SUBCHAPTER 03R - DESCRIPTIVE BOUNDARIES

SECTION .0100 - DESCRIPTIVE BOUNDARIES

15A NCAC 03R .0108 MECHANICAL METHODS PROHIBITED TO TAKE OYSTERS

The dredges and mechanical methods prohibited areas referenced in 15A NCAC 03K .0204 are delineated in the following ~~coastal water areas:~~ Internal Coastal Waters:

(1) In Roanoke Sound and tributaries, south of a line beginning at a point 35° 55.1461' N – 75° 39.5618' W on Baum Point, running easterly to a point 35° 55.9795' N - 75° 37.2072' W and north and east of a line beginning at a point 35° 50.8315' ~~N – 75°~~ N - 75° 37.1909' W on the west side of the mouth of Broad Creek,

running easterly to a point 35° 51.0097' N - 75° 36.6910' W near Beacon "17", running southerly to a point 35° ~~48.6145"~~ 48.6145' N - 75° 35.3760' W near Beacon "7", running easterly to a point 35° 49.0348' N - 75° 34.3161' W on Cedar Point.

(2) In Pamlico Sound and tributaries:

(a) Outer Banks ~~area,within~~ area, within the area described by a line beginning at a point 35° 46.0638' N - 75° 31.4385' W on the shore of Pea Island; running southwesterly to a point 35° 42.9500' N - 75° 34.1500' W; running southerly to a point 35° 39.3500' N - 75° 34.4000' W; running southeasterly to a point 35° 35.8931' N - 75° 31.1514' W in Chicamacomico Channel near Beacon "ICC"; running southerly to a point 35° 28.5610' N - 75° 31.5825' W on Gull Island; running southerly to a point 35° 22.8671' N - 75° 33.5851' W in Avon Channel near Beacon "1"; running southwesterly to a point 35° 18.9603' N - 75° 36.0817' W in Cape Channel near Beacon "2"; running westerly to a point 35° 16.7588' N - 75° 44.2554' W in Rollinson Channel near Beacon "42RC"; running southwesterly to a point 35° 14.0337' N - 75° 45.9643' W southwest of Oliver Reef near the quick-flashing beacon; running westerly to a point 35° 09.3650' N - 76° 00.6377' W in Big Foot Slough Channel near Beacon "14BF"; running southwesterly to a point 35° 08.4523' N - 76° 02.6651' W in Nine Foot Shoal Channel near Beacon "9"; running westerly to a point 35° 07.1000' N - 76° 06.9000; running southwesterly to a point 35° 01.4985' N - 76° 11.4353' W near Beacon "HL"; running southwesterly to a point 35° 00.2728' N - 76° 12.1903' W near Beacon "2CS"; running southerly to a point 34° 59.4383' N - 76° 12.3541' W in Wainwright Channel immediately east of the northern tip of Wainwright Island; running easterly to a point 34° 58.7853' N - 76° 09.8922' W on Core Banks; running northerly along the shoreline and across the inlets following the COLREGS Demarcation lines to the point of beginning;

(b) Stumpy Point Bay, north of a line beginning at a point 35° 40.9719' N - 75° 44.4213' W on Drain Point; running westerly to a point 35° 40.6550' N - 75° 45.6869' W on Kazer Point;

(c) Pains Bay, east of a line beginning at a point 35° 35.0666' N - 75° 51.2000' W on Pains Point, running southerly to a point 35° 34.4666' N – 75° 50.9666' W on Rawls Island; running easterly to a point 35° 34.2309' N - 75° 50.2695' W on the east shore;

(d) Long Shoal River, north of a line beginning at a point 35° 35.2120' N - 75° 53.2232' W at the 5th Avenue Canal, running easterly to a point 35° 35.0666' N - 75° 51.2000' W on the east shore on Pains Point;

(e) Wysocking Bay:

(i) Wysocking Bay, north of a line beginning at a point 35° 25.2741' N - 76° 03.1169' W on Mackey Point, running easterly to a point 35° 25.1189' N - 76° 02.0499' W at the mouth of Lone Tree Creek;

(ii) Mount Pleasant Bay, west of a line beginning at a point 35° 23.8652' N - 76° 04.1270' W on Browns Island, running southerly to a point 35° 22.9684' N - 76° 03.7129' W on Bensons Point;

(f) Juniper Bay, north of a line beginning at a point 35° 22.1384' N - 76° 15.5991' W near the Caffee Bay ditch, running easterly to a point 35° 22.0598' N - 76° 15.0095' W on the east shore;

(g) Swan Quarter Bay:

(i) ~~Cafee~~ Caffee Bay, east of a line beginning at a point 35° 22.1944' N - 76° 19.1722' W on the north shore, running southerly to a point 35° 21.5959' N - 76° 18.3580' W on Drum Point;

(ii) Oyster Creek, east of a line beginning at a point 35° 23.3278' N - 76° 19.9476' W on the north shore, running southerly to a point 35° 22.7018' N - 76° 19.3773' W on the south shore;

(h) Rose Bay:

(i) Rose Bay, north of a line beginning at a point 35° 25.7729' N - 76° 24.5336' W

on Island Point, running southeasterly and passing near Beacon "5" to a point 35° 25.1854' N - 76° 23.2333' W on the east shore;

(ii) Tooleys Creek, west of a line beginning at a point 35° 25.7729' N - 76° 24.5336' W on Island Point, running southwesterly to a point 35° 25.1435' N - 76° 25.1646' W on Ranger Point;

(i) Spencer Bay:

(i) Striking Bay, north of a line beginning at a point 35° 23.4106' N - 76° 26.9629' W on Short Point, running easterly to a point 35° 23.3404' N - 76° 26.2491' W on Long Point;

(ii) Germantown Bay, north of a line beginning at a point 35° 24.0937' N - 76° 27.9348' W; on the west shore, running easterly to a point 35° 23.8598' N - 76° 27.4037' W on the east shore;

(j) Abel Bay, northeast of a line beginning at a point 35° 23.6463' N - 76° 31.0003' W on the west shore, running southeasterly to a point 35° 22.9353' N - 76° 29.7215' W on the east shore;

(k) Pungo River, Fortescue Creek, east of a line beginning at a point 35° 25.9213' N - 76° 31.9135' W on Pasture Point; running southerly to a point 35° 25.6012' N - 76° 31.9641' W on Lupton Point;

(l) Pamlico River:

(i) North Creek, north of a line beginning at a point 35° 25.3988' N - 76° 40.0455' W on the west shore, running southeasterly to a point 35° 25.1384' N - 76° 39.6712' W on the east shore;

(ii) Campbell Creek (off of Goose Creek), west of a line beginning at a point 35° 17.3600' N - 76° 37.1096' W on the north shore; running southerly to a point 35° 16.9876' N - 76° 37.0965' W on the south shore;

(iii) Eastham Creek (off of Goose Creek), east of a line beginning at a point 35° 17.7423' N - 76° 36.5164' W on the north shore; running southeasterly to a point 35° 17.5444' N - 76° 36.3963' W on the south shore;

(iv) Oyster Creek-Middle Prong, southwest of a line beginning at a point 35° 19.4921' N - 76° 32.2590' W on Cedar Island; running southeasterly to a point 35° 19.1265' N - 76° 31.7226' W on Beard Island Point; and southwest of a line beginning at a point 35° 19.5586' N - 76° 32.8830' W on the west shore, running easterly to a point 35° 19.5490' N - 76° 32.7365' W on the east shore;

(m) Mouse Harbor, west of a line beginning at a point 35° 18.3915' N - 76° 29.0454' W on Persimmon Tree Point, running southerly to a point ~~35° 17.1825N~~ 35° 17.1825' N - 76° 28.8713' W on Yaupon Hammock Point;

(n) Big Porpoise Bay, northwest of a line beginning at a point 35° 15.6993' N - 76° 28.2041' W on Big Porpoise Point, running southwesterly to a point 35° 14.9276' N - 76° 28.8658' W on Middle Bay Point;

(o) Middle Bay, west of a line beginning at a point 35° 14.8003' N - 76° 29.1923' W on Deep Point, running southerly to a point 35° 13.5419' N - 76° 29.6123' W on Little Fishing Point;

(p) Jones Bay, west of a line beginning at a point 35° 14.0406' N - 76° 33.3312' W on Drum Creek Point, running southerly to a point 35° 13.3609' N - 76° 33.6539' W on Ditch Creek Point;

(q) Bay River:

(i) Gales Creek-Bear Creek, north and west of a line beginning at a point 35° 11.2833' N - 76° 35.9000' W on Sanders Point, running northeasterly to a point 35° 11.9000' N - 76° 34.2833' W on the east shore;

(ii) Bonner Bay, southeast of a line beginning at a point 35° 09.6281' N - 76° 36.2185' W on the west shore; running northeasterly to a point 35°

10.0888' N - 76° 35.2587' W on Davis Island Point;

(r) Neuse River:

(i) Lower Broad Creek, west of a line beginning at a point 35° 05.8314' N - 76° 35.3845' W on the north shore; running southwesterly to a point 35° 05.5505' N - 76° 35.7249' W on the south shore;

(ii) Greens Creek - north of a line beginning at a point 35° 01.3476' N - 76° 42.1740' W on the west shore of Greens Creek; running northeasterly to a point 35° 01.4899' N - 76° 41.9961' W on the east shore;

(iii) Dawson Creek, north of a line beginning at a point 34° 59.5920' N - 76° 45.4620' W on the west shore; running southeasterly to a point 34° 59.5800' N – 76° 45.4140' W on the east shore;

(iv) Clubfoot Creek, south of a line beginning at a point 34° 54.5424' N - 76° 45.7252' W on the west shore, running easterly to a point 34° 54.4853' N - 76° 45.4022' W on the east shore;

(v) Turnagain Bay, south of a line beginning at a point 34° 59.4065' N - 76° 30.1906' W on the west shore; running easterly to a point 34° 59.5668' N - 76° 29.3557' W on the east shore;

(s) West Bay:

(i) Long Bay-Ditch Bay, west of a line beginning at a point 34° 57.9388' N - 76° 27.0781' W on the north shore of Ditch Bay; running southwesterly to a point 34° 57.2120' N - 76° 27.2185' W on the south shore of Ditch Bay; then south of a line running southeasterly to a point 34° 56.7633' N - 76° 26.3927' W on the east shore of Long Bay;

(ii) West Thorofare Bay, south of a line beginning at a point 34° 57.2199' N - 76° 24.0947' W on the west shore; running easterly to a point 34° 57.4871' N - 76° 23.0737' W on the east shore;

(iii) Merkle Bay, east of a line beginning at a point 34° 58.2286' N - 76° 22.8374' W on the north shore, running southerly to a point 34° 57.5920' N - 76° 23.0704' W on Merkle Bay Point;

(iv) North Bay, east of a line beginning at a point 35° 01.8982' N - 76° 21.7135' W on Point of Grass, running southeasterly to a point 35° 01.3320' N - 76° 21.3353' W on Western Point.

(3) In Core Sound and its tributaries, southwest of a line beginning at a point 35° 00.1000' N - 76° 14.8667' W near Hog Island Reef; running easterly to a point 34° 58.7853' N - 76° 09.8922' W on Core Banks; and in the following waterbodies and their ~~tributaries:Back~~ tributaries: Back Bay, the Straits, Back Sound, North River, Newport River, Bogue ~~Sound~~ Sound, and White Oak River.

(4) In ~~any of the coastal waters of~~ Onslow, Pender, New Hanover, and Brunswick counties.

Authority G.S. 113-134; 113-182; 143B-289.52.

15A NCAC 03R .0112 ATTENDED GILL NET AREAS

(a) The attended gill net areas referenced in 15A NCAC 03J .0103(g) are delineated in the following areas:

(1) Pamlico River, west of a line beginning at a point 35° 27.5768' N - 76° 54.3612' W on Ragged Point; running southwesterly to a point 35° 26.9176' N - 76° 55.5253' W on Mauls Point;

(2) Within 200 yards of any shoreline in Pamlico River and its tributaries east of a line beginning at a point 35° 27.5768' N - 76° 54.3612' W on Ragged Point; running southwesterly to a point 35° 26.9176' N - 76° 55.5253' W on Mauls Point; and west of a line beginning at a point 35° 22.3622' N - 76° 28.2032' W on Roos Point; running southerly to a point at 35° 18.5906' N - 76° 28.9530' W on Pamlico Point;

(3) Pungo River, east of the northern portion of the Pantego Creek breakwater and a line beginning at a point 35° 31.7198' N - 76° 36.9195' W on the northern side of the breakwater near Tooleys Point; running southeasterly to a point 35° 30.5312' N - 76° 35.1594' W on Durants Point;

(4) Within 200 yards of any shoreline in Pungo River and its tributaries west of the northern portion of the Pantego Creek breakwater and a line beginning at a point 35° 31.7198' N - 76°

36.9195' W on the northern side of the breakwater near Tooleys Point; running southeasterly to a point 35° 30.5312' N - 76° 35.1594' W on Durants Point; and west of a line beginning at a point 35° 22.3622' N - 76° 28.2032' W on Roos Point; running southerly to a point at 35° 18.5906' N - 76° 28.9530' W on Pamlico Point;

(5) Neuse River and its tributaries northwest of the Highway 17 highrise bridge;

(6) Trent River and its tributaries; and

(7) Within 200 yards of any shoreline in Neuse River and its tributaries east of the Highway 17 highrise bridge and south and west of a line beginning on Maw Point at a point 35° 09.0407' N - 76° 32.2348' W; running southeasterly near the Maw Point Shoal Marker "2" to a point 35° 08.1250' N - 76° 30.8532' W; running southeasterly near the Neuse River Entrance Marker "NR" to a point 35° 06.6212' N - 76° 28.5383' W; running southerly to a point 35° 04.4833' N - 76° 28.0000' W near Point of Marsh in Neuse River. In Core and Clubfoot creeks, the Highway 101 Bridge constitutes the attendance boundary.

(b) The attended gill net areas referenced in 15A NCAC 03J .0103(h) are delineated in the following ~~coastal and joint waters~~ Internal Coastal Waters and Joint Fishing Waters of the state south of a line beginning on Roanoke Marshes Point at a point 35° 48.3693' N - 75° 43.7232' W; running southeasterly to a point 35° 44.1710' N - 75° 31.0520' W on Eagles Nest Bay to the South Carolina State line:

(1) All primary nursery areas described in 15A NCAC 03R .0103, all permanent secondary nursery areas described in 15A NCAC 03R .0104, and no-trawl areas described in 15A NCAC 03R .0106(2), (4), (5), ~~(7),~~ (8), (10), (11), and (12);

(2) In the area along the Outer Banks, beginning at a point 35° 44.1710' N - 75° 31.0520' W on Eagles Nest Bay; running northwesterly to a point 35° 45.1833' N - 75° 34.1000' W west of Pea Island; running southerly to a point 35° 40.0000' N - 75° 32.8666' W west of Beach Slough; running southeasterly and passing near Beacon "2" in Chicamicomico Channel to a point 35° 35.0000' N - 75° 29.8833' W west of the Rodanthe Pier; running southwesterly to a point 35° 28.4500' N - 75° 31.3500' W on Gull Island; running southerly to a point 35° 22.3000' N - 75° 33.2000' W near Beacon "2" in Avon Channel ; running southwesterly to a point 35° 19.0333' N - 75° 36.3166' W near Beacon "2" in Cape Channel; running southwesterly to a point 35° 15.5000' N - 75° 43.4000' W near Beacon "36" in Rollinson Channel; running southeasterly to a point 35° 14.9386' N - 75° 42.9968' W near Beacon "35" in Rollinson Channel; running southwesterly to a point 35° 14.0377' N - 75° 45.9644' W near a "Danger" Beacon northwest of Austin Reef; running southwesterly to a point 35° 11.4833' N - 75° 51.0833' W on Legged Lump; running southeasterly to a point 35° 10.9666' N - 75° 49.7166' W south of Legged Lump; running southwesterly to a point 35° 09.3000' N - 75° 54.8166' W near the west end of Clarks Reef; running westerly to a point 35° 08.4333' N - 76° 02.5000' W near Nine Foot Shoal Channel; running southerly to a point 35° 06.4000' N - 76° 04.3333' W near North Rock; running southwesterly to a point 35° 01.5833' N - 76° 11.4500' W near Beacon "HL"; running southerly to a point 35° 00.2666' N - 76° 12.2000' W; running southerly to a point 34° 59.4664' N - 76° 12.4859' W on Wainwright Island; running easterly to a point 34° 58.7853' N - 76° 09.8922' W on Core Banks; running northerly along the shoreline and across the inlets following the ~~Colregs~~ COLREGS Demarcation ~~line~~ Line to the point of beginning;

(3) In Core and Back sounds, beginning at a point 34° 58.7853' N - 76° 09.8922' W on Core Banks; running northwesterly to a point 34° 59.4664' N - 76° 12.4859' W on Wainwright Island; running southerly to a point 34° 58.8000' N - 76° 12.5166' W; running southeasterly to a point 34° 58.1833' N - 76° 12.3000' W; running southwesterly to a point 34° 56.4833' N - 76° 13.2833' W; running westerly to a point 34° 56.5500' N - 76° 13.6166' W; running southwesterly to a point 34° 53.5500' N - 76° 16.4166' W; running northwesterly to a point 34° 53.9166' N - 76° 17.1166' W; running southerly to a point 34° 53.4166' N - 76° 17.3500' W; running southwesterly to a point 34° 51.0617' N - 76° 21.0449' W; running southwesterly to a point 34° 48.3137' N - 76° 24.3717' W; running southwesterly to a point 34° 46.3739' N - 76° 26.1526' W; running southwesterly to a point 34° 44.5795' N - 76° 27.5136' W; running southwesterly to a point 34° 43.4895' N - 76° 28.9411' W near Beacon "37A"; running southwesterly to a point 34° 40.4500' N - 76° 30.6833' W; running westerly to a point 34° 40.7061' N - 76° 31.5893' W near Beacon "35" in Back Sound; running westerly to a point 34° 41.3178' N -76° 33.8092' W near Buoy "3"; running southwesterly to a point 34° 39.6601' N - 76° 34.4078' W on Shackleford Banks; running easterly and northeasterly along the

shoreline and across the inlets following the COLREGS Demarcation lines to the point of beginning;

(4) Within 200 yards of any shoreline in the area upstream of the 76° 28.0000' W longitude line beginning at a point 35° 22.3752' N - 76° 28.0000' W near Roos Point in Pamlico River; running southeasterly to a point 35° 04.4833' N - 76° 28.0000' W near Point of Marsh in Neuse River; and

(5) Within 50 yards of any shoreline east of the 76° 28.0000' W longitude line beginning at a point 35° 22.3752' N - 76° 28.0000' W near Roos Point in Pamlico River; running southeasterly to a point 35° 04.4833' N - 76° 28.0000' W near Point of Marsh in Neuse River, except from October 1 through November 30, south and east of Highway 12 in Carteret County and south of a line from a point 34° 59.7942' N - 76° 14.6514' W on Camp Point; running easterly to a point at 34° 58.7853' N - 76° 09.8922' W on Core Banks; to the South Carolina State Line.

Authority G.S. 113-134; 113-173; 113-182; 113-221; 143B-289.52.

TITLE 21 – OCCUPATIONAL LICENSING BOARDS AND COMMISSIONS

CHAPTER 23 – IRRIGATION CONTRACTORS' LICENSING BOARD

***Notice** is hereby given in accordance with G.S. 150B-21.3A(c)(2)g. that the North Carolina Irrigation Contractors' Licensing Board intends to readopt with substantive changes the rule cited as 21 NCAC 23 .0104 and readopt without substantive changes the rules cited as 21 NCAC 23 .0206, .0207, .0406, and .0505.*

Pursuant to G.S. 150B-21.2(c)(1), the text of rules to be readopted without substantive changes are not required to be published. The text of the rules are available on the OAH website: http://reports.oah.nc.us/ncac.asp.

Link to agency website pursuant to G.S. 150B-19.1(c): *www.nciclb.org*

Proposed Effective Date: *December 1, 2015*

Public Hearing:
Date: *August 19, 2015*
Time: *10:00 a.m.*
Location: *State Board of Examiners, 1109 Dresser Court, Raleigh, NC 27609*

Reason for Proposed Action: *The Board identified 21 NCAC 23 .0206, .0207, .0406, and .0505 as being "Necessary with substantive public interest" as a part of its periodic review process because these rules would be of substantive interest to its regulated public and subject to comment. Since no comments were received previously, the Board, having identified these rules as necessary to the enforcement of the governing statute, now seeks to readopt these rules and prevent them from expiring.*
21 NCAC 23 .0104 – The Board would like to readopt with changes, this rule to do away with the carryover of continuing education hours as it is cumbersome and administratively difficult to track.

Comments may be submitted to: *Barbara Geiger, P.O. Box 41421, Raleigh, NC 27629, phone (919) 872-2229, fax (919) 872-1598, email info@nciclb.org*

Comment period ends: *October 2, 2015*

Procedure for Subjecting a Proposed Rule to Legislative Review: If an objection is not resolved prior to the adoption of the rule, a person may also submit written objections to the Rules Review Commission after the adoption of the Rule. If the Rules Review Commission receives written and signed objections after the adoption of the Rule in accordance with G.S. 150B-21.3(b2) from 10 or more persons clearly requesting review by the legislature and the Rules Review Commission approves the rule, the rule will become effective as provided in G.S. 150B-21.3(b1). The Commission will receive written objections until 5:00 p.m. on the day following the day the Commission approves the rule. The Commission will receive those objections by mail, delivery service, hand delivery, or facsimile transmission. If you have any further questions concerning the submission of objections to the Commission, please call a Commission staff attorney at 919-431-3000.

Fiscal impact (check all that apply).
☐ **State funds affected**
☐ **Environmental permitting of DOT affected**
Analysis submitted to Board of Transportation
☐ **Local funds affected**
☐ **Substantial economic impact (≥$1,000,000)**
☐ **Approved by OSBM**
☐ **No fiscal note required by G.S. 150B-21.4**
☒ **No fiscal note required by G.S. 150B-21.3A(d)(2)**

SECTION .0100 - LICENSING

21 NCAC 23 .0104 CONTINUING EDUCATION

(a) Continuing Education (CEU) credit shall not be obtained for the same course more frequently than every three years.

(b) Each individual licensee must earn ten hours of approved continuing education each calendar year. The 10 hours shall include at least two but not more than four hours of business education. The remaining hours of continuing education shall consist of training in landscape and turf irrigation technology.

~~(c) A licensed contractor may carry forward from the year earned to the following year up to 10 hours of continuing education.~~

~~(d)~~(c) A licensed contractor shall provide proof of attendance for all continuing education upon request by the Board.

Director's Report

INFORMATION WILL BE PROVIDED AT THE MEETING.

INFORMATION WILL BE PROVIDED AT THE MEETING.

Volume 24, Issue 3
June/July 2015

ASMFC
FISHERIES focus
Vision: Sustainably Managing Atlantic Coastal Fisheries

INSIDE THIS ISSUE

ASMFC Summer Meeting

August 4-6, 2015

The Westin Alexandria
400 Courthouse Square
Alexandria, VA
703.253.8600

Preliminary Agenda

Please note: The agenda is subject to change. Bulleted items represent the anticipated major issues to be discussed or acted upon at the meeting. The final agenda will include additional items and may revise the bulleted items provided below. The agenda reflects the current estimate of time required for scheduled Board meetings. The Commission may adjust this agenda in accordance with the actual duration of Board meetings. Interested parties should anticipate Boards starting earlier or later than indicated herein.

TUESDAY, AUGUST 4

8 - 10 AM — **Executive Committee**
- Executive Director's Annual Review **(Closed Session)**
- Review Performance and Recommended Changes to Appeal Process
- Review Recommended Changes to the Commission Guidance Documents
- Review Recommended Changes to Advisory Panel and Law Enforcement Participation at Board Meetings
- Review Conservation Equivalency Policy
- Future Annual Meetings Update

10:15 -11:45 AM — **Atlantic Herring Section**
- Provide Guidance to Plan Development Team on Revising Proposed Spawning Protection Measures of Draft Amendment 3
- Update on New England Fishery Management Council Actions

12:45 - 5 PM — **American Lobster Management Board**
- Review and Consider Acceptance of the 2015 Benchmark Stock Assessment and Peer Review Panel Reports
- Discuss Need for Management Response to the Benchmark Assessment
- Discuss Possible Addendum Initiation to Prohibit All Mobile Gear in Closed Area II from June 15 - October 31
- Update on Lobster Trap Transfer Database
- Review and Consider Final Approval of Jonah Crab Fishery Management Plan
- Discuss New England Fishery Observer Program (Tentative)

continued, see SUMMER MEETING AGENDA on page 6

Upcoming Meetings

July 15 (1 PM)
ASMFC Atlantic Menhaden Allocation Working Group Conference Call; go to http://www.asmfc.org/calendar for more details.

July 16 (2 PM)
ASMFC Weakfish Technical Committee Conference Call; go to http://www.asmfc.org/calendar for more details.

July 22 (3 - 6 PM)
ASMFC Jonah Crab Advisory Panel, Renaissance Providence Downtown, 5 Avenue of the Arts, Providence, RI.

July 27 - 30
ASMFC Weakfish Assessment Workshop, ASMFC, 1050 North Highland Street, Suite 200A-N, Arlington, VA.

July 30
ASMFC Atlantic Herring Section Days Out Conference Call; go to http://www.asmfc.org/calendar for more details.

August 4 - 6
ASMFC Summer Meeting, The Westin Alexandria, 400 Courthouse Square, Alexandria, VA.

August 10 - 13
Mid-Atlantic Fishery Management Council, Holiday Inn Midtown, 440 West 57th Street, New York City, NY.

August 14 (9 AM)
ASMFC Ecosystem Management Objectives Workshop Conference Call; go to http://www.asmfc.org/calendar for more details.

August 25 - 27
SEDAR Red Drum Assessment Review Workshop, Frances Marion Hotel, 387 King Street, Charleston, SC.

August 31 - September 1 (8:30 AM - 5 PM both days)
ASMFC Ecosystem Management Objectives Workshop, The Hotel at Arundel Preserve, 7795 Arundel Mills Boulevard, Hanover, MD.

September 14 - 18
South Atlantic Fishery Management Council, The Beach House Resort, 1 South Forest Beach Drive, Hilton Head Island, SC.

September 14 - 18
ASMFC Technical Committee Meeting Week, committees and location to be determined.

September 29 - October 1
New England Fishery Management Council, Radisson Hotel, Plymouth Harbor, Plymouth, MA.

October 6 - 8
Mid-Atlantic Fishery Management Council, Doubletree Philadelphia Center City 237 S Broad St Philadelphia, PA.

November 2 - 5
Joint Annual Meeting of the ASMFC & GSMFC, World Golf Village Renaissance St. Augustine Resort, 500 South Legacy Trail, St. Augustine, FL.

December 1 - 3
New England Fishery Management Council, Holiday Inn by the Bay, Portland, ME.

December 7 - 11
South Atlantic Fishery Management Council, Doubletree by Hilton Oceanfront Hotel, 2717 W. Fort Macon Road, Atlantic Beach, NC.

The Atlantic States Marine Fisheries Commission was formed by the 15 Atlantic coastal states in 1942 for the promotion and protection of coastal fishery resources. The Commission serves as the deliberative body of the Atlantic coastal states, coordinating the conservation and management of nearshore fishery resources, including marine, shell and diadromous species. The fifteen member states of the Commission are: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida.

ASMFC Charts a New Course for Atlantic Menhaden Management

While Atlantic menhaden are not big fish, their historical, economic and ecological importance along the Atlantic coast is sizable. The commercial menhaden fishery can be traced as far back as colonial times when Native Americans, who called menhaden munnawhatteaug, taught colonists to use the fish as fertilizer for corn. The Commission became involved with menhaden in 1942 at its first Annual Meeting where Commissioners discussed how fisheries production could support the war effort. For menhaden, those discussions centered on the development of a menhaden cannery for wartime consumption. Over the next 40 years, Commissioners would continue to monitor the status of the resource and the fishery. However, it was not until 1981, with the adoption of the first Interstate Fishery Management Plan (FMP) for Atlantic Menhaden, that Commissioners began to truly manage this resource. (Interestingly, this plan and the Atlantic Striped Bass FMP were the first two FMPs adopted by the Commission). Thirty-one years later Amendment 2 was adopted and instituted the first total allowable catch limit for menhaden.

Now on the heels of the 2015 Benchmark Stock Assessment, we are once again heading into a new era of Atlantic menhaden management. Traditionally, the Commission has managed this fishery with a focus on mortality and reproductive capacity. However, this approach does not directly to take into account the ecological role of a forage species, like menhaden. At our 2015 Spring Meeting, Commissioners initiated Draft Amendment 3 to establish reference points to address menhaden's vital ecological role.

To initiate discussions on ecosystem objectives and allocation, the Commission's Atlantic Menhaden Management Board (Board) established two working groups to identify issues and options for Board discussion and consideration as part of the amendment process. The first working group, composed of Board members, stakeholder representatives, and technical experts, is tasked with identifying potential ecosystem goals and objectives to aid in the development of ecological reference points. This multi-disciplinary group will have a planning meeting via webinar in early August and an in-person workshop on August 31 and September 1. The webinar will review topics to be covered, expectations, and workshop goals, as well as provide participants an opportunity to ask questions and make suggestions on the process. It will also feature an ecosystem management case study from the Great Lakes region. The workshop will be facilitated by Dr. Michael Jones, who chaired the Peer Review Panel for the 2015 Atlantic Menhaden Benchmark Stock Assessment. Dr. Jones is knowledgeable of Atlantic menhaden science and management, and has expertize in ecosystem management in the Great Lakes region.

The second working group is comprised of a subset of Board members (see Board subgroup list below) and will focus on the issue of allocation. This working group is tasked with informing the Board as it develops options to be included in Draft Amendment 3. The first meeting of this working group, via webinar, is scheduled for July 15.

No management decisions will be formulated or acted upon by either working group. The meetings are a means to initiate discussions on ecosystem objectives and allocation, allowing for the identification of issues and options for Board discussion and consideration. All management actions must be approved by the Board at one of the Commission's four yearly meetings. In order to ensure transparency, the discussions of both working groups will be open to the public and interested stakeholders.

Ecosystem Management Objectives Workshop Participants

Board Subgroup
Russ Allen (NJ)
Bob Ballou (RI, Menhaden Board Vice Chair)
Robert Boyles (SC, Menhaden Board Chair)
Lynn Fegley (MD)
Jim Gilmore (NY)
Rob O'Reilly (VA)

Advisory Panel Subgroup
Ken Hinman (ecosystem)
Jeff Kaelin (bait, AP Chair)
Ron Lukens (reduction)
David Sikorski (recreational)

Technical Representatives
Matt Cieri (ME, BERP Chair)
Jason McNamee (RI, TC Chair)
Amy Schueller (NMFS, SAS Chair)

Facilitator
Michael Jones (SEDAR 40 Review Panel Chair)

These workshops reflect the Commission's continued commitment to addressing the importance of Atlantic menhaden to the ecosystem and industry. To be successful, the process will require the involvement of all interested parties – managers, stakeholders, and scientists – who are committed to the sustainable management of this valuable resource. The Commission's commitment to developing ecological reference points represents an important step forward not only for menhaden, but for coastal fisheries management as a whole. Until recently, managers have not had the tools necessary to undertake a holistic view of fishery management. As with any major new initiative, Commissioners are going to allow adequate time to ensure they listen to their constituents and use the best available science to do what is right for the resource and the fisheries it supports.

ASMFC Moves Forward on 2017 Benchmark Stock Assessment

Introduction

For the past 25 years, the 15 Atlantic coast states, through the Commission, have sought to effectively manage Atlantic sturgeon throughout its range. With the approval of Amendment I to the Atlantic Sturgeon FMP in 1998, which implemented a 40-year coastwide moratorium on harvest, states committed to protecting this ancient species. Additionally, states have invested considerable resources to increase understanding of sturgeon biology and life history. Despite these efforts, in February 2012 NOAA Fisheries announced Atlantic sturgeon was added to the Endangered Species List. In response, the Commission has initiated a coastwide stock assessment to evaluate stock status, stock delineation, and bycatch.

Life History

Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*) are ancient fish, dating back at least 150 million years. Historically, they have been found along the entire Atlantic coast from Labrador, Canada to St. Johns River, Florida. Atlantic sturgeon can reach lengths of over 14 feet, weigh over 800 pounds, and can live up to 60 years. They are also known to undergo extensive coastal migrations, which take them from the ocean into coastal estuaries and rivers to spawn once every two to five years.

Typically, sturgeon in the southern part of the species range mature faster and grow larger than those in the northern part of the range. Females reach sexual maturity between the ages of seven and 30, and males between the ages of five and 24. The number of eggs a female produces increases with age and size, which means older and larger females are more valuable to the population because they produce more eggs (up to eight millions eggs per spawning event) than younger, smaller females (estimated 400,000 eggs per spawning event). The oldest known sturgeon was estimated to be 60 years old.

Atlantic sturgeon are one of the largest and longest-lived anadromous fish in North America. Most juveniles remain in freshwater rivers from one to six years before migrating back out to the ocean. As mature adults, they return to their natal streams to spawn. Little is known about the movements of Atlantic sturgeon when they are at sea, and little is known about actual spawning locations. Sturgeon don't have teeth. Instead, they suck up prey using their downward projecting vacuum-like mouth. As juveniles, Atlantic sturgeon feed on flies, worms, shrimps, and small mollusks and crustaceans. As adults, they are opportunistic feeders and prey mainly on mollusks, snails, worms, shrimps and benthic fish. Very little is known about their natural predators.

Commercial Fishery

Atlantic sturgeon have been taken for food by humans in North America for at least 3,000-4,000 years, and have supported commercial fisheries of varying magnitude since colonial times. The fishery was once considered second in value only to lobster. There are reports from Maine and Massachusetts from as early as the 1600s that cite sturgeon as an important fishery in those states. While sturgeon were primarily harvested for their flesh and eggs

Species Snapshot

Atlantic Sturgeon
Acipenser oxyrhynchus oxyrhynchus

Interesting Facts:

- Atlantic sturgeon fossils date back more than 150 million years. They were around throughout the Cretaceous period when dinosaurs roamed the earth.
- All 24 species of sturgeon can only be found in the Northern Hemisphere. Only Atlantic sturgeon and shortnose sturgeon are found on the US East Coast.
- Sturgeon do not have teeth and swallow their prey whole.
- Rather than having true scales, the Atlantic sturgeon has five rows of bony plates known as scutes.
- Sturgeon are known to leap out of water and sometimes land in boats. It is not known why they do this. Always remember to wear your life jacket!
- Sturgeon are the largest and longest-lived anadromous fish native to North America

Largest Recorded: 14 feet long and 811 pounds, Canada

Oldest Recorded: 60 years old, captured from the St. Lawrence River

Stock Status: Overfished and not experiencing overfishing; listed under the Endangered Species Act in 2012

From Left: Matthew Breece and Dewayne Fox with a large female Atlantic sturgeon captured as part of Delaware State University's (DESU) Spring Sturgeon Sampling Program. The female measured 8.6 feet in total length and weighed 260 pounds. Photo (c) DESU.

(caviar from sturgeon eggs was considered a delicacy in Europe), other parts had commercial value as well. Sturgeon skin was made into leather for clothes and bookbinding. The swim bladder was used to make a gelatin that served as a clarifying agent in jellies, wine, beer, and glue. Swim bladders were also fashioned into windows for carriages.

In 1888, the U.S. Fish Commission reported that there was 7.3 million pounds of sturgeon caught on the East Coast. From 1950 through the mid-1990s, annual landings declined to between 100,000 and 250,000 pounds. In 1998 the Commission implemented a coastwide moratorium on the harvest of wild Atlantic sturgeon stocks, although many states had already closed their fisheries.

Status of the Stock

Very little is known about the stock status of Atlantic sturgeon. Reliable data is difficult to obtain because many river systems have so few fish, and rivers with more fish are often not easily sampled. In 1998, the Commission completed a peer-reviewed coastwide assessment of the population, examining each river system where Atlantic sturgeon were historically found.

The assessment concluded that all systems held significantly less sturgeon than they did in the late 1800s and early 1900s, and very few signs of recovery were detected. As a result of the assessment, the Commission established a 40+ year coastwide moratorium through Amendment 1 to the Atlantic Sturgeon Fishery Management Plan.

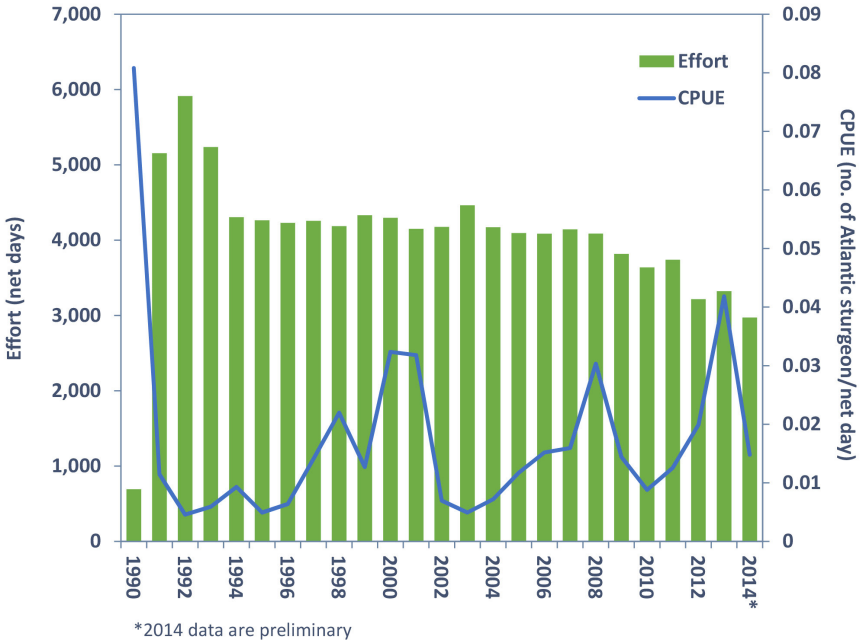
The accompanying graphs depict catch per unit effort (CPUE) for fishery-independent surveys conducted by North Carolina and New York. Both surveys have experienced significant fluctuations in recent years. However, in 2013, North Carolina's CPUE was the second highest value in the past twenty years. Further, the spike of juveniles seen in New York's survey are believed to be a direct result of New York's moratorium in 1997 and the concomitant increase of spawning fish in the Hudson River.

In 2014, the Sturgeon Board evaluated progress on the development of a coastwide benchmark stock assessment for Atlantic sturgeon to evaluate stock status, stock delineation, and bycatch. The assessment responds to the 2012 ESA listing of Atlantic sturgeon as threatened for the Gulf of Maine distinct population segment (DPS) and endangered for the remaining DPSs (New York Bight, Chesapeake Bay, Carolina, and South Atlantic). In order to allow for the most comprehensive assessment, and based on the Atlantic Sturgeon Stock Assessment Subcommittee's (SAS) recommendation, the Board decided to set the completion date for 2017 so that the most recent data from studies currently underway can be incorporated. For example, several assessment approaches at the DPS or stock-level would become possible from the analysis of genetic samples currently underway at the US Geological Survey's

continued, see ATLANTIC STURGEON on page 8

Fishery-independent Catch Rates of Juvenile Atlantic Sturgeon in Albemarle Sound

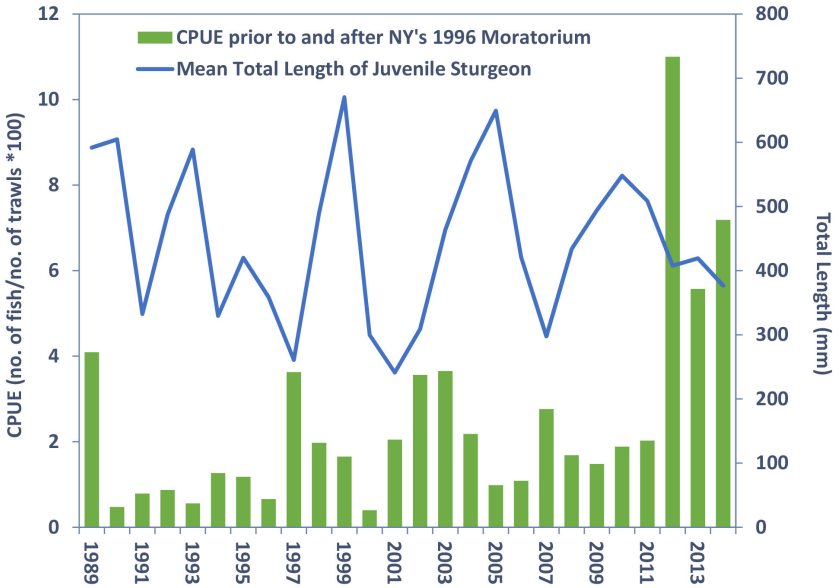
Source: NC Division of Marine Fisheries, 2014



*2014 data are preliminary

Catch Per Unit Effort (CPUE) of Hudson River Juvenile Atlantic Sturgeon

Source: Source: NY State Dept. of Environmental Conservation with data from Hudson River Power Generating Companies Hudson River Monitoring Program, 2014



Timeline of Management Actions: FMP ('90); Amendment 1 ('98); Addendum I ('01); Addendum II ('05); Addendum III ('06); Addendum IV ('12)

Summer Meeting Agenda (continued)

WEDNESDAY, AUGUST 5

8 - 8:45 AM **American Eel Management Board**
- Review and Consider Approval of Maine Eel Life Cycle Survey

9 - 10:30 AM **Tautog Management Board**
- Review and Consider Approval of the Draft PID for Amendment 1 to the Interstate Fishery Management Plan

9 - 10:30 AM **Atlantic Coastal Cooperative Statistics Program (ACCSP) Executive Committee**
- Status Report (Program and Committee Updates)
- Independent Program Review Progress
- APAIS Update
- Governance Update
- Executive Committee Membership SOPs

10:45 AM - 12:15 PM **ACCSP Coordinating Council**
- Status Report (Program and Committee Updates)
- Independent Program Review Progress
- Executive Committee Membership SOPs

1:15 - 2:45 PM **Atlantic Striped Bass Management Board**
- Review Technical Committee Report on Likelihood of Achieving Fishing Mortality (F) Target with Final Implemented Regulations
- Review Technical Committee Report on F Reference Points for the Coastal and Discard Fleets Consistent with Chesapeake Bay Specific F Reference Points
- Review Progress on Management-level Projections Using the Chesapeake Bay and Coastal Fleet Reference Points
- Review and Consider Approval of the 2015 FMP Review and State Compliance Reports

3 - 4:30 PM **Atlantic Menhaden Management Board**
- Update on Atlantic Menhaden Working Group Progress on Ecosystem-based Management Goals and Objectives
- Update on Atlantic Menhaden Working Group Progress on Allocation
- Discuss Quota Rollover Provisions of Amendment 2

THURSDAY, MAY 6

8 - 10 AM **Interstate Fisheries Management Program Policy Board**
- Executive Committee Report
- Review and Discuss Annual Performance of the Stocks
- Review Management and Science Committee Report on Results of Forage Fish Management Provisions Survey
- Review and Approve Revised LEC Report on Guidelines for Resource Managers on the Enforceability of Management Measures
- Atlantic Coastal Fish Habitat Partnership Report
- Review of Non-compliance Findings (if necessary)

10 - 10:30 AM **Business Session**
- Consider Approval of Jonah Crab Fishery Management Plan
- Review Non-compliance Findings (if necessary)

10:45 AM - 12:15 PM **South Atlantic State/Federal Fisheries Management Board**
- Review and Consider Approval of the Draft Terms of Reference for the 2016 Benchmark Stock Assessments for Atlantic Croaker and Spot
- Review the 2015 Traffic Light Analyses for Atlantic Croaker and Spot
- Review and Consider Approval of the 2015 FMP Review and State Compliance Reports for Atlantic Croaker, Black Drum, and Red Drum
- Discuss Extending the Provisions of Spanish Mackerel Addendum I for the 2015 Fishing Season and Possibly Beyond

Public Comment Guidelines

With the intent of developing policies in the Commission's procedures for public participation that result in a fair opportunity for public input, the ISFMP Policy Board has approved the following guidelines for use at management board meetings:

For issues that are not on the agenda, management boards will continue to provide opportunity to the public to bring matters of concern to the board's attention at the start of each board meeting. Board chairs will use a speaker sign-up list in deciding how to allocate the available time on the agenda (typically 10 minutes) to the number of people who want to speak.

For topics that are on the agenda, but have not gone out for public comment, board chairs will provide limited opportunity for comment, taking into account the time allotted on the agenda for the topic. Chairs will have flexibility in deciding how to allocate comment opportunities; this could include hearing one comment in favor and one in opposition until the chair is satisfied further comment will not provide additional insight to the board.

For agenda action items that have already gone out for public comment, it is the Policy Board's intent to end the occasional practice of allowing extensive and lengthy public comments. Currently, board chairs have the discretion to decide what public comment to allow in these circumstances.

In addition, the following timeline has been established for the submission of written comment for issues for which the Commission has NOT established a specific public comment period (i.e., in response to proposed management action).

1. Comments received 3 weeks prior to the start of a meeting week will be included with the main meeting materials.
2. Comments received by **5 PM Tuesday, July 28, 2015** will be distributed electronically to Commissioners/Board members prior to the meeting and a limited number of copies will be provided at the meeting.
3. Following the Tuesday, July 28, 2015 5 PM deadline, the commenter will be responsible for distributing the information to the management board prior to the board meeting or providing enough copies for the management board consideration at the meeting (a minimum of 50 copies).

The submitted comments must clearly indicate the commenter's expectation from the ASMFC staff regarding distribution. As with other public comment, it will be accepted via mail, fax, and email.

Science Highlight: The Ins and Outs of Fish Passage

The Commission manages a number of diadromous species, including American eel, American shad, Atlantic sturgeon, Atlantic striped bass, and river herring (alewife and blueback herring). These species spend part of their lives in freshwater streams and rivers, and part in the ocean. They must migrate between these areas to complete their life cycles and maintain healthy populations. Migrating adults and the offspring they produce are forage for a variety of predators; many ecosystems depend on the seasonal influx of these fish. Aside from serving an integral role in various food webs, diadromous fish are culturally, recreationally, and commercially important.

Furnace Brook Fishway. Photo (c) CT DEEP

The ability of migrating fish to pass man-made stream and river barriers is essential to the protection and restoration of these species and the habitats in which they live. Hundreds of thousands of artificial barriers have been constructed along the Atlantic coast to impound and redirect water for irrigation, flood control, electricity, recreation, drinking water, and transportation—all altering the natural features of rivers and streams. Fisheries managers, scientists, stakeholders, and the public at large have become increasingly concerned about the effects of barriers on fish and other aquatic species. Many barriers are obsolete and no longer serve their original purpose. These barriers often create impediments to fish migration, which is fundamental to the life history of diadromous species. As a result, some fish populations have significantly declined over their historical range.

Elements of Fish Passage: Factors to Consider

The first known fishway was built in 17th century France, when bundles of branches were used to create steps in otherwise impassible channels. A few other reports of constructed fishways are sprinkled throughout European history, though by no means was fish passage implementation a common practice. Though the dilemma of fish passage along the Atlantic coast dates back to the construction of the earliest barriers built in our river systems, and escalated considerably during the Industrial Revolution, the issue went largely unrecognized until the mid-1900s when it attracted the attention of environmental activists. Since then, considerable work has been done to evaluate rivers and determine which barriers cause the most significant impediment to migrating fish. Funding is focused either on removing these barriers entirely, or on constructing passage technology to allow fish to traverse the barrier.

Passage technology is difficult to design, owing to differences between species' natural swimming styles and abilities. Conditions and flow types that encourage and aid movement differ depending on the target species; not all species are able to use the same passage design. Target species must be studied and considered in order to construct an effective fishway.

This fact comprises the center of the argument for additional fish passage research and more informed management: not all fish passage is created equal. The fact that fish passage is built to accommodate a barrier does not mean that fish are actually traversing that barrier. And the fact that one species utilizes the passage technology does not necessarily mean that other species will be able to. Additionally, the implementation of fish passage over a barrier will not be useful if fish aren't encountering that barrier; there may be an obstruction further downstream or a degradation of water quality that is preventing species from even reaching that portion of the waterway.

The last point to consider is timeliness of passage. Fish must not only cross the barrier, they must reach their spawning habitat without undue delay. Mating success depends on a variety of factors, including prey, predators, competitors, and environmental conditions. If fish are delayed by the passage technology, conditions may no longer be suitable to support spawning adults or new offspring, negatively impacting recruitment and sustainability.

Current Technology

Passage technology takes many forms. Passage over a barrier is predominantly comprised of fish ladders and lifts. However, fish passing upstream often have difficulty finding the entrance of the passage structure. Conversely, fish passing downstream can get pulled into turbines by following the current before they find safe passage; for this reason fish screens are often implemented to redirect the path of migrating fish. Additional technologies must be developed to direct fish away from turbine intakes and toward passage structure entrances.

Additional information on upstream technology can be found in the Commission's Guidance Document on Upstream Fish Passage Technologies for Managed Species at http://www.asmfc.org/habitat/fish-passage.

continued, see SCIENCE HIGHLIGHTS on page 10

Leetown Science Center in West Virginia. This past May, the SAS identified each task of the assessment from data needs to modeling approaches, and the time it will take to complete each task to ensure the benchmark assessment is completed on schedule. Currently, the Bycatch and Tagging Working Groups are developing methodologies for their respective parts of the assessment, while each state actively updates its data through the terminal year of the assessment.

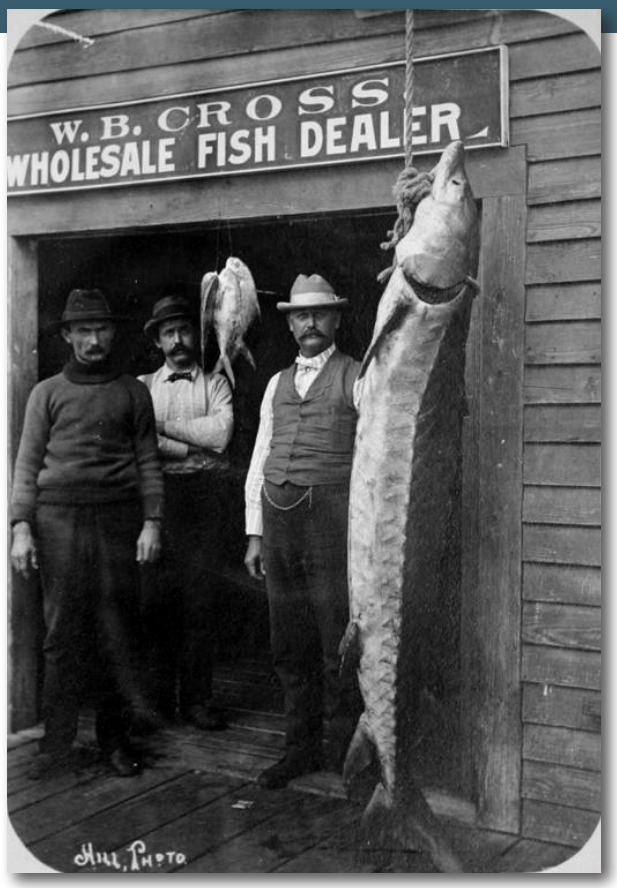


Image (c) NOAA Fisheries

Atlantic Coastal Management

Atlantic sturgeon is managed through Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon (July 1998) and its subsequent addenda (Addendum I - IV). The primary measure of Amendment 1 was the implementation of a coastwide moratorium, as well as a prohibition on take, harvest, harassment and/or other actions that may cause the species harm.

Endangered Species Listing

NOAA Fisheries has investigated the status of Atlantic sturgeon with regard to its listing under the Endangered Species Act (ESA) three times since the Commission's implementation of Amendment 1 in 1998. The first two status reviews, conducted in 1998 and 2005, concluded that listing was not warranted. The last status review, initiated in 2009 and finalized in 2012, declared the Gulf of Maine DPS as threatened and the remaining four DPSs (New York Bight, Chesapeake Bay, Carolina and South Atlantic) as endangered (effective April 2012). The Status Review determined the most significant threats to the DPSs are bycatch mortality, poor water quality, lack of adequate state and/or federal regulatory mechanisms, and dredging activities. Additional stressors include habitat impediments and ship strikes. In December 2013, NOAA Fisheries published an Interim Final 4(d) Rule for the threatened Gulf of Maine DPS, which essentially provides the same protection as an endangered listing.

For more information, please contact Max Appelman, FMP Coordinator, at mappelman@asmfc.org.

ASMFC Comings & Goings

COMMISSIONERS

Thomas O'Connell

In late May, Maryland Governor Larry Hogan elected to make a number of changes to the leadership at the Maryland Department of Natural Resources (DNR). One of those changes was the appointment of David Goshorn as the Acting Director for the Fisheries Service. David replaced Thomas O'Connell who served in that capacity since 2008. Tom began with DNR in 1993 as a fisheries biologist working on striped bass monitoring and management. Over his 22-year tenure, he served as the Fisheries Service's Legislative and Policy Program Administrator, Coastal Bays Fisheries Management Plan Coordinator, Oyster Restoration Program Manager, and Assistant Director for the Estuarine and Marine Fisheries Division. Tom became active in the Commission process in the mid-1990s, when he became the first Fishery Management Plan Coordinator for horseshoe crab. Working with the Management Board, Technical Committee and Advisory Panel, he oversaw the development and implementation of the FMP and Addenda I and II, which established the first state quotas for horseshoe crab. For the past seven years, Tom served as the state's Administrative Commissioner to the ASMFC, bringing his passion for and commitment to sustainable management of marine resources to all his interactions. We are grateful for Tom's longstanding support of the Commission and wish him the best in all his future endeavors.

David Goshorn

Since 2013, David Goshorn has served as Maryland's DNR's Assistant Secretary for Aquatic Resources. In this role, he is responsible for monitoring and assessment of water and geological resources; policy and management of the recreational and commercial fisheries; restoration of the Chesapeake and coastal bays; boating services; and the Department's Integrated Policy and Review Unit.

continued, see COMINGS & GOINGS on page 12

Research and Development

While there have been significant advancements in fish passage technologies over the past decade, more research is needed to increase efficiency and effectiveness of passage technologies. Several federal agencies, such as the Bureau of Reclamation, the National Biological Survey, the U.S. Army Corps of Engineers, and the Department of Energy are involved in research, development, and evaluation of new technologies. The U.S. Geological survey studies population dynamics, ecohydraulics, physiology, and toxicology factors of fish passage, and has even constructed an indoor simulated river to conduct research. The U.S Fish and Wildlife Service takes an application-focused approach, developing partnerships to implement individual passage projects.

To date, most efficiency studies rely on tagging methods, but only a small minority of fishways have been evaluated for efficiency. Diadromous fish are often collected by biologists below barriers during their annual migrations. The fish are fitted with tags and released to continue their upstream migration. Fish above the stream are detected or captured later and the number of tagged fish passing the barrier is compared to the number of fish initially tagged to estimate passage structure efficiency. Efficiency evaluations are of the utmost importance, not only to be sure that implemented passage technologies are meeting goals at a particular site, but also to gather more information on how to focus funding in ways that will make a maximum impact on fish population restoration.

Commission Involvement

The Commission is particularly concerned about the migrations of Atlantic sturgeon, American shad, alewife, blueback herring, and striped bass to their spawning habitat, as well as access to long-term riverine growth areas for American eel. Without access to these habitats, it will be very difficult to restore populations of these very important diadromous species.

The primary objective of the Commission's Policy on Passage Efficiency for Diadromous Species is "to pass as many upstream migrants as needed to support natural reproduction of anadromous species. The most effective method of improving fish passage is barrier removal, but when removal is not feasible, parties must work together to develop and implement fish passage technologies that will support restoration plans based on upstream habitat."

It is recognized that the percentage of migrants passed at each site will vary based on watershed-specific factors, including: location within the watershed, species, stream discharge, population size, and distribution of required habitat. It is also recognized that technical knowledge on effective passage design is more advanced for some species than others, and also that all parties should commit to continued improvement of passage efficiency as technology advances and as site-specific information improves the understanding of restoration in the watershed.

Working to restore both upstream and downstream fish passage is an evolving field that requires continued collaboration. In response to the growing concern about barrier impacts on diadromous species, the Commission created a Fish Passage Working Group, which continues to convene as needed to discuss developments and mitigate the negative effects of fish passage. Major accomplishments of this group include policy development on diadromous fish passage efficiency, a guidance document identifying effective approaches to upstream fish passage, and a guidance document to promote state involvement in Federal Energy Regulatory Commission licensing projects. The Atlantic Coastal Fish Habitat Partnership (ACFHP), endorses many projects, including dam removal, culvert replacement, and habitat restoration. Details can be found on the ACFHP Projects webpage at http://www.atlanticfishhabitat.org/projects/endorsedprojects/.

How You Can Help

Waterways along the Atlantic coast are littered with old dams, road culverts, and debris; keep your eye out for these obstructions. Observe local bridge culverts in particular, these should be positioned to allow fish to swim through a stream uninterrupted by an impassible "waterfall." If an impassible obstruction is encountered, report it to your state's wildlife service for remediation. Remember:

1. Removal of an unnecessary structure is the most effective option.
2. The construction of a fish passageway is a viable option for structures still in use. Often small, low-cost changes can be made to barriers to allow for fish passage, like adding spat rope to perched culverts.
3. Be sure that any new barriers scheduled for construction in waterways are designed to allow fish passage, and provide natural stream channel features where possible.

Finally, mark your calendars! The next Annual World Fish Migration Day is May 21, 2016; www.worldfishmigrationday.com. Check for events near you, or hold your own.

What's in a Name?

Finding it hard to tell the difference between anadromous, catadromous and diadromous? Here's a breakdown of their word origins with some examples of species that fall under the categories.

Anadromous, derived from Latinized form of Greek 'ana' meaning 'up or back' and 'dramein' meaning 'to run,' is running upward or ascending up-river. It describes species that spend most of their adult lives at sea and return to freshwater to spawn. American shad, Atlantic striped bass, Atlantic sturgeon, and river herring (alewife and blueback) are examples of Commission managed anadromous species.

Catadromous, derived from the Greek 'cata' meaning 'down, against, or back,' is running down river. It decsribes species that spend most of their adult lives in freshwater and return to the sea to spawn. American eel are the only catadromous species managed by the Commission.

Diadromous, derived from Greek 'dia' meaning 'through or passing through' is migrating between saltwater and freshwater. The category encompasses both anadromous and catadromous species.

ACCSP Announces 2015 Funding Awards

The Atlantic Coastal Cooperative Statistics Program (ACCSP) has allocated nearly two million dollars to its state and federal partners for new and ongoing projects to improve data collection for coastal fisheries in 2015. The following projects will be awarded funding.

- **Maine Department of Marine Resources** will receive (1) $176,373 to continue the state's management of dealer and harvester reporting and (2) $136,306 to continue portside commercial catch sampling and comparative bycatch sampling for Atlantic herring, Atlantic mackerel, and Atlantic menhaden.
- **New Hampshire Department of Fish and Game** will receive $74,423 to improve the American lobster biological and catch/effort data for Georges Bank and characterize seasonal egger aggregation in Closed Area II.
- **Rhode Island Division of Fish and Wildlife** will receive $79,719 to maintain and coordinate its fishery-dependent data feeds to ACCSP.
- **New York State Department of Environmental Conservation** will receive $62,928 to improve trip-level reporting and quota monitoring for state license participants in New York's marine fisheries.
- **New Jersey Division of Fish and Wildlife** will receive $155,126 to continue electronic reporting and biological characterization of its commercial fisheries and process and age summer flounder and black sea bass otoliths.
- **North Carolina Division of Marine Fisheries** will receive $75,620 to update and enhance the data transmission methods to ACCSP.
- **South Carolina Department of Natural Resources** will receive $165,824 to continue instituting a collection method for ACCSP commercial module in South Carolina.
- **Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council** will receive $183,200 to continue carrying out an observer program for the Mid-Atlantic and Rhode Island small mesh otter trawl fishery.
- **NOAA Fisheries' Southeast Fisheries Science Center** will receive $250,831 to continue processing and ageing biological samples collected from U.S. South Atlantic commercial and recreational fisheries.
- **ACCSP Recreational Technical** will receive $168,738 to increase at-sea sampling levels for the recreational headboat fishery on the Atlantic coast (New Hampshire through Florida).

For more information, please contact Ann McElhatton, Program Manager with ACCSP, at info@accsp.org.

ACCSP Promotes Julie Defilippi and Welcomes Heather Konell

In recognition of her many accomplishments and longstanding commitment to the ACCSP as Data Coordinator, **Julie Defilippi** was promoted to Data Team Leader this June. As Team Leader, Julie provides guidance for all ACCSP data-related activities, including oversight of commercial and biological data, data collection and warehousing projects, user interface projects, and data dissemination activities. She staffs the Biological Review Panel and the Bycatch Prioritization Committee, and works closely with Ed Martino, Information Systems Manager, on database development and maintenance. Julie has a Bachelor's Degree in Marine Biology from Boston University. Congratulations, Julie!

This July, ACCSP welcomed **Heather Konell** as its new Fisheries Data Coordinator. Heather's primary responsibilities include providing programming capabilities and system support required to develop and fine tune the data management system. She also assists users as they access the system and supports customer-related data intensive activities (e.g., stock assessment data workshop).

From 2012 to 2015, Heather worked with the New Jersey Marine Fisheries Bureau managing its Saltwater Recreational Registry Program database, which contains over 500,000 participants, and providing angler support and outreach. She also worked on various field surveys including the Delaware River Recruitment Survey, Ocean Trawl Survey, Delaware Bay Tagging Survey, and American Eel Survey giving her experience with identifying, measuring, and sexing many species. Heather has also worked with the Adventure Aquarium, Stockton University, Rutgers University Marine Field Station, and the Marine Mammal Stranding Center through various internships and positions, gaining experience with a variety of marine fauna and flora. She earned a Bachelor of Science in Marine Science with a concentration in Marine Biology and minor in General Biology from Stockton University in December 2014. Welcome, Heather!

ACCSP
Good Data, Good Decisions

ACCSP is a cooperative state-federal program focused on the design, implementation, and conduct of marine fisheries statistics data collection programs and the integration of those data into a single data management system that will meet the needs of fishery managers, scientists, and fishermen. It is composed of representatives from natural resource management agencies coastwide, including the Atlantic States Marine Fisheries Commission, the three Atlantic fishery management councils, the 15 Atlantic states, the Potomac River Fisheries Commission, the D.C. Fisheries and Wildlife Division, NOAA Fisheries, and the U.S. Fish & Wildlife Service. For further information please visit www.accsp.org.

On the Legislative Front: FY2016 Appropriations Update

On May 20th the House of Representatives passed 2016 appropriations legislation for the Department of Commerce, including NOAA Fisheries. The legislation includes $32 million for the "Councils & Commissions" line item, which provides funding for state fishery management programs and the Commission. The figure represents a decrease of $738,000 from 2015. The legislation also eliminates funding for "Interjurisdictional Fisheries Act Grants," which match state funding for fishery management programs. These grants received $2.5 million in funding in 2014.

Meanwhile, on June 11th the Senate Appropriations Committee approved 2016 appropriations legislation for the Department of Commerce, including NOAA Fisheries. The "Councils & Commissions" line item would be increased by $732,000 and "Interjurisdictional Fisheries Act Grants" would receive a $500 increase under Senate funding levels. The Senate legislation is now awaiting approval of the full Senate.

NOAA Fisheries Operations, Research, and Facilities (in $ thousands)		
	House	Senate
Protected Resources Science and Management		
Marine Mammals, Sea Turtles and Other Species	113,200	110,246
ESA Salmon	67,000	-
Species Recovery Grants	-	6,000
Atlantic Salmon	-	6,163
Pacific Salmon	-	60,000
Protected Resources Science and Management Total	180,200	182,409
Fisheries Science and Management		
Fisheries and Ecosystem Science Programs and Services	132,189	134,489
Fisheries Data Collections, Surveys and Assessments	168,000	163,271
Observers and Training	43,000	43,655
Fisheries Management Programs and Services	119,000	114,545
Aquaculture	-	7,000
Salmon Management Activities	35,500	30,200
Regional Councils and Fisheries Commissions	32,000	33,470
Interjurisdictional Fisheries Act Grants	0	3,000
Fisheries Science and Management Total	529,689	529,630
Enforcement	65,000	67,049
Habitat Conservation and Restoration	53,854	51,484
Total, NMFS, Operations, Research, and Facilities	828,743	830,572

Looking forward, Senate Democrats have vowed to filibuster all Republican spending bills until a budget deal is reached. Democrats are opposing any appropriations bill that adheres to the Republican budget framework, and are pushing for a multi-year agreement to increase sequester spending caps for defense and nondefense discretionary programs. The deadline to enact 2016 appropriations bills or a temporary extension is September 30, 2015.

Both the House and Senate appropriations bills contain policy riders that reference the Mid-Atlantic trawl survey for horseshoe crabs. While the specific language differs slightly, both lay the groundwork for resuming the survey. Since 2002, estimates of horseshoe crab abundance in the region were obtained from a trawl survey conducted through Virginia Tech aboard privately-owned commercial fishing vessels. From 2011 to 2013 the biomedical and fishing industries provided limited funding for increasingly smaller scale surveys. In 2014, the survey did not occur and barring further action no survey will be conducted in 2015. For more information, please contact Deke Tompkins at dtompkins@asmfc.org.

Preparations Begin for Atlantic Croaker and Spot Benchmark Stock Assessments

The Commission has begun work on the joint benchmark stock assessments for Atlantic croaker and spot. The spot assessment will be the first coastwide assessment for these species, while the Atlantic croaker assessment will build upon the last benchmark assessment conducted in 2010. The assessments will evaluate the health of Atlantic croaker and spot populations and inform future management of the species. The Commission's stock assessment process and meetings are open to the public (with the exception of discussion of confidential data).

The Commission welcomes the submission of data sets that will improve the accuracy of the assessments. These include, but are not limited to data on growth, maturation, migration, genetics, tagging, recruitment, natural mortality, abundance/biomass, and fishery removals. An essential need is data to inform the stock assessments of discards and bycatch in other directed fisheries (e.g., the South Atlantic shrimp trawl fishery). For data sets to be considered at the Data Workshop, the data must be sent in the required format, with accompanying methods description, to the Commission by August 1, 2015. All available data will be reviewed and vetted by the Atlantic Croaker and Spot Stock Assessment Subcommittee for possible use in the assessments. For those interested in submitting data, please contact Jeff Kipp, Stock Assessment Scientist, at jkipp@asmfc.org.

The Data Workshop will take place September 21-25, 2015 with the location to be determined. The assessment workshop and peer review will be conducted in 2016. For more information on the Atlantic croaker and spot stock assessment process, please contact Megan Ware, Fishery Management Plan Coordinator, at mware@asmfc.org.

Atlantic States Marine Fisheries Commission
1050 North Highland Street
Suite 200 A-N
Arlington, VA 22201

Return Service Requested

COMINGS & GOINGS continued from page 8

David has worked at DNR since 1992, serving initially as a member of the Fisheries Service Striped Bass Project, and later as Chief of the Living Resource Assessment Program, where he was responsible for submerged aquatic vegetation restoration, fish community assessments, coastal bays monitoring, and harmful algal bloom response.

From 2007 through 2013, David directed the agency's Office for a Sustainable Future, with responsibility for moving DNR in particular and Maryland in general toward a sustainable future. A Towson native, David received his Bachelor's Degree in Biology from Bucknell University and his Ph.D. in Marine Biology from the University of Delaware. Welcome aboard, David!

STAFF

Ashton Harp

In late June, Ashton Harp joined the Commission as its new Fishery Management Plan Coordinator, coordinating management programs for Atlantic herring, coastal sharks, tautog and winter flounder. Ashton comes to us having recently completed a Master of Public Policy/Environmental Policy *and* a Master of Science, Sustainable Development and Conservation Biology from the University of Maryland. Prior to pursuing her dual masters, Ashton worked at Conservation International as the Senior Seascapes Coordinator, where she focused on multiple projects including the evaluation of the supply chain of yellowfin, bigeye, and skipjack tuna in the Eastern Pacific Ocean. Ashton earned her Bachelor of Science, Business and Marketing Management from Virginia Tech. Welcome aboard, Ashton!

Lead and Back-up Coordinators for Commission Managed Species

Species back-ups are available to help answer questions when the lead coordinator is out of the office or provide additional support during times of high activity.

Species	Lead Coordinator	Species Back-ups
American Eel	Mike Waine, mwaine@asmfc.org	Megan Ware
American Lobster & Jonah Crab	Megan Ware, mware@asmfc.org	Kirby Rootes-Murdy
Atlantic Herring	Ashton Harp, aharp@asmfc.org	Kirby Rootes-Murdy
Atlantic Menhaden	Mike Waine, mwaine@asmfc.org	Ashton Harp
Atlantic Striped Bass	Max Appelman, mappelman@asmfc.org	Mike Waine
Bluefish	Kirby Rootes-Murdy, krootes-murdy@asmfc.org	Ashton Harp
Coastal Sharks	Ashton Harp, aharp@asmfc.org	Max Appelman
Horseshoe Crab	Kirby Rootes-Murdy, krootes-murdy@asmfc.org	Megan Ware
Northern Shrimp	Max Appelman, mappelman@asmfc.org	Mike Waine
Shad & River Herring	Kirby Rootes-Murdy, krootes-murdy@asmfc.org	Ashton Harp
South Atlantic Species	Megan Ware, mware@asmfc.org	Max Appelman
Spiny Dogfish	Ashton Harp, aharp@asmfc.org	Max Appelman
Sturgeon	Max Appelman, mappelman@asmfc.org	Mike Waine
Summer Flounder, Scup, Black Sea Bass	Kirby Rootes-Murdy, krootes-murdy@asmfc.org	Megan Ware
Tautog	Ashton Harp, aharp@asmfc.org	Kirby Rootes-Murdy
Weakfish	Megan Ware, mware@asmfc.org	Mike Waine
Winter Flounder	Ashton Harp, aharp@asmfc.org	Mike Waine

N.C. Marine Fisheries Commission Rule Suspension Update- As of July 27, 2015
(In accordance with N.C. Division of Marine Fisheries Resource Management Policy 2014-2)

New Suspensions-Action Required
The following new suspensions occurred since the commission's May 2015 meeting. These suspensions are action items on the August 2015 agenda and are subject to approval:

- **The following portion of N.C. Marine Fisheries Commission Rule 15A NCAC 03M .0301 SPANISH AND KING MACKEREL is suspended:**
  Section (a) (1), which reads:
  (a) Spanish Mackerel:
  (1) It is unlawful to possess Spanish mackerel less than 12 inches fork length.

Suspension of portions of this rule allows the division to implement an 11 ½ inch fork length minimum size limit for Spanish mackerel in the commercial pound net fishery. The intent of this size limit change is to reduce seasonal dead discards in this fishery. It is requested that portions of the rule listed above be suspended to a date certain. This suspension was implemented in proclamation FF-36-2015, effective 12:01 A.M., Friday, July 3, 2015 until midnight, September 30, 2015.

Continuing Suspensions
The following rule suspensions have been approved on a continuing basis by the commission and no further action is required:

- **The following portion of N.C. Marine Fisheries Commission Rule 15A NCAC 03J .0103 GILL NETS, SEINES, IDENTIFICATION, RESTRICTIONS is suspended:**
  Section (i) (1), which reads:
  (i) For gill nets with a mesh length five inches or greater, it is unlawful:
  (1) To use more than 3,000 yards of gill net per vessel in internal waters regardless of the number of individuals involved.

Suspension of portions of this rule allows the division to decrease the total yardage of gill nets with a mesh length five inches or greater in order to manage the gill net fishery in accordance with the Federal Incidental Take Permits (ITPs) for sea turtles and Atlantic sturgeon. This rule has been approved to be suspended indefinitely.

- **The following portion of N.C. Marine Fisheries Commission Rule 15A NCAC 03M .0519 SHAD is suspended:**
  Paragraphs (a) and (b) which read:
  (a) It is unlawful to take American shad and hickory shad by any method except hook-and-line from April 15 through December 31.
  (b) It is unlawful to possess more than 10 American shad or hickory shad, in the aggregate, per person per day taken by hook-and-line or for recreational purposes.

- **The following portion of N.C. Marine Fisheries Commission Rule 15A NCAC 03Q .0107 SPECIAL REGULATIONS: JOINT WATERS is suspended:**
  Paragraph (4) which reads**:**
  (4) Shad: It is unlawful to possess more than 10 American shad or hickory shad, in the aggregate per person per day taken by hook-and-line.

Suspension of portions of these rules allows the division to change the season and creel limit of American shad under the management framework of the N.C. American Shad Sustainable Fishery Plan. These rules have been approved to be suspended indefinitely.

North Carolina
Division of Marine Fisheries

Fishery Management Plan Review

August 2015

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FISHERY MANAGEMENT PLAN UPDATE
BAY SCALLOP
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	November 2007
Amendments:	Amendment 1 – November 2010 Amendment 2 – February 2015
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	July 2005 – Began the original FMP a year earlier than planned due to concern limited abundance
Next Benchmark Review:	July 2020

The N.C. Bay Scallop Fishery Management Plan (FMP) was adopted in November 2007 by the North Carolina Marine Fisheries Commission. The FMP implemented prohibited take from 2006 to 2008 until an independent sampling indicator was established for re-opening in 2009. Amendment 1 of the N.C. Bay Scallop FMP was finalized in November 2010 to provide more flexibility (Adaptive Management) to open the fisheries as the bay scallop population recovers. Target indices were established from fishery independent data collected before the red tide event in 1984 and 1985 in Core, Back, and Bogue sounds. A separate sampling indicator for re-opening was developed in 2009 for Pamlico Sound. Amendment 2, adopted in February 2015, continues to use the abundance thresholds for opening the harvest season and defining the harvest levels for all areas, except areas south of Bogue Sound. Areas south of Bogue Sound will not be managed with a specific abundance opening level, but will be opened or remain closed based on North Carolina Division of Marine Fisheries' (NCDMF) judgement from sampling in this region. Expanded sampling is to occur in all areas including areas south of Bogue Sound and improve the reliability of the data for the recreational scallop harvest. For private culture and enhancement the current management strategy is to modify rules for bottom culture and aquaculture operations to be consistent with rules for other shellfish species, and establish a pilot program with the Shellfish Research Hatchery to distribute cultured seed on private bottoms and contingent on results to distribute seed on private bottom, expand the pilot program to include public bottom.

Management Unit

Includes the bay scallop (*Argopecten irradians)* and its fisheries in all waters of coastal North Carolina.

Goal and Objectives

The goal of the North Carolina Bay Scallop Fishery Management Plan is to implement a management strategy that restores the stock, maintains sustainable harvest, maximizes the social and economic value, and considers the needs of all user groups. To achieve this goal, it is recommended that the following objectives be met:

1. Develop an objective management program that restores and maintains sustainable harvest.

2. Promote the protection, restoration, and enhancement of habitats and water quality necessary for enhancing the fishery resource.

3. Identify, enhance, and initiate studies to increase our understanding of bay scallop biology, predator/prey relationships, and population dynamics in North Carolina.

4. Investigate methods for protecting and enhancing the spawning stock.

5. Investigate methods and implications of bay scallop aquaculture.

6. Address social and economic concerns of all user groups.

7. Promote public awareness regarding the status and management of the North Carolina bay scallop stock.

STATUS OF THE STOCK

Stock Status

North Carolina's bay scallop stocks are listed as a species of concern in the annual Stock Status Report because of the population declines. Annual commercial landings of bay scallops show large fluctuations through time and are presumed to be driven by changing climate conditions (i.e., winter freezes, high freshwater runoff), predation, and red tide. Therefore, bay scallops are vulnerable to overharvest because of these different factors affecting their survival.

Stock Assessment

Independent data have been collected by the NCDMF since 1984 and consistently collected since 1998 to evaluate recruitment into the population and recruitment into the fishery for the current fishing season. Analyses of these data have demonstrated trends between NCDMF independent data and landings data from the following year. The long term landings data (1972-2005) most likely reflected population abundance because harvest was allowed to continue until scallop densities reached levels below those that make the fishing economically viable (Peterson and Summerson 1992). However, during 2006 and after the implementation of the 2007 N.C. Bay Scallop FMP, a harvest prohibited take went into effect in order to rebuild the stock and until a standardized catch per unit effort could be met (NCDMF 2007). Therefore using landings data as an indicator is no longer an effective tool to indicate population size. Data on scallop abundance from fishery independent sampling are evaluated annually and standardized scallop population level indicators were first established as progressive triggers for opening the harvest season in 2010 (NCDMF 2010). These triggers are based on NCDMF

sampling that occurred between the pre-red tide months of October and December in 1984 and 1985 for Back, Bogue, and Core sounds and in post-red tide January 2009 in Pamlico Sound (Table 1). This time period for estimating abundance makes the most sense since it is less likely for the two year-classes to be selecting to the sampling gear. Areas south of Bogue Sound will not be managed with a specific abundance opening level, but will be opened or remain closed based on NCDMF judgement from sampling in this region (NCMDF 2015). These progressive triggers allow for flexibility to open the fisheries as the bay scallop population recovers and determines harvest limits based on 50%, 75%, and 125% of the natural log of the Catch Per Unit Effort (lnCPUE) target (Tables 2 and 3).
Fishery independent sampling shows that most tows have small or zero catch, while only a few samples exhibit large catches producing a lognormal distribution, which is usual for most fishery independent data. The natural log (ln) of the catch per unit effort (lnCPUE), measured as the number of scallops per minute (dredges) and number of scallops per meter squared (quadrat), is taken to avoid bias towards occasional large catches. A constant of 0.1 was added to all catches so that tows/quadrats with zero catches can be included in the estimates of the mean since the natural log of zero is undefined. All tows/quadrats taken at a station are averaged to get a single value for each station and are referred to as a sample. This is done to avoid weighting some tows/quadrats to each station more than others because the number of tows/quadrats was not always consistent in duration. Each sample is averaged to get the estimated mean lnCPUE and standard deviation for the October-December time period for all areas to produce indices of abundance.

Trends in the past ten years show bay scallop abundance is very low in all regions which is also a reflection in landings when harvest is opened (Figures 1, 2, and 3). Since the inception of the harvest opening index of abundance the season has only opening three years in specific regions at the lowest allowed harvest levels. Two of the three open harvest seasons saw very little catch (Figure 4). Expanding the sampling coverage or number of stations in all areas is recommended in Amendment 2 of the FMP to improve estimates of bay scallop abundance. As bay scallops expand and retract from year to year, broader coverage of these areas will help identify more precisely what is happening to the population before entering the harvest season.

STATUS OF THE FISHERY

Current Regulations

The North Carolina Marine Fisheries Commission adopted an adaptive management strategy to open waters to bay scallop harvest with specific progressive triggers for Bogue, Core, Back, and Pamlico sounds (Table 1). Areas south of Bogue Sound will not be managed with a specific abundance opening level, but will be opened or remain closed based on NCDMF judgement from sampling in this region. Expanded sampling is to occur in all areas including areas south of Bogue Sound and improve the reliability of the data for the recreational scallop harvest. The triggers allow limited harvest when NCDMF sampling indicates bay scallop abundance in a given region is at 50 percent of the target. Trip limits and fishing days for commercial harvest will progressively increase if sampling showed bay scallop abundance was at 75 percent and 125 percent of the target levels established within each region (Table 2). Recreational daily harvest limits and open days remain the same at all abundance levels (Table 3).

The season can only occur from the last Monday in January through April 1st and there is no minimum size limit for both the commercial and recreational user groups. Specific trip limits, number of days to harvest, and specific gear allowances are implemented within the open

season. Both the opening of the season and the harvest restrictions within the open season are based on NCDMF fishery independent sampling abundance levels determining the levels of harvest (NCDMF 2015). There was no open harvest season for bay scallops in 2014 because abundance levels were too low to meet the threshold for opening the season.

Commercial Landings

Bay scallop abundance and harvest have widely fluctuated since landings have been recorded (MacKenzie 2008). Landings are closely linked to weather and other environmental factors. Landings ranged from a peak of approximately 1.4 million pounds of meats in 1928 when North Carolina led the nation in scallop production, to a low of zero landings in 2005 even though there was an open harvest season. Landings have been virtually non-existent since 2005.

The red tide (toxic dinoflagellate) event of late autumn 1987 and early 1988 caused mortality to approximately 21% of the adult scallops in Bogue and Back sounds and reduced recruitment of juvenile scallops the following spring to only 2% of normal (the mean of the previous three red tide-free years)(Summerson and Peterson 1990). This event has had lasting impacts to the bay scallop fishery and repopulation of the Bogue, Back, and Core sound regions has not fully occurred. Landings in recent years have been extremely low due to the failure of scallop stocks to recover after the red tide event, fishing pressure, and predation.

A moratorium on harvest occurred from 2006 to 2008 through the 2005 FMP (NCDMF 2007). Amendment 1 initiated abundance estimates to determine opening the fishery and at what levels harvest would occur based on the abundance estimates by region (NCDMF 2010). An open harvest commercial and recreational harvest season occurred in Core and Pamlico sounds in 2009, and in Pamlico Sound in 2010 (less than 500 pounds of meat (Figure 4). Bogue Sound and all areas south of Bogue Sound were opened to harvest to the NC/SC state line in internal waters in 2014 (less than 1,500 pounds of meat) (Figure 4).

Recreational Landings

Unknown

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Currently, the only data available for the stock in all areas are the commercial landings and associated effort from the Trip Ticket Program. There are no fishery dependent sampling programs that collect information on the commercial or recreational fisheries for bay scallops.

Fishery-Independent Monitoring

Independent sampling of bay scallops for fisheries management information has been conducted since 1975, and has varied from monthly examinations at twenty stations to seasonal monitoring at fewer locations.

Currently sampling occurs 4 times a year in Pamlico, Core, Back, Bogue and areas south of Bogue Sound during the second or third week of the month in January, April, July, and October. Standardized sampling at fixed stations occur quarterly (January, April, July, and October) in

Pamlico Sound using a m^2 quadrat and a bay scallop dredge in Core, Back, Bogue, and areas south of Bogue Sound. A core set of 8 stations are towed 3 times for two minutes with a scallop dredge in Core, Back, and Bogue sounds and additional stations are also sampled 3 times for two minutes where scallops have historically been found. The core set stations were selected based on historical information from Program 697 of traditionally abundant areas in Core, Bogue, and Back sounds. A set of 3 core stations, two in New River and 1 in Topsail Sound, are towed 3 times for two minutes with a scallop dredge beginning in 2009. Stations were selected in New River and Topsail Sound based on scouting the areas for scallops and input from fishermen and the public that use the waters regularly. Sampling also occurs at 5 core stations and 5 non-core stations off Hatteras Island. Scallops are collected with a rake or by hand for 10, meter-square (m^2) samples within the station in Pamlico Sound. The PVC m^2 quadrat is randomly placed 10 separate times within the area. Beginning in 2015, after adoption of Amendment 2 of the FMP, more stations will be sampled in most areas and especially in areas south of Bogue Sound. Catch per unit effort (lnCPUE) is defined as the natural logarithm, of the number of scallops (juvenile and adult combined) per 1 minute tow if a dredge is used or per quadrat. Additional stations (non-core) are sampled in most areas dependent on scallop abundance at the given time of year.

Most tows/quadrats have small or zero catch, while only a few samples exhibit large catches producing a lognormal distribution, which is usual for most fishery independent data. The natural log (ln) of the catch per unit effort (lnCPUE), measured as the number of scallops per minute (dredges) and number of scallops per meter squared (quadrat), is taken to avoid bias towards occasional large catches. A constant of 0.1 was added to all catches so that tows/quadrats with zero catches can be included in the estimates of the mean since the natural log of zero is undefined. All tows/quadrats taken at a station are averaged to get a single value for each station and are referred to as a sample. This is done to avoid weighting some tows/quadrats to each station more than others because the number of tows/quadrats was not always consistent in duration. Each sample is averaged to get the estimated mean lnCPUE and standard deviation for the October-December time period for all areas to produce indices of abundance (Figures 1 and 2).

Trends in the past ten years show bay scallop abundance is very low in all regions which is also a reflection in landings when harvest is opened (Table 4; Figure 1).

MANAGEMENT STRATEGY

The current management strategy for the bay scallop fisheries is to allow the NCDMF Director to open a region to limited bay scallop harvest when sampling indicates bay scallop abundance is at 50 percent of the natural logarithm of the Catch Per Unit Effort (lnCPUE) level it was in 1984-85 in the main harvest areas (Core, Bogue and Back sounds)(Table1). A separate sampling indicator for re-opening was developed in 2009 for Pamlico Sound (Table 1). Areas south of Bogue Sound will not be managed with a specific abundance opening level, but will be opened or remain closed based on NCDMF judgement from sampling in this region. Expanded sampling is to occur in all areas including areas south of Bogue Sound and improve the reliability of the data for the recreational scallop harvest. For private culture and enhancement the current management strategy is to modify rules for bottom culture and aquaculture operations to be consistent with rules for other shellfish species, and establish a pilot program with the Shellfish Research Hatchery to distribute cultured seed on private bottoms and contingent on results to distribute seed on private bottom, expand the pilot program to include public bottom.

Trip limits and fishing days will progressively increase if sampling shows bay scallop abundance is at 75 percent or 125 percent lnCPUE levels (Tables 2 and 3). The open season may only occur from the last Monday in January through April 1 to ensure spawning is complete and the economic yield is at an optimum for fishermen. Improving data collection on the biology, harvest, environment, enhancement, and socioeconomic aspects relative to bay scallops is recommended throughout Amendment 2 to provide more comprehensive information for assisting in future management decisions. See Table 5 for current management strategies and the status on the implementation of each.

Bay scallop abundance is still quite low (Figures 1, 2, and 3). Harvest openings have only occurred three times since the initiation of the original FMP which was scheduled one year earlier in development due to concern for the stock.

MANAGEMENT AND RESEARCH NEEDS

The status on the implementation of the research recommendations is unknown or incomplete at this time since Amendment 2 was just adopted in February 2015. See Table 5 for current management strategies and the status on the implementation of each.

The following research recommendations were compiled from the Status of the Stock Section 6.0, the Private Culture, Aquaculture, and Stock Enhancement Section 9.0, the Socioeconomic Aspects of the Bay Scallop Fishery Section 10.0, and the Environmental Factors Section 11.0 and issue papers listed in the Principal Issues and Management Options Section 12.0. The list below is presented in order as it would appear in draft Amendment 2 and the section or issue paper they come from is identified. The PDT reviewed and prioritized the research recommendations in accordance to the suggestion by the Biological Review Team research committee. The AC reviewed the draft research recommendations and provided input to prioritize these recommendations as well. The Management Review Team determined the final ranking. If there were differences between the PDT and AC priorities then the middle priority level was chosen between the two, if there was only one level difference the AC priority was chosen. If one group chose to delete the research recommendation but the other prioritized the item then the research recommendation remained with the ranking. The prioritization of each research recommendation is designated either a HIGH, MEDIUM, or LOW standing. A low ranking does not infer a lack of importance but is either already being addressed by others or provides limited information for aiding in management decisions. A high ranking indicates there is a substantial need, which may be time sensitive in nature, to provide information to help with management decisions.

Proper management of the bay scallop resource cannot occur until some of these research needs are met (status of need provided in parenthesis):

- Develop better methods to quantify the population including the means to have more precise measures of spatial and temporal variability at both within and between Sound scales - HIGH (Ongoing through NCDMF fishery independent sampling)
- Collect information on larval recruitment and spat settlement - LOW (needed)
- Genetically identify how many separate bay scallop stocks exist in North Carolina - MEDIUM (needed)
- Examine the effects of scallop culture and oyster cultch on seagrass density - MEDIUM (needed)

- Perform socioeconomic surveys on commercial participants to determine specific business characteristics, the economics of working in the fishery, which issues are important to the participants, attitudes towards management of the fishery and general demographic information - LOW (needed)
- Determine a method to collect socioeconomic information on processors – LOW (needed)
- Collect information on the economic impact and value of the recreational bay scallop fishery - MEDIUM (needed)
- Determine the spatial and biological characteristics of SAV beds that maximize their ecological value to the bay scallop for enhancement or conservation purposes – LOW (needed)
- Develop techniques to enhance SAV habitat to promote scallop survival – LOW (needed)
- Conduct research to evaluate the role of shell hash and shell bottom in bay scallop recruitment and survival, particularly where SAV is absent - LOW (needed)
- Determine the concentrations of EDCs in known bay scallop habitats and impacts on bay scallops – LOW (needed)
- Assess the impacts of nutrient loading and algae on SAV and the life history of bay scallops - MEDIUM (needed)
- Determine levels of TSS, turbidity, chlorophyll *a,* and other parameters necessary to achieve desired water clarity and investigate the feasibility of a water quality standard for light attenuation required for SAV growth – LOW (needed)
- Complete a more comprehensive study on treading and impacts of treading on juvenile and adult bay scallops – HIGH (needed)
- Survey fishermen that use a commercial license for personal consumption – LOW (Ongoing through NCDMF)
- Collect more information on the value of the spring spawn to the population – MEDIUM (needed)

FISHERY MANAGEMENT PLAN RECOMMENDATION

Recommend maintain the current timing of the Benchmark Review. Amendment 2 of the N.C. Bay Scallop FMP was just adopted in February 2015 with rule changes in effect May 1, 2015. Suggested statute change to G.S. 113-168.4 is also part of Amendment 2 with the intention to take this suggested change to legislators at their next short session, otherwise leaseholders who wish to grow out bay scallops reared in an aquaculture operation cannot acquire seed for further grow out without this change.

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TABLES

Table 1. Target and progressive triggers based on the lnCPUE (natural log of the number of scallops per 1 minute tow) for the October – December 1984-1985 time period for Back, Bogue, and Core sounds. Target and progressive triggers based on the lnCPUE (natural log of the number of scallops per meter squared) for Pamlico Sound based on sampling in January 2009.

	Pamlico Sound	Core Sound	Back Sound	Bogue Sound
Target lnCPUE	-0.18	1.72	2.02	2.33
Progressive trigger 50%	-0.27	0.86	1.01	1.17
Progressive trigger 75%	-0.23	1.29	1.52	1.75
Progressive trigger 125%	-0.14	2.15	2.53	2.91

Table 2. Adaptive management measures for opening the bay scallop commercial fishery as the selected management strategy of the Marine Fisheries Commission. The harvest levels are based on progressive triggers derived from the lnCPUE1984-1985 (Oct-Dec) target indicators for Core, Bogue and Back sounds and the lnCPUEJan 2009 target indicator for Pamlico Sound.

Progressive triggers and target	Trip limit	Days open in the week	Allowed gears	Season
Less than 50% of target	No allowed harvest			
50% or greater of target but less than 75% of target	5 bushels per person per day not to exceed 10 bushels per fishing operation	Mon and Wed	By hand, hand rakes, hand tongs, dip net, and scoops	Last Monday in January to April 1st
75% or greater of target but less than 125% of target	10 bushels per person per day not to exceed 20 bushels per fishing operation	Mon, Tues, Wed, and Thur	By hand, hand rakes, hand tongs, dip net, and scoops	Last Monday in January to April 1st
	10 bushels per person per day not to exceed 20 bushels per fishing operation	Mon and Wed	Bay scallop dredges as described by rule 15A NCAC 03K. 0503	Delay opening until first full week in March after hand harvest removes scallops from shallow waters to April 1st
125% or greater of target	15 bushels per person per day not to exceed 30 bushels per fishing operation	Mon, Tues, Wed, and Thur	By hand, hand rakes, hand tongs, dip net, and scoops	Last Monday in January to April 1st
	15 bushels per person per day not to exceed 30 bushels per fishing operation	Mon and Wed	Bay scallop dredges as described by rule 15A NCAC 03K. 0503	Delay opening until the third full week in February after hand harvest removes scallops from shallow waters to April 1st

Table 3. Adaptive management measures for opening the bay scallop recreational fishery as the selected management strategy by the Marine Fisheries Commission. The harvest levels are based on progressive triggers derived from the lnCPUE1984-1985 (Oct-Dec) target indicators for Core, Bogue and Back sounds and the lnCPUEJan 2009 target indicator for Pamlico Sound.

Progressive triggers and target	Trip limit	Days open in week	Allowed gears	Season
Less than 50% of target	No allowed harvest	Seven days a week	By hand, hand rakes, hand tongs, dip net, and scoops	Last Monday in January to April 1st
50% or greater of target	1/2 bushel per person per day not to exceed 1 bushel per recreational fishing operation			

Table 4. Fishery Independent sampling annual lnCPUE and standard error. Pamlico Sound sampling is conducted in January with a m^2 quadrat, all other areas are sampled in October with a scallop dredge.

	Pamlico Sound		Core Sound		Back Sound		Bogue Sound		South	
Year	LnCPUE	Standard Error	lnCPUE	Standard Error	lnCPUE	Standard Error	lnCPUE	Standard Error	lnCPUE	Standard Error
2006			-2.3026	0.0000	-1.5419	0.4975	-1.0241	0.3366		
2007			-1.2432	0.4958	-2.0040	0.2986	-1.5685	0.3366		
2008			2.9378	0.3485	-1.4067	0.4006	1.2051	0.5700		
2009	-0.1766	0.7908	-1.0071	0.4207	-1.3057	0.4549	1.3421	0.2676	0.9372	0.7512
2010	0.3238	0.6701	-0.5450	0.3887	-1.1036	0.5362	-1.1168	0.5366	-2.3026	0.0000
2011	-1.9941	0.1273	-0.6323	0.5705	0.8260	0.2581	0.3793	0.3429	-1.7652	0.3704
2012	-1.6620	0.2626	-1.7053	0.3777	-0.5607	0.7793	1.1833	0.2450	-0.9060	0.3599
2013	-1.2115	0.1091	-2.3026	0.0000	-2.3026	0.0000	-0.4116	0.7131	-1.1949	0.4186
2014	-1.5395	0.3130	-2.0040	0.2986	-1.0071	0.4207	-2.0040	0.2013	-1.6380	0.3374
2015	-1.8590	0.3865								

Table 5. Summary of the management strategies and their implementation status from Amendment 2 of the Bay Scallop Fishery Management Plan.

Management Strategy	Implementation Status
ENVIRONMENTAL CONCERNS	
Status quo (manage fishing gear based on scallop densities)	No action required
Continue to support CHPP recommendations that enhance protection of existing bay scallop habitat	No action required; Already support the CHPP
Support programs that enhance bay scallop habitat by planting sea grass or other suitable settlement substrate	No action required; Already support CHPP
Identify and designate SHAs that will enhance protection of the bay scallop	Existing authority through CHPP implementation plan
Remap and monitor SAV coverage in North Carolina to assess distribution and change over time.	Existing authority through CHPP implementation plan
Restore coastal wetlands to compensate for previous losses and enhance water quality conditions for the bay scallop	Existing authority through CHPP implementation plan
Work with CRC to revise shoreline stabilization rules to adequately protect riparian wetlands and shallow water habitat and significantly reduce the rate of shoreline hardening	Existing authority through CHPP implementation plan
Develop and implement a comprehensive coastal marina and dock management plan and policy to minimize impacts to SAV and other fish habitats	Existing authority through CHPP implementation plan
Evaluate dock criteria siting and construction to determine if existing requirements are adequate for SAV survival and growth, and modify if necessary	Existing authority through CHPP implementation plan
Assess the distribution, concentration, and threat of heavy metals and other toxic contaminants in freshwater and estuarine sediments and identify the areas of greatest concern to focus water quality improvement efforts	Existing authority through CHPP implementation plan
Shallow areas where trawling is currently allowed should be re-examined to determine if additional restrictions are necessary	Existing authority through CHPP implementation plan
Accelerate and complete mapping of all shell bottom in coastal North Carolina	Existing authority through CHPP implementation plan
Improve methods to reduce sediment and nutrient pollution from construction sites, agriculture, and forestry	Existing authority through CHPP implementation plan
Reduce impervious surfaces and increase on-site infiltration of stormwater through voluntary or regulatory measures	Existing authority through CHPP implementation plan
Provide more incentives for low-impact development	Existing authority through CHPP implementation plan
Aggressively reduce point source pollution from wastewater through improved inspections of wastewater treatment facilities, improved maintenance of collection infrastructure, and establishment of additional incentives to local governments for wastewater treatment plant upgrading	Existing authority through CHPP implementation plan
Aggressively reduce point and non-point nutrient and sediment loading in estuarine waters, to levels that will sustain SAV habitat, using regulatory and non-regulatory actions	Existing authority through CHPP implementation plan

Management Strategy	Implementation Status
ENVIRONMENTAL CONCERNS	
Provide proper disposal of unwanted drugs, reduce insecticide and heavy metal run-off, and develop technologies to treat wastewater for antibiotics and hormones	Existing authority through CHPP implementation plan
Discourage use of detergents in coastal waters, especially detergents with antimicrobial components	Existing authority through CHPP implementation plan
INSUFFICIENT DATA	
Support improving the reliability of the data for the recreational scallop harvest	Dependent on available funding to improve current survey design
MANAGEMENT	
Eliminate the August 1 through September 15 season open period in rule	Rule change required to 15A NCAC 03K .0501; Rule change completed on May 1, 2015
Expand sampling in all regions and manage harvest conditionally in areas south of Bogue Sound until adequate sampling can determine a harvest trigger for management.	Existing authority
Continue current progressive triggers with adaptive harvest levels in all areas, except areas south of Bogue Sound, and modify harvest management measures as shown in Table 12.7 and Table 12.8 in the issue paper. And continue to improve the statistical rigor of the abundance index.	Existing proclamation authority.
Keep dredges at the 75% trigger harvest level in Table 12.7	Existing proclamation authority.
Modify the daily commercial harvest possession limit in Rule 15A NCAC 03K .0501 to a quantity of no more than 15 standard U.S. bushels per person per day not to exceed 30 standard U.S. bushels in any combined commercial fishing operation per day to be consistent with the adaptive management measures trip limits.	Requires rule change to rule 15A NCAC 03K .0501; Rule change completed on May 1, 2015.
Exempt bay scallop harvest from leases from the regular season and harvest limits	Requires rule change to rules 15A NCAC 03K .0111, 03K .0206, 03K .0303, 03K 0501, 03K .0502, 03K .0507, 03K .0508, 03O .0501; Rule changes completed on May 1, 2015
Support an exemption from G.S. 113-168.4 (b) (3) when the sale is to lease or Aquaculture Operations permit holders for further rearing	Requires statutory change to G.S. 113-168.4; NCDMF will take this suggested change to legislators at the next short session.
STOCK ENHANCEMENT	
Establish a pilot program with the Shellfish Research Hatchery to distribute cultured seed on private bottoms	Will need to start communicating with Shellfish Hatchery staff and interested private culturists interested in establishing this pilot work
Contingent on results to distribute seed on private bottom, expand the pilot program to include public bottom	Dependent on results from previous management strategy.

FIGURES

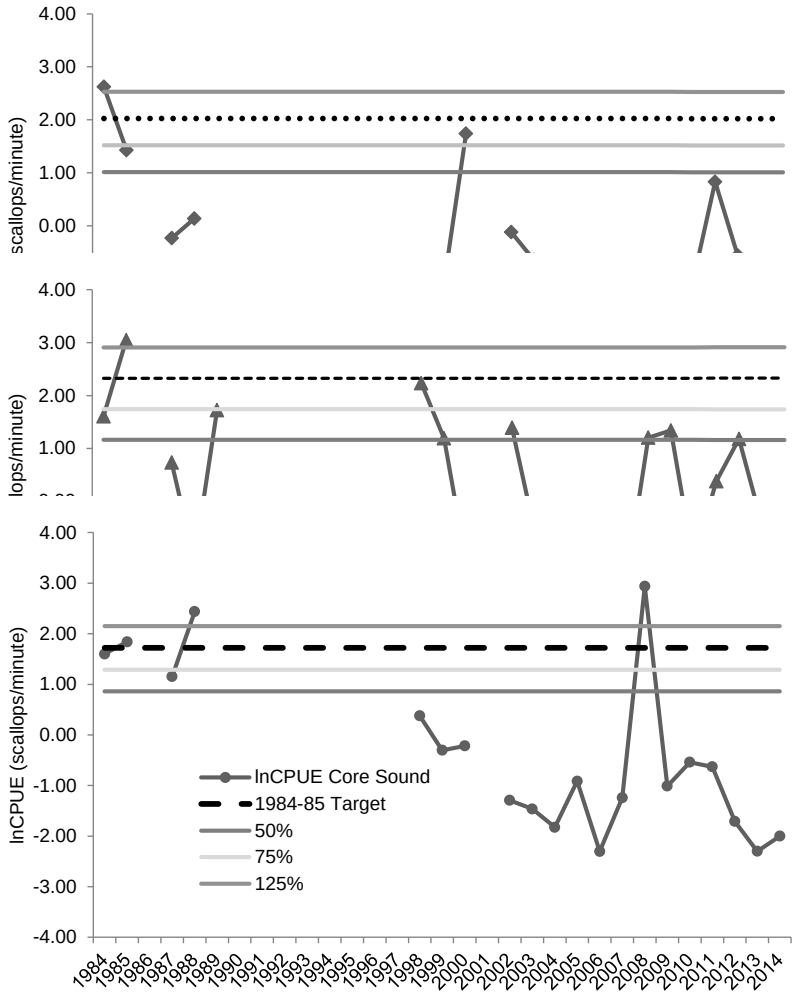


Figure 1. The mean number of scallops (lnCPUE)(scallops/minute) for Back, Bogue, and Core sounds during the October-December sampling time period and average lnCPUE (target) for the 1984-1985 period showing progressive triggers at 50%, 75%, and 125% of the target. Year indicates the sampling year which is used to determine the harvest season for the next calendar year.

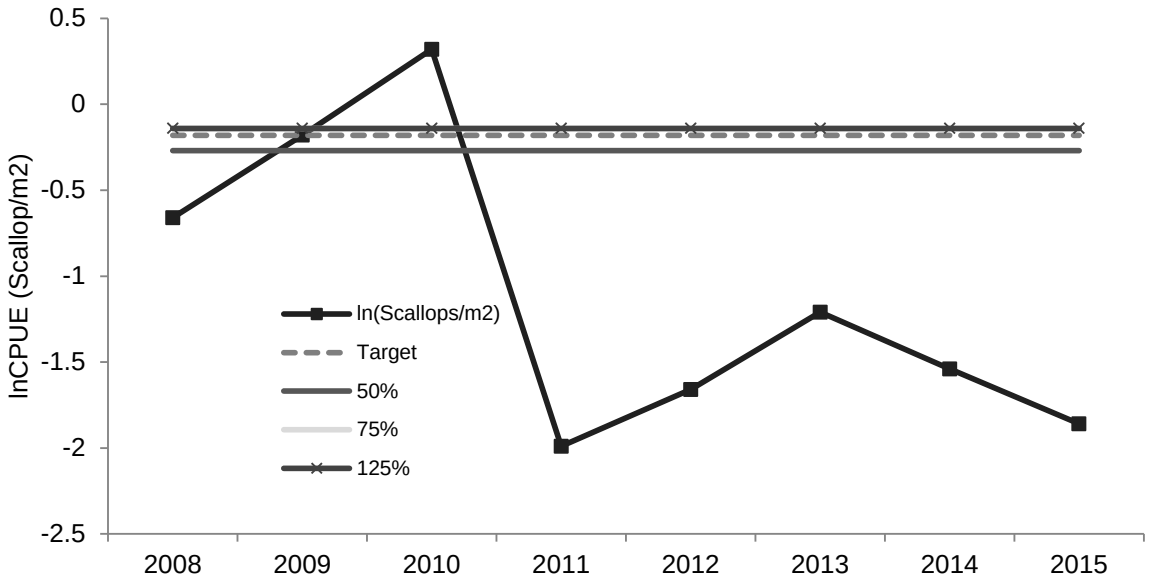


Figure 2. The mean number of bay scallops, lnCPUE (ln(scallops/m^2)), for Pamlico Sound during the January sampling time period and target for the January 2009 period showing progressive triggers at 50%, 75%, and 125% of the target. Year indicates the sampling year which is used to determine the harvest season for the same calendar year.

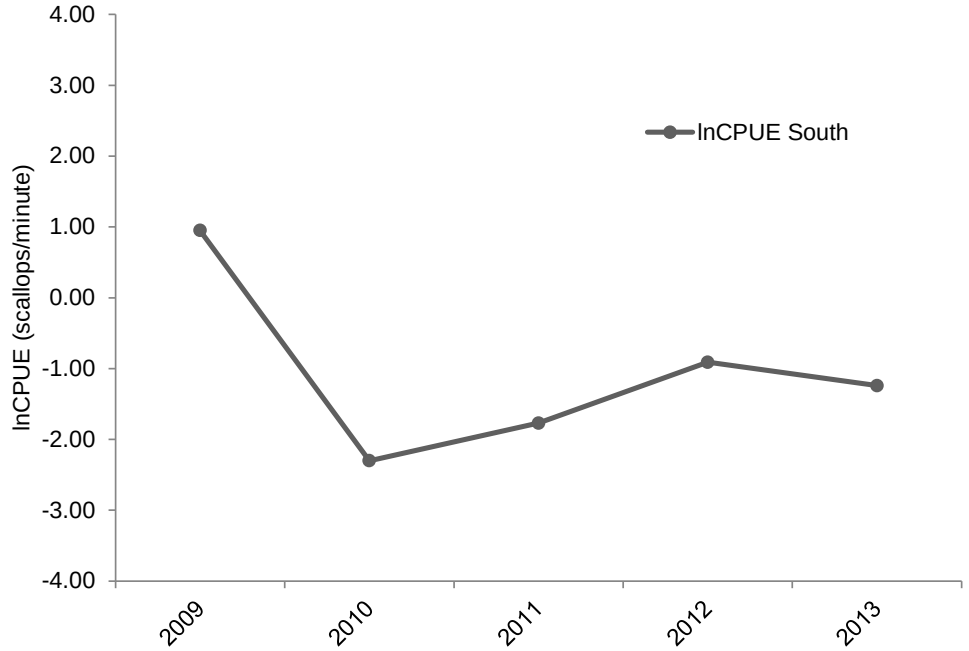


Figure 3. The mean number of scallops (lnCPUE)(scallops/minute) for areas south of Bogue Sound in October, 2009-2014. Target opening estimates and progressive triggers are not defined for this region until sampling is expanded and a longer time series is established.

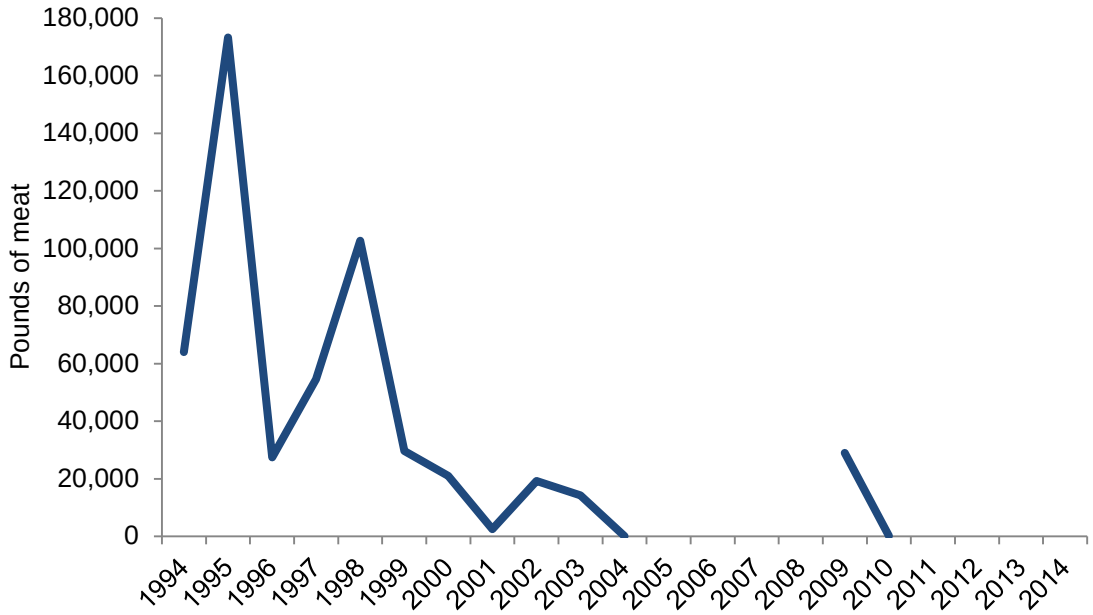


Figure 4. Bay scallop landings (pounds of meat) in North Carolina, 1994-2014. Landings occurred in 2010 and 2013 but are not evident in the figure due to the scale required to show the range of landings for the time series.

FISHERY MANAGEMENT PLAN UPDATE
BLUE CRAB
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	December 1998
Amendments:	December 2004, November 2013
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	November 2018

The original Blue Crab Fishery Management Plan (FMP) was adopted in December 1998. The plan adopted several management changes including: 1) requiring sinking lines to be used on all crab pot buoys, 2) prohibited commercial gears (except attended gill nets) in crab spawning sanctuaries from March 1 through August 31, 3) prohibited baiting peeler pots except with live legal male blue crabs, 4) repealed the exemption for culling peelers before reaching shore in the hard crab fishery, 5) prohibiting the possession of white line peelers from June 1 through September 30, 6) changed the unattended pot rule from 10 days to 7 days, 7) prohibiting setting pots in any navigation channel marked by State or Federal agencies, 8) modified crab pot area regulations to use depth instead of distance from shore, 9) implemented marking requirements for recreational pots, 10) defined collapsible traps as non-commercial gear, and 11) established a permit for shedding operations (NCDMF 1998).

Amendment 1 was adopted in December 2004. The amendment implemented several management changes including: 1) establishing a 6.75-inch maximum size limit for mature females from September 1 through April 30 if the spawner index fell below the threshold for two consecutive years, 2) establishing a 5.25-inch maximum size limit for female peeler crabs from September 1 through April 30 if the spawner index fell below the threshold for two consecutive years, 3) prohibiting the sale of white-line peelers but allow possession by licensed peeler operations and requiring white-line peelers to be kept separate from pink and red-line peelers, 4) extending the pot cleanup period by nine days, 5) change the unattended pot rule from 7 days to 5 days, 6) requiring a 4-inch stretch mesh tail bag for crab trawls in western Pamlico Sound (including the Pamlico, Pungo, Bay, and Neuse rivers), 7) separate hard and peeler crab trawl landings on trip ticket, 8) modifying channel net rule to incorporate limited blue crab bycatch provisions identical to those for shrimp trawls, 9) modifying user conflict rule to resolve user conflicts on a regional basis, 10) rule change to allow crab pots in all designated long haul areas in the Hyde, Beaufort, and Pamlico counties, 11) modifying the dates for designated crab pot areas from May 1 through October 31 to June 1 through November 30, 12) change

designated pot area boundary description to a standardized 6 foot depth contour in many areas, and 13) prohibit the use of trawls in designated pot areas (NCDMF 2004).

Amendment 2 was adopted in November 2013. The amendment implemented several management changes including: 1) repealing the spawner index trigger and replacing it with adaptive management framework based on the Traffic Light Stock Assessment, 2) open long haul areas in the Pungo River to pots, 3) add Lower Broad Creek to non-pot areas in rule, 4) modify crab dredging rule to conform to current harvest management, 5) incorporate Pamlico Sound four-inch crab trawl line into rule, 6) redefine criteria for exempting escape rings in crab pots from the 1½-inch pot mesh size to unbaited pots and pots baited with a male crab, 7) repeal proclamation authority that allowed for the exemption of escape ring requirement to allow harvest of peeler crabs, 8)adopt no trawl line in Pamlico Sound and Newport River boundary in rule as new boundary for areas where closure of escape rings to take small mature female crabs is allowed, 9) modify trawl nets rule to identify Pamlico, Back, and Core sounds as areas that can open to peeler trawling by proclamation, 10) modify rule to clearly state the intent of the exceptions, culling tolerance, and separation requirements for various crab categories, and 11) establish proclamation authority to require terrapin excluders in crab pots and establish a framework for developing criteria and terrapin excluder specifications (NCDMF 2013).

Management Unit

The management unit includes the blue crab (*Callinectes sapidus*) and its fisheries in all coastal fishing waters of North Carolina.

Goal and Objectives

The goal of the North Carolina Blue Crab FMP is to manage the blue crab fishery in a manner that promotes its ecological and economic value, and the long-term viability of the resource through sustainable harvest. The following objectives will be utilized to achieve this goal.

1. Utilize a management strategy that provides resource protection and sustainable harvest, promotes blue crab ecological and economic value, provides opportunity for resource utilization, and considers the needs of all users.

2. Promote harvesting practices that minimize waste of the resource and environmental damage.

3. Promote the protection, restoration, and enhancement of habitats and environmental quality necessary for the perpetuation of the blue crab resource.

4. Maintain a clear distinction between conservation goals and allocation issues.

5. Minimize conflicts among and within user groups, including non-crabbing user groups.

6. Identify and promote research to improve the understanding and management of the blue crab resource.

7. Promote education and public information to help users understand the causes and nature of problems for blue crabs in North Carolina, its habitats and fisheries, and the rationale for efforts to address resource management.

STATUS OF THE STOCK

Stock Status

Results of the current stock assessment suggest the North Carolina blue crab stock is not overfished. The stock status of blue crabs is still considered to be of "Concern" because of declining landings and evidence of reduced adult and recruit abundance in the traffic light. Even though there is now a more robust assessment of the stock condition, overfishing status cannot be determined at this time.

Stock Assessment

The Traffic Light method was used to assess the blue crab stock in 2011. The Traffic Light Stock Assessment method is capable of synthesizing a variety of information to provide a description of the stock condition. The nature of the Traffic Light method does not allow for a quantitative assessment of sustainable harvest for the North Carolina blue crab stock since overfishing cannot be calculated.

The blue crab stock is considered overfished when the proportion of red in the production characteristic of the Traffic Light method is greater than or equal to the third quartile (>0.75) for three consecutive years. Based on this definition, the results of the Traffic Light through 2014 suggest the North Carolina blue crab stock is not overfished.

Though the overfished definition is based only on the production characteristic, the adult abundance and recruit abundance characteristics are evaluated annually for warning signs that the stock may be approaching an unfavorable state. If a series of negative trends is evident in the adult abundance and production characteristics for three consecutive years, management action may be taken to reduce the unfavorable condition of the stock. Only the adult abundance and production characteristics will be utilized to trigger management actions; the recruit abundance characteristic will be used as a supplement to further direct conservation management actions, if deemed necessary. A review by the Crustacean Advisory Committee would be maintained to consider management options, evaluate their merits, and gain approval by the North Carolina Marine Fisheries Commission (NCMFC) before the Director's proclamation authority (expanded under the adaptive management framework) would be used to implement any changes to the fisheries.

The NCMFC preferred adaptive management strategy for blue crabs (Table 1) relies on the Traffic Light Stock Assessment as the tool to provide information on the relative condition of the stock. The base years (1987 to 2009) for assigning the signals in the Traffic Light Stock Assessment will remain constant until the next amendment of the FMP. The Traffic Light Stock Assessment will be updated annually by July of each year.

STATUS OF THE FISHERY

Current Regulations

General Statutes

All management authority for North Carolina's blue crab fishery is vested in the State of North Carolina. Statutes that have been applied to the blue crab fishery include:

- Definitions relating to resources. G.S.113-129.
- Definitions relating to activities of public. G.S.113-130.
- Jurisdiction of fisheries agencies. G.S.113-132.
- It is unlawful for any person without the authority of the owner of the equipment to take fish from said equipment. G.S. 113-268 (a).
- It is unlawful for any vessel in the navigable waters of the State to willfully, wantonly, and unnecessarily do injury to any seine, net or pot. G.S. 113-268 (b).
- It is unlawful for any person to willfully destroy or injure any buoys, markers, stakes, nets, pots, or other devices or property lawfully set out in the open waters of the state in connection with any fishing or fishery. G.S. 113-268 (c).

Marine Fisheries Commission Rules

The North Carolina Marine Fisheries Commission has established several rules that directly govern the harvest of blue crabs. Below are rules and excerpts from rules that directly affect the blue crab fishery. The rules below do not cover any gear, area, or other rules which may impact the blue crab fishery. As regulations may change, please contact the North Carolina Division of Marine Fisheries (NCDMF) for the most current regulations.

Definitions

Blue Crab Shedding: The process whereby a blue crab emerges soft from its former hard exoskeleton. A shedding operation is any operation that holds peeler crabs in a controlled environment. A controlled environment provides and maintains throughout the shedding process one or more of the following: (i) food, (ii) predator protection, (iii) salinity, (iv) temperature controls, or (v) water circulation, utilizing technology not found in the natural environment. A shedding operation does not include transporting pink or red-line peeler crabs to a permitted shedding operation. 15A NCAC 03I .0101 (2) (c).

Peeler Crab: A blue crab that has a soft shell developing under a hard shell and having a white, pink, or red-line or rim on the outer edge of the back fin or flipper. 15A NCAC 03I .0101 (2) (f).

Commercial Fishing Equipment or Gear: All fishing equipment used in coastal fishing waters except: (i) Cast nets; (ii) Collapsible crab traps, a trap used for taking crabs with the largest open dimension no larger than 18 inches and that by design is collapsed at all times when in the water, except when it is being retrieved from or lowered to the bottom; (iii) Dip nets or scoops having a handle not more than eight feet in length and a hoop or frame to which the net is attached not exceeding 60 inches along the perimeter; (iv) Gigs or other pointed implements which are propelled by hand, whether or not the implement remains in the hand; (v) Hand operated rakes no more than 12 inches wide and weighing no more than six pounds and hand operated tongs; (vi) Hook and line and bait and line equipment other than multiple hook or

multiple bait trotline; (vii) Landing nets used to assist in taking fish when the initial and primary method of taking is by the use of hook and line; (viii) Minnow traps when no more than two are in use; (ix) Seines less than 30 feet in length; (x) Spears, Hawaiian slings or similar devices, which propel pointed implements by mechanical means, including elastic tubing or bands, pressurized gas or similar means. 15A NCAC 03I .0101 (3) (c).

Mesh Length: The diagonal distance from the inside of one knot to the outside of the other knot, when the net is stretched hand-tight. 15A NCAC 03I .0101 (3) (k).

Crab Harvest Restrictions

Hard crab minimum size limit of 5 inches measured from tip of spike to tip of spike for male and immature female hard blue crabs. Soft crabs shall be separated where taken and placed in a separate container. Peeler crabs shall be separated where taken and placed in a separate container. White-line peeler crabs shall be separated from pink and red-line peeler crabs where taken and placed in a separate container. Male crabs to be used as peeler bait are exempt from the 5 inch size limit from March 1 through October 31 and hall be placed in a separate container. A culling tolerance of not more than five percent by number shall be allowed for white-line peelers in the pink and red-line peeler container. It is unlawful to: sell white-line peelers, possess white-line peelers unless they are to be used by the harvester in the harvester's permitted blue crab shedding operation, possess male white line peelers from June 1 through September 1. It is unlawful to possess more than 50 crabs per person per day not to exceed 100 blue crabs per vessel per day for recreational purposes. To comply with management measures I the N.C. Blue Crab Fishery Management Plan, the Director, may by proclamation, close the harvest of blue crabs and may impose any or all of the following restrictions on the commercial and recreational blue crab harvest: specify, areas, season; time periods, means and methods, culling tolerance, and limit harvest based on size, quantity, sex, reproductive stage, or peeler stage. 15A NCAC 03L .0201 (a) (b) (1) (2) (3) (4) (c) (d) (1) (2) (3) (e) (f).

Spawning Sanctuaries

It is unlawful to set or use trawls, pots, and mechanical methods for oysters or clams or take crabs with the use of commercial fishing equipment from crab spawning sanctuaries [3R .0110 (1) (2) (3) (4) (5)] from March 1 through August 31. During the remainder of the year the Director may, by proclamation, close these areas and may impose any or all of the following restrictions: areas, time periods, means and methods, and limit harvest based on size, quantity, sex, reproductive stage, or peeler stage. 15A NCAC 03L .0205 (a) (b) (1) (2) (3) (4).

Peeler and Soft Crabs

It is unlawful to possess more than 50 blue crabs in a shedding operation without first obtaining a Blue Crab Shedding Permit from the Division of Marine Fisheries. 15A NCAC 03O .0503 (c).

Recreational Harvest

- Blue crabs may be taken without a commercial license if the following gears are used; cast nets, collapsible crab traps with the largest open dimension no larger than 18 inches, a dip net having a handle not more than 8 feet in length and a hoop or frame to which the net is attached not exceeding 60 inches along the perimeter; single bait-and-line equipment, or seines less than 30 feet. 15A NCAC 03I .0101 (3) (c) (i) (ii) (iii) (vi) (ix)

- Recreational crab pot buoys must be any shade of hot pink in color, and be no less than 5 inches in diameter and length and be engraved with the owner's last name and initials. If a vessel is used the buoy must also be engraved with the gear owners current motorboat registration number or owner's U.S. vessel documentation name. 15A NCAC 03J .0302 (a) (1) (2).
- It is unlawful for a person to use more than one crab pot attached to the shore along privately owned land or to a privately owned pier without possessing a valid Recreational Commercial Gear License. 15A NCAC 03J .0302 (b).
- Up to five crab pots may be used by holders of the Recreational Commercial Gear License. 15A NCAC 03O .0302 (a) (3).
- Peeler pots are not permitted to be used by holders of the Recreational Commercial Gear License. 15A NCAC 03O .0302 (a) (3).
- One multiple hook or multiple bait trotline up to 100 feet in length may be used to harvest blue crabs. 15A NCAC 03O .0302 (a) (4).
- Trotlines must be marked at both ends with any shade of hot pink in color, and be no less than 5 inches in diameter and length and be engraved with the owner's last name and initials. If a vessel is used the buoy must also be engraved with the gear owners current motorboat registration number or owner's U.S. vessel documentation name. 15A NCAC 03J .0302.

Trawls

- It is unlawful to use trawl nets in designated pot areas opened to the use of pots and within an area bound by the shoreline to the depth of six feet. 15A NCAC 03J .0104 (b) (6).
- It is unlawful to use shrimp trawls for the taking of blue crabs in internal waters, except that it shall be permissible to take or possess blue crabs incidental to commercial shrimp trawling provided that the weight of the crabs shall not exceed; 50 percent of the total weight of the combined crab and shrimp catch; or 300 pounds, whichever is greater. For individuals using shrimp trawls authorized by a Recreational Commercial Gear License, 50 blue crabs, not to exceed 100 blue crabs if two or more Recreational Commercial Gear License holders are on board. The Fisheries Director may, by proclamation, close any area to trawling for specific time periods in order to secure compliance with this rule. 15A NCAC 03J .0104 (f) (1) (2) (A) (B) (g).
- From December 1 through March 31 it is unlawful to possess finfish caught incidental to shrimp and crab trawling in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish; except that trawlers working south of Bogue Inlet may keep up to 300 pounds of kingfish, regardless of their shrimp or crab catch weight. 15A NCAC 03J .0202 (5).
- It is unlawful to take or possess crabs aboard a vessel in internal waters except in areas and during such times as the Fisheries Director may specify by proclamation. 15A NCAC 03L .0202 (a).
- It is unlawful to take crabs with crab trawls with a mesh less than three inches, except in areas of western Pamlico Sound the minimum mesh length is four inches; the Director may, by proclamation, specify other areas for trawl mesh length and increase the minimum mesh length to no more than four inches. 15A NCAC 3L .0202 (b) (1) (2).
- It is unlawful to use trawls with a mesh length less than two inches or with a combined total headrope length exceeding 25 feet for taking soft or peeler crabs. 15A NCAC 03L .0202 (c).
- It is unlawful to use trawl nets for any purpose in any of the special secondary nursery areas, except that the Fisheries Director, may, by proclamation, open any or all of the special secondary nursery areas, or any portion thereof to crab trawling from August 16

through May 14. 15A NCAC 03N .0105 (b), 15A NCAC 03R .0105, 15A NCAC 03L .0100 and .0200.

- It is unlawful to use trawl nets in areas listed in 15A NCAC 3R .0106, except that certain areas may be opened to peeler trawling for single-rigged peeler trawls or double-rigged boats whose combined total headrope length does not exceed 25 feet. 15A NCAC 3J .0104 (b) (4); 15A NCAC 03R .0106 (1).

Crab Pots

- It is unlawful to leave pots in any coastal fishing waters for more than five consecutive days, when such pots are not being employed in fishing operations, except upon a timely and sufficient showing of hardship. 15A NCAC 03I .0105 (b) (1) (2) (A) (B) (3) (c).
- All pots shall be removed from internal waters from January 15 through February 7. Areas may be reopened, by proclamation, to the use of pots after January 19 if it is determined that such areas are free of pots. 15A NCAC 03J .0301 (a) (1).
- From June 1 through November 30 the use of crab pots is restricted in certain areas north and east of the Highway 58 Bridge at Emerald Isle. These areas are describe in 15A NCAC 03R .0107 (a). To allow for the variable spatial distribution of crustacea and finfish, the Fisheries Director may, by proclamation, specify time periods for or designate the areas described in 15A NCAC 03R .0107(b); or any part thereof, for the use of pots. From May 1 through November 30 in the Atlantic Ocean and west and south of the Highway 58 Bridge at Emerald Isle in areas and during time periods designated by the Fisheries Director by proclamation.15A NCAC 03J .0301 (a) (2) (A) (B) (3) and 03R .0107 (a) (b).
- It is unlawful to use pots in any navigation channel maintained and marked by State or Federal agencies. 15A NCAC 03J .0301 (b) (1).
- It is unlawful to use pots in any turning basin maintained and marked by the North Carolina Ferry Division. 15A NCAC 03J .0301 (b) (2).
- It is unlawful to use pots in a commercial fishing operation unless each pot is marked by attaching a floating buoy which shall be of solid foam or other solid buoyant material no less than five inches in diameter and no less than five inches in length. Buoys may be any color except yellow or hot pink or any combination of colors that include yellow or hot pink. The pot owner's N.C. motorboat registration number, or U.S. vessel documentation name, or last name and initials shall be engraved in the buoy, or on a metal or plastic tag attached to the buoy. 15A NCAC 03J .0301(c) (1) (2) (3).
- It is unlawful to use crab pots in coastal fishing waters unless each pot contains no less than two unobstructed escape rings that are at least 2 5/16 inches inside diameter and located in the opposite outside panels of the upper chamber of the pot except: unbaited pots, pots baited with a male crab, and pots set in areas described in 15A NCAC 03R .0118. 15A NCAC 03J .0301 (g).
- The Fisheries Director may, by proclamation, exempt the escape ring requirement describe in paragraph (g) in order to allow the harvest of mature female crabs and may impose any or all of the following restrictions: specify time, areas, means and methods, seasons, and quantity. 15A NCAC 03J .0301 (h).
- It is unlawful to use more than 150 pots per vessel in the Newport River.15A NCAC 03J .0301(i).
- It is unlawful to remove crab pots from the water or remove crabs from pots between one hour after sunset and one hour before sunrise. 15A NCAC 03J .0301(j).
- It is unlawful to use pots to take crabs unless the line connecting the pot to the buoy is non-floating. 15A NCAC 03J .0301(k).

Crab Dredging

- It is unlawful to use any dredge weighing more than 100 lb except in the Atlantic Ocean. 15A NCAC 03J .0303 (a).
- It is unlawful to use more than one dredge per vessel to take crabs or to use any dredges between sunset and sunrise. 15A NCAC 03J .0303 (b).
- It is unlawful to take crabs with dredges except from January 1 through March 1 in portions of Pamlico Sound. 15A NCAC 03L .0203 (a) (1) and 15A NCAC 03R .0109.
- Crabs may be taken incidental to lawful oyster dredging provided the weight of the crabs shall not exceed 50% of the total weight of the combined oyster and crab catch; or 500 lb, whichever is less. 15A NCAC 03L .0203 (a) (2) (A) (B).
- It is unlawful to take crabs with dredges between sunset and sunrise and between sunset on any Saturday and sunrise on the following Monday, except in the Atlantic Ocean. 15A NCAC 03L .0203 (b).

Miscellaneous

- It is unlawful to possess, sell, or purchase fish under four inches in length except for use as bait in the crab pot fishery in North Carolina with the following provision: such crab pot bait shall not be transported west of U.S. Interstate 95 and when transported, shall be accompanied by documentation showing the name and address of the shipper, the name and address of the consignee, and the total weight of the shipment. 15A NCAC 03M .0103 (1).

Wildlife Resources Commission Rules

Manner of Taking Nongame Fish Purchase and Sale

- Blue crabs shall have a minimum carapace width of five inches (point to point) and it is unlawful to possess more than 50 crabs per person per day or to exceed 100 crabs per vessel per day. 15A NCAC 10C .0401 (a) (1).
- Blue crab taken by hook and line, grabbling or by licensed special devices may not be sold. 15A NCAC 10C .0401 (c).

Taking Nongame Fish, Crustaceans, and Mollusks for Bait or Personal Consumption

- A single, multiple bait line for taking crabs not to exceed 100 feet in length that is under the immediate control and attendance of the user and is limited to one line per person and no more than one line per vessel. The line is required to be marked on each end with a solid float no less than five inches in diameter and bearing legible and indelible identification of the user's name and address. 15A NCAC 10C .0402 (a) (6).
- A collapsible crab trap with the largest opening not greater than 18 inches and which, by design, collapses at all times when in the water, except when being retrieved or lowered to the bottom. 15A NCAC 10C .0402 (a) (7).
- Nongame fishes, crustaceans (crayfish and blue crabs), and mollusks taken for bait or personal consumption may not be sold. 15A NCAC 10C .0402 (b).
- No more than 50 crabs per person, per day or 100 per vessel, per day with a minimum carapace width of five inches (point to point) from inland fishing waters or in designated waterfowl impoundments located on game lands. 15A NCAC 10C .0402 (d) (3).

Special Device Fishing

- It is unlawful to use crab pots in inland fishing waters, except by persons owning property adjacent to the inland fishing waters of coastal rivers and their tributaries who are permitted to set two crab pots to be attached to their property and not subject to special device license requirements. 15A NCAC 10C .0404 (e).

Commercial Landings

Commercial blue crab landings (hard, soft, and peeler crabs) averaged 40.5 million pounds from 1987 – 2009 (base years used in the traffic light; Figure 1). The majority of blue crab landings are hard blue crabs. Landings for 2014 were 26.2 million pounds, under the base year average. Generally landings have been declining since 2003, although landings for 2014 were 18 percent higher than 2013. Landings have been below the base year average since 2004. Landings data from 1987 – 1994 were collected under the NCDMF/National Marine Fisheries Service Cooperative Statistics Program which was based on voluntary dealer reporting. Since 1994, landings data have been collected under the NCDMF Trip Ticket Program which instituted mandatory dealer reporting. Landings data should be viewed only as a general indicator of fishing trends since they are influenced by market demand, price, fishing effort, weather, availability of alternate species, regulations, and data collection techniques as well as stock abundance.

Recreational Landings

A survey of Recreational Commercial Gear License (RCGL) holders conducted from 2002 – 2008 by the NCDMF indicated blue crabs were the most abundant species landed (by weight) by RCGL participants. During this time, on average, blue crabs accounted for 20% (116,797 pounds) of the total poundage (587,172 pounds) landed by RCGL holders. This survey was discontinued in 2009 so more recent estimates of RCGL harvest are unavailable. The harvest of RCGL exempted shore and pier based pots, as well as other non-commercial gear, is unknown. While current data is not available, NCDMF has recently started a new program to survey and estimate recreational blue crab landings from RCGL exempt gear (NCDMF 2013)

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

The traffic light, used to monitor the health of the blue crab stock, uses commercial crab sampling data (combined with fishery-independent data) to determine the annual length of fifty percent maturity for female blue crabs. This index is used in the Production characteristic of the traffic light. The annual length of fifty percent maturity is compared to the mean length of fifty percent maturity for the base years of 1987 – 2009 (112.1mm carapace width; CW). In 2014, the length of fifty percent maturity was 122.2mm CW and was above the mean for the base years. The length of fifty percent maturity has been above the base year mean since 2005 (Figure 2).

Fishery-Independent Monitoring

The traffic light, used to monitor, the health of the blue crab stock, uses several fishery-independent indices for the Adult Abundance, Recruit Abundance, and Production characteristics. The status of each indicator is compared to the mean of that indicator over a set of base years. The base years used for the blue crab traffic light were 1987 – 2009.

Adult Abundance

The adult abundance characteristic uses data from the Juvenile Anadromous Trawl Survey (P100), the Estuarine Trawl Survey (P120), and the Pamlico Sound Survey (P195) to monitor adult blue crab abundance. Indices from P120 and P195 consist of blue crabs greater than or equal to 100mm CW; an index of total abundance (no size restrictions) is derived from P100. Two indices are derived from P120, a Pamlico index using data from tributaries in and around Pamlico Sound and a Southern index using data collected from Core Sound and south (Figure 3).

Adult abundance for P100 was above the mean for the base years (0.27 crabs/minute) from 2006 – 2012, both 2013 (0.266 crabs/minute) and 2014 (0.23 crabs/minute) adult abundance estimates were below the base year mean. Adult abundance for P120 in the Pamlico region was below the base year mean (0.62 crabs/tow) in 2013 (0.31 crabs/tow) and 2014 (0.27 crabs/tow). In the Southern region, adult abundance has been below the base year mean (0.15 crabs/tow) since 2011. In 2014, adult abundance was 0.096 crabs/tow in the Southern region. Adult abundance for P195 has been below the base year mean (4.52 crabs/tow) since 2000. Adult abundance in 2014 was 0.33 crabs/tow and was the lowest in the 28 year time series. Figure 4 shows the individual traffic lights for each index as well as the composite adult abundance traffic light.

Recruit Abundance

The recruit abundance characteristic uses data from the Estuarine Trawl Survey (P120) and the Pamlico Sound Survey (P195) to monitor blue crab recruit abundance. Each index consists of blue crabs less than 100mm CW and greater than or equal to 30mm CW. Two indices are derived from P120, a Pamlico index using data from tributaries in and around Pamlico Sound and a Southern index using data collected from Core Sound and south. Two indices are also derived from P195, a summer (June) and a fall (September) index (Figure 5).

Recruit abundance for P120 in the Pamlico region was below the base year mean (1.93 crabs/tow) in 2013 (0.66 crabs/tow) and 2014 (0.66 crabs/tow). In the Southern region, recruit abundance has been below the base year mean (0.44 crabs/tow) since 2005. In 2014, recruit abundance was 0.33 crabs/tow in the Southern region. Recruit abundance for P195 in the summer has been below the base year mean (29.66 crabs/tow) since 2011. In the fall, recruit abundance has been below the base year mean (3.49 crabs/tow) since 1998. In 2014, recruit abundance was 0.74 crabs/tow in the fall. Figure 6 shows the individual traffic lights for each index as well as the composite recruit abundance traffic light.

Production

The production characteristic uses data from the Juvenile Anadromous Trawl Survey (P100), the Estuarine Trawl Survey (P120), and the Pamlico Sound Survey (P195) to monitor the blue crab stock's production potential. The production indicators include measures of median

carapace width, pre-recruit abundance (blue crabs less than 30mm CW), length at fifty percent maturity (see fishery-dependent monitoring section), spawning stock (mature female mm/minute), and frequency of occurrence of mature females (percent of samples with mature female blue crabs).

Three indices are derived from P100 including median carapace width, spawning stock, and frequency of occurrence of mature females (Figure 7). Median carapace width has been below the base year mean (114.2mm) since 2009. In 2014, the median carapace width was 98mm in P100. The spawning stock index has been below the base year mean (19.54 mm/minute) since 2012. In 2014, the spawning stock index was 1.67 mm/minute in P100. The frequency of occurrence of mature females was above the base year mean (23.4 percent) from 2005 – 2013; in 2014 the frequency of occurrence of mature females was 7.9 percent, below the base year mean.

Three indices are derived from P120 including Pamlico and Southern region median carapace width and a statewide pre-recruit abundance index (Figure 8). Median carapace width was below the base year mean (34.3mm) in 2013 (19mm) and 2014 (22mm) in the Pamlico region. In the Southern region, median carapace width was below the base year mean (32.7mm) in 2013 (29mm) and 2014 (32mm). The statewide pre-recruit index has been below the base year mean (1.09 crabs/tow) since 2010; in 2014 the pre-recruit index was 0.71 crabs/tow.

Four indices are derived from P195 including summer and fall median carapace width, fall spawning stock, and fall frequency of occurrence of mature female indices (Figure 9). The summer median carapace width index was below the base year mean (72.1mm) in 2013 (54mm) and 2014 (58mm). The fall median carapace width index was above the base year mean (107.7mm) from 2010 - 2013; in 2014 the fall median carapace width was 56mm, below the base year mean. The fall spawning stock index has been below the base year mean (741.7 mm/tow) since 2004; in 2014 the fall spawning index was 49.4 mm/tow. The frequency of occurrence of mature females has been below the base year mean (55.9 percent) since 2004; in 2014 the frequency of occurrence of mature females was 18.5 percent and was the lowest in the 28 year time series. Figure 10 shows the individual traffic lights for each index as well as the composite production traffic light.

MANAGEMENT STRATEGY

Traffic Light

The NCMFC preferred management strategy for blue crabs relies on the Traffic Light Stock Assessment approach to provide information on the relative condition of the stock. The base years (1987 to 2009) for assigning the signals in the Traffic Light Stock Assessment will remain constant until the next amendment of the FMP. The Traffic Light Stock Assessment is updated annually by July of each year to gauge the current status of the stock. To trigger management actions, either the adult abundance or production characteristic of the assessment must be above the 50 percent red threshold for three consecutive years to trigger the moderate management actions and must be above the 75 percent red threshold for two of three consecutive years to trigger the elevated management actions established in the plan (Table 1). The recruit abundance indicator, while not used to trigger initial management action, may be used to supplement any management actions taken if the adult abundance or production triggers are activated.

The current assessment update indicates the adult abundance characteristic has exceeded the moderate threshold for the second consecutive year and has exceeded the elevated threshold for the first year. Currently the adult abundance characteristic is at 79 percent red. The production characteristic has exceeded the moderate threshold for the second consecutive year. Currently the production characteristic is at 71 percent red. The recruit abundance characteristic has exceeded the moderate threshold for the fourth consecutive year and has exceeded the elevated threshold for the second consecutive year. Currently the recruit abundance characteristic is at 96 percent red (Figure 11).

This serves as the second of the three consecutive years above the moderate threshold, for both the adult and production characteristics, that is required before moderate management action must be taken. This also serves as the first of two years in a three year period above the elevated threshold for the adult abundance characteristic that is required before elevated management action must be taken.

Principal Issues

Several management issues were explored in Amendment 2; Table 2 outlines the specific issue explored and the implementation status of each management strategy.

MANAGEMENT AND RESEARCH NEEDS

Several management and research needs were identified in N.C. Blue Crab Fishery Management Plan Amendment 2; Table 3 outlines the specific needs and highlights the progress made towards each management and research need.

FISHERY MANAGEMENT PLAN RECOMMENDATION

The NCDMF recommendation is to maintain the timing of the Benchmark Review “as is” on the current FMP schedule. Currently the review is scheduled to begin in November 2018.

LITERATURE CITED

NCDMF. 1998. North Carolina Blue Crab Fishery Management Plan. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 178 pp.

NCDMF. 2004. North Carolina Blue Crab Fishery Management Plan Amendment 1. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 411 pp.

NCDMF. 2013. North Carolina Blue Crab Fishery Management Plan Amendment 2. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 528 pp.

TABLES

Table 1. Management measures in N.C. Blue Crab Fishery Management Plan Amendment 2 that may be implemented by proclamation as described in the blue crab adaptive management framework when a stock characteristic exceeds a designated management threshold.

Characteristic	Moderate management level	Elevated management level
Adult abundance	A1. Increase in minimum size limit for male and immature female crabs	A4. Closure of the fishery (season and/or gear)
	A2. Reduction in tolerance of sub-legal size blue crabs (to a minimum of 5%) and/or implement gear modifications to reduce sublegal catch	A5. Reduction in tolerance of sub-legal size blue crabs (to a minimum of 1%) and/or implement gear modifications to reduce sublegal catch
	A3. Eliminate harvest of v-apron immature hard crab females	A6. Time restrictions
Recruit abundance	R1. Establish a seasonal size limit on peeler crabs	R4. Prohibit harvest of sponge crabs (all) and/or require sponge crab excluders in pots in specific areas
	R2. Restrict trip level harvest of sponge crabs (tolerance, quantity, sponge color)	R5. Expand existing and/or designate new crab spawning sanctuaries
	R3. Close the crab spawning sanctuaries from September 1 to February 28 and may impose further restrictions	R6. Closure of the fishery (season and/or gear)
		R7. Gear modifications in the crab trawl fishery
Production	P1. Restrict trip level harvest of sponge crabs (tolerance, quantity, sponge color)	P4. Prohibit harvest of sponge crabs (all) and/or require sponge crab excluders in pots for specific areas
	P2. Minimum and/or maximum size limit for mature female crabs	P5. Reduce peeler harvest (no white line peelers and/or peeler size limit)
	P3. Close the crab spawning sanctuaries from September 1 to February 28 and may impose further restrictions	P6. Expand existing and/or designate new crab spawning sanctuaries
		P7. Closure of the fishery (season and/or gear)

Table 2. Summary of management strategies and outcomes from N.C. Blue Crab Fishery Management Plan Amendment 2.

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Stock Protection			
11.1 Adaptive management framework for the North Carolina blue crab stock	1. Repeal the current female stock conservation management trigger.	1	Rule change to 03L .0201 **Completed**
	2. Continue existing sampling programs to maintain baseline information for the Traffic Light Stock Assessment method.	1 and 6	No action required.
	3. Adopt the adaptive management framework based on the Traffic Light Stock Assessment and the proposed moderate and elevated management levels for recruit abundance, adult abundance, and production characteristics. Initial management action will only be implemented when either the adult abundance or production characteristic reach the management trigger of 50% red or greater for three consecutive years. The recruit abundance characteristic will be used as a supplement to further direct conservation management actions, if deemed necessary.	1 and 6	Rule change to 03L .0201, 03L .0203, 03L .0204, 03L .0205, 03L .0206, 03L .0209, and 03J .0301. **Completed**
User Conflicts			
11.2 Crab pot limit for southern Bogue Sound	Status quo, continue with no crab pot limit in southern Bogue Sound.	1, 4, and 5	No action required.
11.3 Consider allowing non-pot areas in the Pungo River area to be re-designated as open to pots	Open the non-pot (long haul net) areas all the time by rule in the Pungo River and keep status quo in the Long Point area on the Pamlico River.	1, 4, and 5	Rule change to 03R .0107. **Completed**
Clarification of Rules			
11.4 Incorporate the lower Broad Creek closure of pot area into rule	Modify the rule to include the lower Broad Creek area that is closed to crab pots from June 1 through November 30.	1, 4, and 5	Rule change to 03R .0107. **Completed**
11.5 Clarify crab dredging restrictions	Amend the rule to match harvest management for crab dredging.	2	Rule change to 03L .0203. **Completed**

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Clarification of Rules			
11.6 Incorporate the Pamlico Sound crab trawling proclamation into rule 15A NCAC 03L .0202	Modify Rule 15A NCAC 03L .0202 to incorporate the long-standing provisions of Proclamation SH-5-2007 (Pamlico Sound four inch mesh crab trawl line), and retain the Director's proclamation authority to restrict crab trawl mesh size.	1 and 2	Rule change to 03L .0202 **Completed**
11.7 Explore options for escape ring exemptions in hard crab pots to harvest peeler crabs	1. Amend the current rule to redefine criteria for exempting escape rings in crab pots from the 1½-inch pot mesh size to unbaited pots and pots baited with a male crab.	1, 2, and 5	Rule change to 03J .0301 and 03L .0301. **Completed**
	2. Repeal the proclamation authority that allows for exempting the escape ring requirement in order to allow the harvest of peeler crabs.	1 and 5	Rule change to 03J .0301. **Completed**
11.8 Convert crab pot escape ring proclamation exemptions for mature females into rule	Adopt the no trawl line along the Outer Banks in Pamlico Sound as the new boundary in Pamlico Sound, and the Newport River boundaries as delineated in the proposed rule as new boundaries for the area where closure of escape rings to take small mature females is allowed.	1 and 4	Rule change to 03J .0301. Add new rule 03R .0118. **Completed**
11.9 Correction of peeler trawl exception rule	Modify Rule 15A NCAC 03J .0104 (b)(4) TRAWL NETS to correctly reference the Pamlico, Back and Core sounds as the areas in which the Director can open peeler trawling by proclamation.	1 and 2	Rule change to 03J .0104. **Completed**
11.10 Blue crab size limit and culling tolerance	Modify rule to clearly state the intent of the exceptions, culling tolerance, and separation requirements for the various categories of crabs.	1	Rule change to 03L .0201. **Completed**
Harvest Practices			
11.11 Allow floating crab pot lines in areas where obstructions exist	Status quo, continue with non-floating line on crab pots.	1, 2, and 5	No action required.

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Harvest Practices			
11.12 Diamondback terrapins interactions with the blue crab fishery in North Carolina	1. Establish proclamation authority for requiring terrapin excluder devices in crab pots.	2 and 5	Rule change to 03L .0204. **Completed**
	2. Establish a framework for developing proclamation use criteria and terrapin excluder specifications which may extend until after adoption of the amendment. The strategy is contingent on: a. Consultation with the Crustacean Advisory Committee on developing criteria; and b. No use of the proclamation authority until criteria is approved by the Marine Fisheries Commission.	2 and 5	Staff is developing an issue paper to be presented later this year.
11.13 Multiple pots to a single buoy	Status quo, do not allow multiple pots to a single buoy.	1 and 5	No action required.
11.14 Pot loss and ghost pot bycatch mortality	1. Encourage crab potters in areas of high pot loss to incorporate methods to reduce pot loss. Develop and provide information on potential methods to reduce pot loss.	6 and 7	Develop and provide information on potential methods to reduce pot loss.
	2. Encourage crab potters in areas of high pot loss to incorporate escape panel designs in pots to reduce potential ghost fishing impacts. Develop and provide information on potential methods and materials to reduce ghost fishing impacts.	6 and 7	Develop and provide information on potential methods and materials to reduce ghost fishing impacts.
Environmental Factors			
10.4 Habitat	1. Identify and designate Strategic Habitat Areas that will enhance protection of the blue crab.	1, 3, and 6	Existing authority through the Coastal Habitat Protection Plan (CHPP).

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Environmental Factors			
10.4 Habitat	2. Identify, research, and designate additional areas as Primary Nursery Areas that may be important to blue crabs as well as other fisheries.	1, 3, and 6	Existing authority through the CHPP.
	3. Continue to map blue crab spawning areas and evaluate any that need to adjust or expand the boundaries or restrictions of the crab spawning sanctuaries based on recent research.	1, 3, and 6	Existing authority through the CHPP.
	4. Remap and monitor submerged aquatic vegetation in North Carolina to assess distribution and change over time.	3 and 6	Existing authority through the CHPP.
	5. Restore coastal wetlands to compensate for previous losses and enhance habitat and water quality conditions for the blue crab.	3 and 6	Existing authority through the CHPP.
	6. Work with Coastal Resource Commission to revise shoreline stabilization rules to adequately protect riparian wetlands and shallow water habitat and significantly reduce the rate of shoreline hardening.	3	Existing authority through the CHPP.
	7. Develop and implement a comprehensive coastal marina and dock management plan and policy to minimize impacts to submerged aquatic vegetation, wetland edge, and other habitat important to blue crab.	3	Existing authority through the CHPP.
	8. Assess the distribution, concentration, and threat of heavy metals and other toxic contaminants in freshwater and estuarine sediments and identify the areas of greatest concern to focus water quality improvement efforts.	3 and 6	Existing authority through the CHPP.
	9. Support oyster shell recycling and oyster sanctuary programs to provide areas of enhanced or restored shell bottom habitat.	3	Existing authority through the CHPP.

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Environmental Factors			
10.4 Habitat	10. Consider if prohibition of crab dredging is advisable.	2	Existing authority through the CHPP.
	11. Protect “recruitment bottlenecks”, like inlets for the blue crab, from trawling or other impacts including natural channel modification using hardened structures like groins and jetties.	2 and 3	Existing authority through the CHPP.
	12. Shallow areas where trawling is currently allowed should be re-examined to determine if additional restrictions are necessary.	2	Existing authority through the CHPP.
10.4 Water Quality	1. Improve methods to reduce sediment and nutrient pollution from construction sites, agriculture, and forestry.	3	Existing authority through the CHPP.
	2. Increase on-site infiltration of storm water through voluntary or regulatory measures.	3	Existing authority through the CHPP.
	3. Provide more incentives for low-impact development.	3	Existing authority through the CHPP.
	4. Aggressively reduce point source pollution from wastewater through improved inspections of wastewater treatment facilities, improved maintenance of collection infrastructure, and establishment of additional incentives to local governments for wastewater treatment plant upgrading.	3	Existing authority through the CHPP.
	5. Provide proper disposal of unwanted drugs, prevent the use of harmful JHA insecticides near-surface waters or in livestock feed, and develop technologies to treat wastewater for antibiotics and hormones.	3, 6, and 7	Existing authority through the CHPP.

Table 3. Summary of research needs and outcomes from N.C. Blue Crab Fishery Management Plan Amendment 2.

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Continue to support research to determine the status of protected species (e.g., migration patterns, habitat utilization) along the North Carolina coast to better anticipate and prevent interactions.	2 and 5	No Action
Support research on blue crab fishery interactions with protected species (e.g., identifying any seasonal or spatial peaks in potential for interactions).	2 and 5	Ongoing; Began an observer program for Pamlico Sound in 2000, and expanded into other areas of state. Recently began using observers on alternative platforms which may reduce the type of finfish bycatch data collected. Currently monitoring set gill net fisheries statewide.
Support gear modification research and testing that could reduce protected species interactions.	2 and 5	No Action
Continue socioeconomic surveys of blue crab harvesters and include wholesale and retail benefits, the entire support industry for this fishery including suppliers, picking houses, and restaurants..	1, 6, and 7	Ongoing
Update Recreational Commercial Gear License (RCGL) survey.	6	No Action
Continue survey and compile data of recreational crabbers not possessing a RCGL license.	6	Ongoing
Determine the economic effects of imported crabmeat, including the mixture of imported meat with local crabmeat, on processing and demand.	1 and 6	No Action
Determine the costs associated with crab processing. Identify the factors and their relative importance in predicting processor closures.	1 and 6	No Action
Research the changing demographics of the commercial blue crab fishery.	1 and 6	No Action
Continue research on the impacts of endocrine disrupting chemicals (EDCs) on the various life stages of the blue crabs and way to reduce introduction of EDCs into estuarine waters.	1, 3, 6, and 7	No Action
Assess the impact of winter inlet deepening dredge activities on the overwintering female blue crabs and their habitat.	1, 3, and 6	No Action

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Determine the spatial and biological characteristics of SAV beds that maximize their ecological value to the blue crab for restoration or conservation purposes.	1, 3, and 6	Ongoing CHPP and SHA work group
Identify, research, and map shallow detrital areas important to blue crabs.	1, 3, and 6	Ongoing CHPP and SHA work group
Additional research is needed on the extent, causes, and impacts of hypoxia and anoxia on blue crab behavior and population abundance in North Carolina's estuarine waters.	1, 3, and 6	Ongoing CHPP
Conduct research on the water quality impacts of crab pot zincs, bait discard, and alternative crab baits in the pot fishery.	1, 3, and 6	No Action
Develop methods to expand sampling effort to more accurately assess the status of the blue crab stock and its fisheries.	1 and 6	Ongoing
Continue research on blue crab discards in the shrimp trawl fishery.	1, 2, and 6	Ongoing
Expand research state wide on the use of terrapin excluder devices in crab pots	1, 3, and 5	Ongoing
Implement outreach programs to inform state agencies, the public, and the commercial and recreational fishing industries about issues relating to protected species and fishery management.	1, 2, and 7	Ongoing
Continue gear development research to minimize species interactions.	1, 2, and 6	Ongoing
Continue existing programs that have been used to monitor North Carolina's blue crab stock to maintain baseline data	1 and 6	Ongoing
Identify key environmental factors that significantly impact North Carolina's blue crab stock and investigate assessment methods that can account for these environmental factors	1 and 6	Ongoing
Conduct a study of the selectivity of the gear used in the Juvenile Anadromous Trawl Survey (Program 100) to evaluate the size at which blue crabs are fully-selected to the survey gear; the results of such a study could help determine whether the survey data could be used to develop a reliable index of blue crab recruitment for the Albemarle region; no such index is currently available	1 and 6	No Action

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Expand spatial coverage of the Estuarine Trawl Survey (Program 120) to include shallow-water habitat in Albemarle Sound; sampling in shallow-water habitat is intended to target juvenile blue crabs so that a recruitment index for the Albemarle Sound could be developed	1 and 6	No Action
Expand temporal coverage of the Estuarine Trawl Survey (Program 120) beyond May and June sampling; additional sampling later in the blue crab's growing season would provide more information on within-year changes in growth, mortality, and abundance; at a minimum, recommend addition of September sampling in order to capture the fall settlement peak	1 and 6	No Action
Expand spatial coverage of Pamlico Sound Survey (Program 195) to include deep water habitat in Albemarle Sound and the Southern Region; expanding the sampling region of adult blue crab habitat would allow for a more spatially-comprehensive adult index; additionally, there would be increased confidence in comparison of adult abundance trends among regions since all would derive from the same sampling methodology	1 and 6	No Action
Implement a statewide survey with the primary goal of monitoring the abundance of blue crabs in the entire state; such a survey would need to be stratified by water depth to ensure capture of all stages of the blue crabs life cycle and standardized among North Carolina waters	1 and 6	No Action
Implement monitoring of megalopal settlement near the ocean inlets could potentially add a predictive function to the blue crab stock assessments in the future; Forward et al. (2004) detected a positive, linear relationship between megalopal abundance and commercial landings of hard blue crabs for both the local estuarine area and the entire state of North Carolina when a two-year time lag was implemented (Forward et al. 2004); such monitoring is critical to track larval ingress peaks and the effect of natural forces, such as tropical storms and prevailing winds, on ingress.	1 and 6	No Action

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Continue surveys of recreational harvest and effort to improve characterization of the recreational fishery for blue crabs	1 and 6	Ongoing
Identify programs outside the NCDMF that collect data of potential use to the stock assessment of North Carolina's blue crabs	1 and 6	Ongoing
Perform in-depth analysis of available data; consider standardization techniques to account for gear and other effects in development of indices; explore utility of spatial analysis in assessing the blue crab stock	1, 6	Ongoing

FIGURES

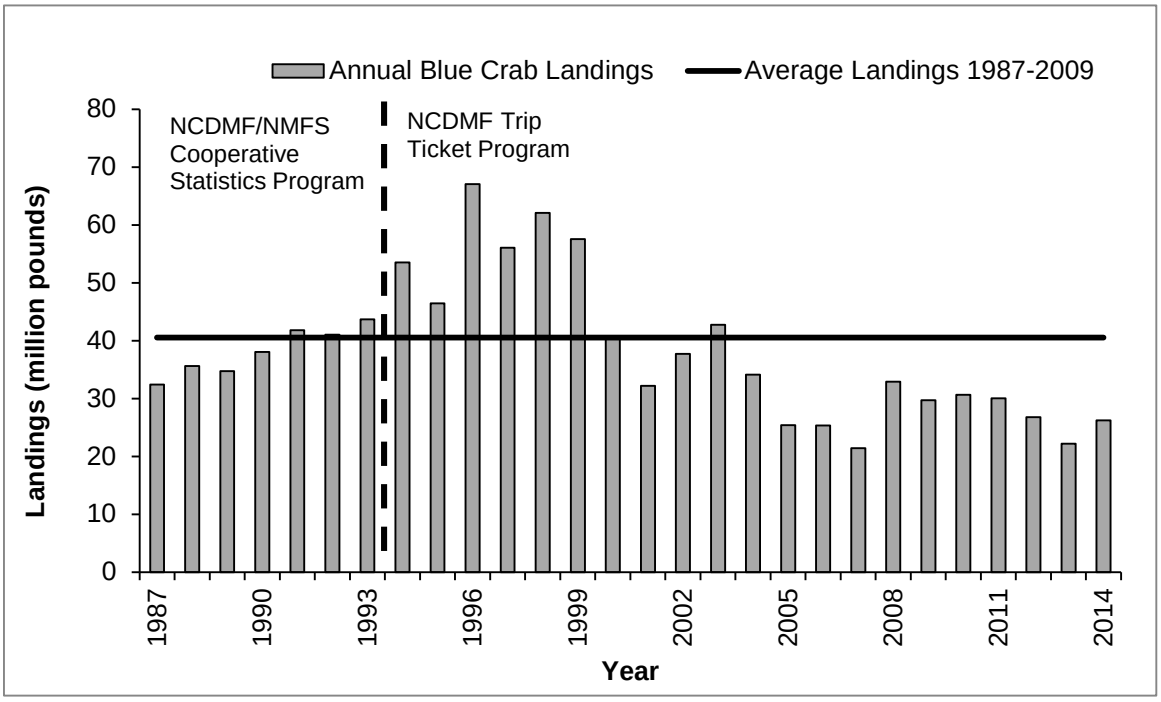


Figure 1. Annual blue crab commercial landings, 2004-2014. Landings include hard, soft, and peeler crabs. The vertical dashed line denotes the change from a voluntary to a mandatory commercial landings reporting program.

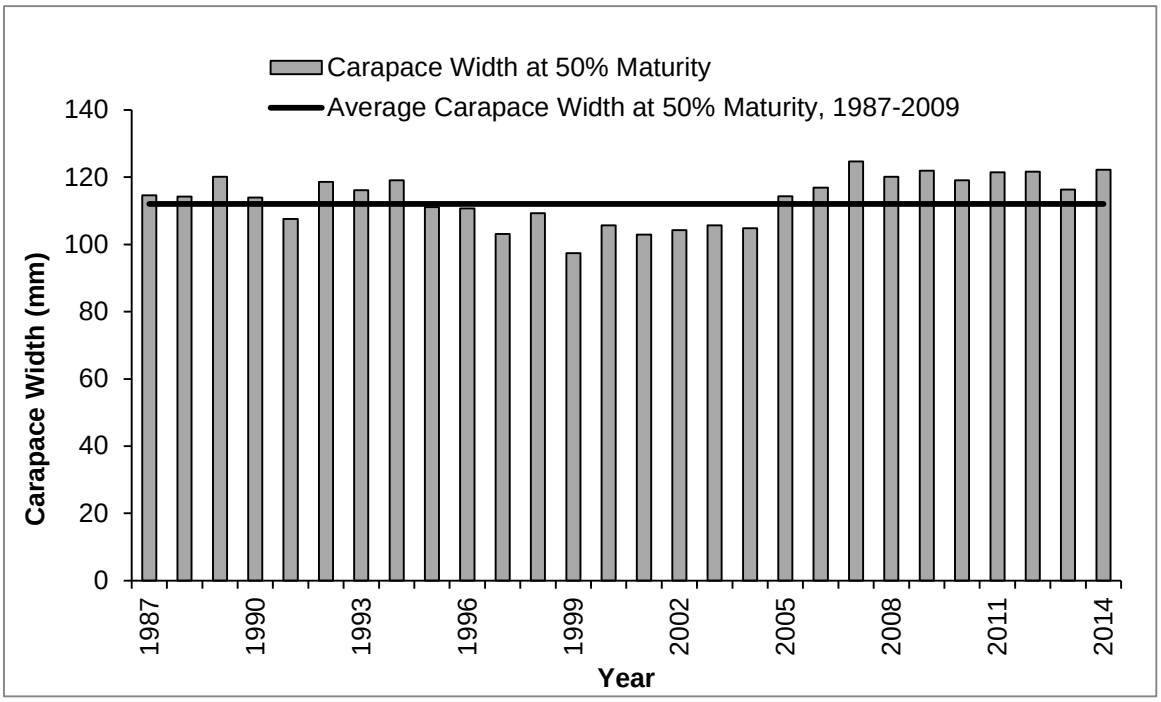


Figure 2. Length at 50% maturity for female blue crabs used in the production characteristic of the Blue Crab Traffic Light, 1987-2014. Fishery-dependent and independent data were included in the analysis.

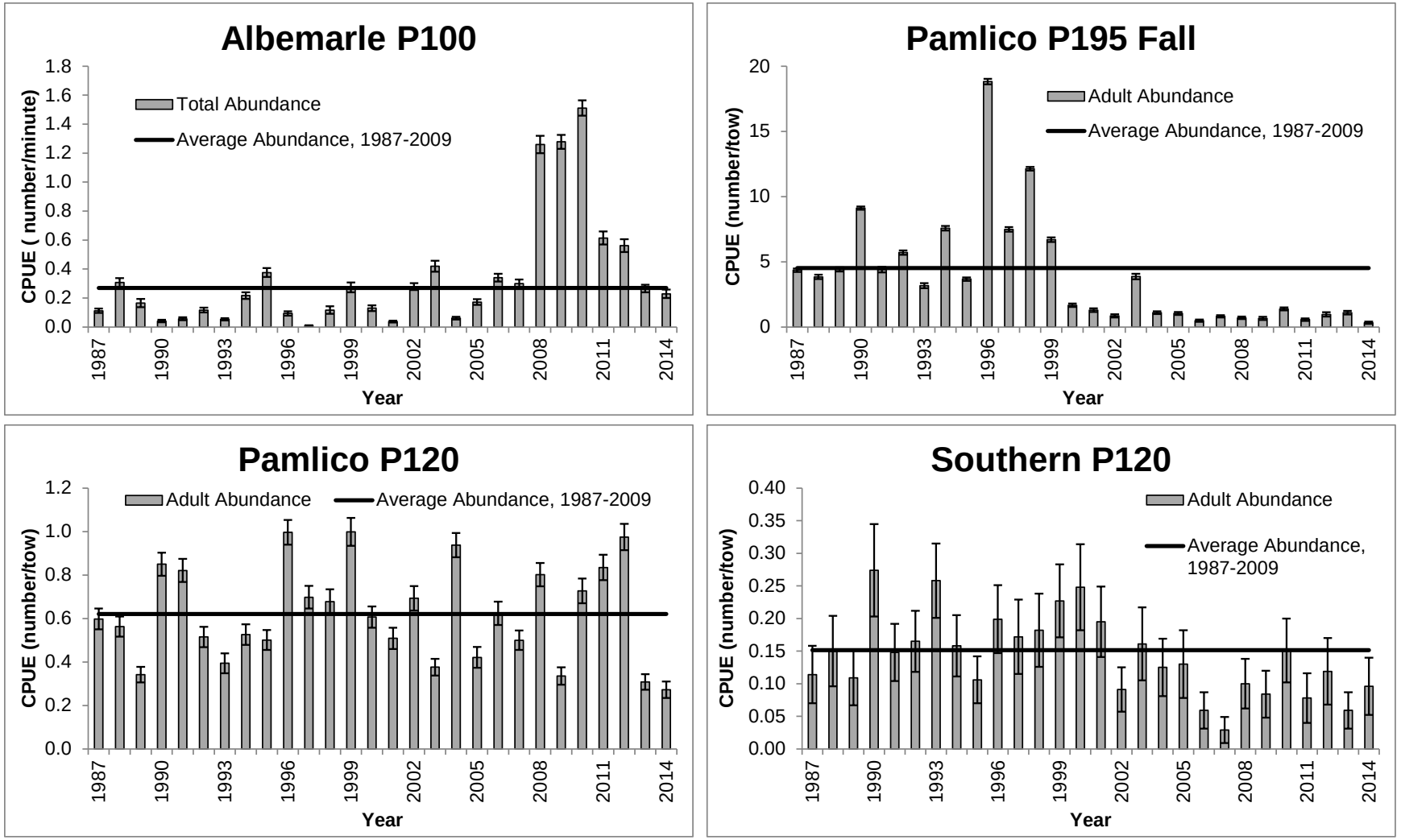


Figure 3. Indices from NCDMF programs P100, P120, and P195 used for the adult abundance characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

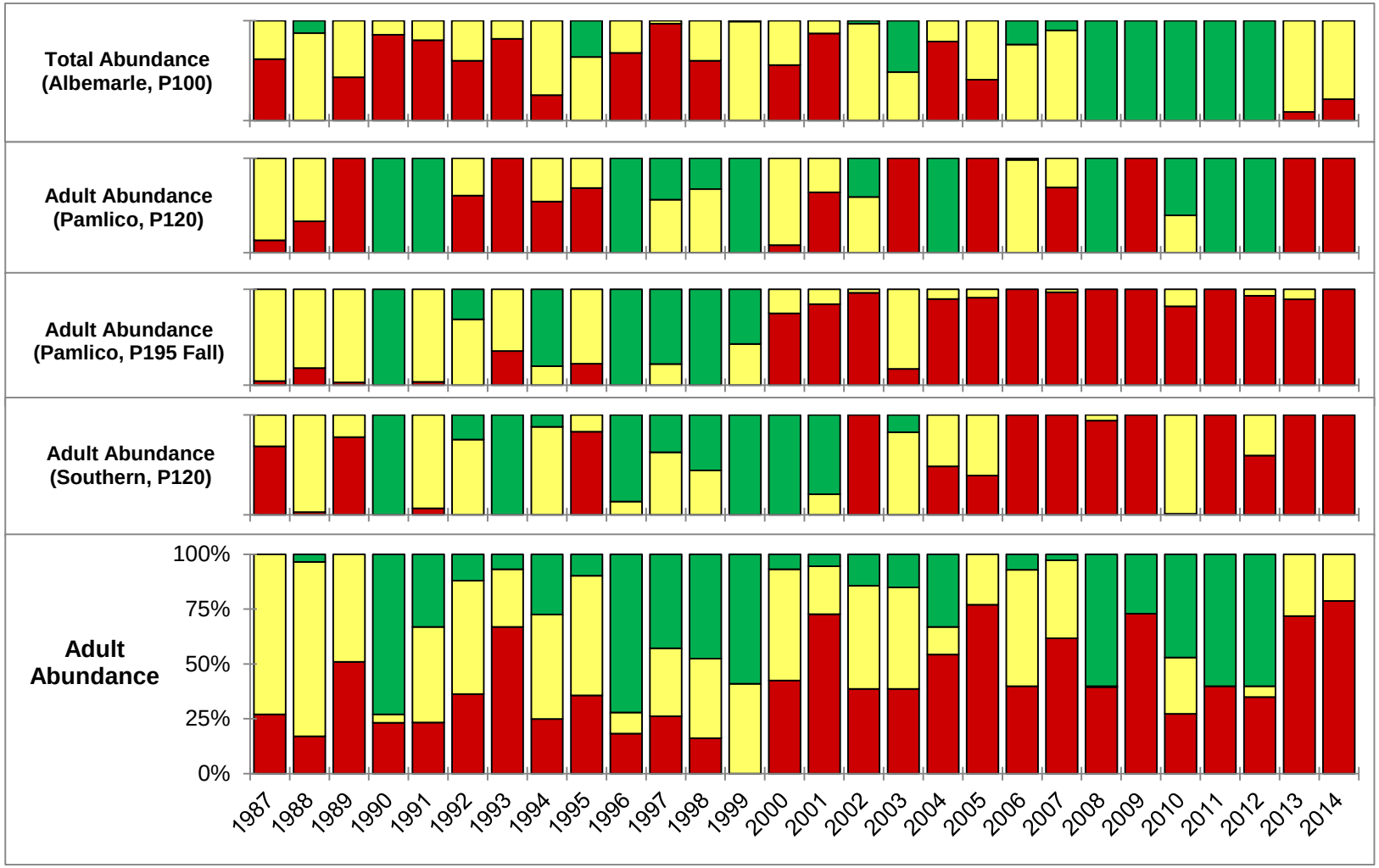


Figure 4. Blue Crab Traffic Light individual adult abundance indicators and the integrated summary (bottom figure), 1987-2014.

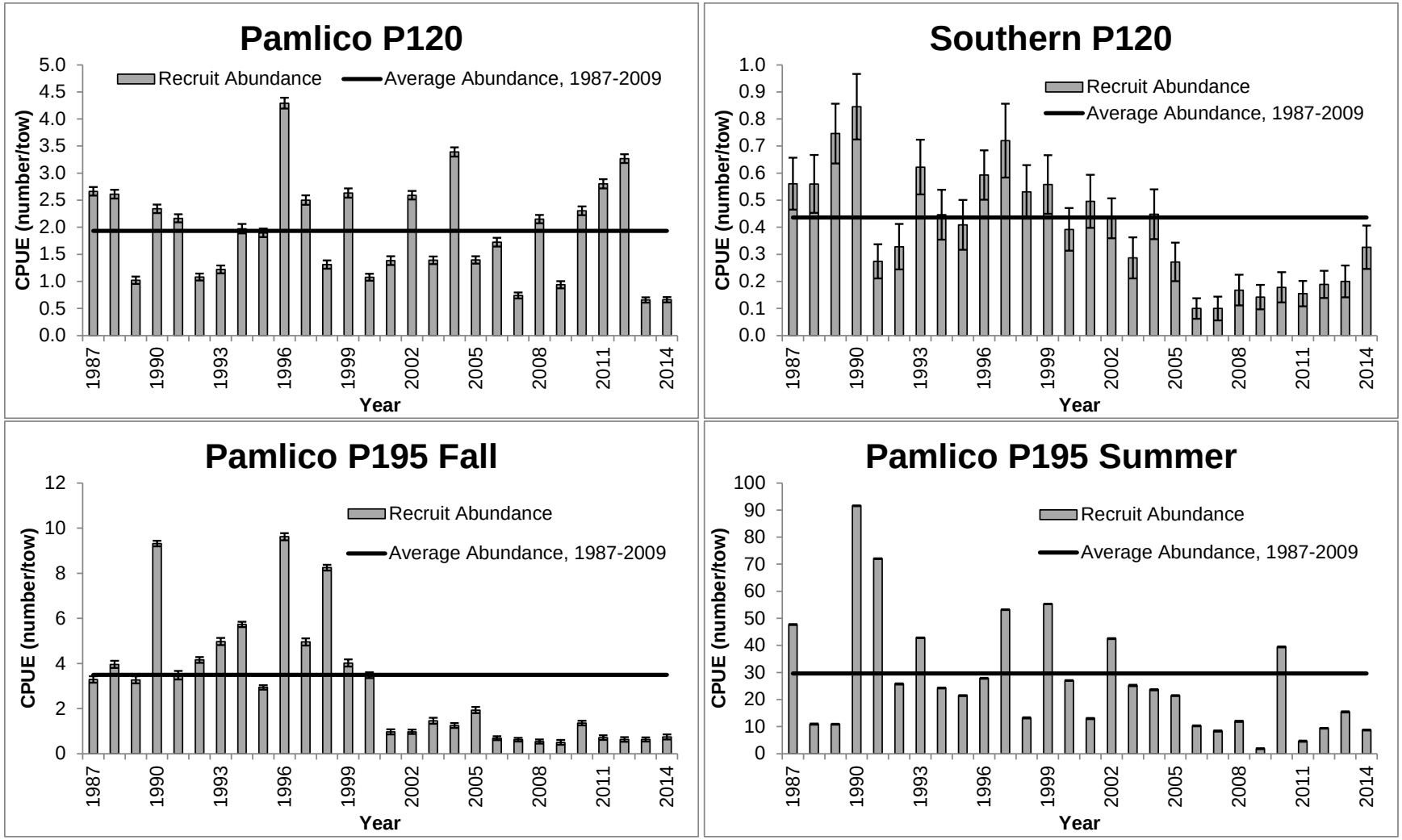


Figure 5. Indices from NCDMF programs P120 and P195 used for the recruit abundance characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

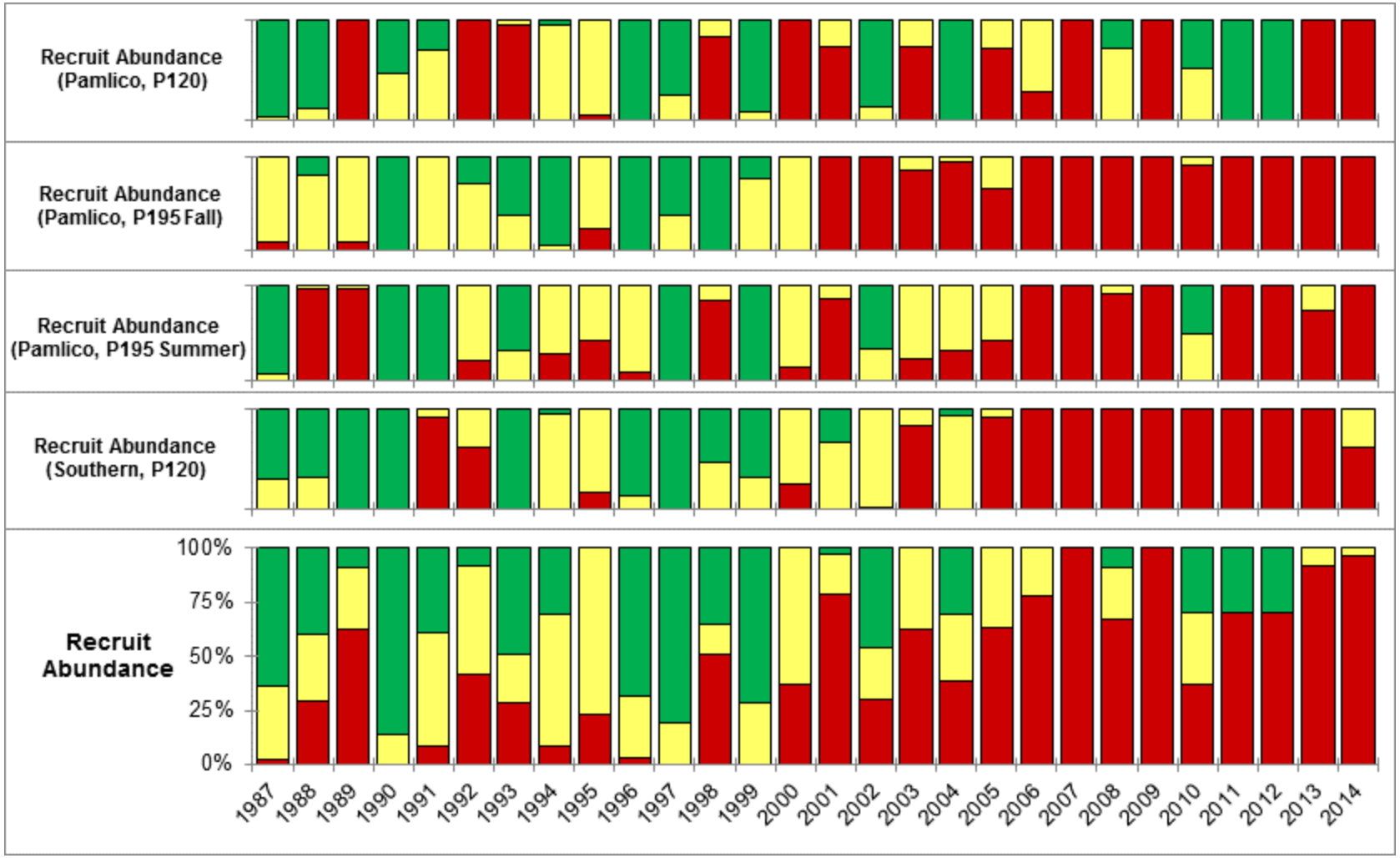
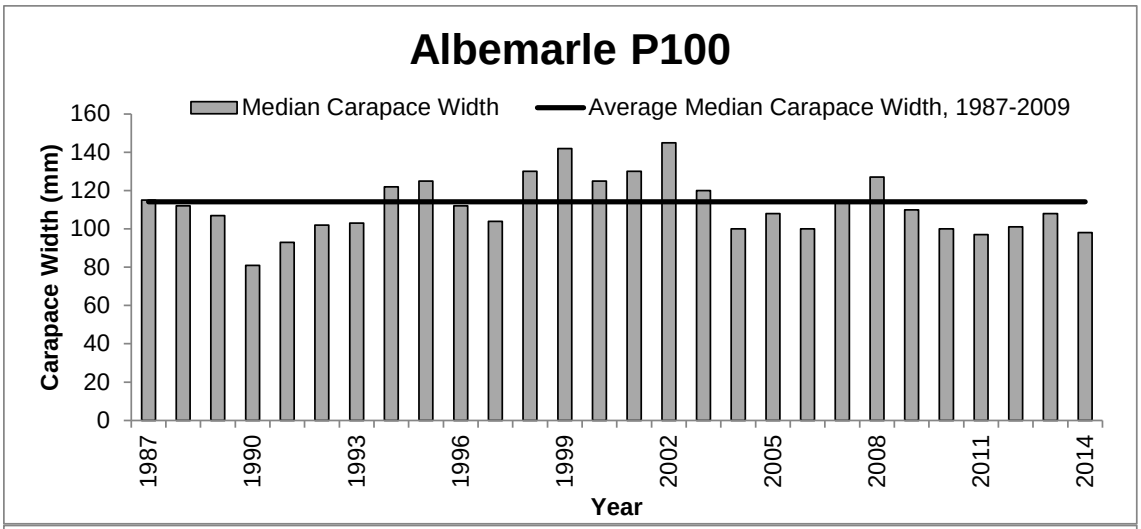
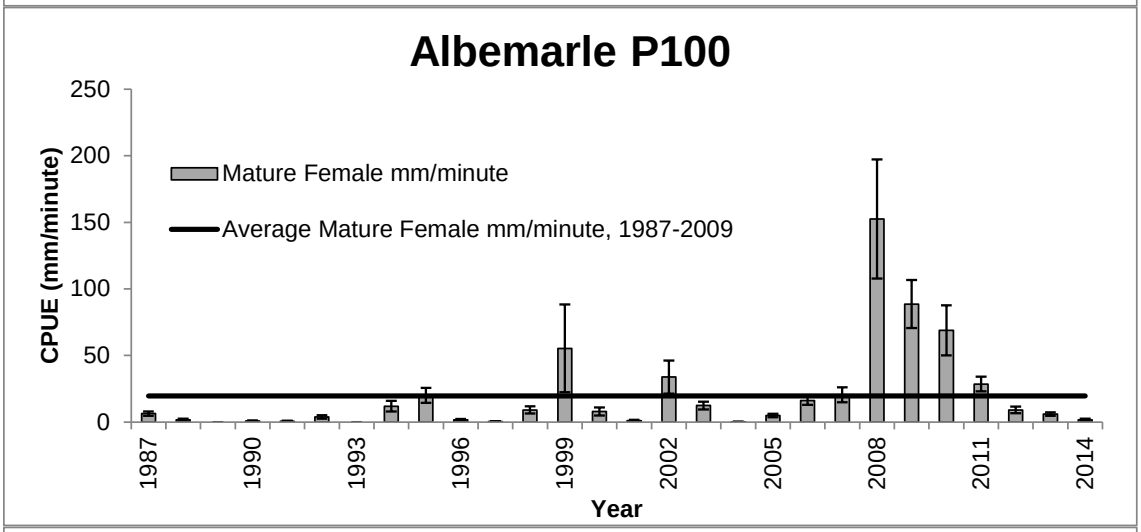


Figure 6. Blue Crab Traffic Light individual recruit abundance indicators and the integrated summary (bottom figure) 1987-2014.





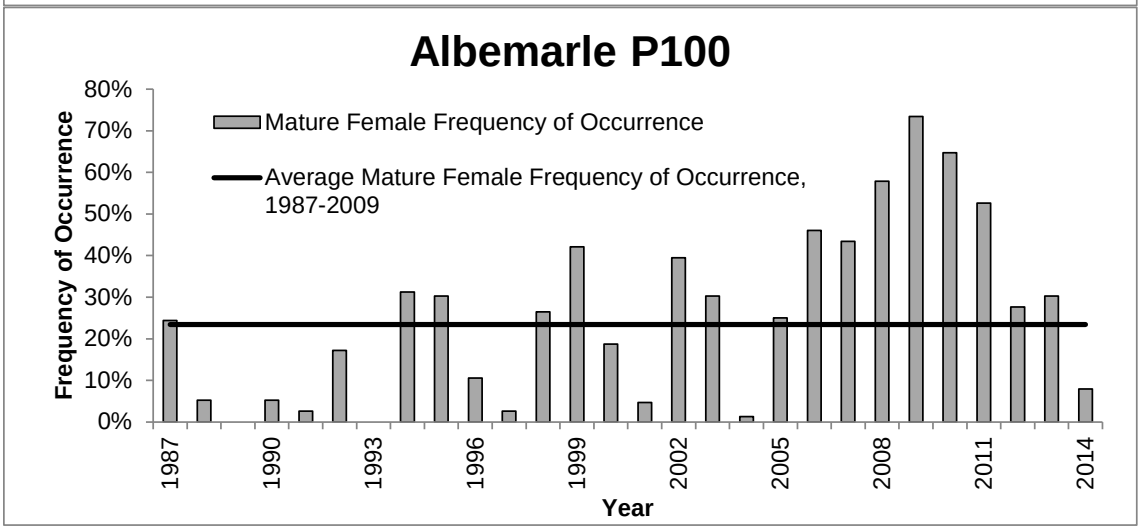


Figure 7. Indices from NCDMF program P100 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

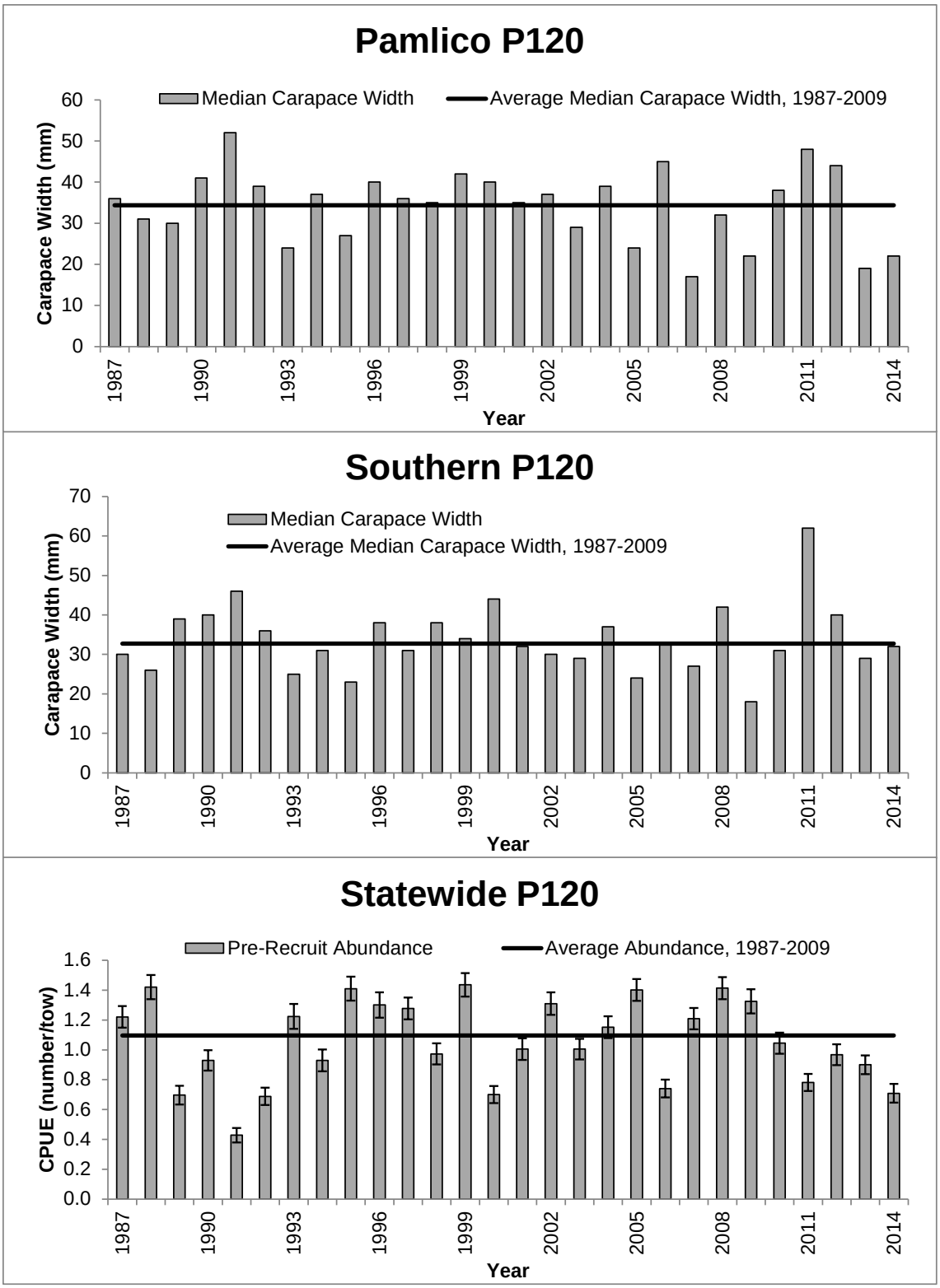


Figure 8. Indices from NCDMF program P120 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

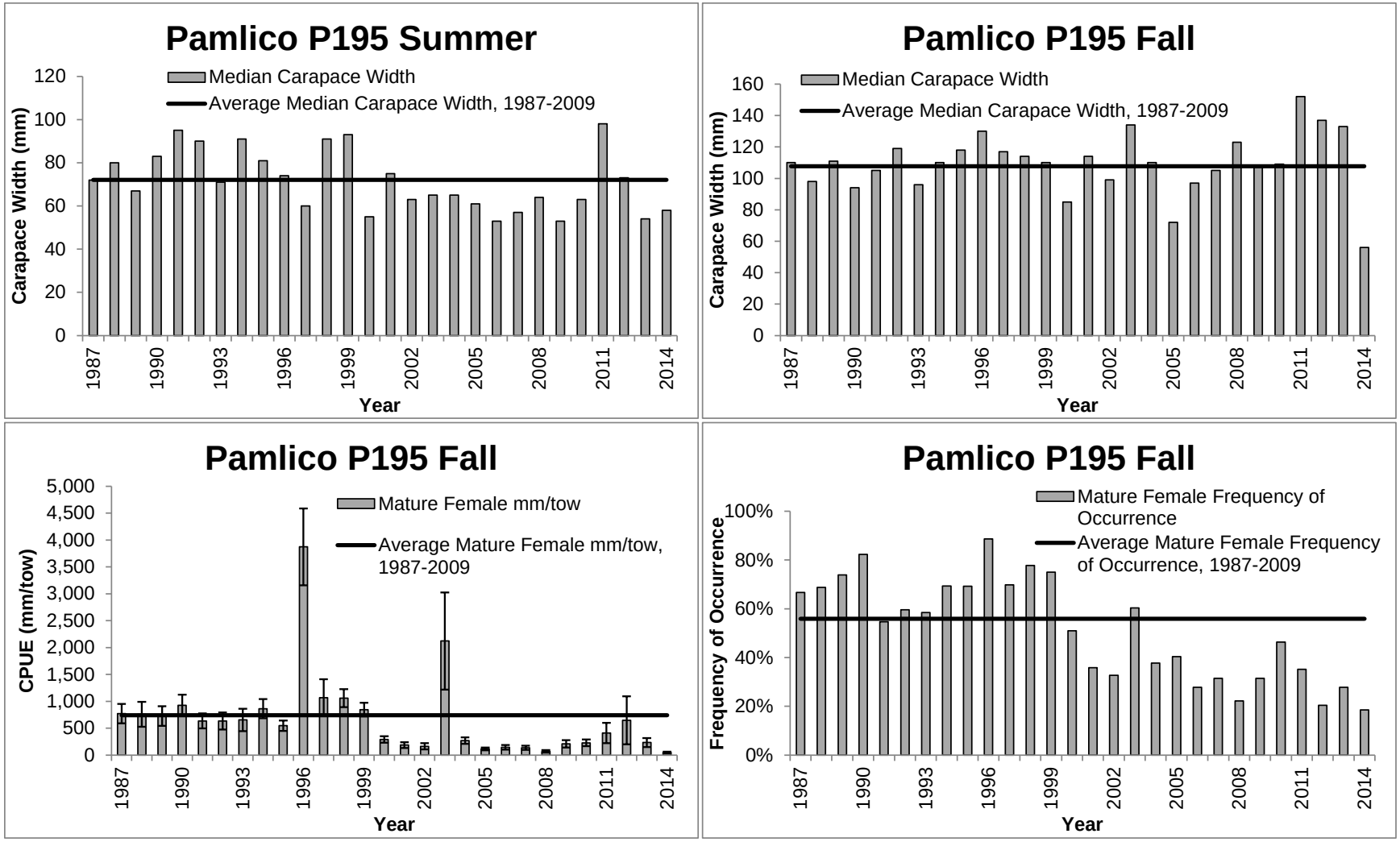


Figure 9. Indices from NCDMF program P195 used for the production characteristic of the Blue Crab Traffic Light, 1987-2014. Error bars represent one standard error of the mean.

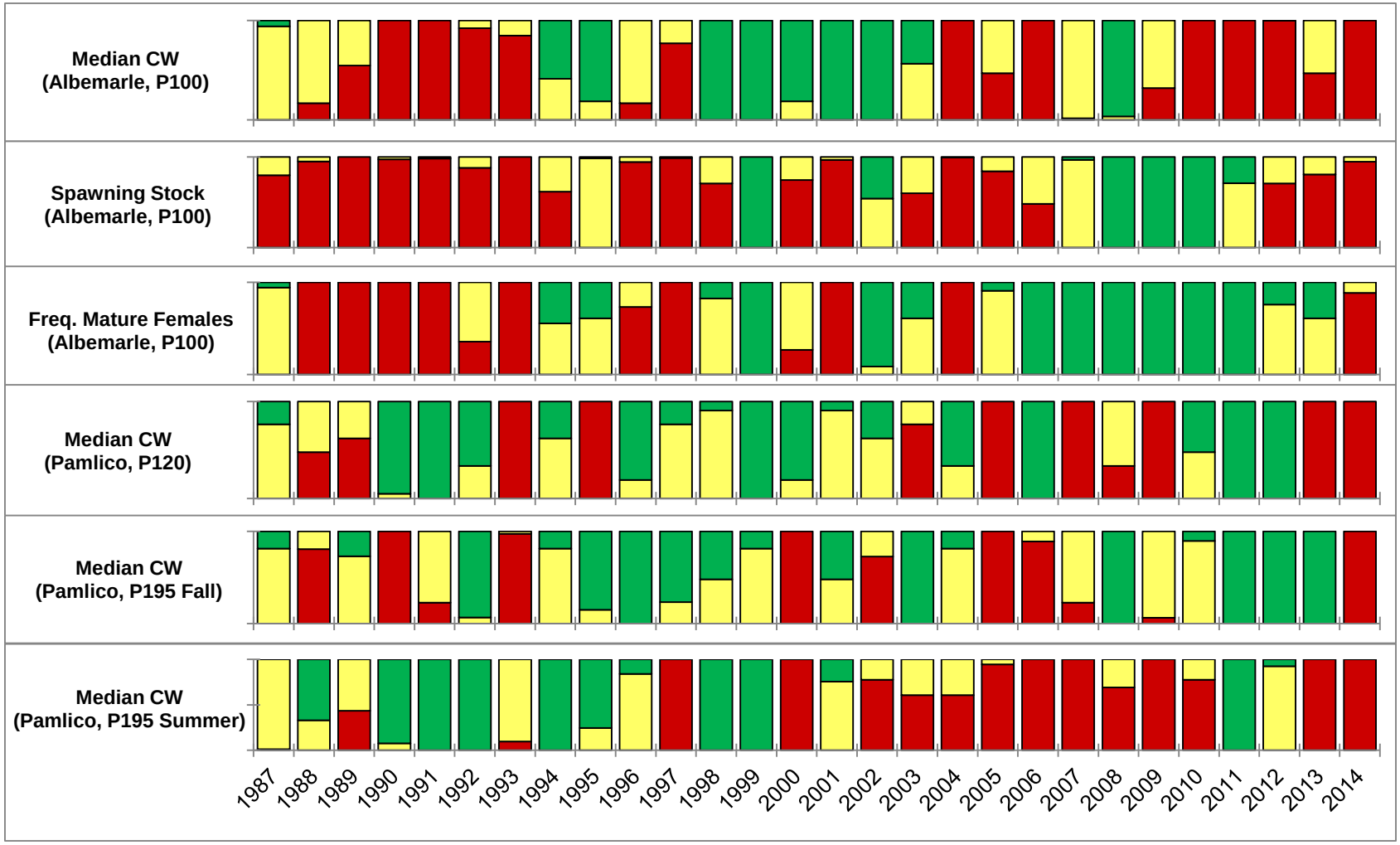


Figure 10. Blue Crab Traffic Light individual production indicators and integrated summary (bottom figure, next page), 1987-2014.

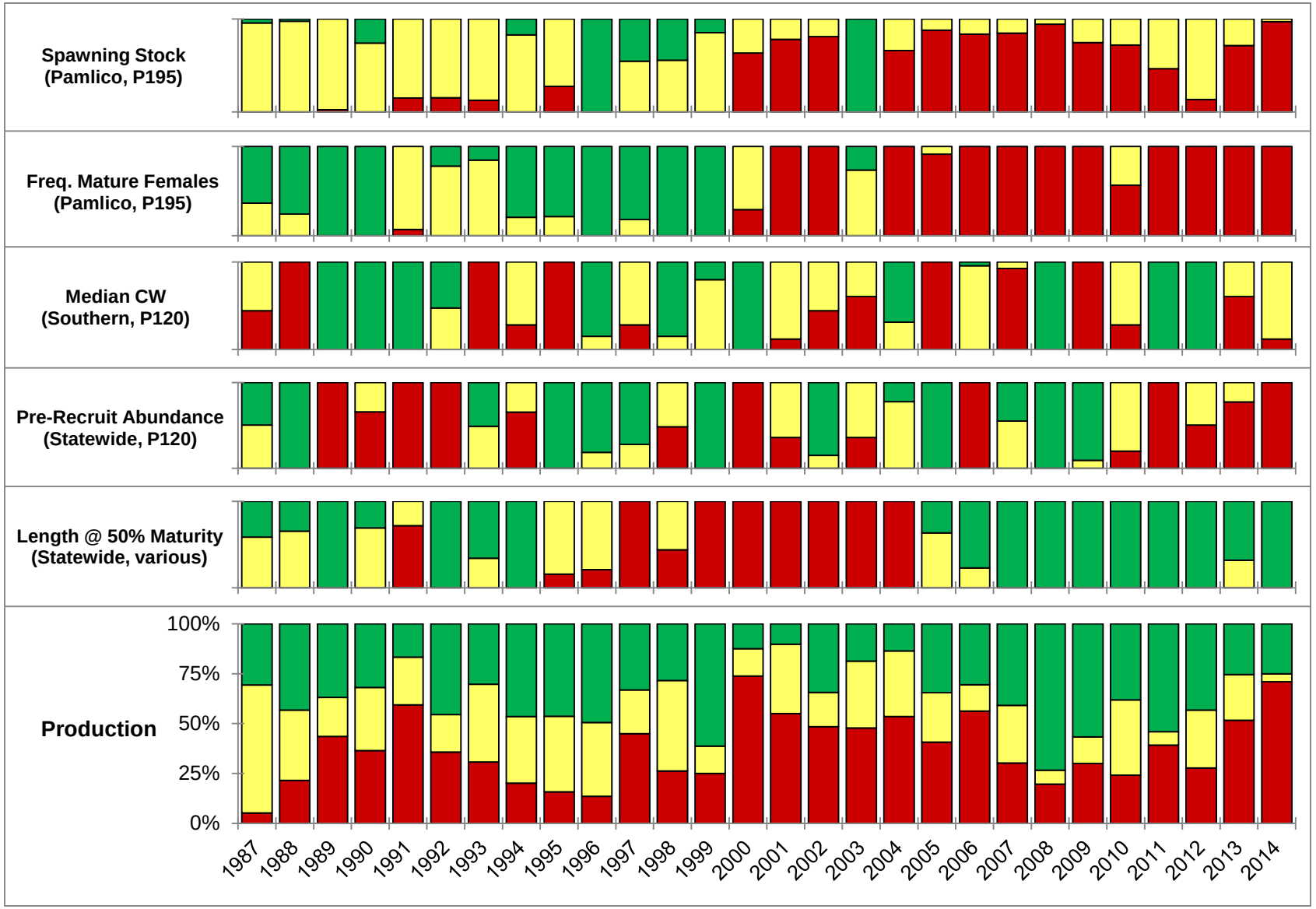


Figure 10 (cont.). Blue Crab Traffic Light individual production indicators and integrated summary (bottom figure), 1987-2014.

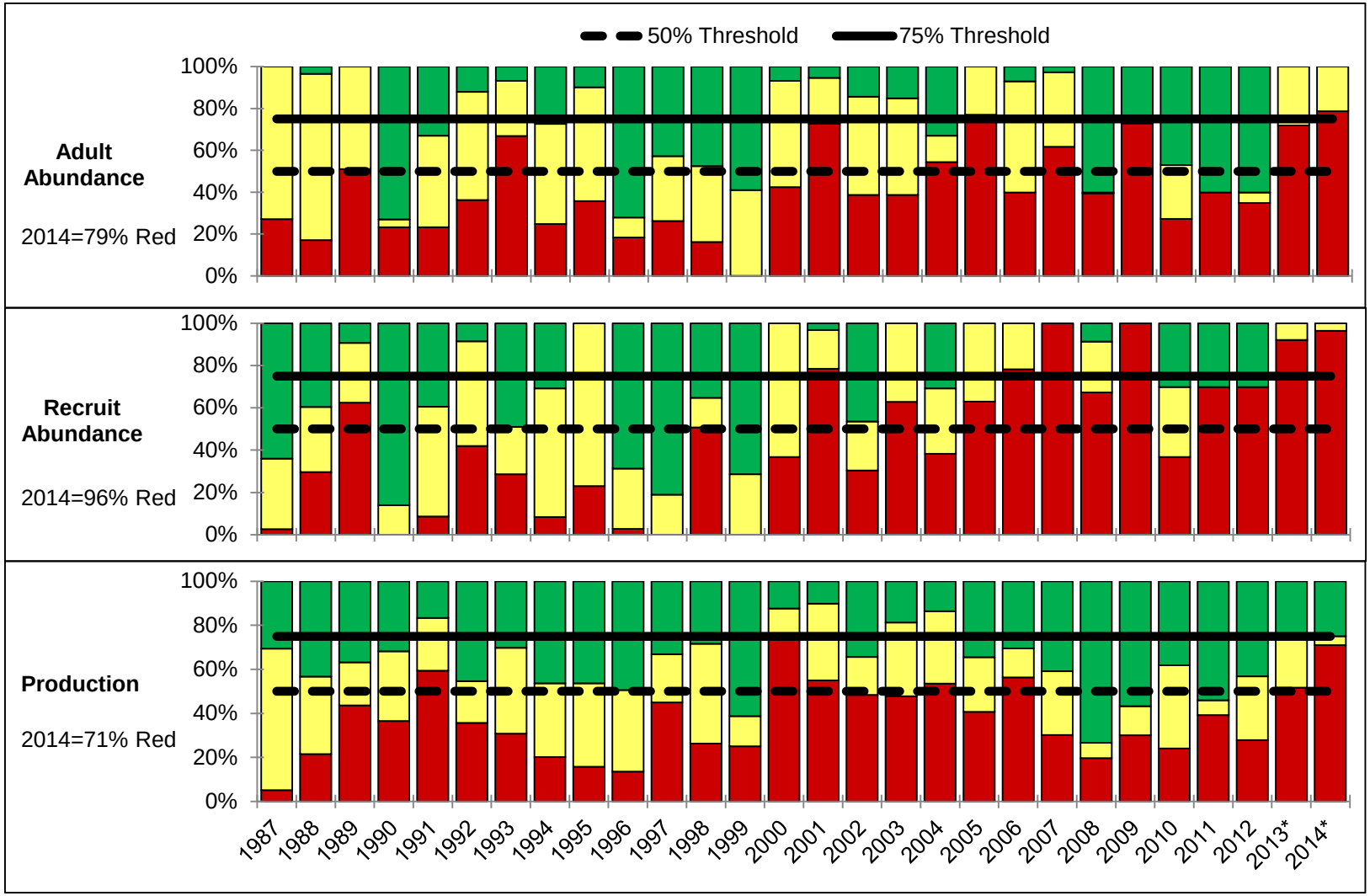


Figure 11. Blue Crab Traffic Light indicators for the adult abundance, recruit abundance, and production characteristics, 1987-2014. The dashed line represents the second quartile (50%) moderate management trigger and the solid line represents the third quartile (75%) elevated management trigger relative to the proportion of red.

FISHERY MANAGEMENT PLAN UPDATE
EASTERN OYSTER
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	August 2001
Amendments:	Amendment 1 – January 2003 Amendment 2 – June 2008 Amendment 3 – April 2014
Revisions:	None
Supplements:	Supplement A to Amendment 2 – November 2010
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	Amendment 4 is currently in development and scheduled for adoption in November 2016

The original N.C. Oyster Fishery Management Plan (FMP) was adopted by the North Carolina Marine Fisheries Commission (NCMFC) in 2001 and set up a process for designation of additional areas limited to hand harvest methods around Pamlico Sound and recommended several statutory changes to the shellfish lease program including higher fees, training requirements, and modified lease production requirements. The N.C. Oyster FMP Amendment 1 simply changed one of the criteria for designation of hand harvest areas from waters generally less than 10 feet deep to waters less than six feet deep. Highlights of the management measures developed in the N.C. Oyster FMP Amendment 2 include adopting a 15 bushel harvest limit in Pamlico Sound and a 10 bushel harvest limit for all gears in designated areas around the sound, reducing the available harvest season, changed the way lease production averages are calculated, limited lease applications to five acres and a recommendation to expand oyster sanctuary construction efforts. Supplement A raised the potential harvest limit in Pamlico Sound to 20 bushels and created a monitoring system for when to close mechanical harvest in that area. The N.C. Oyster FMP Amendment 3 created two seed oyster management areas in Onlsow County. The N.C. Oyster FMP Amendment 4 along with the N.C. Hard Clam FMP Amendment 2 is in development and scheduled for final adoption in November 2016.

Management Unit

The management unit includes the Eastern oyster (Crassostrea virginica) and its fisheries in all waters of coastal North Carolina.

Goal and Objectives

From the draft Amendment 4, approved by the North Carolina Marine Fisheries Commission in August 2014:

The goal of the N.C. Oyster FMP is to manage the state's oyster population so that it achieves sustainable harvest and maximizes its role in providing ecological benefits to North Carolina's estuaries. To achieve this goal, it is recommended that the following objectives be met:

1. Identify, restore, and protect oyster populations as important estuarine habitat.

2. Manage and restore oyster populations to levels capable of maintaining sustained production through judicious use of natural oyster resources, enhancement of oyster habitats, and development and improvement of oyster production on shellfish leases and franchises.

3. Minimize the impacts of oyster parasites and other biological stressors through better understanding of oyster disease, better utilization of affected stocks, and use of disease resistant and biological stress resistant oysters.

4. Consider the socioeconomic concerns of all oyster resource user groups, including market factors.

5. Recommend improvements to coastal water quality to reduce bacteriological-based harvest closures and to limit other pollutants to provide a suitable environment for healthy oyster populations.

6. Identify and encourage research to improve understanding of oyster population ecology and dynamics, habitat restoration needs, and oyster aquaculture practices.

7. Identify, develop, and promote efficient oyster harvesting practices that minimize damage to the habitat.

8. Initiate, enhance, and continue studies to collect and analyze economic, social, and fisheries data needed to effectively monitor and manage the oyster resource.

9. Promote public awareness regarding the ecological value of oysters and encourage public involvement in management and enhancement activities.

STATUS OF THE STOCK

Stock Status

There are insufficient data to conduct a traditional stock assessment for the Eastern oyster in North Carolina. Until that time, the NCDMF Oyster Plan Development Team recommends that the status of Eastern oyster in North Carolina continue to be defined as a species of concern. North Carolina commercial oyster landings have been in decline for most of the past century. This decline was likely initiated by overharvest and compounded by habitat disturbance, pollution, and biological and environmental stressors. Species designated by the NCDMF with a concern status exhibit one or more of the following: increased effort, declining landings,

truncated age distribution, or are negatively impacted by biotic and/or abiotic factors (e.g., water quality, habitat loss, disease, life history, predation, etc.). Oysters are believed to be vulnerable to overharvest because several factors negatively impact their survival.

Stock Assessment

An oyster stock assessment was attempted in 1999, but the necessary data were lacking to determine levels of sustainable harvest. Since there were no significant changes in the types and quantity of data collected, an oyster stock assessment could not be achieved in 2006 and again in 2014. Collection of appropriate data should be initiated in order to conduct a stock assessment and determine levels of sustainable harvest (NCDMF 2008).

Data are not available to perform a traditional assessment so it was not possible to estimate population size or fishing mortality rates in the latest update in 2014. The only data representative of the stock were the commercial landings and associated effort. For this reason, the current assessment focused on trends in catch rates in the commercial oyster fishery. These catch rates should not be considered an unbiased representation of trends in population size; fisheries-dependent data are often not proportional to population size due to a number of caveats and should be interpreted with caution if the interest is relative changes in the population. In order for a fisheries-dependent index to be proportional to abundance, fishing effort must be random with respect to the distribution of the population and catchability must be constant over space and time. Other factors affecting the proportionality of fishery-dependent indices to stock size include changes in fishing power, gear selectivity, gear saturation and handling time, fishery regulations, gear configuration, fishermen skill, market prices, discarding, vulnerability and availability to the gear, distribution of fishing activity, seasonal and spatial patterns of stock distribution, changes in stock abundance, and environmental variables. Many agencies, such as the NCDMF, do not require fishermen to report records of positive effort with zero catch; lack of these “zero catch” records in the calculation of indices can introduce further bias.

The North Carolina commercial Eastern oyster fishery is subject to trip limits, which could bias catch rates (Mike Wilberg, UMCES, pers. comm.; John Walter, NOAA Fisheries, pers. comm.); that is, the trip limits affect the amount of catch that is observed per unit effort—the true value of the variable cannot be observed. A censored regression approach was attempted to calculate an index of relative abundance (numbers harvested per transaction) using data collected from a fishery with trip limits.

Data were obtained from the North Carolina Trip Ticket Program for 1994 through 2013. The censored response variable (catch per unit effort) was fit within a Generalised Additive Models for Location Scale and Shape (GAMLSS) framework using the ‘gamlss.cens’ (Stasinopoulos et al. 2014) and ‘survival’ (Therneau 2014) packages in R (R Core Team 2014). Catch rates were estimated for both hand harvest and mechanical harvest in each of the major water bodies from which Eastern oysters are harvested where sufficient data were available. Data were summarized by fishing year (October through March for hand harvest and November through March for mechanical harvest). Only landings from public bottom were examined.

Catch rates were expressed as bushels harvested per transaction. The censored regression approach failed for both hand and mechanical harvest data despite trying three different distributional assumptions (lognormal, gamma, t). This failure was believed to be due to the large number of trips (transactions) that meet or exceed the trip limit in both fisheries. Similar work found that when about 50% or more of the trips equaled or exceeded the trip limits, there

was not enough information from the uncensored trips to produce a reliable model. Here, 51.4% of trips by hand gears equaled (39.3%) or exceeded (12.1%) the trip limits over all water bodies and fishing years combined; the number of trips equaling or exceeding the trip limits for mechanical gears was 43.5% (42.9% equaled and < 1% exceeded).
Available data are considered insufficient for estimating reliable fishing mortality rates.

STATUS OF THE FISHERY

Current Regulations

Oysters cannot be taken from any public or private bottom in areas designated as prohibited (polluted) by proclamation except for special instances for: Shellfish Management Areas (NCMFC Rule 15A NCAC 03K .0103), with a permit for planting shellfish from prohibited areas (NCMFC Rule 15A NCAC 03K .0104), and for the depuration of shellfish (NCMFC Rule 15A NCAC 03K .0107). Oysters cannot be taken between the hours of sunset and sunrise of any day. Beginning in April 2014, time and temperature control measures were initiated for oysters to prevent post-harvest growth of naturally-occurring Vibrio bacteria that can cause serious illness in humans.

Public Bottom:

The minimum size limit for oysters from public bottom is 3-inch shell length. Both the hand and mechanical oyster harvest season from public bottom are opened annually by proclamation. It is unlawful to sell oysters taken on Saturday and Sunday from public bottom.

The hand-harvest season for commercial and recreational harvest begins on October 15 each year with commercial harvest limited to Monday through Friday each week and recreational harvest allowed seven days a week. Mechanical methods are only allowed from sunrise to 4:00 p.m. Recreational harvest is only allowed by hand methods. The season typically continues until closed by rule on March 31 although some locations may close earlier due to perceived excessive harvest. Brunswick County is the only area frequently closed early due to this concern and it was closed by proclamation on March 15, 2015 during the 2014/15 harvest season on public bottom. The daily hand harvest limit for oysters in Pamlico Sound outside the bays is 15 bushel per day per commercial fishing operation and 10 bushels per day per commercial fishing operation in the bays and in the Mechanical Methods Prohibited area along the Outer Banks of Pamlico Sound. Areas from Core Sound south have a daily hand harvest limit of 5 bushels per person not to exceed 10 bushels in any combined fishing operation regardless of the number of persons, license holders, or boats involved. Recreational daily harvest limits in 2014/15 were one bushel per person per day not to exceed two bushels per vessel per day.

The mechanical harvest season for oysters in 2014/15 was opened November 10, 2014, and areas where mechanical harvest gear was allowed were restricted to deeper portions of the sounds, rivers and bays north of Core Sound. These areas are designated in N.C. Marine Fisheries Commission Rule 15A NCAC 03R .0108. The bays around Pamlico Sound are opened for a six-week season, and were opened from November 10 to December 19, 2014 with a 10-bushel-per-commercial-fishing-operation-per-day harvest limit. Areas outside the bays open to mechanical harvest were limited to a daily harvest limit of 15 bushels of oysters per operation. The mechanical harvest season can close sooner for areas in Pamlico Sound if sampling by NCDMF indicates that oysters of legal size have been reduced below 26% of the

sampling for two consecutive sampling trips, as directed by Supplement A to Amendment 2 of the Oyster FMP.

There are also further restrictions noted in the proclamation for mechanical oyster harvesters to make sure that cultch material and culled oysters are either put back into the water where they were taken or remain on the existing rocks. North Carolina has a rule in place (Marine Fisheries Commission Rule 15A NCAC 03K .0202) requiring culling on site. The following restrictions were put in place beginning with the 2012-13 oyster season to discourage those practices.

> It is unlawful to possess more than **five** bushels of unculled catch onboard a vessel. Only material on the culling tray is exempt from culling restrictions.
>
> It is unlawful to possess unculled catch or culled cultch material while underway and not engaged in mechanical harvesting.

Also some harvesters did not have vessels or dredges rigged for circular dredging patterns which work best with towing points over the side of the vessel or for short tows to allow for culling between pickups. The following restrictions were put in place to encourage circular dredging patterns and shorter tows to keep the cultch and culled oysters on the existing rocks.

> It is unlawful for the catch container (bag, cage) attached to a dredge to extend more than **two** feet in any direction from the tooth bar.
>
> It is unlawful to tow a dredge unless the point where the tow line or cable exits the vessel and goes directly into the water is on the port or starboard side of the vessel forward of the transom.

Private Bottom**:**

The minimum size limit for oysters from private bottom 3-inch shell length and culling requirements only occurs during the open public harvest season, the rest of the year there is no minimum size requirement for oysters taken from private bottom. There is no daily maximum harvest limit applied to the taking of oysters from private bottom in internal waters.

Possession and sale of oysters by a hatchery or aquaculture operation and purchase and possession of oysters from a hatchery or aquaculture operation are exempt from the daily harvest limit and minimum size restrictions. The possession, sale, purchase and transport of such oysters must be in compliance with the Aquaculture Operation Permit.

Commercial Landings

Data on landings by gear indicate that, prior to 1960, most of the oysters were taken by dredge when compared to all hand methods. Chestnut (1955) reported that ninety percent of the oysters landed in North Carolina came from Pamlico Sound. The Pamlico Sound area is largely dependent on dredging. The resurgence of the dredge landings in 1987 was due, in part, to increased oyster populations and in part to increased effort, as displaced mechanical harvest clam harvesters turned to oyster dredging due to closure of southern clam areas by a red tide. These closures affected 98% of the clam harvesting areas and had its greatest impact on the clam fishermen. The red tide was a dinoflagellate bloom that caused closure of over 361,000 acres of public bottoms to shellfish harvest from November 1987 to May 1988. The

dinoflagellate (*Karenia brevis*) produced a neurotoxin, which was concentrated in shellfish, making them unfit for consumption. Hand harvest landings of oysters failed to reach their potential that same year due to the fact that a majority of the hand-harvest-only areas were also closed because of the red tide (Figure 1). Hand harvest landings are the most consistent contributor to the State's oyster fishery. Hand harvest landings exceeded the dredge landings for significant periods between 1961 and 1970 and between 1989 and 2008 (Figure 1).

The oyster parasite *Perkinsus marinus*, also known as Dermo disease, has been responsible for major oyster mortalities in North Carolina during the late 1980s to mid-1990s. Dermo, a protist, similar to dinoflagellates, causes degradation of oyster tissue. Once infected, oysters suffer reduced growth, poor condition, diminished reproductive capacity and ultimately mortality resulting from tissue lysis and occlusion of hemolymph vessels (Ford and Figueras 1988; Ford and Tripp 1996; Haskin et al. 1966; Ray and Chandler 1955). Chestnut (1955) may have been the first to report its occurrence in North Carolina. However, no extensive assessments were attempted until large-scale oyster mortalities prompted investigations during the fall of 1988. Oyster samples from 11 sites were sent to the Virginia Institute of Marine Science (VIMS) and the Cooperative Oxford Laboratory. Results showed that Dermo infection was the major cause of mortalities (NCDMF 2008).

Staff observed in the southern estuaries while the Dermo infections were on the rise, that during late summer, moderate and high Dermo infection levels did not reduce oyster populations. Hand harvest landings in the south from 1991 through 2002 did not decline in the same manner as landings from Pamlico Sound during the same time. It is suspected that the small, high salinity estuaries may inhibit mortality by flushing out parasites at a higher rate or by exceeding the salinity tolerance of the Dermo parasite, allowing for a higher survival rate compared to Pamlico Sound. The link between low dissolved oxygen, increased availability of iron and increased parasite activity may also be a factor in the different mortality rates as the smaller, high salinity estuaries are less prone to low dissolved oxygen events than the Pamlico Sound (Leffler et al. 1998). Dermo infection intensity levels since 2005 have remained low; however prevalence appears to be increasing (NCDMF unpublished data). Dermo infection intensity has remained low and mechanical harvest landings in Pamlico Sound continued to recover from the extremely high Dermo mortality levels and hurricane impacts of the mid-1990s until additional environmental impacts began affecting the fishery in 2011 (Figure 1).

Overall oyster landings have been increasing in the last ten years (Figure 2). Hand harvest has shown a slight increasing trend in landings for the past ten years, but the most significant increase occurred during the 2009/10 and 2010/11 mechanical harvest season (Figures 1 and 2). During the early 2009/10 mechanical harvest oyster season, the Great Island Narrows area between Great Island and the mainland in Hyde County in Pamlico Sound experienced intensive oyster harvest (Figures 1 and 2). Some of the operations were harvesting the 15-bushel limit, offloading, returning to the area with a new crew and harvesting another limit the same day. The harvest limit of 15 bushels per commercial fishing operation per day did not apply to vessels that replaced the crew since the new crew constituted a new commercial fishing operation according to standing division policy. Staff investigation of this intensive harvest indicated that substantial shell damage was occurring on the remaining oysters and the area was closed after six weeks of harvest. The oyster dredge fleet moved out into the open sound and continued to have good catches for the rest of the 2009/10 mechanical harvest oyster season.

The 2010/11 season began with a 2:00 pm time limit on dredging to stop the two-trips-per-day loophole but it probably had little impact on mechanical harvest since experienced dredgers

could take their limit in a few hours and there appeared to be many new entrants into the fishery. The traditionally harvested oyster rocks in the deeper waters of western Pamlico Sound contributed greatly to the increased landings in the 2009/10 and 2010/11 seasons but the Middle Ground area in 2010/11 provided another unexpected source of significant oyster production similar to the Great Island Narrows in 2009 (Figures 1 and 2). Also, interest in taking advantage of expected high market demand caused by closure of oyster harvest areas in the Gulf of Mexico due to the Deepwater Horizon oil spill lengthened the season slightly with a November 1 mechanical harvest season opening in the fall of 2010.

The last significant production of oysters from a non-traditional harvest area was reported by local fishermen to have occurred more than 20 years prior to the 2010/11 season or around the time of another large increase in mechanical harvest landings in 1987/88 (Figure 1). That production came from Brant Island Shoal and like the Middle Ground is an area in western Pamlico Sound generally around 12 feet deep and characterized by hard sandy bottom. Dredge samples and sonar observations from the Middle Ground oyster producing area revealed that there were no typical oyster rock formations and the cultch material producing the oysters was typically large “fossil” clam shells. Nearby oyster rocks are found in areas around 18 feet deep and on mounds of oyster shell cultch. The oysters tended to be very large with most samples averaging more than the 3-inch (76 mm) size limit and up to 80 percent of some samples legal for harvest. There were reports that some shucking houses complained the oysters were too large. These Middle Ground oysters also displayed an unusual shell characteristic with very long, thin umbos, or beaks, not normally seen on Pamlico Sound oysters.

Hurricane Irene hit the North Carolina coast on August 27, 2011 and had major impacts on the mechanical harvest area for oysters. The oyster resources on the Middle Ground could not be located after the storm probably due to sedimentation or physical relocation caused by waves or currents. Many of the deeper water oyster resources located near Brant Island Shoal were also significantly damaged (Figure 3). Most of the damage was oyster mortality caused by detritus covering the oyster rocks. Oyster resources in the Neuse and Pamlico rivers did not appear to suffer much damage but also did not show any of the typical growth characteristics during the following fall and winter months. These factors had a pronounced effect on the mechanical harvest oyster season in 2011/12 and the mechanical harvest area in western Pamlico Sound was closed on January 2, 2012. Mechanical harvest landings declined to near 2008/09 levels (Figure 1 and 3). Regular sampling of oyster sizes to fulfill the requirements of Supplement A to the N.C. Oyster FMP has made it clear that oyster growth during the harvest season is essential to sustain acceptable harvest levels.

Prior to the 2012/13 mechanical harvest season, an apparent, severe low dissolved oxygen event occurred in the Neuse River that caused virtually a 100 percent mortality of the oyster resources at 18 feet or greater depths. A few oyster rocks in shallower waters between Maw Point Shoal and Light House Shoal were spared as well as some division oyster habitat enhancement projects in other shallow areas (Figure 3). The Pamlico River area also had not recovered from the effects of Hurricane Irene at this time. The Neuse River area was available for mechanical harvest until the adjacent bays closed on December 21 although there was no harvest activity in the river during the time it was open. The Pamlico River area closed to mechanical harvest on February 1, 2013 based on failure to meet the 26-percent trigger although effort was much reduced since early January. The 2012/13 mechanical harvest oyster landings declined further.

There was little evidence of any recovery of the Neuse River oyster resources prior to the 2013/14 season but the Pamlico River area appeared to be recovering and growth indicators

were good during the season. The Dare County area in northern Pamlico Sound also supported some significant mechanical harvest activity throughout the season and when oyster harvests began to decline in the western sound in early February, 20 to 25 boats moved to Dare County to finish the season. The remaining productive areas in the Neuse River closed on February 28, 2014 and most of the harvesters left the Pamlico River area by mid-February. Mechanical harvest in Dare County continued until the season ended on March 31, 2014. The overall result was some increase in the combined gear oyster landings with over 725,000 pounds of meats landed in 2014 (Figure 2).

The 2014/15 mechanical harvest season opened on November 10, 2014, all areas were above the percentage of legal-sized oysters during preseason sampling. Effort was still consistently low in the Neuse River due to limited amounts of oysters available for harvest and this area was closed on March 23. The Pamlico River area also showed promise for growth and maintaining the number of legal sized oysters to stay open, but fishing effort was much higher in the Pamlico River area with the fleet scattered from the mouth of the river to Brant Island (Figure 3). Pamlico River closed on March 9 and did not re-open for the rest of the season. At the beginning of the season, effort in Hyde County was mostly in Wysocking Bay while effort in Dare County was from Sandy Point to the Crab Hole. After Christmas, more effort shifted into the Crab Hole area off of Stumpy Point Bay due to Hyde County boats joining the Dare County fishery. Dealers reported that fishermen were bringing in their limits by mid-day. After the fleet shift to Northern Dare, sampling resulted in less than 26 percent legal-size oysters for two consecutive sampling trips in both Dare and Hyde Counties which resulted in a closure of these areas on January 12, 2015. Sampling continued and it was decided to stop sampling Hyde County because of no improvement. Staff continued to sample Dare County and the area was re-opened on March 9, 2015 and closed by rule on March 31, 2015. The fleet encountered what was described as a “crust” covering much of the oyster rocks fished on opening day and took several days to break up this “crust”. Effort was high in the Northern Dare area for the re-opening with approximately 50 boats fishing on the first day and dropping off to around 20 boats. The 2014/15 peaked in December. Closures of the Northern Hyde and Dare areas resulted in declines in harvest in January and in combination with weather impacts in February.

Recreational Landings

Unknown

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Currently, the only data available for the stock in all areas are the commercial landings and associated effort from the Trip Ticket Program. No fishery dependent monitoring programs occur for oysters.

Fishery-Independent Monitoring

There are two independent programs for oysters. One is a long-term spatfall sampling program conducted by the Habitat and Enhancement section to estimate recruitment of spat (P610). The second program is an indicator for habitat disturbance and damage of the commercial dredge fishery on public bottom to determine closure of the season for habitat protection of oyster rocks.

Mechanical Harvest Area Oyster Sampling

Supplement A to Amendment 2 established the trigger for closing areas to mechanical harvest to protect the resource and habitat. The management trigger was established and defined as when the sampling indicates the number of legal-sized (3-inch) oysters in the area has declined to 26% of the live oysters sampled. The management areas are divided geographically into four areas; the Neuse River Area, Pamlico River Area, Northern Hyde Area, and Northern Dare Area (Figure 4). Sampling targets areas and oyster rocks being worked by commercial oystermen, directly before the opening of and throughout the mechanical harvest oyster season. The sampling sites are selected based on the presence/absence of commercial oystermen working in the area. Only areas where commercial oystermen are working are sampled to determine localized depletion and address habitat protection. From each sample, the first 100 live oysters, including spat and any boxes, are collected for workup. Each oyster, up to a maximum of 100, is measured to the nearest mm and inspected for any damage. Shell damage is denoted as none, minor, or substantial for further evaluation.

Sampling began on September 23, 2009 with preseason oyster sampling, in five management areas, using mechanical harvesting methods. Sampling has consistently continued with a target of 10 sites per management area, throughout the four management areas. All sampling is conducted using NCDMF vessels and standard oyster dredges with comparable construction to those used by commercial oystermen. Samples are collected at least bi-monthly in each management area before, during, and after the open mechanical oyster harvest season. More intensive sampling is conducted if samples are near the trigger percentage. Sampling continues after an area is closed to assess the possibility of reopening. Sampling is discontinued when it is apparent that reopening is not likely to occur. Mean oyster shell height (commonly referred to as length) is calculated for each 100-oyster sample. The number of legal-sized (≥76 mm) and undersized (<76 mm) oysters is determined for each sample. The total legal-sized oysters for all the samples taken in a management area on a sampling trip is divided by the total of all oysters sampled on that trip to calculate the percentage used to assess compliance with the harvest closure trigger. Oyster sizes are also sorted into 5 mm size bins and the size distribution for the area is presented as a line graph. Box/gaper size distribution is sorted and displayed similarly. Sampling results are reported to interested dealers/fishermen after each sampling event.

This sampling is not intended for use as a species abundance index, but instead to reflect the conditions of the habitat during the open oyster mechanical harvest season to determine closure of an area as a protection measure. For the purpose of this update only the prior open mechanical harvest season data will be provided with a brief overview of the season.

All areas were above the percentage of legal-sized oysters during preseason sampling of the 2014/15 mechanical harvest season. Pamlico River closed on March 9 and did not re-open for the rest of the season. The areas in the northern region of Dare and Hyde Counties closed on January 12, 2015. Sampling continued and it was decided to stop sampling Hyde County because of no improvement. Staff continued to sample Dare County and the area was re-opened on March 9, 2015. Effort was consistently low in the Neuse River throughout the season due to limited amounts of oysters available for harvest and this area was closed on March 23. Table 1 shows the percentages of legal-sized oysters taken by area throughout the 2014/15 mechanical harvest season.

Spatfall Evaluation

Division staff conduct spatfall sampling annually, on cultch planting sites from the previous three years, during January but samples may be collected through April, if required. Subtidal sites are sampled by towing a standard oyster dredge over the planting site until, at a minimum, 30 pieces of cultch are collected. Normally a 75-pound, 36-inch toothed bar dredge is used; however, various other dredges may be used. On rare occasions, patent tongs and hand tongs may be used to obtain planting samples. Intertidal sites are sampled by hand at low tide in all applicable intertidal areas of the Southern District and hand tongs are used in the more northerly subtidal areas of Stump Sound and New River. Three tong grabs per location are usually taken to obtain the minimum amounts of cultch required. Gear type and any other valuable gear parameters are recorded. Prior to 2005, data was not collected south of New River.

Thirty pieces of cultch are randomly selected from each sample and the type of cultch (oyster, calico scallop, surf clam, marl, or sea scallop) is noted. The total number of spat on each piece of cultch is enumerated, with each spat being measured to nearest millimeter shell length. The average number of spat per piece of cultch is calculated by summing the number of spat per cultch piece, divided by the total number of cultch pieces sampled. Annual Juvenile Abundance Index (JAI) is calculated as the average number of spat per site and then averaged across all sites within that year. The ten year average is calculated by averaging the annual JAI over the last 10 years.

The JAI has been somewhat variable from year to year in the more recent years in the time series, but overall showing an increasing trend for the past ten years (Table2; Figure 5). The 2014 JAI was the second highest in the ten year time series (Table 2).

MANAGEMENT STRATEGY

There are no management triggers or methods to track stock abundance, fishing mortality, or recruitment between benchmark reviews from the current FMP.

Highlights of the management measures developed in Amendment 2 include adopting a 15 bushel harvest limit in Pamlico Sound and a 10 bushel harvest limit for all gears in designated areas around the sound, reducing the available harvest season, changed the way lease production averages are calculated, limited lease applications to five acres and a recommendation to expand oyster sanctuary construction efforts. Supplement A raised the potential harvest limit in Pamlico Sound to 20 bushels and provided a monitoring system for determining the closure of mechanical harvest areas when sampling indicates the number of legal-sized oysters in the area has declined to 26 percent of the live oysters sampled for two consecutive sampling occurrences. This trigger is to protect the resource and habitat and not a measure to track stock abundance or removals from the stock (fishing mortality). Amendment 3 established two seed oyster management areas in Onslow County.

See Tables 3, 4, and 5 for current management strategies and implementation status in Amendment 2, Supplement A to Amendment 2, and Amendment 3 of the Oyster FMP.

MANAGEMENT AND RESEARCH NEEDS

Table 3, provides the NCMFC selected management strategy from Amendment 2 and Table 4 provides the NCMFC selected management strategy for Supplement A to Amendment 2. Table 5 provides the selected management strategy for Amendment 3. The specific research recommendations from Amendment 2 and Supplement A for Amendment 2, with the status of need provided in parenthesis, include:

Amendment 2

- Develop peer reviewed, standardized monitoring metrics and methodologies for oyster restoration and stock status assessments (standards that are strived for in all assessments and monitoring programs in NCDMF)
- Conduct studies on the impacts of current oyster dredging practices on oyster habitat (needed)
- Conduct studies on the effects of oyster dredge weight and size on habitat disturbance and oyster catches (needed)
- Determine a protocol and triggers for closures of oyster harvesting areas (ongoing through Supplement A in under development in draft Amendment 4)
- Conduct stock assessments of oysters located within polluted areas to determine feasibility of depuration operations (needed)
- Review current DEH rules to update to current depuration technologies (needed)
- Explore new technologies for off-bottom oyster culturing methods (needed)
- Develop new types of biomarkers that can be used to select more effectively for disease-resistant genetic oyster stock (needed)
- Develop disease-resistant or fast-growing strains of oysters (needed)
- Establish an oyster brood stock development program (work ongoing through UNCW hatchery)
- Develop methods to determine resistance of shellfish stocks to various diseases(needed)
- Assess survival and productivity of relayed oysters vs. natural recruitment on planted cultch (needed)
- Investigate timing of oyster spatfall, larval dispersal and transport (needed)
- Determine the hydrodynamics of areas for oyster restoration, culture activities and sanctuaries (needed)
- Collect population information on cownose rays (needed)
- Explore uses of cownose rays for food in the pet food industry and the human food industry (some work completed in Virginia but did not work out long-term)
- Explore uses of cownose rays as a source of chondroitin/glucosamine or oil for pet and human supplements (needed)
- Investigate markets for cownose rays (Some work in Virginia but did not work out for long-term)
- Investigate areas of sanctuary placement (shallow/deep), size, and impacts to the local fishing grounds (ongoing through NCDMF)
- Determine sanctuary size, profile, and amount of material needed (ongoing through NCDMF)
- Determine the cost of an oyster sanctuary project (private vs. state) (ongoing through NCDMF)
- Investigate larval oyster dispersal and transport (needed)

- Investigate oyster spat settlement success on different cultch materials (some research conducted through UNC-IMS)
- Continue research on means and methods for reduction of non-point source pollution and mitigation of pollutant effects in the estuary (ongoing through the CHPP)
- Determine the effect of shellfish filtering capacities on water quality parameters, such as bacteria, nutrients and sediments (unknown)
- Support collaborative research to more efficiently track bacterial sources for land-based protection and restoration efforts (ongoing through the CHPP)
- Quantify the impact of current fishing practices on oyster habitat suitability in North Carolina (needed)
- Determine the impact of docks siting practices and bottom disturbing activities on nearby habitats and on the shifting boundaries of habitat itself so that protective buffer distances can be established (ongoing through the CHPP)
- Quantify the relationship between water quality parameters and the cumulative effect of shoreline development units (i.e., docks, bulkhead sections) (ongoing through the CHPP)

Supplement A

- Further studies on the impacts of oyster dredging on oyster habitat (needed)
- Further studies on the effects of dredge weight and size on habitat disturbance and oyster catches (needed)
- Determine a protocol and triggers for closures of oyster harvesting areas (needed)
- Research providing a more timely management response to harvest pressure (ongoing through NCDMF)
- Evaluate a harvest closure (needed)
- Develop a program to monitor oyster reef height (needed)
- Evaluate methods to assess oyster resource and habitat condition prior to the season to determine a baseline for harvest levels in a season (e.g. oyster reef height, legal/sublegal abundance and general health of oyster stocks) (needed)

FISHERY MANAGEMENT PLAN RECOMMENDATION

Recommend maintain the current timing of the Benchmark Review. Amendment 4 of the N.C. Oyster FMP is currently in development and scheduled for NCMFC adoption in November 2016 with any recommended rules changes in effect by April 2017,

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TABLES

Table 1. Percentage of legal-sized oysters by area for the 2014/15 season in the mechanical fishery. *Includes samples from Wysocking Bay which closed December 19

Neuse River		Pamlico River		Northern Hyde County		Northern Dare County	
Date	Percent	Date	Percent	Date	Percent	Date	Percent
Sep. 22, 2014	24.6	Sep. 22, 2014	23.8	Oct. 1, 2014	31.0	Sep. 16, 2014	28
Nov. 5, 2014	32.0	Oct. 10, 2014	37.0	Dec. 1, 2014	30.0	Dec. 3, 2014	34
Dec. 3, 2014	31.2	Nov. 5, 2014	33.4	Dec. 15, 2014	21.3	Dec. 16, 2014	23
Dec. 15, 2014	36.0	Nov. 19, 2014	34.7	Jan. 5, 2015	24.6	Jan. 6, 2015	22
Jan. 6, 2015	32.0	Dec. 3, 2014	39.6	Jan. 29, 2015	22.0	Jan. 26, 2015	24
Jan. 21, 2015	23.3	Dec. 15, 2014	34.3	Feb. 12, 2015	22.7	Feb. 9, 2015	25.7
Jan. 29, 2015	29.2	Jan. 6, 2015	30.0	Mar. 31, 2015*	28.5	Feb. 25, 2015	26.2
Feb. 9, 2015	27.3	Jan. 21, 2015	30.3			Mar. 3, 2015	27.9
Mar. 9, 2015	19.1	Feb. 4, 2015	22.2			Mar. 25, 2015	28.8
Mar. 17, 2015	15.7	Feb. 27, 2015	23.7				
Apr. 13, 2015	13.9						

Table 2. The annual average number of oyster spat across all sampling sites, 2005-2014 (NCDMF Habitat and Enhancement Section).

Year	Number of sites sampled	Annual average number of spat across all sampling sites	Standard error
2005	110	1.4130	0.1329
2006	130	1.7736	0.1054
2007	132	1.8890	0.1308
2008	107	2.3810	0.1599
2009	111	3.1462	0.1935
2010	112	2.7676	0.1974
2011	99	2.1027	0.2196
2012	89	3.0416	0.3050
2013	82	1.8955	0.1898
2014	76	2.9216	0.2488

Table 3. Summary of the NCMFC management strategies and their implementation status for Amendment 2 of the Oyster Fishery Management Plan.

Management Strategy	Implementation Status
HARVEST ISSUES	
Recommend no change to the open shellfish harvest license	Accomplished
Recommend a 15 bushel hand/mechanical harvest limit in Pamlico Sound mechanical harvest areas outside the bays, 10 bushel hand/mechanical harvest limit in the bays and in the Mechanical Methods Prohibited area along the Outer Banks of Pamlico Sound.	Accomplished
Define recreational shellfish gear	Accomplished
Allow no sale of weekend shellfish harvest except from leases	Accomplished
Propose repeal of G.S. 113-169.2 license exemption.	Accomplished
Set recreational limits in rule and proclamation	Accomplished
Require all shellfish to be tagged at the dealer level	Accomplished
Adopt a new rule limiting mechanical harvest of other shellfish to areas where and season when mechanical harvest gear for shellfish is allowed in existing fisheries	Accomplished
10 bushel mechanical gear harvest limit in the Pamlico Sound bays with a six week (mid-November through December) season (until triggers are established)	Accomplished
Collect more data comparing the effects of 50 and 100 pound dredges prior to making a decision on this issue	Accomplished
Change existing rule to set the latest season closure date at March 31	Accomplished
PRIVATE CULTURE ISSUES	
Leave regulations as is for depuration facilities.	Accomplished
Utilize user coordination plans for shellfish lease issuance coast wide	Funding required but was not sought due to budget situation
Support private oyster larvae monitoring programs	Accomplished
Support construction of an integrated system of shellfish hatcheries and remote-setting sites	Accomplished
Develop a subsidized, fee-for-service disease diagnosis program.	Not under consideration at this time
Update seed oyster management in statutes and rule.	Accomplished
Monitor seeded oyster sanctuaries for cownose ray predation.	Research underway
Propose an exemption from G.S. 113-168.4(b)(1) when the sale is to lease, UDOC permit, or Aquaculture Operations Permit holders for further rearing	Accomplished
Require an examination with a passing score based on pertinent information in the training package irrespective of whether the applicant has obtained instruction voluntarily or is reviewing the information independently	Accomplished
Request that appropriate agencies such as the Oyster Hatchery and N.C. Sea Grant conduct shellfish lease training as part of their educational and outreach activities	Needed
Modify G.S. 113–201 to include a requirement of an examination with a passing score for persons acquiring shellfish leases by lawful transfers unless they have a shellfish lease that is currently meeting production requirements	Accomplished

Management Strategy	Implementation Status
Encourage harvesters to take volunteer time and temperature control measures on their product.	Covered by new permit requirement
Change the current rule specifying a three year running production average to a five year production average and change the statutory provision for a ten year lease contract to a five year contract	Accomplished
Limit acreage per shellfish lease application to 5 acres	Accomplished
A leaseholder holding at least 5 acres of shellfish bottom is required to meet shellfish lease production requirements before being approved for any additional lease acreage	Accomplished
Require Lat./Long. coordinates on lease corner locations as part of the requirement of a registered land survey	Accomplished
Develop regional lease acreage caps based on established use of water bodies	Accomplished Statute change – No NCMFC Action
Rewrite the statutory provision limiting the amount of shellfish lease acreage that can be held by an individual to include acreage held by corporations where the individual is a member, or any combination of corporate or family holdings	Accomplished
No change to rules affecting the issuance of permits for culturing shellfish in closed harvest areas	Accomplished
INSUFFICIENT DATA	
Recommend no change (status quo) to collect information on recreational harvest of shellfish through a license	Accomplished
ENHANCEMENT ACTIVITIES	
Expand and evaluate the number of designated oyster sanctuaries to increase oyster populations	Ongoing
Include current and future oyster sanctuaries into North Carolina Fisheries Rules For Coastal Waters Subchapter 03R.	Accomplished
Plant and monitor seed oysters on existing oyster sanctuary/artificial reef sites.	Accomplished
ENVIRONMENTAL ISSUES	
Review the results of the completed USACE EIS on the proposed introduction of Suminoe oysters in Chesapeake Bay and consult with sister states concerning use of these non-native oysters	Accomplished
Support DWQ's efforts to improve stormwater rules through permit comments and CHPP implementation and co-ordinate with sister agencies	Accomplished
Recommend DWQ to designate Use-Restoration waters in conditionally closed waters where moderate contamination and healthy shellfish beds are present and develop strategies to restore and protect those waters	Accomplished URW coordinator hired by DWQ
Recommend DWQ designate Use-restoration waters in areas where moderate contamination and appropriate shellfish culture conditions are present and develop strategies to restore and protect those waters	Accomplished URW coordinator hired by DWQ
Recommend to the DWQ to accept a lower threshold of 10,000 square feet to coastal stormwater rules	Accomplished
Recommend a naturally vegetative riparian buffer width of 50 feet	Accomplished

Management Strategy	Implementation Status
Recommend the exclusion of all wetlands (coastal and non-coastal), from the built-upon area calculations	Accomplished
Provide educational materials to harvesters in license offices and on DMF webpage, through other training opportunities, and through DMF Port Agent contact with harvesters and dealers and include other state and federal regulatory agencies to reach all coastal waters users	Partially Accomplished
Leave current management practices in place for Ward Creek	Accomplished
Recommend repeal of G.S. 113-207 (a) and (b) to end the requirement that all oyster rocks must be posted by the Department	Accomplished
Recommend that conservation leasing for constructed oyster rock habitat be studied by DENR counsel for development of a proper mechanism and to develop siting criteria	Not under consideration at this time

Table 4. Summary of the NCMFC management strategies and their implementation status for Supplement A to Amendment 2 of the Oyster Fishery Management Plan.

Management Strategy	Implementation Status
Proclamation authority up to 20 bushels per fishing operation with a harvest closure trigger when sampling indicates the number of legal-size oysters in the area has declined to 26% of the live oysters sampled	Accomplished

Table 5. Summary of the NCMFC management strategies and their implementation status for Amendment 3 of the Oyster Fishery Management Plan.

Management Strategy	Implementation Status
Create seed oyster management areas at Swan Point and Possum Bay in Onslow County	Accomplished

FIGURES

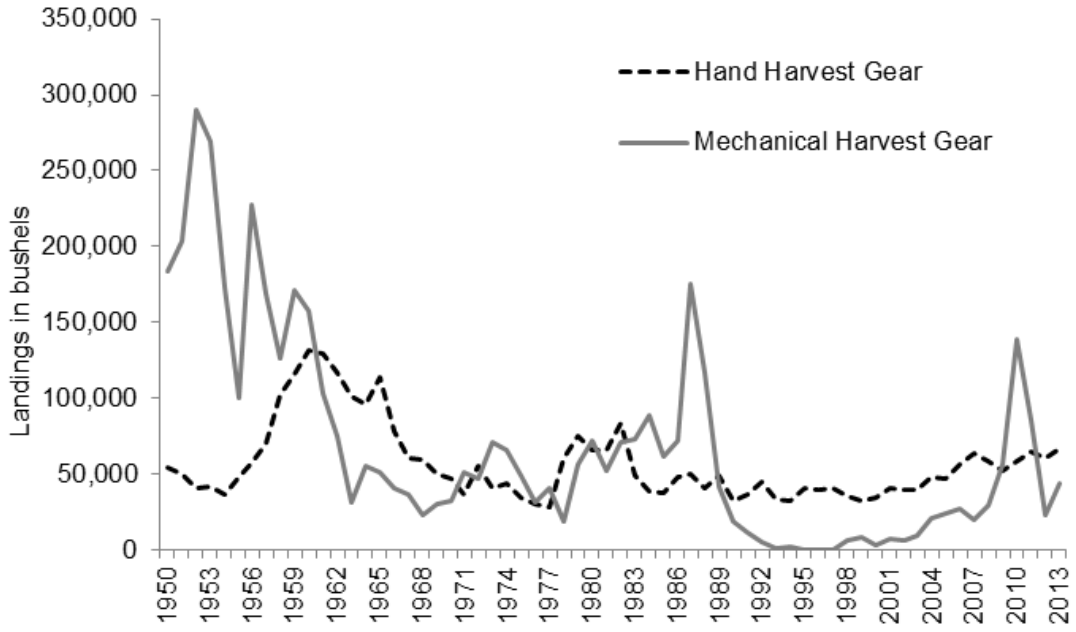

Figure 1. Annual commercial oyster landings (bushels)from both public and private bottom by gear 1950-2013 (Chestnut and Davis 1975; National Marine Fisheries Service unpublished data; NCDMF Trip Ticket Program).

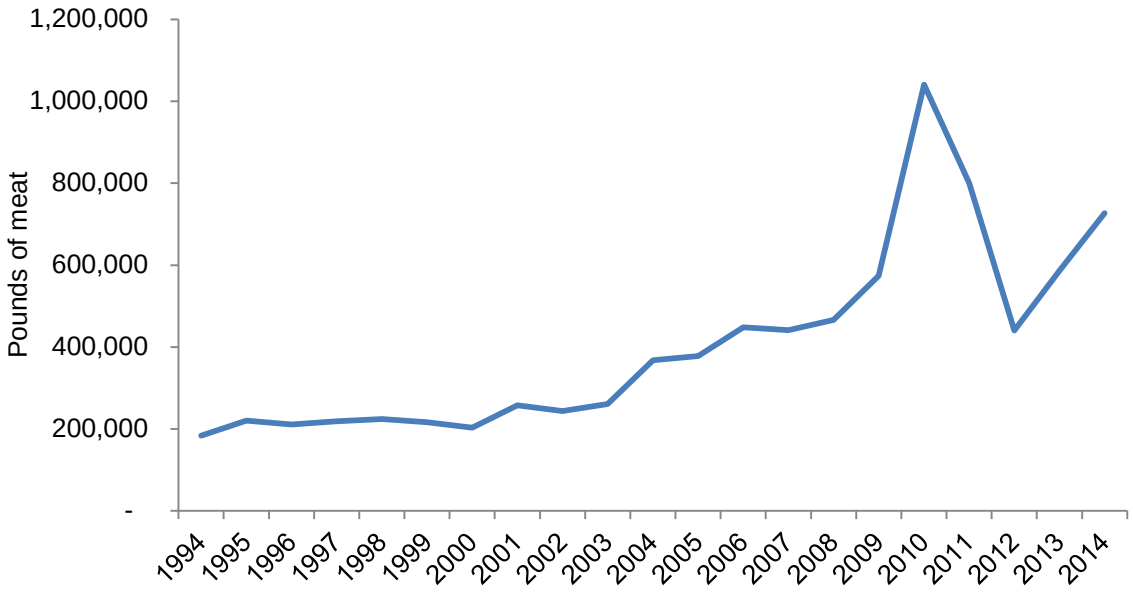

Figure 2. Annual commercial oyster landings (Pounds of meat) from private and public bottom in North Carolina, 1994-2014 (NCDMF Trip Ticket Program).

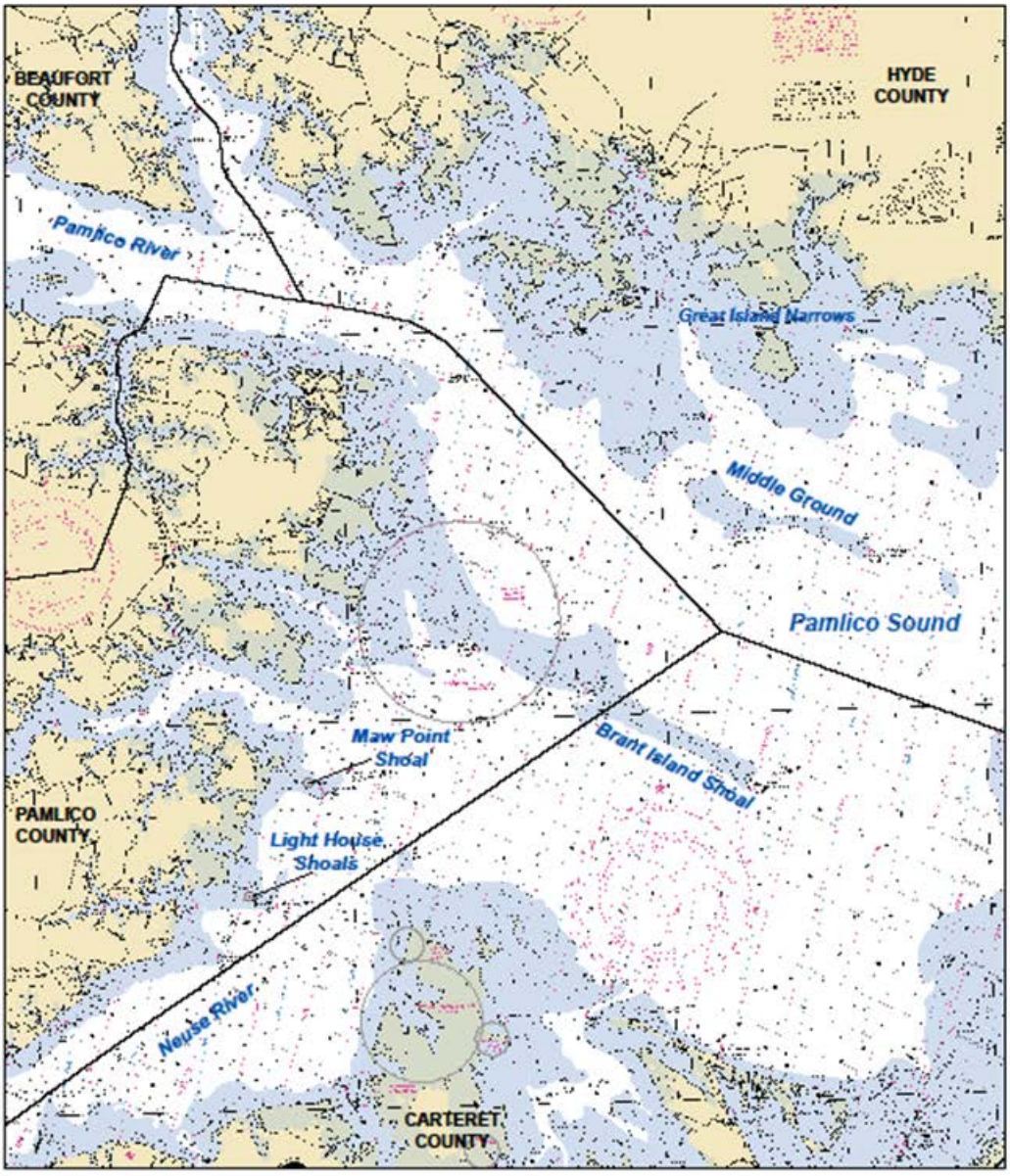

Figure 3. Map of areas referenced in the commercial landings section (NCDMF GIS database).

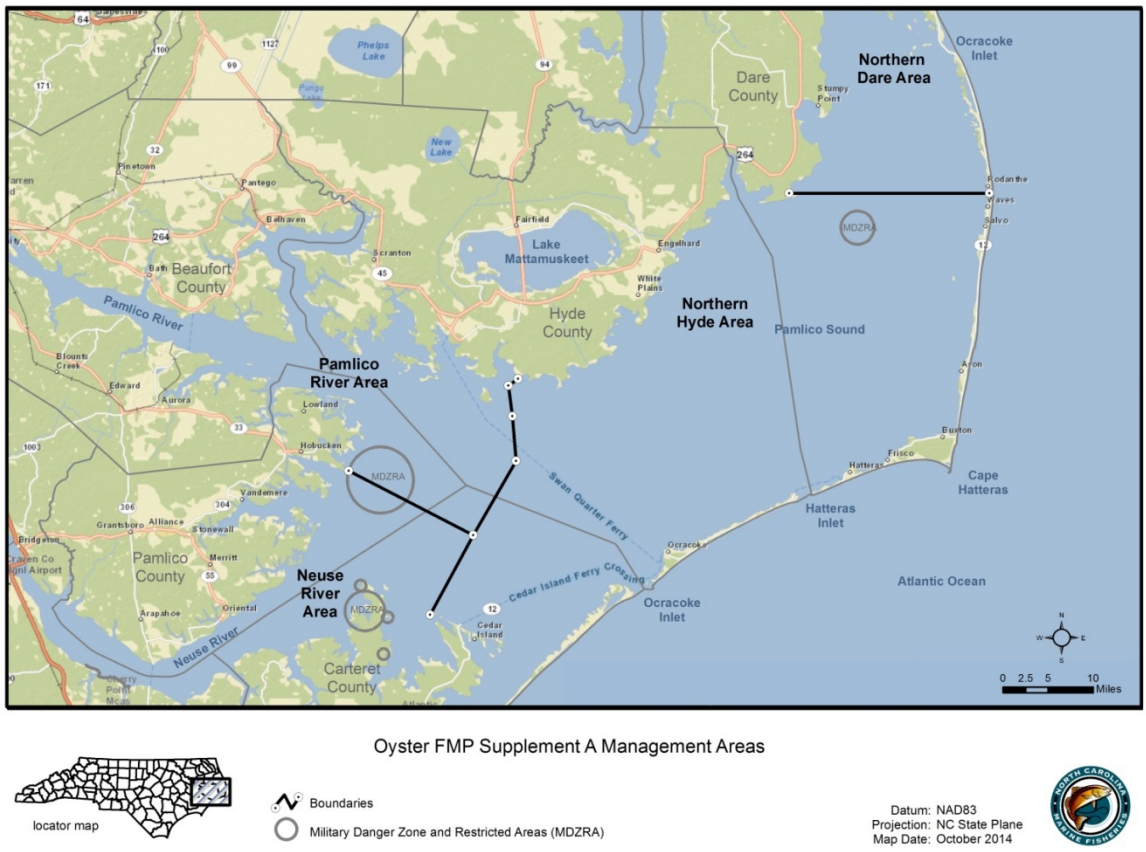

Figure 4. Mechanical harvest management areas from Supplement A to Amendment 2 of the Oyster FMP.

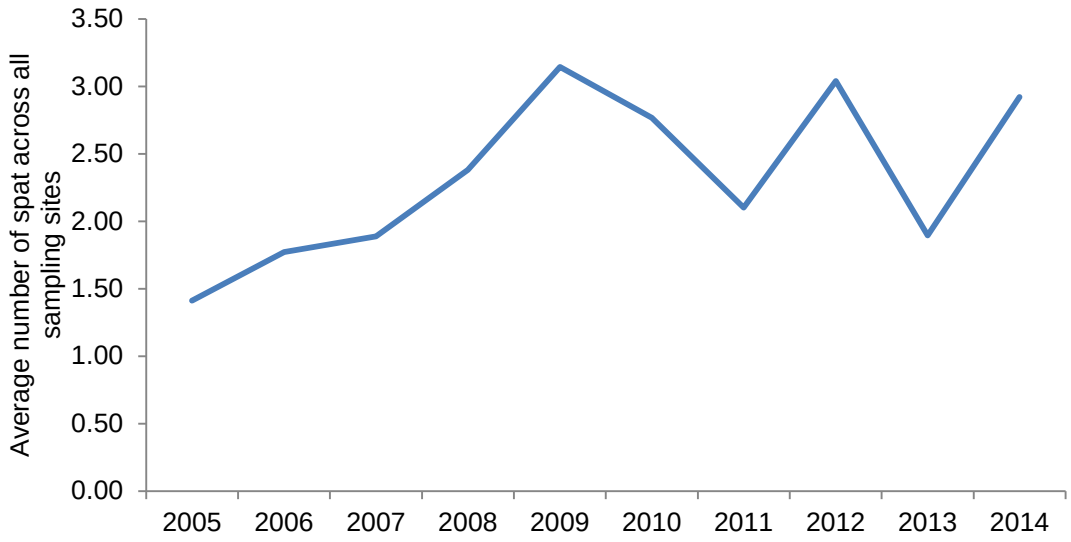

Figure 5. The annual average number of oyster spat across all sampling sites, 2005-2014 (NCDMF Habitat and Enhancement Section).

FISHERY MANAGEMENT PLAN UPDATE
NORTH CAROLINA ESTUARINE STRIPED BASS
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	1994
Amendments:	Amendment 1 – May 2013
Revisions:	November 2014
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	July 2018

Estuarine striped bass *(Morone saxatilis)* in North Carolina are currently managed under Amendment 1 to the North Carolina Estuarine Striped Bass Fishery Management Plan (FMP) and its subsequent revision (NCDMF 2014). It is a joint plan between the North Carolina Marine Fisheries Commission (NCMFC) and the North Carolina Wildlife Resources Commission (NCWRC). Amendment 1, adopted in 2013, lays out separate management strategies for the Albemarle/Roanoke (A/R) stock and the Central and Southern stocks in the Tar/Pamlico, Neuse, and Cape Fear rivers. Management programs in Amendment 1 utilize annual total allowable landings (TAL), daily possession limits, open and closed harvest seasons, gill net mesh size and yardage restrictions, seasonal attendance requirements, barbless hook requirements in some areas, minimum size limits, and slot limits to maintain a sustainable harvest and reduce regulatory discard mortality in all sectors. Amendment 1 also maintains the stocking regime in the Central and Southern systems and the harvest moratorium on striped bass in the Cape Fear River and its tributaries (NCDMF 2013). Striped bass fisheries in the Atlantic Ocean of North Carolina are managed under ASMFC's Amendment 6 to the Interstate FMP for Atlantic Striped Bass and subsequent addenda.

In response to the results of the 2013 benchmark A/R striped bass stock assessment that indicated fishing mortality was above its target, the NCMFC approved a Revision to Amendment 1 in November 2014 (NCDMF 2014). The revision reduced the TAL for the A/R stock from 550,000 pounds to 275,000 pounds, to be split evenly between the commercial and recreational sectors. Stock assessment projections indicated a TAL of 275,000 pounds would maintain fishing mortality and spawning stock at their respective targets and provide a sustainable harvest. The Central and Southern stocks continue to be managed under a 25,000 pounds commercial TAL, daily possession limits and a closed summer season to control recreational harvest, and a total harvest moratorium in the Cape Fear River and its tributaries.

The North Carolina Estuarine Striped Bass FMP approved in May 2004 was the first FMP developed under the criteria and standards of the 1997 Fisheries Reform Act (NCDMF 2004).

The plan focused on identifying water flow, water quality, and habitat issues throughout the state, reducing discard mortality in the commercial anchored gill net fisheries, continued stocking of striped bass in the Central and Southern areas of the state, and developing creel surveys in the Tar/Pamlico, Neuse, and Cape Fear rivers to estimate recreational harvest in those systems.

The NCMFC and the NCWRC implemented a Memorandum of Agreement in 1990 to address management of striped bass in the Albemarle Sound and Roanoke River. The original Estuarine Striped Bass FMP was approved by the NCMFC in 1994 and was targeted at the continued recovery of the A/R stock, which at the time was at historically low levels of abundance and was experiencing chronic spawning failures (Laney et. al. 1993). The comprehensive plan for the first time addressed the management of all estuarine stocks of striped bass in the state. The plan also satisfied the recommendation, contained in the Report to Congress for the North Carolina Striped Bass Study (U.S. Fish and Wildlife Service 1992) that such a plan be prepared.

Management Unit

There are two geographic management units and four striped bass stocks included in Amendment 1 to the North Carolina Estuarine Striped Bass FMP. The northern management unit is comprised of two harvest management areas; the Albemarle Sound Management Area (ASMA) and the Roanoke River Management Area (RRMA). The ASMA includes the Albemarle Sound and all its coastal, joint and inland water tributaries, (except for the Roanoke, Middle, Eastmost and Cashie rivers), Currituck, Roanoke and Croatan sounds and all their joint and inland water tributaries, including Oregon Inlet, north of a line from Roanoke Marshes Point across to the north point of Eagle Nest Bay in Dare county. The RRMA includes the Roanoke River and its joint and inland water tributaries, including Middle, Eastmost and Cashie rivers, up to the Roanoke Rapids Dam. The striped bass stock in these two harvest management areas is referred to as the A/R stock, and its spawning grounds are located in the Roanoke River in the vicinity of Weldon, NC. Management of recreational and commercial striped bass regulations within the ASMA is the responsibility of the NCMFC. Within the RRMA commercial regulations are the responsibility of the NCMFC while recreational regulations are the responsibility of the NCWRC. The A/R stock is also included in the management unit of Amendment 6 to the Atlantic States Marine Fisheries Commission (ASMFC) Interstate FMP for Atlantic Striped Bass.

The southern geographic management unit is the Central Southern Management Area (CSMA) and includes all internal coastal, joint and contiguous inland waters of North Carolina south of the ASMA to the South Carolina state line. There are spawning stocks in each of the major river systems within the CSMA; the Tar/Pamlico, the Neuse, and the Cape Fear. These stocks are collectively referred to as the CSMA stocks. Spawning grounds are not clearly defined in these systems as access to spawning areas is influenced by low river flows as well as impediments to migration. Management of striped bass within the CSMA is the sole responsibility of the NCMFC and the NCWRC, and is not subject to compliance with the ASMFC Interstate FMP for Atlantic Striped Bass.

Goals and Objectives

The goals of Amendment 1 to the North Carolina Estuarine Striped Bass FMP are to achieve sustainable harvest through science based decision-making processes that conserve adequate spawning stock, provide and maintain a broad age structure, and protect the integrity of critical habitats. To achieve these goals, the following objectives must be met:

1. Identify and describe population attributes, including age structure, necessary to achieve sustainable harvest.

2. Restore, improve, and protect striped bass habitat and environmental quality consistent with the Coastal Habitat Protection Plan (CHPP) to increase growth, survival and reproduction.

3. Manage the fishery in a manner that considers biological, social, and economic factors.

4. Initiate, enhance, and/or continue programs to collect and analyze biological, social, economic, fishery, habitat, and environmental data needed to effectively monitor and manage the fishery.

5. Initiate, enhance, and/or continue information and education programs to elevate public awareness of the causes and nature of issues in the striped bass stocks, habitat, and fisheries, and explain management programs.

6. Develop management measures, including regulations that consider the needs of all user groups and provide sustainable harvest.

7. Promote practices that minimize bycatch and discard mortality in recreational and commercial fisheries.

STATUS OF THE STOCK

Stock Status

A/R stock
The A/R striped bass stock status is currently listed as “concern”. Although the 2014 A/R striped bass benchmark stock assessment indicated the resource is not overfished or experiencing overfishing relative to the new reference points, both reference points have crossed their targets and are approaching their thresholds, meaning the point estimate is very close to the overfishing and overfished definitions (Mroch and Godwin 2013). Declining trends in landings and independent indices of abundance also contribute to the “concern” designation.

CSMA stocks
The lack of adequate data causes the CSMA stocks to be quantitatively assessed as unknown and to be listed as “concern”. The need for continued conservation management efforts are supported by the truncated size and age distributions, low overall abundance, and the absence of older fish in the spawning ground surveys (NCDMF 2013, Appendix 14.7).

Stock Assessment

A/R stock
The most recent A/R stock assessment (data through 2012) utilized the ASAP3 statistical catch at age model. The benchmark assessment was peer reviewed and approved for management use by an outside panel of experts and the ASMFC Atlantic Striped Bass Technical Committee. The model incorporated all commercial and recreational harvest and discard data, as well as abundance data from fishery independent surveys conducted by North Carolina Division of Marine Fisheries (NCDMF) and NCWRC staff.

Results from the assessment indicated the stock is not overfished or experiencing overfishing relative to its biological reference points (Table 1, Figures 1 and 2). Although the stock is not overfished, female spawning stock biomass has declined steadily since its peak in 2003, and is estimated at 835,462 pounds, just above the threshold of 772,588 pounds. Albemarle/Roanoke striped bass experienced a period of unusually strong recruitment (number of age-1 fish entering the population) from 1994-2001 followed by a period of lower recruitment from 2002-2013 (Figure 1). Total stock abundance reached its peak in the late 1990s and has declined gradually since, averaging about 1.5 million fish in recent years. Additionally, fishing mortality is estimated at 0.34, just above the target of 0.33 (Figure 2).

An update of the A/R stock assessment with data through 2014 will begin in August 2015.

CSMA stocks

The index-based method of catch curve analysis was used to assess the status of striped bass populations in the CSMA (NCDMF 2013, Appendix 14.7). Exploitation and mortality were estimated for the Tar/Pamlico and Neuse river stocks using catch-per-unit-effort (CPUE) from the NCWRC electrofishing spawning grounds survey and the NCDMF Program 915 independent gill net survey. The large confidence intervals and lack of precision in the catch curves Z estimates (total mortality rate) make them unsuitable for making a stock determination (NCDMF 2013). For this reason, catch curve results (especially annual estimates of mortality) were supplemented with additional quantitative information (such as trends in mean CPUE). Improvements in the age structure of the CSMA striped bass stocks are expected from the regulatory restrictions implemented under the 2004 FMP and from the protective measures for endangered species implemented in May 2010 (NCDMF 2010).

STATUS OF THE FISHERY

Annual spawning success of anadromous fish and fish that spawn in or use estuaries for nursery habitat, is largely dependent upon environmental conditions, both natural and manmade. Even when female spawning stock biomass is very high, very poor reproductive success can still occur due to unfavorable environmental conditions. This fact is important to keep in mind when discussing trends in landings data and stock abundance. For species that have long term juvenile abundance surveys, this phenomenon is evident when we observe a year with tremendous spawning success (termed a “strong year class”) followed by a year when practically no eggs survive to the juvenile stage (a “weak year class”). This cycle of spawning success and failure results in annual harvests that increase and decrease depending on the abundance of the year classes available to the fishery.

Current Regulations

ASMA

Harvest in the commercial sector is limited by an annual TAL of 137,500 pounds (see the November 2014 Revision of Amendment 1 to the North Carolina Estuarine Striped Bass FMP for a thorough discussion of how the current TAL was determined). There is also an 18 inch minimum total length (TL) size limit. The commercial fishery is prosecuted as a non-directed bycatch fishery, with the majority of landings occurring in large mesh (≥ 5 inch stretched mesh (ISM)) floating gill nets during the spring American shad fishery. Pound nets and flounder nets account for the remainder of the harvest. Daily trip limits are set by proclamation. Daily reporting of the number and pounds of striped bass landed from all licensed striped bass dealers ensure the TAL is not exceeded. There is a fall harvest season from October 1 through December 31

and a spring harvest season from January 1 through April 30. The harvest season is closed from May 1 through September 30 each year. The seasons may be closed early by proclamation if the TAL is reached. There is mandatory attendance on all small mesh (< 5 ISM) gill nets during the summer closed season to reduce discard mortality in that fishery. There are areas within the ASMA that are closed to all gill netting to further reduce undersize discards and to protect females as they enter the mouth of the Roanoke River during their spring spawning migration.

Harvest in the recreational sector is limited by an annual TAL of 68,750 pounds. The recreational sector also has an 18 inch TL minimum size limit and a three fish per person daily possession limit. The harvest seasons are the same as the commercial sector. Harvest is estimated via a creel survey designed for striped bass in the ASMA. The daily possession limit may be changed and/or seasons closed early by proclamation to ensure the TAL is not exceeded.

Check with the NCDMF for the most recent proclamation on striped bass harvest limits including trip limits and bycatch requirements.

RRMA

Commercial harvest in the RRMA is prohibited. The RRMA recreational sector also has an annual TAL of 68,750 pounds. The harvest season is open from March 1 through April 30 each year. There is an 18 inch TL minimum size limit and a no possession slot where fish between 18 inch TL and 27 inch TL may not be possessed. There is a two fish per person daily possession limit and only one of those fish may be greater than 27 inches TL. Only a single barbless hook may be used.in inland waters of the RRMA upstream of the U.S. Highway 258 Bridge from April 1 – June 30.

CSMA

Both commercial and recreational fishermen are subject to an 18 inch TL minimum size limit for striped bass within the CSMA. As a protective measure in joint and inland CSMA waters, it is unlawful for recreational fishermen to possess striped bass between 22 to 27 inches TL. Recreational fishermen are subject to a two fish per person per day creel limit. Commercial fishermen are subject to 10 fish per person per day limit with a maximum of two limits per commercial operation. Recreational harvest season for striped bass within the CSMA is October 1 through April 30. The commercial season opens by proclamation and may occur between January 1 and April 30, and is closed by proclamation once the annual 25,000 pound TAL is reached or on April 30, whichever occurs first. After the closure of the commercial harvest season through December 31, commercial fishermen are required to use a 3 foot tie down in large mesh (>=5 inch stretch mesh) gill nets in internal coastal fishing waters west of the 76 28.0000’ W longitude line. They must also maintain a minimum distance from shore (DFS) of 50 yards for these nets upstream of the existing DFS line (see proclamation M-3-2015 for area descriptions). There is a harvest moratorium for all recreational and commercial fisheries in the Cape Fear River and its tributaries.

Commercial Landings

ASMA

Commercial landings in the ASMA have been controlled by an annual TAL since 1991 (Table 2). Due to gill net mesh regulations and minimum size limits in place since 1993, the majority of harvest consists of fish 4-6 years of age (Figure 3). From 1990 through 1997 the TAL was set at

98,000 pounds because the A/R stock was at historical low levels of abundance. The stock was declared recovered in 1997 and the TAL was gradually increased as stock abundance increased. The TAL reached its maximum level of 275,000 pounds in 2003 as the stock reached record levels of abundance.

Through 2004 the TAL was reached easily. As stock abundance started to decline, commercial landings no longer reached the annual TAL, even with increases in the number of harvest days and daily possession limits. From 2005 through 2009 landings steadily declined and averaged about 150,000 pounds, even though gill net trips remained steady during that period (Figure 4). Gill net trips in this instance are all anchored gill net trips occurring in the ASMA as reported through the North Carolina Trip Ticket Program. Because of several caveats, including this is not a directed fishery, the trip data cannot be used to calculate any type of catch per unit of effort, but are shown to provide a general idea about the trends in anchored gill net effort in the ASMA.

The decline in landings during 2005-2009 was due to poor year classes produced from 2001 to 2004. An increase in landings in 2010 to over 200,000 pounds was due to the fairly strong 2005 year class. In 2013 and 2014 landings were reduced in part because of a very weak 2009 year class and a shortened American shad season resulting from triggers being met in the American Shad Sustainable Fishery Plan.

CSMA

Commercial landings in the CSMA have been controlled by an annual TAL of 25,000 pounds since 1994. Over the past ten year period, landings have closely followed the annual TAL, with the exception of 2008 when less than half of the TAL was landed. The majority of landings have been split between the Pamlico / Pungo Rivers and the Neuse / Bay Rivers, with the remainder coming from the Pamlico Sound (Figure 5). Since 2004 there has only been a spring harvest season, recently opening March 1 each year and closing when the TAL is reached, usually near the end of March. Unlike the fishery in the ASMA, this is a directed fishery for striped bass primarily using anchored gill nets.

Recreational Landings

ASMA

The recreational sector's landings in the ASMA are dominated by fish age 3-6 due in part to a statewide rule that prohibits possession of river herring over six inches while engaged in fishing activities, the migratory nature of larger, older fish, and general angling techniques in the ASMA. Very few anglers use the large size artificial lures or natural bait required to catch striped bass over 28 inches, so very few fish over nine or ten years old are observed in the creel survey.

Landings in the ASMA have been controlled by a TAL since 1991 (Table 2). Starting in 1998 the TAL was split evenly between the commercial and recreational sectors. The recreational TAL increased incrementally from 29,400 pounds in 1997 to 137,500 pounds in 2003. The recreational sector reached its TAL consistently until 2002, when landings started declining. Recreational landings peaked in 2001 at 118,506 pounds. Landings have averaged about 32,000 pounds for years 2006-2014, well below the ASMA recreational TAL at the time of 137,500 pounds (Figure 6). The harvest season increased from four days a week to seven in the fall of 2005 and the daily recreational possession limit increased from two to three fish in the fall of 2006, but landings continued to decline. Several poor year classes produced since 2001 have accounted for the decline in stock abundance and recreational harvest since 2006.

RRMA
The recreational sector's landings in the RRMA are dominated by fish age 3-6 due to a no possession rule of fish between 22 and 27 inches TL in the RRMA, a statewide rule that prohibits possession of river herring over six inches while engaged in fishing activities, and general angling techniques in the RRMA. Very few anglers use the large size artificial lures or natural bait required to catch striped bass over 28 inches, so very few fish over nine or ten years old are observed in the creel survey.

The recreational TAL in the ASMA and RRMA has been split evenly since 1990. Landings in the RRMA followed the TAL closely through 2002. From 2003 through 2013 landings averaged 64,749 pounds, with a few noticeable low years (2003, 2008, and 2013) (Figure 7). The total number of fish caught per angler during the spring fishery in the RRMA can be large; catches of 100 fish per day are not uncommon. But angler catch rate can be impacted by spring water flows. The hydropower company operating the dams on the Roanoke River, along with the U.S. Army Corps of Engineers and biologists with the USFWS and NCWRC, coordinate releases to best mimic natural flow conditions during the spring spawn. However, droughts or heavy rainfall may still result in very low, i.e. 2,000-3,000 cubic feet per second (cfs) or very high, (20,000 cfs) flood stage flow conditions in some years. During these low or high flow years, angler success can be greatly diminished.

CSMA
Recreational landings since 2005 have ranged from a low in 2008 and 2009 averaging 3,026 pounds to a high of 20,003 pounds in 2013 (Table 3). Over the ten year time period both the number of trips and more recently the hours spent targeting striped bass within the CSMA have increased. Since 2011 harvest in the Tar/Pamlico and Neuse has been similar, ranging from about 4,000 pounds to 9,000 pounds, and has been two to three times greater than harvest in the Pungo River (Figure 8). Harvest on the Pungo River has remained consistent at a relatively low level compared to fluctuations experienced by Tar / Pamlico and Neuse Rivers. Legal sized striped bass discards have increased over the past five years, as well as fish released that are within the slot limit (Table 3). There is also a significant catch-and-release fishery during the summer in the middle reaches of the Tar/Pamlico and Neuse rivers.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

A/R Stock
The length, weight, sex, and age of the commercial harvest of striped bass has been consistently monitored through sampling at fish houses conducted by the division since 1982. For the last several decades anchored gill nets have accounted for >90% of the harvest in the ASMA. Pound nets account for most of the remaining landings with minor catches coming from fyke nets, hoop nets, and pots. The majority of annual landings were from age four to six year old fish (Table 4). The majority of harvest was between 21 and 26 inches TL (Table 5). The total number of fish sampled from the commercial fishery is presented in Table 6.

The recreational harvest of striped bass in the ASMA and RRMA has been consistently monitored by the NCDMF since 1990 and the NCWRC since 1988 respectively. Age length keys generated by staff are applied to the total annual recreational harvest to create recreational catch at age matrices used in stock assessments (Tables 7 and 8). The majority of harvest is

usually between 18 and 22 inches TL (Tables 9 and 10). The numbers of fish sampled from the ASMA and RRMA recreational fisheries are presented in Tables 11 and 12.

CSMA Stocks

Monitoring of the commercial fishery in the CSMA follows the same methodology as in the ASMA. The NCDMF started collecting recreational striped bass data in the major rivers of the CSMA in 2005. There has been a harvest moratorium in the Cape Fear River since 2008. Length data from the commercial harvest in the Pamlico Sound and tributaries shows that striped bass in the Neuse / Bay Rivers are slightly larger than fish harvested in the Pamlico / Pungo Rivers (Table 13).

Fishery-Independent Monitoring

A/R Stock

A young-of-year (age-0) A/R striped bass juvenile abundance index (JAI) was initiated by Dr. William Hassler of North Carolina State University in 1955. The NCDMF took over the survey in 1985 in preparation of Dr. Hassler's retirement so the long term dataset could continue. Sampling occurs at seven fixed stations in the western Albemarle Sound from July through mid-October. Sampling gear is an 18-foot semi-balloon trawl towed for 15 minutes. Catch per unit of effort is the number of striped bass captured per tow. The JAI provided by the survey is usually a reliable indicator of relative abundance and future harvest potential. Data from the survey reveal the highly variable interannual spawning success of striped bass. Years of great spawning success can be immediately followed by years of spawning failure. The long time series of data also clearly shows the extended period of spawning failure that occurred when the stock was at historical levels of low abundance during the 1980s. Starting in 1993 the stock began producing successful spawns once again, due to severe management restrictions, improved water quality, agreements about a water flow regime on the Roanoke River during the spawning season, and favorable environmental conditions during the spawning season. Within an eight year period spanning 1993-2000, the stock produced the four highest JAI values in the entire 46 year time series. The average JAI during 1993-2000 was 24.04, over three times higher than the average of the JAI prior to the stock crashing (1955-1977 JAI = 7.9; Figure 9). Based on this level of recruitment, the stock was declared recovered by the ASMFC in 1997. However from 2001 to 2013 spawning success has been below average for most years, with only two well above average spawns and several years, some back to back, considered spawning failures. This cycle since 1993 led to overall stock abundance increasing steadily through the mid-2000s followed by a period of stock decline from those all-time highs. The data generated from the survey is used in the A/R stock assessment as an independent measure of stock abundance (Table 14). The index is also used as a trigger. If the JAI is below 75% of all other values for three consecutive years, the ASMFC Striped Bass Technical Committee will make a recommendation to the ASMFC Striped Bass Management Board.

A fall/winter fishery independent gill net survey has been conducted by the NCDMF throughout the Albemarle and Croatan sounds since the fall of 1990. The survey utilizes a stratified random sampling design, employing mesh sizes from 2 ½ inch to 10 inch stretch mesh to characterize the resident and overwintering portion of the A/R stock. The survey is conducted from November through February. Catch per unit of effort is measured as the abundance of fish per 40 yard net soaked for 24 hours.

A spring survey employs the same methodology but is conducted in the western Albemarle Sound only, in the vicinity of the mouth of the Roanoke River. The goal of the survey is to characterize the spawning portion of the A/R stock. The survey is conducted from March

through May. Data from surveys are used in the A/R stock assessment as an independent measure of stock abundance (Tables 15 and 16).

The independent gill net surveys do a good job of tracking relative abundance, but the trend in total abundance is often masked by the highly variable and often very large number of two and three year old fish captured in the survey, so trends in total abundance are less informative than trends in 4-6 year old abundance. The trend in 4-6 year olds show the stock increasing in abundance through the early 2000s, then declining to levels similar to the late 1990s (Figure 10). The main weakness of the gill net surveys is they collect very few older fish, and under-represent the expansion of fish in the 9+ age group that has occurred since 2002. They also don't capture the decline in abundance of age 9+ fish that has occurred since the period of poor spawning success starting in 2001.

An electrofishing spawning ground survey has been conducted by the NCWRC since the spring of 1990. The survey goals are the same as the gill net survey but takes place on the Roanoke River in the vicinity of Weldon, the location of the fall line and historical center of spawning activity for A/R striped bass. The survey uses a stratified random sampling design. Catch per unit of effort is measured as the number of fish captured per hour of electrofishing. The survey is used in the A/R stock assessment as an independent measure of stock abundance.

The trend in total abundance from the electrofishing survey is similar to the trends of age 4-6 fish in the gill net surveys, increasing from low levels of abundance in the early 1990s to a peak in the early 2000s, then decreasing since (Figure 11). Both surveys exhibit a few years with high interannual variability, but this is common with fisheries surveys in which environmental conditions affect relative abundance in the survey area and the catch efficiency of the gear. The electrofishing survey does a better job at tracking the abundance of the age 9+ group, and clearly shows the emergence of the 1993 cohort into this age group in 2002 (Figure 12). The strong year classes produced from 1993-2000 supported the increased abundance of fish in the 9+ age group, but since the below average spawning and several years of spawning failure since 2001, the 9+ age group is also declining. The oldest fish seen recently in the population is 17 years old, indicating that fishing mortality has decreased significantly since the implementation of minimum size limits and a TAL. When the survey started in 1990 fish older than seven were rarely observed in the survey.

Taken together, all the independent surveys track A/R stock dynamics well, and indicate the stock is healthy and female spawning stock biomass is adequate to produce large year classes; the most recent occurred in 2011. The major factors currently contributing to annual spawning success, and hence stock abundance, are water quality and environmental conditions; the most important of these being river flow during the spring spawning season and for the following 3-5 weeks afterwards, as eggs and larval fish are transported the 137 river miles down the Roanoke River to their nursery areas in the western Albemarle Sound and lower Chowan River.

CSMA Stocks

A fishery independent gill net survey in the Central and Southern portion of the state was initiated by the NCDMF in May of 2001. Data from the Fishery-Independent Gill Net Survey (Program 915) on the Pamlico, Pungo, and Neuse Rivers demonstrated that the majority of all striped bass were captured in the upper and middle portions of the rivers. Annual striped bass CPUE ranged from 0.9 to 2.15 fish per sample during the reporting period (Table 17).

MANAGEMENT STRATEGY

A/R Stock

Estuarine striped bass in North Carolina are managed under Amendment 1 to the North Carolina Estuarine Striped Bass FMP and subsequent revisions. Striped bass fisheries in the Atlantic Ocean of North Carolina are managed under ASMFC's Amendment 6 to the Interstate FMP for Atlantic Striped Bass and subsequent addenda. The A/R stock is managed using biological reference points for spawning stock biomass and fishing mortality that are aimed at maintaining a sustainable harvest and adequate spawning stock biomass. Stock status is determined through a formal, peer reviewed stock assessment process that evaluates annual estimates of fishing mortality and biomass against their target and threshold values. An annual harvest quota for the A/R stock is calculated to keep these metrics below their targets.

CSMA Stocks

The need for continued conservation management efforts at this time are supported by the constrained size and age distributions, low abundance, and the absence of older fish in all stocks. Since the 2004 FMP there has been little change in the size and age distribution with few age 6 and older fish observed in any system. Management strategies in place to constrain harvest in an effort to allow for rebuilding of the stocks include a total harvest moratorium in the Cape Fear River, an annual commercial TAL of 25,000 pounds, and daily creel limits, a closed summertime harvest season, and a protective slot limit for the recreational fisheries. Annual stockings in all CSMA systems are designed to augment the populations during this period of low abundance until which time successful natural reproduction in these stocks occurs.

MANAGEMENT AND RESEARCH NEEDS

Several management issues were identified and explored in Amendment 1. Table 18 outlines the specific issue and implementation status. Several management and research needs were also identified. Table 19 outlines the progress on recommendations identified in Amendment 1 to the North Carolina Estuarine Striped Bass FMP.

FISHERY MANAGEMENT PLAN RECOMMENDATION

Updates to the ASMFC Atlantic striped bass stock assessment and the North Carolina A/R striped bass stock assessment are planned starting August 2015, with the next benchmark assessments scheduled for 2018. This coincides with the current NCMFC schedule for the North Carolina Estuarine Striped Bass FMP review. Should the TAL need to be adjusted in between FMP reviews based on an update to the stock assessment, a revision can serve as the mechanism to accomplish the change.

It is recommended that the review schedule for the North Carolina Estuarine Striped Bass FMP be maintained.

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TABLES

Table 1. Albemarle/Roanoke striped bass spawning stock biomass and fishing mortality targets and thresholds. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

Reference Point	Fishing Mortality (F)	Spawning Stock Biomass (SSB pounds)	Total Allowable Landings pounds (TAL)
Target	0.33	969,496 lb	305,762 lb
Threshold	0.41	785,150 lb	325,905 lb
Estimate from 2014 A/R stock assessment	0.34	835,462 lb	N/A

Table 2. Striped bass commercial and recreational harvest and discards in pounds from the ASMA/RRMA, NC.

Year	Harvest (lb.)						Discard (lb.)					Combined
	ASMA Comm.	ASMA Rec.	RRMA Comm.	RRMA Rec.	Total Harvest	TAL	ASMA Comm.	ASMA Rec.	RRMA Comm.	RRMA Rec.	Total Discards	Harvest and Discards
1982	228,004	24,098	17,369	23,693	293,164		No estimates for shaded years					293,164
1983	228,742	27,320	8,861	26,861	291,784							291,784
1984	475,641	17,181	1,703	16,892	511,417							511,417
1985	269,671	6,603	6,200	6,492	288,966							288,966
1986	172,683	18,755	50	18,440	209,928							209,928
1987	228,861	37,621	0#	36,989	303,471							303,471
1988	108,791	52,434	0	74,639	235,864							235,864
1989	97,061	26,857	0	32,107	156,025							156,025
1990	103,757	36,976	0	42,204	182,937							182,937
1991	108,460	30,021	0	72,529	211,010	156,800				17,048	17,048	228,058
1992	100,544	51,167	0	36,016	187,727	156,800				4,370	4,370	192,097
1993	109,475	54,835	0	45,146	209,456	156,800				11,546	11,546	221,002
1994	102,201	39,704	0	28,084	169,989	156,800	151,810			12,613	164,423	334,412
1995	89,502	30,564	0	28,884	148,950	156,800	348,255			14,539	362,794	511,744
1996	89,624	29,185	0	28,173	146,982	156,800	200,429			36,634	237,063	384,045
1997	95,671	26,724	0	28,929	151,324	156,800	120,840			55,863	176,703	328,027
1998	122,454	64,885	0	73,527	260,866	250,860	135,855			21,149	157,004	417,870
1999	155,176	60,897	0	72,966	289,039	275,946	139,043			31,513	170,556	459,595
2000	218,888	116,163	0	119,584	454,635	450,000	137,996	11,951		33,810	183,757	638,392
2001	220,227	118,533	0	112,825	451,585	450,000	92,047	10,540		29,284	131,871	583,456
2002	222,834	92,649	0	112,698	428,181	450,000	128,664	7,710		10,897	147,271	575,452
2003	266,555	51,794	0	39,170	357,519	550,000	162,115	5,278		8,598	175,991	533,510
2004	273,666	98,403	0	120,697	492,766	550,000	89,832	9,244		62,523	161,599	654,365
2005	232,645	63,477	0	107,530	403,652	550,000	45,393	3,360		34,313	83,066	486,718
2006	156,314	35,985	0	84,523	276,822	550,000	54,529	1,453		13,799	69,781	346,603
2007	173,509	26,633	0	64,986	265,128	550,000	43,475	1,914		11,330	56,719	321,847
2008	74,926	31,628	0	32,725	139,279	550,000	108,176	4,969		37,624	150,769	290,048
2009	96,134	37,313	0	69,581	203,028	550,000	32,494	5,452		29,523	67,469	270,497
2010	199,829	11,460	0	72,037	283,326	550,000	44,838	3,318		25,263	73,419	356,745
2011	134,538	42,536	0	71,561	248,635	550,000	52,741	2,870		29,409	85,020	333,655
2012	115,605	71,456	0	88,271	275,332	550,000	34,253	3,995		10,251	48,499	323,831
2013	68,338	14,897	0	25,197	108,432	550,000						
2014	71,372	16,867	0	33,717	121,956	550,000						

Table 3. Recreational striped bass effort, harvest, and discards in the CSMA, NC.

	All Effort		Striped bass Effort		Striped bass Harvest		Striped bass Discards (numbers)				
Year	Trips	Hours	Trips	Hours	Number	Pounds	Over Creel	Under size	Legal size	In slot	Total
2005	64,018	302,159	13,205	44,313	3,833	14,966	152	15,611	1,000	78	16,841
2006	62,663	259,344	10,609	30,889	2,483	7,356	33	12,549	2,314	0	14,896
2007	65,764	296,031	10,974	37,088	3,600	10,795	147	21,673	1,707	0	23,527
2008	52,887	246,585	6,621	21,296	842	2,990	2,838	11,719	3,316	91	17,964
2009	45,907	201,319	5,642	20,695	896	3,062	7	4,472	1,768	719	6,966
2010	37,518	152,662	6,558	16,060	1,758	5,536	28	5,201	2,402	361	7,992
2011	45,246	160,610	12,608	33,353	2,727	9,475	9	16,661	5,397	2,128	24,195
2012	110,527	369,171	18,340	71,899	3,871	15,198	351	26,250	13,614	2,986	43,201
2013	113,830	408,696	20,053	85,674	5,425	20,003	438	19,304	10,361	2,305	32,408
2014	87,146	349,604	15,573	69,211	3,301	13,371	734	18,911	7,110	1,651	28,405

Table 4. Striped bass commercial landings at age in thousands of fish from the ASMA, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Age									
Year	1	2	3	4	5	6	7	8	9+	Sum N fish
1982	0.000	31.449	22.724	6.186	3.190	1.172	0.195	0.000	0.195	65.111
1983	0.000	23.841	27.694	11.921	4.070	2.253	1.672	0.800	0.436	72.687
1984	0.000	101.035	5.889	23.244	18.285	2.789	2.324	0.000	1.395	154.961
1985	11.562	80.428	30.113	2.287	1.271	0.762	0.508	0.127	0.000	127.058
1986	0.000	48.219	7.860	4.554	0.000	0.437	0.437	0.000	0.873	62.380
1987	0.000	31.392	13.525	12.160	4.157	0.248	0.000	0.434	0.124	62.040
1988	0.000	17.717	9.843	4.640	1.687	0.703	0.176	0.281	0.105	35.152
1989	0.000	13.577	9.073	7.947	1.383	0.129	0.064	0.000	0.000	32.173
1990	0.000	33.369	3.359	5.241	1.389	0.493	0.269	0.269	0.403	44.792
1991	0.000	6.820	19.875	4.157	0.877	0.292	0.292	0.000	0.162	32.475
1992	0.000	0.000	8.163	18.226	0.187	0.062	0.062	0.064	0.000	26.764
1993	0.000	0.000	1.076	15.794	10.965	0.756	0.262	0.116	0.116	29.085
1994	0.000	0.000	0.130	3.095	7.035	11.018	0.281	0.000	0.087	21.646
1995	0.000	0.000	0.240	4.829	11.161	3.647	0.160	0.000	0.000	20.037
1996	0.000	0.000	1.735	1.925	6.311	7.321	1.294	0.316	0.190	19.092
1997	0.000	0.000	0.997	3.846	3.647	9.107	3.462	0.274	0.040	21.373
1998	0.000	0.000	1.599	7.233	9.701	6.549	3.253	0.045	0.134	28.514
1999	0.000	0.000	0.000	3.344	20.972	9.513	1.134	0.230	0.430	35.623
2000	0.000	0.000	0.000	6.380	23.169	14.119	2.158	0.516	0.564	46.906
2001	0.000	0.000	2.818	16.908	25.018	3.361	0.445	0.643	0.246	49.439
2002	0.000	0.000	1.165	10.785	18.074	4.411	1.178	1.119	3.236	39.968
2003	0.000	0.000	4.779	15.036	15.270	5.584	1.505	0.515	2.141	44.830
2004	0.000	0.000	3.100	16.840	10.756	2.366	1.001	1.457	6.557	42.077
2005	0.000	0.000	0.707	9.151	19.515	7.864	1.854	0.764	3.244	43.099
2006	0.000	0.000	0.407	7.241	16.263	5.661	0.558	0.379	3.109	33.618
2007	0.000	0.000	0.168	3.953	13.225	5.473	1.217	0.583	2.958	27.577
2008	0.000	0.000	0.473	5.931	6.377	2.195	2.620	0.292	0.483	18.371
2009	0.000	0.000	1.264	11.497	6.713	2.665	0.906	0.354	0.602	24.001
2010	0.000	0.000	5.543	22.129	18.757	4.230	1.260	0.399	0.708	53.026
2011	0.000	0.000	1.698	12.237	12.170	2.645	1.128	0.447	0.373	30.698
2012	0.000	0.000	0.090	5.916	5.647	6.857	5.423	1.031	0.313	25.277

Table 5. Striped bass length data from commercial landings from the ASMA, NC.

Year	Mean Fork Length	Minimum Total Length	Maximum Total Length	Total Number Measured
2005	23	17	43	517
2006	23	18	44	938
2007	24	17	48	623
2008	22	18	47	553
2009	21	18	42	813
2010	21	17	48	940
2011	21	18	39	1,004
2012	22	18	39	643
2013	22	18	45	563
2014	23	18	43	483

Table 6. Striped bass sample counts for length, weight, sex, and age from commercial landings, ASMA, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Samples Collected			
Year	Length	Weight	Sexed	Aged
1982	1,089	1,089	1,089	612
1983	1,013	1,010	1,013	728
1984	919	919	919	679
1985	552	552	550	547
1986	422	422	422	375
1987	690	690	690	581
1988	566	566	564	421
1989	525	508	525	378
1990	520	520	520	398
1991	560	559	560	430
1992	335	335	334	141
1993	437	436	437	187
1994	455	454	454	353
1995	282	282	281	146
1996	603	602	605	297
1997	1,090	1,090	1,089	600
1998	633	633	633	440
1999	405	405	405	386
2000	835	832	834	562
2001	912	912	893	354
2002	920	920	917	505
2003	723	722	723	333
2004	455	454	451	386
2005	719	718	719	314
2006	926	926	924	437
2007	860	856	860	425
2008	547	545	545	391
2009	813	812	813	419
2010	940	940	939	563
2011	977	976	977	579
2012	649	642	649	451

Table 7. Striped bass recreational landings at age in thousands of fish from the ASMA, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Age									
Year	1	2	3	4	5	6	7	8	9+	Sum N fish
1982	0.000	3.598	2.600	0.708	0.365	0.134	0.022	0.000	0.022	7.449
1983	0.000	2.327	2.703	1.164	0.397	0.220	0.163	0.078	0.043	7.095
1984	0.000	3.662	0.213	0.843	0.663	0.101	0.084	0.000	0.051	5.617
1985	0.290	2.016	0.755	0.057	0.032	0.019	0.013	0.003	0.000	3.185
1986	0.000	5.239	0.854	0.495	0.000	0.047	0.047	0.000	0.095	6.777
1987	0.000	5.160	2.223	1.999	0.683	0.041	0.000	0.071	0.020	10.197
1988	0.000	1.711	2.762	4.185	3.473	2.152	1.677	0.610	0.373	16.943
1989	0.000	2.128	2.876	1.976	1.353	0.338	0.098	0.062	0.071	8.902
1990	0.000	9.896	3.703	1.245	0.683	0.208	0.176	0.032	0.016	15.959
1991	0.000	2.501	6.397	0.065	0.026	0.000	0.000	0.000	0.000	8.989
1992	0.000	0.092	9.912	3.342	0.137	0.092	0.023	0.023	0.000	13.621
1993	0.000	0.145	2.133	10.990	1.193	0.108	0.000	0.000	0.000	14.569
1994	0.000	0.017	0.749	2.485	5.090	0.085	0.000	0.000	0.000	8.426
1995	0.000	0.000	0.554	2.137	3.680	0.919	0.053	0.000	0.000	7.343
1996	0.000	0.000	0.561	2.163	3.725	0.930	0.054	0.000	0.000	7.433
1997	0.000	0.106	3.100	0.784	1.125	0.353	0.009	0.000	0.000	5.477
1998	0.000	0.000	0.092	11.431	6.114	1.316	0.627	0.024	0.000	19.604
1999	0.000	0.000	0.428	6.903	7.059	2.103	0.344	0.026	0.015	16.878
2000	0.000	0.000	0.003	19.792	14.359	3.311	0.439	0.097	0.038	38.039
2001	0.000	0.000	12.033	20.777	6.819	0.411	0.020	0.019	0.000	40.079
2002	0.000	0.000	4.564	13.910	8.491	0.695	0.171	0.059	0.008	27.898
2003	0.000	0.000	4.173	7.704	3.371	0.431	0.112	0.044	0.047	15.882
2004	0.000	0.000	0.252	11.258	12.630	3.248	0.420	0.168	0.028	28.004
2005	0.000	0.072	2.206	7.875	6.729	0.893	0.021	0.087	0.074	17.957
2006	0.000	0.048	0.903	3.414	5.135	1.094	0.019	0.060	0.037	10.710
2007	0.000	0.000	0.532	2.797	2.823	0.807	0.093	0.023	0.068	7.143
2008	0.000	0.000	3.858	2.943	2.140	0.936	0.076	0.055	0.039	10.047
2009	0.000	0.000	3.640	6.315	1.372	0.449	0.175	0.087	0.030	12.068
2010	0.000	0.000	0.444	1.131	1.330	0.458	0.132	0.008	0.000	3.503
2011	0.000	0.000	5.928	3.939	1.764	0.995	0.356	0.112	0.246	13.340
2012	0.000	0.000	1.955	10.997	4.413	3.442	1.227	0.197	0.113	22.344

Table 8. Striped bass recreational landings at age in thousands of fish from the RRMA, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Age									
Year	1	2	3	4	5	6	7	8	9+	Sum N fish
1982	0.000	2.307	1.670	1.311	0.798	0.850	0.220	0.139	0.029	7.324
1983	0.000	0.335	1.995	1.535	1.451	0.746	0.579	0.209	0.126	6.976
1984	0.000	2.789	0.237	0.950	0.828	0.359	0.122	0.177	0.061	5.523
1985	0.000	1.663	1.030	0.110	0.263	0.000	0.066	0.000	0.000	3.132
1986	0.000	3.072	2.052	1.539	0.000	0.000	0.000	0.000	0.000	6.663
1987	0.000	5.224	2.467	1.634	0.541	0.040	0.080	0.040	0.000	10.026
1988	0.000	1.680	2.721	4.109	8.146	0.000	0.000	0.000	0.000	16.656
1989	0.000	2.088	2.834	1.948	1.893	0.000	0.000	0.000	0.000	8.763
1990	0.000	9.714	3.643	1.245	1.093	0.000	0.000	0.000	0.000	15.695
1991	0.000	2.310	23.387	0.730	0.507	0.000	0.000	0.000	0.000	26.934
1992	0.000	0.168	10.458	2.731	0.034	0.000	0.000	0.000	0.000	13.391
1993	0.000	0.000	3.896	9.669	0.759	0.000	0.000	0.000	0.000	14.324
1994	0.000	0.000	1.549	4.134	2.469	0.132	0.000	0.000	0.000	8.284
1995	0.000	0.000	0.514	1.233	3.460	2.210	0.034	0.000	0.007	7.458
1996	0.000	0.000	1.899	2.736	2.201	1.364	0.167	0.000	0.000	8.367
1997	0.000	0.031	3.794	3.285	1.275	0.694	0.225	0.051	0.010	9.365
1998	0.000	0.024	3.190	13.344	4.724	1.339	0.244	0.146	0.097	23.108
1999	0.000	0.066	5.016	10.916	4.897	1.426	0.066	0.079	0.013	22.479
2000	0.000	0.103	13.334	18.653	4.265	1.515	0.128	0.128	0.077	38.203
2001	0.000	0.000	9.815	15.133	7.273	2.190	0.195	0.195	0.430	35.231
2002	0.000	0.019	3.347	18.107	11.094	3.253	0.282	0.112	0.208	36.422
2003	0.000	0.000	0.979	5.839	3.018	0.489	0.049	0.163	0.602	11.139
2004	0.000	0.000	7.607	9.595	5.619	3.128	0.106	0.080	0.374	26.509
2005	0.000	0.000	8.861	15.125	6.824	2.139	0.178	0.280	0.660	34.067
2006	0.000	0.000	2.682	16.304	4.788	1.245	0.072	0.024	0.219	25.334
2007	0.000	0.000	1.007	6.644	10.456	1.062	0.082	0.054	0.000	19.305
2008	0.000	0.158	4.741	3.856	1.138	0.569	0.048	0.000	0.032	10.542
2009	0.000	0.022	9.085	10.444	3.051	0.601	0.000	0.000	0.045	23.248
2010	0.000	0.000	6.029	11.634	4.145	0.542	0.000	0.048	0.047	22.445
2011	0.000	0.000	8.756	6.869	2.702	3.483	0.196	0.000	0.098	22.104
2012	0.000	0.000	5.482	19.189	3.374	0.337	0.421	0.042	0.000	28.845

Table 9. Striped bass length data from recreational landings from the ASMA, NC.

Year	Mean Fork Length	Minimum Total Length	Maximum Total Length	Total Number Measured
2005	20	18	29	1,631
2006	21	18	32	773
2007	21	15	39	415
2008	20	18	30	632
2009	20	18	42	549
2010	20	17	28	337
2011	20	18	34	979
2012	20	18	36	1,059
2013	20	18	32	527
2014	19	18	28	803

Table 10. Striped bass length data from recreational landings from the RRMA, NC.

Year	Mean Fork Length	Minimum Total Length	Maximum Total Length	Total Number Measured
2005	20	17	40	981
2006	20	17	39	1,058
2007	20	18	39	709
2008	19	17	35	667
2009	19	17	32	1,049
2010	20	18	28	954
2011	20	18	31	679
2012	20	17	28	688
2013	20	17	27	512
2014	19	17	30	559

Table 11. Striped bass sample counts for length, weight, sex, and age from recreational landings, ASMA, NC. ALK=age length key used. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Samples Collected			
Year	Length	Weight	Sexed	Aged
1994	1,179	1,179	0	ALK
1995	954	954	0	ALK
1996	1,062	1,062	0	ALK
1997	1,088	1,088	0	ALK
1998	3,276	3,276	0	ALK
1999	2,417	2,417	0	ALK
2000	3,153	3,153	0	ALK
2001	4,346	4,346	0	ALK
2002	3,173	3,173	0	ALK
2003	1,178	1,178	0	ALK
2004	2,854	2,854	0	ALK
2005	1,656	1,656	0	ALK
2006	769	769	0	ALK
2007	430	430	0	ALK
2008	633	633	0	ALK
2009	549	549	0	ALK
2010	269	269	0	ALK
2011	978	978	0	ALK
2012	1,059	1,059	0	ALK

Table 12. Striped bass sample counts for length, weight, sex, and age from recreational landings, RRMA, NC. ALK=age length key used. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Samples Collected			
Year	Length	Weight	Sexed	Aged
2005	359	353	357	ALK
2006	1,059	1,059	1,058	ALK
2007	709	709	709	ALK
2008	667	667	667	ALK
2009	1,049	1,049	1,049	ALK
2010	954	954	954	ALK
2011	679	679	679	ALK
2012	688	688	688	ALK
2013	512	512	512	ALK
2014	559	559	559	ALK

Table 13. Striped bass sample counts for length, weight, sex, and age from commercial landings, CSMA, NC. ALK=age length key used.

	Pamlico / Pungo R.				Neuse / Bay R.			
	Length (mm)				Length (mm)			
Year	Mean	Min	Max	N	Mean	Min	Max	N
2000	550.0	470	828	126	598.0	530	747	5
2001	556.8	498	614	116	589.3	546	750	12
2002	579.7	455	942	92	593.4	456	682	31
2003	541.9	420	889	163	579.1	454	890	19
2004	575.0	468	999	131	604.7	462	895	69
2005	551.0	465	888	127	582.3	480	870	70
2006	516.6	420	873	119	574.1	457	871	101
2007	527.9	462	778	112	527.8	449	632	56
2008	537.6	428	1020	54	553.4	440	1060	39
2009	519.1	440	741	99	538.7	449	737	70
2010	534.9	447	619	194	545.6	445	772	263
2011	545.7	428	647	281	555.1	456	1006	195
2012	576.8	363	712	234	583.2	443	702	96
2013	586.2	435	965	212	582.3	434	894	155
2014	508.2	431	587	24	557.3	482	716	26

Table 14. Striped bass GLM-standardized index of relative abundance and coefficient of variation (CV) from the Albemarle/Roanoke juvenile abundance survey, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

Year	GLM Index	CV[Index]
1982	3.01	0.354
1983	1.39	0.367
1984	0.36	0.270
1985	0.95	0.449
1986	0.10	0.328
1987	0.27	0.243
1988	4.81	0.226
1989	6.09	0.250
1990	1.32	0.271
1991	0.72	0.255
1992	2.22	0.220
1993	42.4	0.218
1994	56.0	0.224
1995	14.2	0.219
1996	31.1	0.232
1997	4.82	0.263
1998	5.60	0.283
1999	0.94	0.222
2000	56.2	0.245
2001	3.50	0.228
2002	6.32	0.381
2003	0.25	0.262
2004	1.75	0.221
2005	24.1	0.234
2006	2.87	0.224
2007	5.50	0.238
2008	5.52	0.314
2009	0.36	0.223
2010	6.88	0.220
2011	15.1	0.240
2012	5.11	1.23

Table 15. Striped bass catch proportion at age and GLM-standardized index of relative abundance and coefficient of variation (CV) from the fall/winter component of the Albemarle Sound IGNS (Program 135), NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Age										
Year	1	2	3	4	5	6	7	8	9+	GLM Index	CV[Index]
1991	0	0.76	0.22	0.022	0.0000	0	0	0	0	0.655	0.129
1992	0	0.17	0.74	0.083	0.0000	0	0	0	0	0.534	0.132
1993	0	0.12	0.13	0.70	0.026	0.0050	0	0.0011	0	0.769	0.128
1994	0	0.094	0.064	0.28	0.55	0.0057	0	0.0010	0	0.892	0.132
1995	0	0.51	0.10	0.11	0.24	0.036	0.00062	0	0.00062	0.289	0.144
1996	0	0.17	0.42	0.080	0.16	0.16	0.011	0	0	1.99	0.122
1997	0	0.20	0.36	0.23	0.127	0.064	0.016	0.0015	0.00023	0.612	0.131
1998	0	0.12	0.41	0.37	0.07	0.021	0.010	0.0016	0	1.38	0.122
1999	0	0.058	0.16	0.47	0.24	0.066	0.0034	0.00084	0.00045	0.641	0.129
2000	0	0.11	0.12	0.40	0.31	0.057	0.0040	0.00089	0.00089	0.626	0.128
2001	0	0.013	0.15	0.40	0.39	0.034	0.0047	0.0012	0.0012	0.993	0.157
2002	0	0.50	0.043	0.30	0.15	0.0038	0.00044	0	0	0.816	0.125
2003	0	0.038	0.48	0.25	0.19	0.042	0.0023	0	0	1.43	0.211
2004	0	0.097	0.22	0.54	0.12	0.017	0.00077	0.0020	0.0032	0.817	0.125
2005	0	0.072	0.14	0.40	0.33	0.053	0.0026	0.0027	0.00090	0.793	0.128
2006	0	0.39	0.063	0.14	0.25	0.13	0.019	0.0018	0.0045	0.373	0.141
2007	0	0.18	0.33	0.063	0.24	0.17	0.018	0	0	1.49	0.122
2008	0	0.16	0.67	0.13	0.019	0.013	0.0071	0.0015	0.00057	1.19	0.131
2009	0	0.16	0.24	0.55	0.039	0.0055	0.0019	0.00093	0	0.897	0.127
2010	0	0.61	0.14	0.083	0.148	0.012	0.0040	0.00088	0	0.406	0.135
2011	0	0.094	0.56	0.14	0.077	0.092	0.029	0.0062	0.0021	0.311	0.142
2012	0	0.36	0.16	0.31	0.099	0.021	0.048	0.0018	0		

Table 16. Striped bass catch proportion at age and GLM-standardized index of relative abundance and coefficient of variation (CV) from the spring component of the Albemarle Sound IGNS (Program 135), NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

	Age										
Year	1	2	3	4	5	6	7	8	9+	GLM Index	CV[Index]
1991	0.010	0.77	0.22	0.0023	0.0028	0.0010	0	0	0	1.47	0.104
1992	0	0.16	0.76	0.075	0.0056	0.00093	0	0.00093	0	0.845	0.0993
1993	0	0.20	0.25	0.51	0.045	0.0016	0	0.0016	0	0.292	0.118
1994	0	0.056	0.10	0.31	0.53	0.0048	0	0.0024	0	0.294	0.128
1995	0	0.61	0.05	0.11	0.18	0.054	0.0022	0.00050	0.00050	1.42	0.0970
1996	0	0.079	0.47	0.054	0.19	0.18	0.024	0.00082	0	0.993	0.0979
1997	0	0.091	0.41	0.31	0.067	0.10	0.025	0.00059	0	1.34	0.0959
1998	0	0.060	0.27	0.51	0.12	0.018	0.014	0.00051	0	1.96	0.0964
1999	0	0.031	0.13	0.44	0.33	0.068	0.0062	0.00087	0.00043	1.79	0.0937
2000	0	0.008	0.06	0.38	0.43	0.10	0.016	0.0029	0	1.67	0.0967
2001	0	0.005	0.21	0.56	0.21	0.0083	0.0028	0.0022	0.00056	2.17	0.0966
2002	0.00035	0.14	0.02	0.42	0.40	0.015	0.0012	0.0012	0.0025	1.06	0.0986
2003	0	0.030	0.39	0.32	0.20	0.035	0.0070	0.0087	0.0057	0.664	0.135
2004	0.0010	0.095	0.44	0.30	0.13	0.033	0.0045	0.0017	0.0030	1.44	0.126
2005	0.0028	0.051	0.15	0.67	0.10	0.023	0.0021	0.0069	0.0041	1.53	0.110
2006	0	0.41	0.052	0.33	0.17	0.024	0.0032	0.0026	0.0026	1.62	0.101
2007	0.0010	0.39	0.22	0.13	0.17	0.057	0.014	0.013	0.0100	0.502	0.110
2008	0.0016	0.20	0.72	0.028	0.027	0.020	0.0017	0.0012	0.0021	1.15	0.101
2009	0.0025	0.33	0.44	0.18	0.028	0.013	0.0039	0.0049	0.0042	0.463	0.148
2010	0.0030	0.76	0.13	0.049	0.048	0.0078	0.00070	0.0014	0.0032	1.46	0.121
2011	0.00058	0.30	0.48	0.11	0.054	0.034	0.017	0.0024	0.0012	1.07	0.132
2012	0	0.86	0.023	0.077	0.021	0.0073	0.0084	0.0017	0	2.48	0.149

Table 17. Annual weighted CPUE of striped bass (No. of individuals per sample), total numbers collected striped bass collected, and the number of gill net samples (N) in the Pamlico, Pungo, and Neuse River systems. The Percent Standard Error (PSE) represents a measure of precision. *Annually, 160 samples are collected from the Pamlico / Pungo Rivers, and 160 samples from the Neuse River, for a combined total of 320 samples. In 2005, only 304 stations were sampled due to high gasoline prices.

Year	CPUE	No. of Striped Bass	N*	PSE
2005	2.08	596	304	12
2006	2.09	639	320	12
2007	1.39	418	320	15
2008	1.45	442	320	16
2009	1.05	324	320	14
2010	2.07	640	320	14
2011	2.15	653	320	13
2012	0.9	271	320	14
2013	1.22	365	320	15
2014	1.61	490	320	13

Table 18. Research recommendations and progress from Amendment 1 to the North Carolina Estuarine Striped Bass FMP.

Management Strategy	Objectives	Outcome
Continued support and development of SHAs in NC.	2,4,5	Ongoing
Continued protection of SHAs by the cooperating agencies once they have been designated.	2,4,5	Ongoing
Work with WRC, DWQ, and others to implement management measures that will enhance water quality in areas used by striped bass.	2,4,5	Ongoing
Work with American Rivers and other partners to accelerate dam removal in priority areas.	2,4,5	Ongoing
Continue to protect NC coastal wetlands through the permit review process.	2,4,5	Ongoing
Quantify the density and distribution of striped bass eggs, fry, and juveniles in coastal rivers to estimate potential losses to entrainment and impingement	1,2,3,4,5	Ongoing in the Roanoke River through ECU. Still needed in the CSMA
Determine if contaminants are present in striped bass habitats and identify those that are potentially detrimental to various life history stages.	2,4,5	Ongoing through Division of Water Quality but could be expanded
Evaluate the effects of existing and future water withdrawals on water quality and quantity and fisheries habitat in coastal watersheds.	2,4,5	No Action
Identify and designate anadromous fish nursery areas and how early juvenile striped bass move and are distributed in NC estuarine waters.	1,2,3,4,5	No Action
Identify minimum flow requirements in the Tar/Pamlico, Neuse, and Cape Fear rivers necessary for successful spawning, egg development, and larval transport to nursery grounds.	2,4,5	No Action
Evaluate the impacts/effects of reverse osmosis plants on receiving waters and aquatic resources.	2,3,4,5	Short term studies conducted but there is a need for long term studies
Verify condition of identified SHAs used by striped bass.	2,4,5	No Action
Investigate abundance and spawning contribution of striped bass in the North Carolina and Virginia portions of the Blackwater, Nottoway and Meherrin rivers.	1,2,3,4,5	Some sampling is by VADGIF and a CRFL grant is being completed that evaluated the potential spawning contribution on the Chowan and Meherrin rivers.
Investigate striped bass use in the North Carolina portions of the Waccamaw River during the appropriate season.	1,2,3,4,5	No Action
Continue to investigate the potential for passage of striped bass above Roanoke Rapids Dam.	2,4,5	Ongoing
Support fish passage at Buckhorn Dam and Lock and Dam No.2 and No.3 and investigate anadromous fish utilization of the rock ladder at Lock and Dam No. 1.	2,4,5	Ongoing
Investigate the feasibility of fish passage at and	2,4,5	Ongoing

Management Strategy	Objectives	Outcome
improved water flows from Rocky Mount Mill Dam and Tar River Reservoir Dam.		
Support the removal of Milburnie Dam in Raleigh.	2,4,5	Ongoing
Support fish passage above the Yadkin chain of dams in North Carolina.	2,4,5	Ongoing
Data on the density and distribution of striped bass eggs, fry, and juveniles in coastal rivers are needed so that potential losses to entrainment and impingement can be estimated.	2,3,4,5	CSMA No Action
Identify effective engineering solutions to prevent entrainment and impingement of striped bass eggs, fry, and juveniles.	2,3,4,5	Ongoing
NCDMF and NCWRC should work with DWQ and other agencies to determine and establish more stringent water quality standards in Anadromous Fish Spawning Areas.	2,4,5	No Action
Determine system of origin of fish on the spawning grounds.	1,3,4	Ongoing through NCWRC genetics study **(High)**
Acquire life history information: maturity, fecundity, size and weight at age, egg and larval survival.	1,3,4	Ongoing through CRFL funded projects **(High)**
Conduct a mark-recapture study utilizing conventional tags and telemetry approaches.	1,2,3,4	Ongoing through CRFL funded projects **(High)**
Determine if suitable striped bass spawning conditions exist in the Tar/Pamlico, Neuse, and Cape Fear rivers	1,2,3,4,5	No Action **(Medium)**
Conduct egg abundance and egg viability studies.	1,2,3,4,5	No Action **(Medium)**
Determine contribution of stocked fish to spawning stock.	1,2,3,4,5	Ongoing through NCWRC genetics study **(Medium)**
Determine extent of spawning grounds.	1,2,3,4,5	Ongoing through CRFL funded grant **(Low)**
Improve discard estimates and discard biological characteristics from commercial fisheries.	1,3,4,5,6,7	Ongoing through statewide observer coverage **(Medium)**
Obtain biological characteristics such as length, weight, age, and sex of recreational harvest.	1,3,4,5,6,7	Ongoing through creel surveys but could be expanded **(Medium)**
Obtain biological characteristics such as length, weight, age, and sex of commercial harvest.	1,3,4,5,6,7	Ongoing but sampling could be increased **(Medium)**
Improve discard estimates and discard biological characteristics from recreational fisheries.	3,4,5,6,7	Ongoing through creel survey **(Low)**
Conduct delayed mortality studies for recreational and commercial gear.	3,4,5,6,7	Ongoing for recreational fisheries **(Low)**
Conduct independent surveys that adequately capture all life stages of striped bass.	3,4,5,6,7	No Action **(High)**
Continue tagging striped bass in order to evaluate the possible contribution to the Atlantic Migratory stock and provide data to be used in stock assessment efforts. Develop means to better assess the tag recapture and reporting rate for use in tag-based stock assessments.	1,3,4,5	Ongoing through CRFL funded projects **(High)**
Conduct a short term study to determine vulnerability-	1,3,4,5	No Action **(Low)**

Management Strategy	Objectives	Outcome
at-length for survey gears		
Apply for ITP for impacted fisheries.	3,4,5,6,7	Ongoing
Continue gear development research to minimize species interactions.	3,4,5,6,7	Ongoing
Implementation of outreach programs to inform state agencies, the public, and the commercial and recreational fishing industries about issues relating to protected species and fishery management	3,4,5,6,7	Ongoing
Methodology tested to accurately capture Atlantic Ocean striped bass harvest during summer months.	1,3,4,5	Ongoing through catch card survey but compliance is uncertain.
Increase surveys of stocked systems to determine percent contribution of wild versus stocked fish.	1,3,4,5	Ongoing through NCWRC genetics survey.
Determine if fish produced from system-specific parentage will increase stocking contribution to spawning populations.	1,3,4,5	Ongoing through NCWRC genetics survey.
Determine factors impacting survivability of stocked fish in each system.	1,3,4,5	No Action
More at-sea observations made for the gill net fishery to more accurately assess the discards from this fishery.	1,3,4,5,6,7	No Action
Explore improvements to NCDMF programs (Trip Ticket, Fish House sampling, fisherman surveys or logbooks) in order to acquire spatially and temporally accurate gill net gear parameters.	1,4,5,6,7	No Action
Investigate the impacts of delayed mortality on striped bass captured in gill nets.	1,3,4,5,7	No Action
Clarify relationships between salinity, DO, temperature and catch and release mortality rates in the ASMA and CSMA.	1,2,3,4,5,6,7	No Action
Year round creel survey in the ASMA.	3,4,5,6,7	No Action
Expand tagging programs to include high reward tagging.	1,3,4,5,6,7	Ongoing through CRFL funded grant
Conduct new analysis of relationship between JAI in Albemarle Sound and flows in Roanoke River	1,2,3,4,5	No Action

Table 19. Management action taken as a result of Amendment 1 to the North Carolina Estuarine Striped Bass FMP.

ISSUE	NCMFC/NCWRC SELECTED MANAGEMENT STRATEGY	OBJECTIVES ADDRESSED	REGUALTORY ACTION TAKEN
1. Recreational Striped Bass Harvest Closure – Oregon Inlet Area/Atlantic Ocean	Status Quo – Allow the fishery to continue with catch card survey (May – Oct).	3,4,5	No additional regulatory action required
2. Striped Bass Stocking In Coastal Rivers	Status quo and research needs – Goal of 100,000 Phase II striped bass stocked annually per CSMA system (Tar-Pamlico, Neuse, and Cape Fear) with 3,000 stocked fish tagged annually in each system.	3,4,5,6	No additional regulatory action required
3. Use Of Single Barbless Hooks During The Striped Bass Closed Season	Status quo (don't require barbless hooks) and continue to educate anglers on ethical angling practices, with the additional recommendation to include mortality statistics associated with various handling techniques when possible.	5,6,7	Increase angler education about proper angling and handling techniques to reduce discard mortality
4. Striped Bass Management Area – Albemarle Sound Management Area Southern Boundary Line Adjustment	Support the necessary rule changes to create a new boundary point.	2,3,6	Rule change: 15A NCAC 03J .0209; 03R .0112; and 03R .0201
5. Cashie River – Change In Joint and Coastal Waters Boundary Line	Support the necessary rule changes to create a new boundary point.	3,6	Rule change 15A NCAC 03Q .0202
6. Discard Mortality Of Striped Bass From Commercial Set Gill Nets Central Southern Management Area	Status Quo – continue the gill net requirement for tie downs and restricting gill net from within 50 yards of shore proclamation.	6,7	No additional regulatory action required
7. Hook and Line as Commercial Gear in Estuarine Striped Bass Fisheries	Status Quo (don't allow hook and line as commercial gear) and support the necessary rule changes for adaptive management.	3,6,7	Rule change 15A NCAC 03M .0201 and 03M .0202[1]

[1] These rule changes will not initiate hook and line harvest of striped bass, only make it possible to do so in the future should unforeseen gill net regulations due to Endangered Species Interactions make adaptive management necessary.

ISSUE	**NCMFC/NCWRC SELECTED MANAGEMENT STRATEGY**	**OBJECTIVES ADDRESSED**	**REGUALTORY ACTION TAKEN**
8. Central Southern Management Area Striped Bass Management Measures	Status Quo with the addition of instituting a pound for pound payback provision for the commercial harvest TAC. Status Quo for CSMA management measures maintain the following: **CSMA Recreational Harvest (Coastal, Joint, and Inland waters)** • Unified season Oct 1 – Apr 30 • 2 fish daily creel limit • 18 inch TL minimum size limit • Protective slot (no harvest) 22 – 27 inches TL (joint and inland waters only) • Harvest moratorium for Cape Fear River and its tributaries **CSMA Commercial Harvest (Coastal and Joint waters)** • TAC of 25,000 lbs and commercial fishery, excluding Pamlico Sound, is not a bycatch fishery • 18 inch TL minimum size limit • 10 fish or less trip limit • Spring season only, anytime between Jan 1 – Apr 30 • Gill net mesh size restrictions and yardage limits • 18 inch TL minimum size limit • Discards – maintain existing gill net tie-down and distance from shoreline (DFS) measures implemented by proclamation. • Harvest moratorium for Cape Fear River and its tributaries	1,2,3,4,5,6,7	No additional regulatory action required

ISSUE	**NCMFC/NCWRC SELECTED MANAGEMENT STRATEGY**	**OBJECTIVES ADDRESSED**	**REGUALTORY ACTION TAKEN**
9. Albemarle Sound Management Area And Roanoke River Management Area Striped Bass Management Measures	Status Quo with the current management measures in the ASMA and RRMA. Status Quo for ASMA and RRMA management measures maintain the following: **Biological Reference Points** • $F_{Target} = 0.25$ • $F_{Threshold} = 0.29$ **A/R stock has been managed with a Total Allowable Catch (TAC) since 1990** • Maintain current TAC of 550,000 lbs • The TAC will continue to be split evenly between commercial and recreational sectors • ASMA commercial TAC = 275,000 lbs • ASMA recreational TAC = 137,500 lbs • RRMA recreational TAC = 137,500 lbs **ASMA Commercial Harvest (TAC = 275,000 lbs)** • 18 inch TL minimum size limit (ASMFC compliance requirement) • Continue to operate as a bycatch fishery • Spring season, anytime between Jan 1 – Apr 30 • Fall Season, anytime between Oct 1 – Dec 31 • Daily trip limits for striped bass • Maintain gill net mesh size and yardage restrictions • Maintain seasonal and area closures • Maintain attendance requirements for small mesh nets (mid – May through late November)	1,2,3,4,5,6,7	No additional regulatory action required

ISSUE	**NCMFC/NCWRC SELECTED MANAGEMENT STRATEGY**	**OBJECTIVES ADDRESSED**	**REGUALTORY ACTION TAKEN**
9. Albemarle Sound Management Area And Roanoke River Management Area Striped Bass Management Measures (cont.)	**ASMA Recreational Harvest (TAC = 137,500 lbs)** • 18 inch TL minimum size limit • Daily creel limit (can be adjusted as necessary to keep harvest below the TAC) • Open 7 days a week all season (can be adjusted as necessary to keep harvest below the TAC) • Spring season, anytime between Jan 1 – Apr 30 • Fall season, anytime between Oct 1 – Dec 31 **RRMA Recreational Harvest (TAC = 137,500 lbs)** • 18 inch TL minimum size limit • Protective slot (no harvest): 22-27 inches TL • 2 fish daily creel, only one of which can be greater than 27 inches TL • Harvest season in entire river opens on March 1 and closes on April 30 by rule since 2008 • Single barbless hook regulation from April 1 – June 30 in Inland waters above the US 258 Bridge **Management of TACs for ASMA and RRMA** • Short-term Overages: if the harvest point estimate exceeds the total TAC by 10% in a single year, overage is deducted from the next year and restrictive measures implemented in the responsible fishery (ies) • Long-term Overages: five-year running average of harvest point estimate exceeds the five-year running average of the total TAC harvest by 2%, the responsible fishery exceeding the harvest limit will be reduced by the amount of the overage for the next five years. Should the target F be exceeded, then restrictive measures will be imposed to reduce F to the target level	1,2,3,4,5,6,7	No additional regulatory action required

ISSUE	**NCMFC/NCWRC SELECTED MANAGEMENT STRATEGY**	**OBJECTIVES ADDRESSED**	**REGUALTORY ACTION TAKEN**
9. Albemarle Sound Management Area And Roanoke River Management Area Striped Bass Management Measures (cont.)	**Proclamation Authority for the ASMA, RRMA, and CSMA striped bass stocks:** It should also be noted that under the provisions of this FMP the NCDMF Director and the NCWRC Chief of Inland Fisheries will maintain the ability to establish seasons, authorize or restrict fishing methods and gear, limit quantities taken or possessed, and restrict fishing areas as deemed necessary to maintain a sustainable harvest.	1,2,3,4,5,6,7	No additional regulatory action required

FIGURES

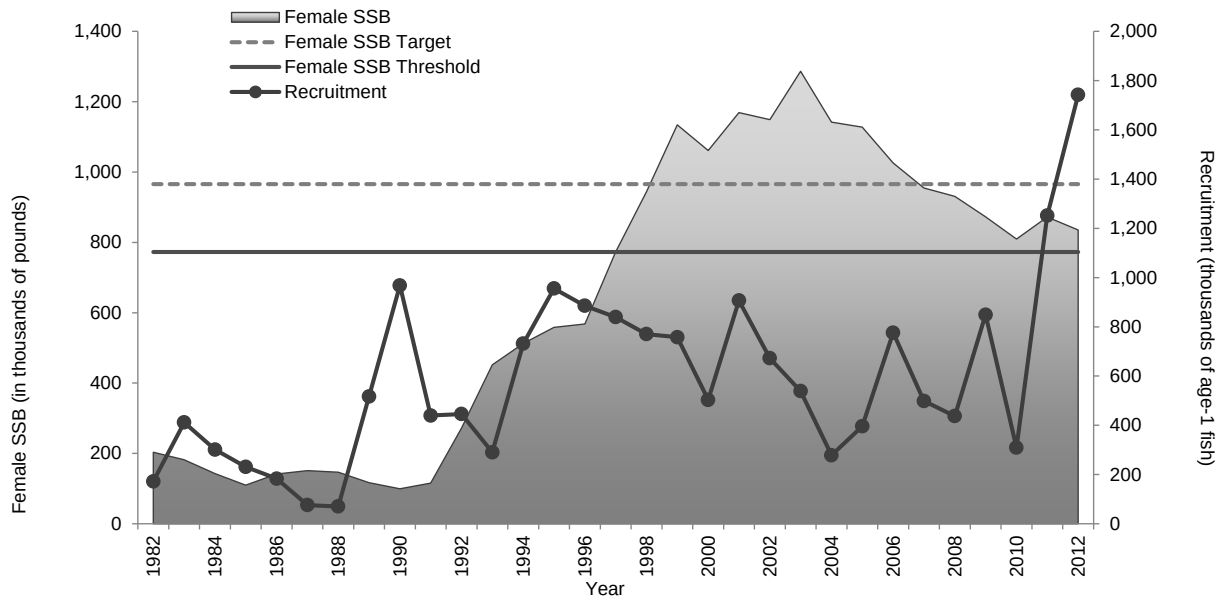

Figure 1. Albemarle/Roanoke striped bass female spawning stock biomass and recruitment (abundance of age-1). Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

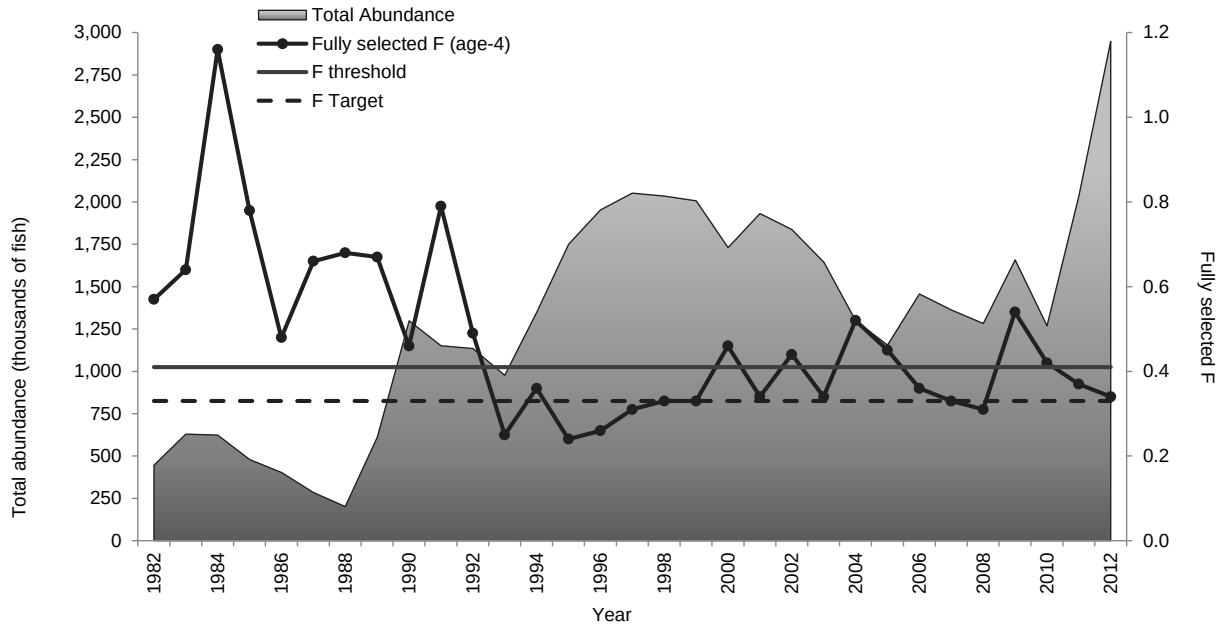

Figure 2. Albemarle/Roanoke striped bass total stock abundance and fishing mortality. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

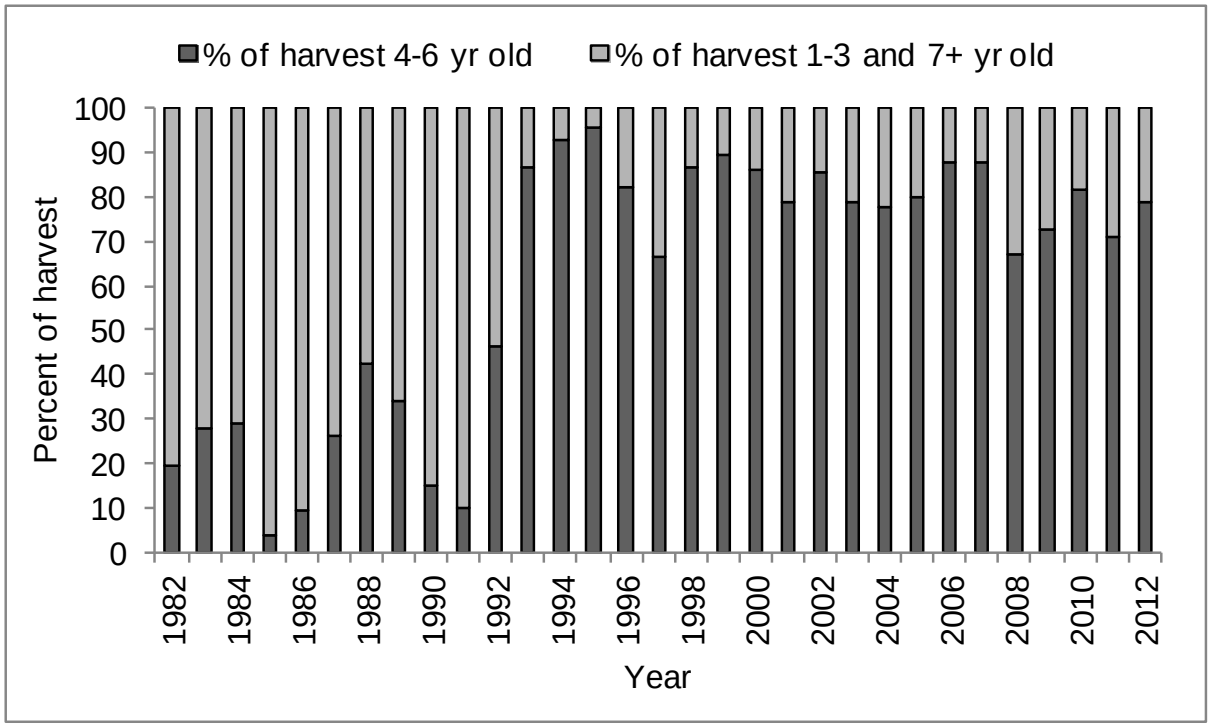

Figure 3. Percent of the total striped bass landings by 4-6 year old and 1-3 and 7+ year old age groups in the ASMA and RRMA, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

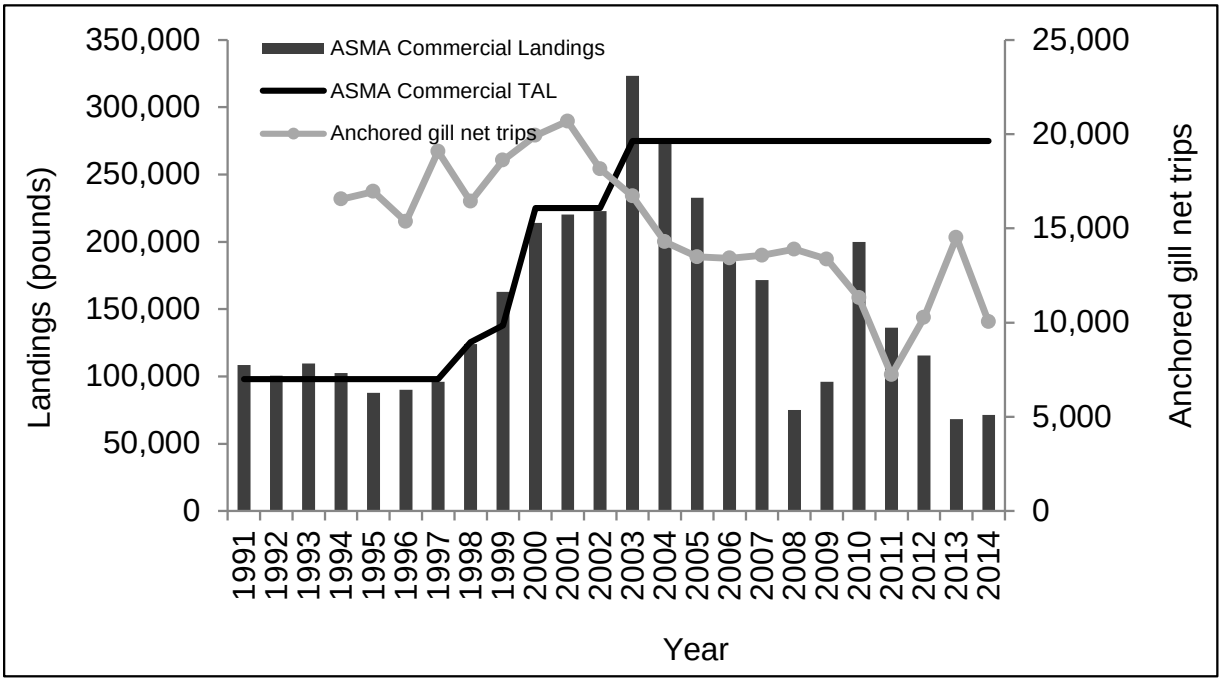

Figure 4. Commercial striped bass landings, TAL, and anchored gill net trips in the ASMA, NC.

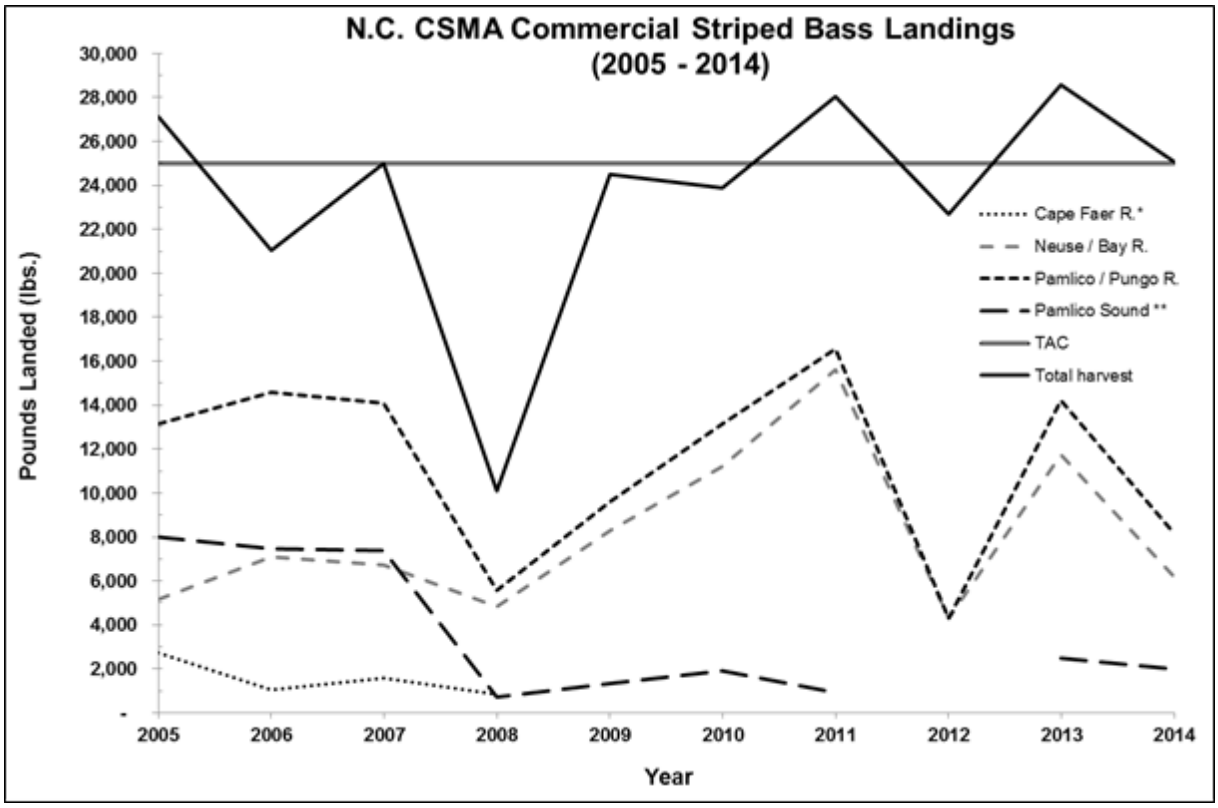

Figure 5. Commercial striped bass landings by river system, and the TAL in the CSMA, NC. There has been a moratorium on harvest in the Cape Fear River since 2009.

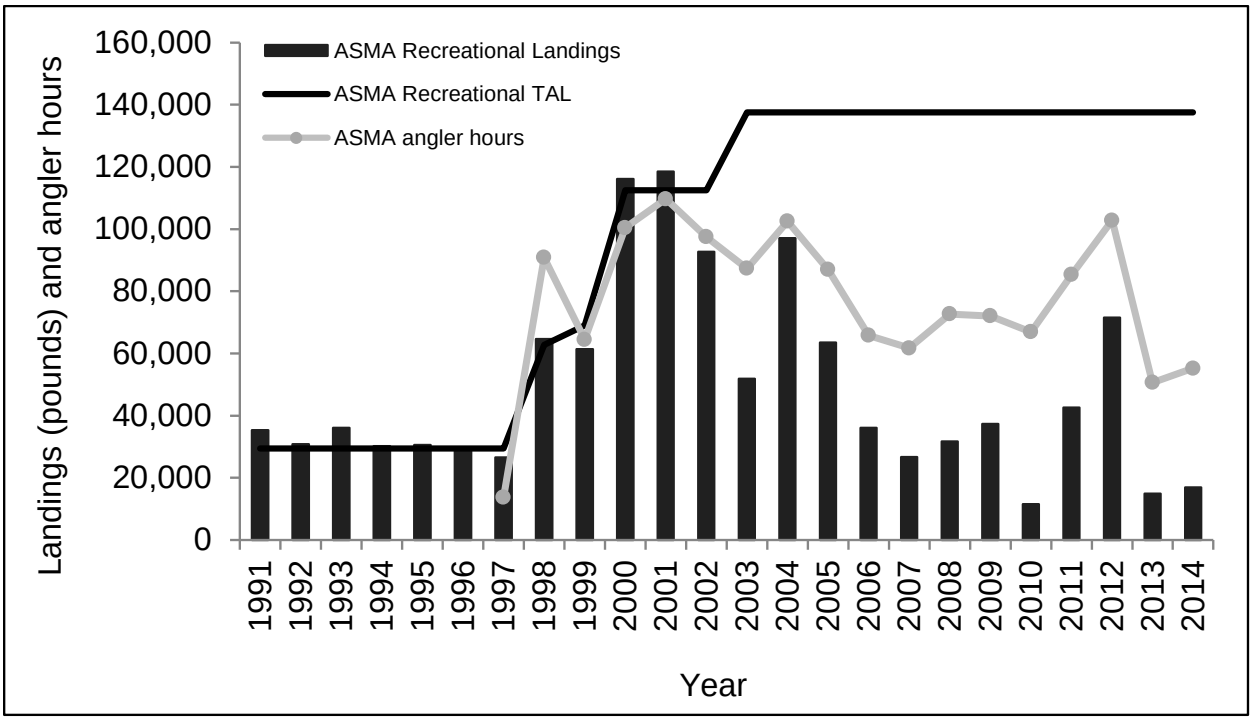

Figure 6. Recreational striped bass landings, TAL, and angler hours in the ASMA, NC.

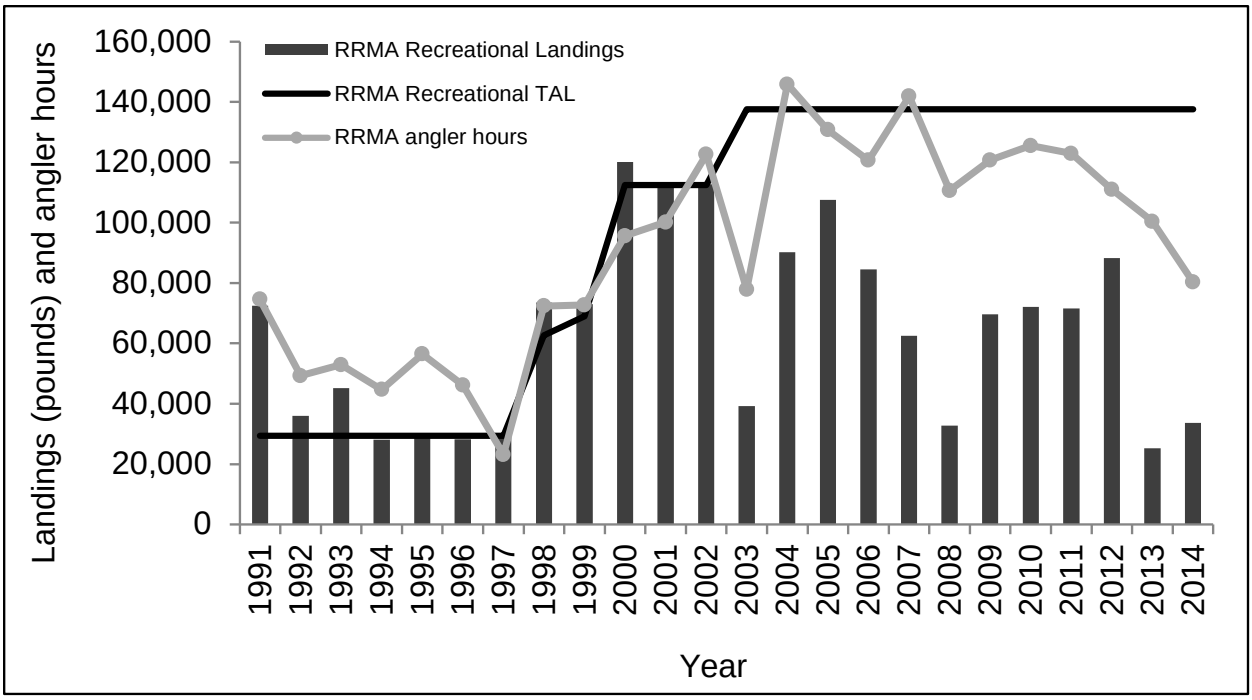

Figure 7. Recreational striped bass landings, TAL, and angler hours in the RRMA, NC.

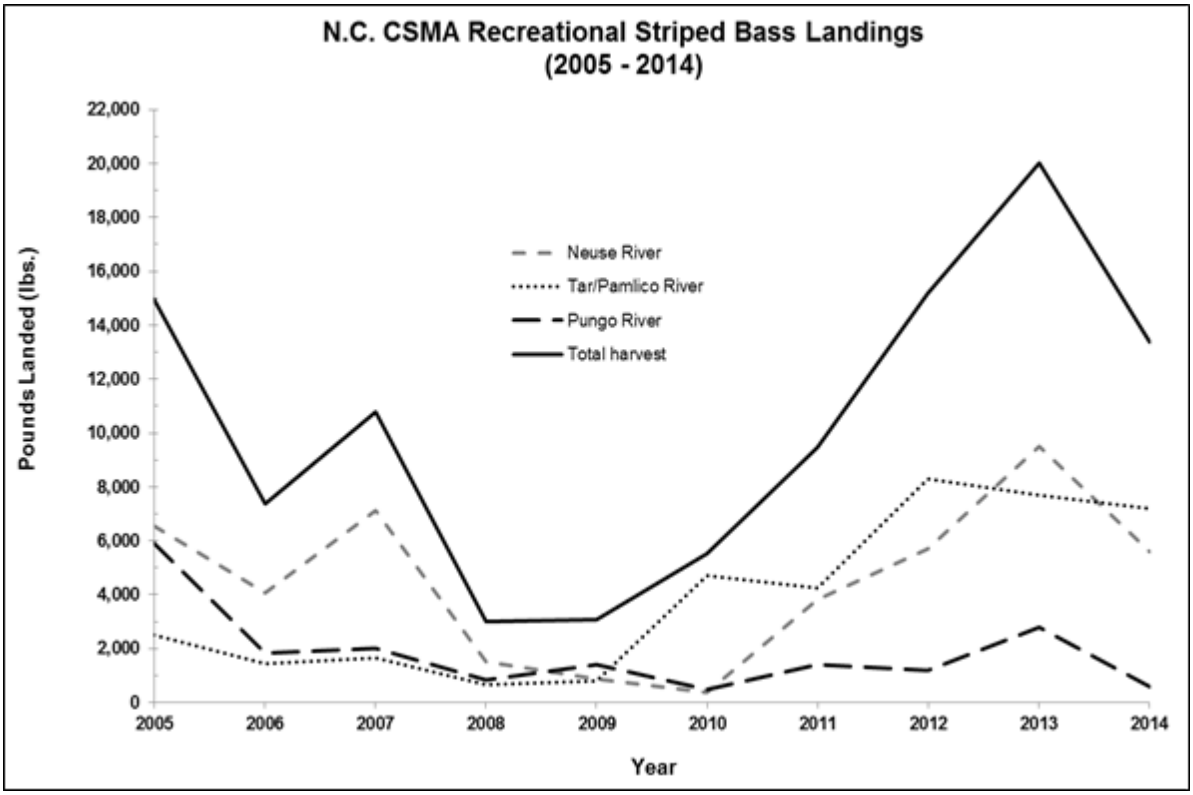

Figure 8. Recreational striped bass landings broken out by major river system in the CSMA, NC.

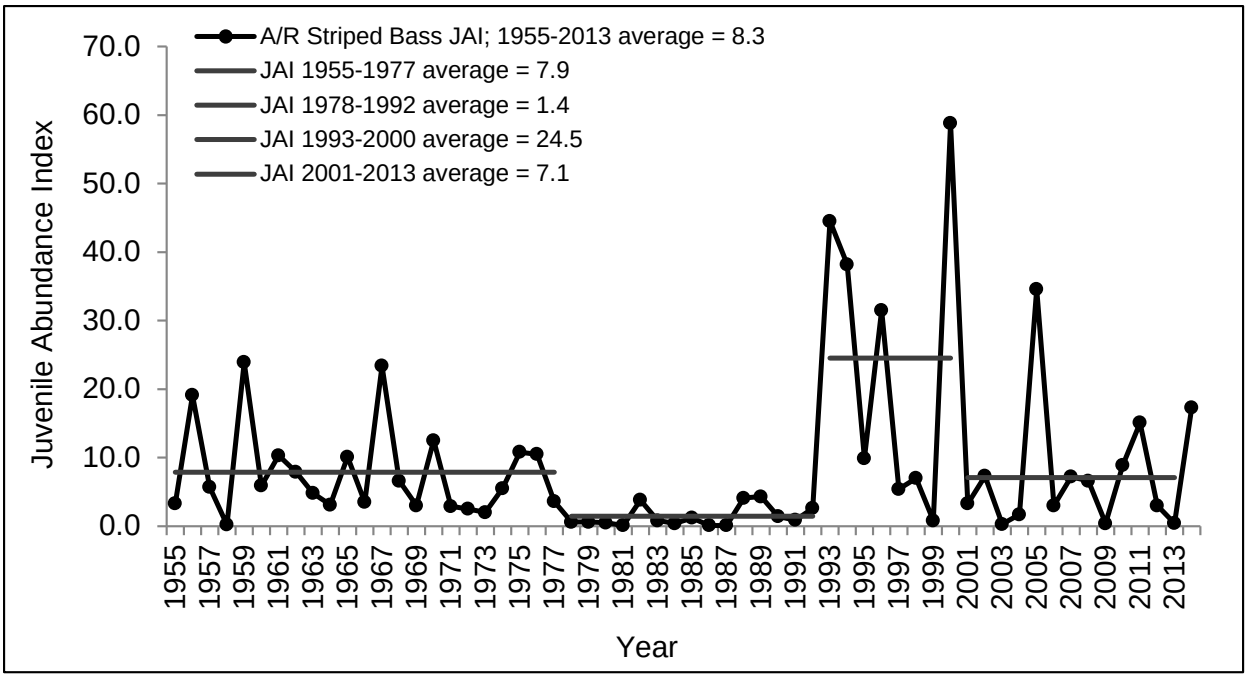

Figure 9. Juvenile abundance index (JAI) of Albemarle/Roanoke striped bass from the NCDMF juvenile trawl survey, western Albemarle Sound, NC.

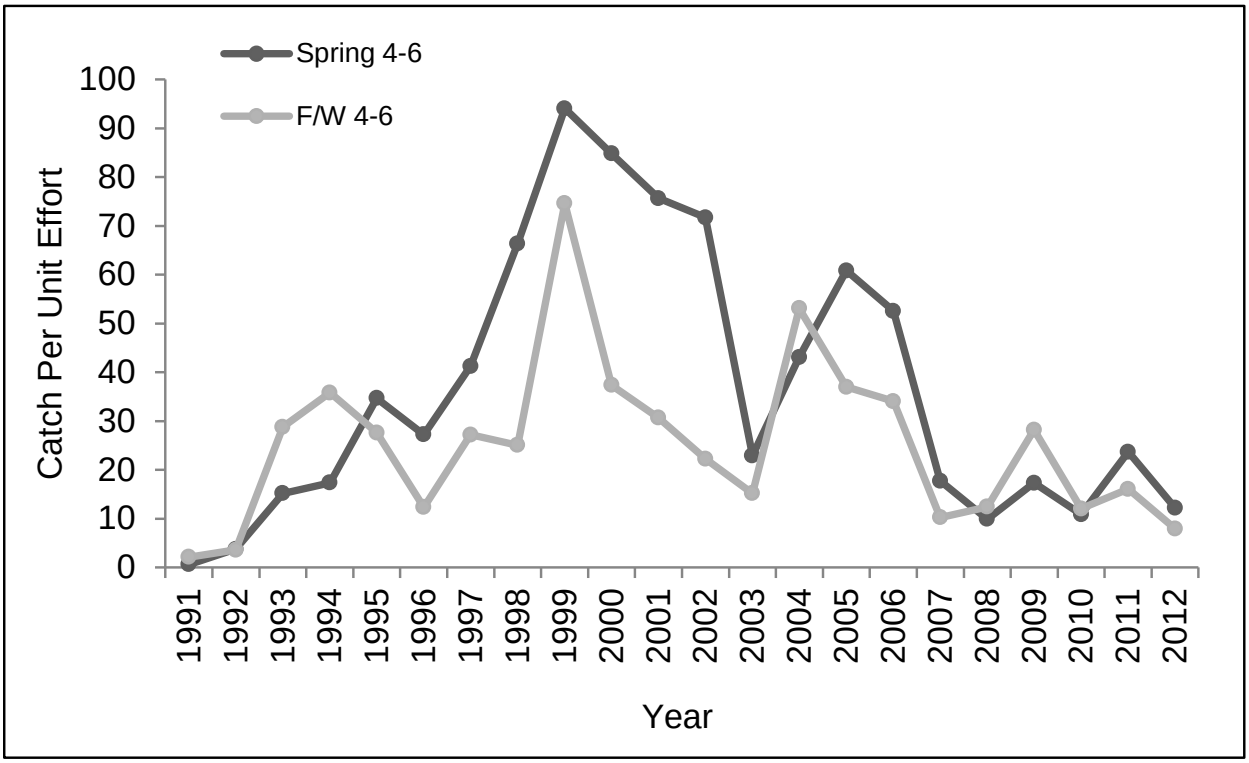

Figure 10. Relative abundance of age 4-6 Albemarle/Roanoke striped bass from the NCDMF fall/winter and spring independent gill net surveys, Albemarle Sound area, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

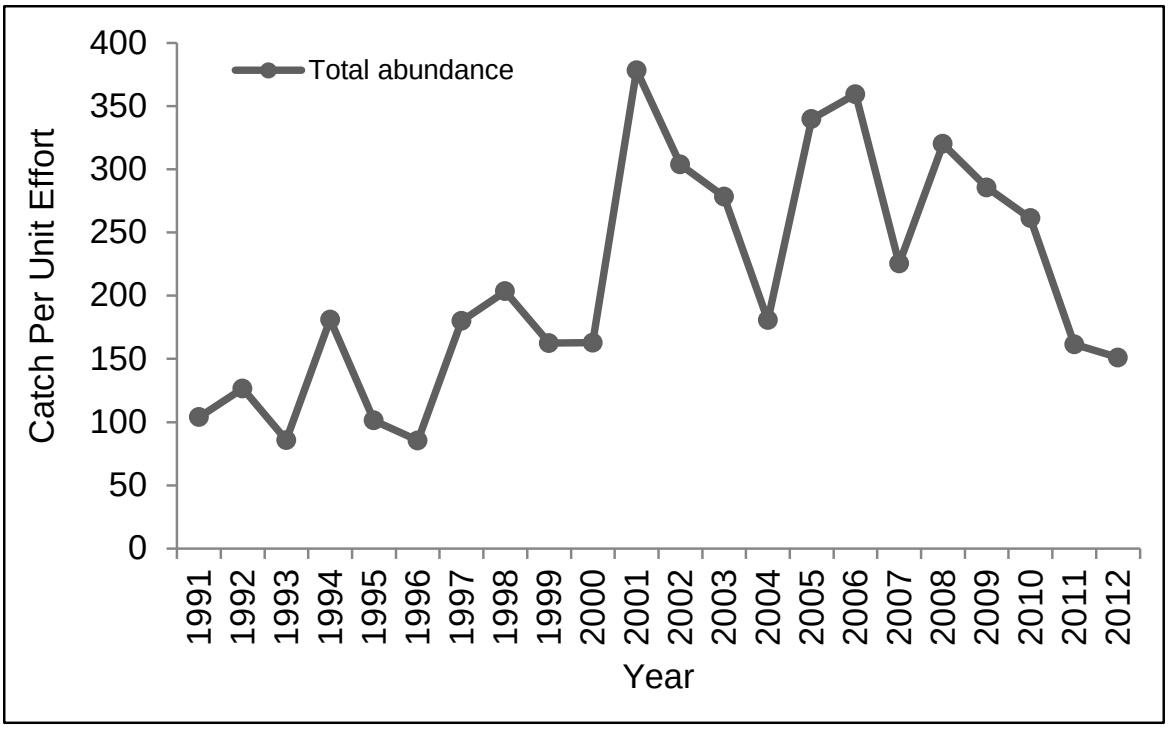

Figure 11. Relative abundance of Albemarle/Roanoke striped bass from the NCWRC spawning grounds electrofishing survey, Roanoke River at Weldon, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

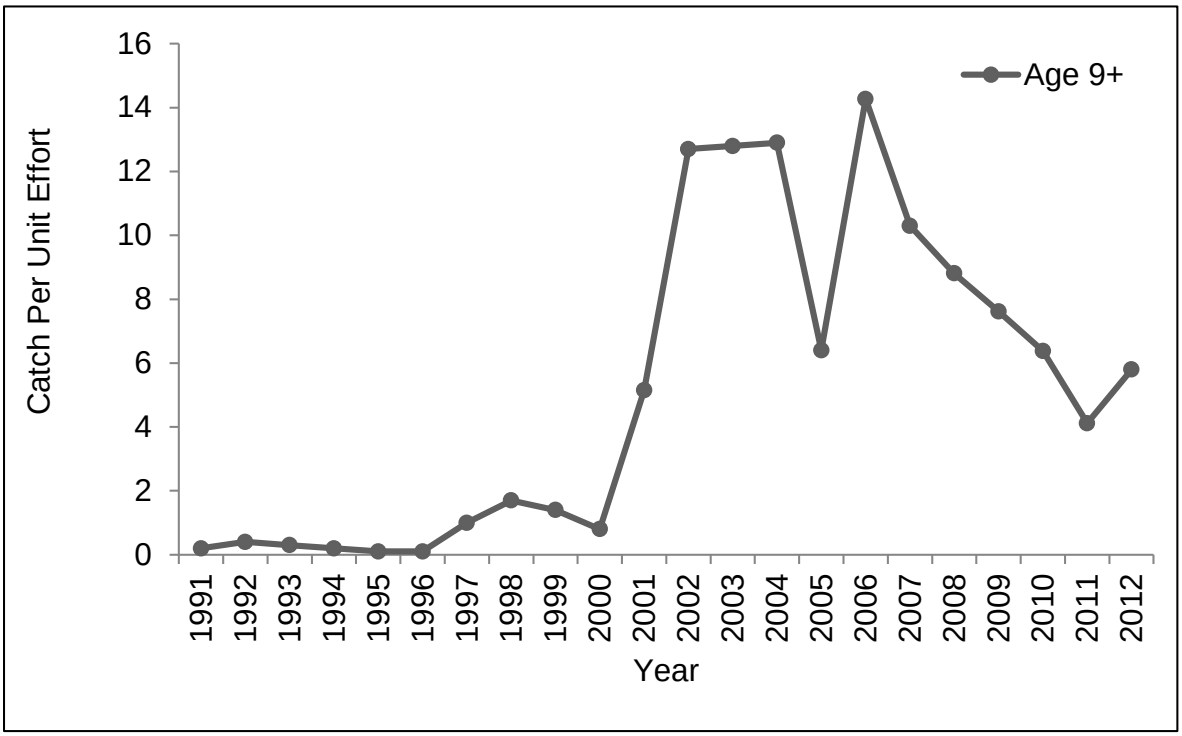

Figure 12. Relative abundance of age 9+ Albemarle/Roanoke striped bass from the NCWRC spawning grounds electrofishing survey, Roanoke River at Weldon, NC. Source: Stock Status of Albemarle Sound-Roanoke River Striped Bass, 2014.

FISHERY MANAGEMENT PLAN UPDATE
HARD CLAM
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	August 2001
Amendments:	Amendment 1 – June 2008
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	July 2013; Amendment 2 is currently in development and scheduled for final approval in November 2016.

The 2001 N.C. Hard Clam Fishery Management Plan (FMP) recommendations included: adding in a new mechanical clam harvest area in Pamlico Sound and rotate openings in this area with northern Core Sound, decrease the daily harvest limit for mechanical harvest in Core Sound, change some of the lease requirements, increase relay of clams, and increase funding for Shellfish Sanitation (NCDMF 2001).

The N.C. Hard Clam FMP Amendment 1 recommended from public bottom that the hard clam fishery continue harvest at current daily limits, eliminate the mechanical clam harvest rotation in Pamlico Sound, institute a resting period in the northern Core Sound mechanical clam harvest area, and develop sampling programs to collect information necessary for the completion of a hard clam stock assessment (NCDMF 2008). Amendment 1 also endorsed several changes to the shellfish lease program to increase the accountability of the leaseholders and improve public acceptance of the program

The N.C. Hard Clam FMP Amendment 2 along with the N.C. Oyster FMP Amendment 4 is in development and scheduled for final adoption in November 2016.

Management Unit

All hard clams (*Mercenaria mercenaria*) occurring within North Carolina coastal waters.

Goal and Objectives

From the draft Amendment 2, approved by the North Carolina Marine Fisheries Commission (NCMFC) in August 2014:

The goal of N.C. Hard Clam FMP is to manage hard clam stocks in a manner that achieves sustainable harvest and protects its ecological value. To achieve this goal, it is recommended that the following objectives be met:

1. Protect the hard clam stock from overfishing, while maintaining levels of harvest at sustained production, providing sufficient opportunity for both recreational and commercial hard clamming, and aquaculture.

2. Identify, develop, and promote research to improve the understanding of hard clam biology, ecology, population dynamics, and aquaculture practices.

3. Initiate, enhance, and continue studies to collect and analyze economic, social, and fisheries data needed to effectively monitor and manage the hard clam fishery.

4. Identify, develop and promote efficient hard clam harvesting practices while protecting habitat.

5. Promote the protection, restoration, and enhancement of habitats and water quality so that the production of hard clams is optimized.

6. Consider the socioeconomic concerns of all hard clam resource user groups, including market factors.

7. Promote public awareness regarding the status and management of the North Carolina hard clam stock.

STATUS OF THE STOCK

Stock Status

Since Amendment 2 to the NCDMF FMP for Hard Clams, the status of the hard clam stock in North Carolina has been considered unknown due to the paucity of data available to assess the population (NCDMF 2008). The NCDMF Hard Clam Plan Development Team recommends the status continue to be defined as unknown due to the continued lack of data needed to conduct a reliable assessment of the stock.

The statutory obligation to manage hard clams according to sustainable harvest cannot be met until the appropriate data are collected. While landings records reflect population abundance to some extent, the relationship is confounded by changes in harvest effort and efficiency.

Stock Assessment

Data limitations prevent NCDMF from conducting a hard clam stock assessment and calculating sustainable harvest. Currently, the only data available for the stock in most areas are the commercial landings and associated effort. For this reason, the current assessment focused on trends in catch rates in the commercial hard clam fishery from 1994 through 2013. These catch rates should not be considered an unbiased representation of trends in population size; fisheries-dependent data are often not proportional to population size due to a number of caveats and should be interpreted with caution if the interest is relative changes in the population.

The North Carolina commercial hard clam fishery is subject to trip limits, which could bias catch rates (Mike Wilberg, UMCES, personal communication; John Walter, NOAA Fisheries, personal communication); that is, the trip limits affect the amount of catch that is observed per unit effort—the true value of the variable cannot be observed. A censored regression approach was applied to calculate an unbiased index of relative abundance using data collected from a fishery with trip limits. Preliminary analysis found that for years in which greater than or equal to 50% of transactions equaled or exceeded the trip limit in a particular water body, the censored regression produced nonsensical results. For this reason, such years were removed from those water bodies where this occurred. Note that this was only an issue for mechanical harvest data.

Data were obtained from the North Carolina Trip Ticket Program for 1994 through 2013. The censored response variable (catch per unit effort—the number of clams per transaction) was fit within a Generalised Additive Models for Location Scale and Shape (GAMLSS) framework using the 'gamlss.cens' (Stasinopoulos et al. 2014) and 'survival' (Therneau 2014) packages in R (R Core Team 2014). Catch rates were estimated for both hand harvest and mechanical harvest in each of the major water bodies from which hard clams are harvested where sufficient data were available (see previous paragraph). Hand harvest occurs year-round and is summarized by calendar year. The majority of mechanical harvest occurs from December through March with some harvest occasionally allowed during other times of the year; therefore, mechanical harvest is summarized by fishing year (December through March). Only landings from public bottom were examined because planting of seed clams, grow-out availability, and market demand often artificially drives landings from private leases. Fisheries-dependent catch rates were expressed as numbers harvested per transaction. Catch rates were consistently higher for mechanical harvest than for hand harvest.

The Mann-Kendall test was performed to evaluate trends in the annual percentages. The Mann-Kendall test is a non-parametric test for monotonic trend in time-ordered data and allows for missing values (Gilbert 1987). The test was applied to the percentage of trip limits for hand harvest and mechanical harvest by area. Trends were considered statistically significant at $\square$ = 0.05.

Based on the Mann-Kendall test there were significant increasing trends over time detected in eight areas for hand harvest—Bogue Sound, Core Sound, Inland Waterway, New River, Newport River, North River/Back Sound, Shallotte River, and White Oak River. A significant decreasing trend was found in the hand harvest catch rates in Pamlico Sound. The remaining water bodies showed no trend in hand harvest catch rates over time. The Inland Waterway, New River, Newport River, North River/Back Sound, and Stump Sound demonstrated significantly increasing trends in mechanical harvest catch rates over time. No trends were detected in Bogue Sound, Core Sound, or White Oak River catch rates for mechanical harvest.

Trends observed in fishery-dependent indices must be interpreted with strong caveats. In order for a fisheries-dependent index to be proportional to abundance, fishing effort must be random with respect to the distribution of the population and catchability must be constant over space and time. Other factors affecting the proportionality of fishery-dependent indices to stock size include changes in fishing power, gear selectivity, gear saturation and handling time, fishery regulations, gear configuration, fishermen skill, market prices, discarding, vulnerability and availability to the gear, distribution of fishing activity, seasonal and spatial patterns of stock distribution, change in stock abundance, and environmental variables. Many agencies, such as the NCDMF, do not require fishermen to report records of positive effort with zero catch; lack of these "zero catch" records in the calculation of indices can introduce further bias.

STATUS OF THE FISHERY

Current Regulations

Hard clams cannot be taken from any public or private bottom in areas designated as prohibited (polluted) by proclamation except for special instances for: Shellfish Management Areas (NCMFC Rule 15A NCAC 03K .0103), with a permit for planting shellfish from prohibited areas (NCMFC Rule 15A NCAC 03K .0104), and for the depuration of shellfish (NCMFC Rule 15A NCAC 03K .0107).

Public Bottom:

The minimum size limit for hard clams is 1-inch thickness (width). Daily commercial harvest limits on public bottom are no more than 6,250 hard clams (25 bags at 250 clams per bag) per fishing operation in any coastal fishing waters regardless of the harvest methods employed. Size, daily harvest limits, and season and area limitations do not apply in some situations on public bottom for: 1) temporary openings made on the recommendation of shellfish sanitation; and 2) maintenance dredging operations, where waste of the hard clam resource is apparent due to these activities and Shellfish Sanitation deem the area safe from public health risks.

The daily hand harvest limit on public bottom is 6,250 hard clams and the fishery is open year-round. Rakes no more than 12 inches in width or weighing no more than six pounds to take hard clams can be used in any live oyster bed, in any established bed submerged aquatic vegetation or in and established bed of salt water cordgrass.

The public mechanical hard clam harvest season can occur from December 1 through March 31, and is opened by proclamation. Internal waters that can open to public mechanical hard clam harvest can only be in areas in Core and Bogue Sounds, Newport, North, White Oak and New Rivers and the Intracoastal Waterway north of "BC" Marker at Topsail Beach which have been opened at any time from January, 1979, through September, 1988. Public hard clam mechanical daily harvest limits vary by waterbody. In some instances mechanical harvest areas are rotated (alternately open and close) with other areas (Table 1). The White Oak River, New River, and the Intracoastal Waterway (IWW) of Onslow and Pender counties (Marker 65 to the BC Marker at Banks Channel) are fished mainly with escalator dredges and are rotated on a yearly basis with maximum daily limits of 6,250 hard clams (25 bags at 250 hard clams per bag) per operation. The mechanical harvest area from Marker 72A to the New River Inlet is opened annually with a maximum daily harvest limit of 6,250 hard clams. The maximum daily harvest of 3,750 hard clams is allowed in North River, Newport River, and Bogue Sound (Table 1). Since 2008, upon adoption of Amendment 2 to the Hard Clam FMP, Core Sound has been divided into two areas and the northern area is open every other year while the southern portion is opened annually. Each area in Core Sound has a daily harvest limit of 5,000 hard clams per operation.

Recreational harvest limits from public bottom are 100 hard clams per person per day and no more than 200 hard clams per vessel. Hard clams can only be taken by hand for recreational purposes.

Private Bottom:

Leases and franchises in internal waters must adhere to the minimum 1-inch thick size limit for the sale of hard clams for consumption. There is no daily maximum harvest limit applied to the taking of hard clams from private bottom in internal waters.

Possession and sale of hard clams by a hatchery or aquaculture operation and purchase and possession of hard clams from a hatchery or aquaculture operation are exempt from the daily harvest limit and minimum size restrictions. The possession, sale, purchase and transport of such hard clams must be in compliance with the Aquaculture Operation Permit.

Commercial Landings

Hard clam harvest has fluctuated historically, often in response to changes in demand, improved harvesting, and increases in polluted shellfish area closures. Since 1994 it is known that about 88% (1994-2013 combined estimates) of the total commercial hard clam harvest come from public bottom in North Carolina. It is assumed that trends in hard clam landings from both sources (private and public bottom) combined can be attributed to changes in hard clam landings from public bottom since they make up the largest component to the overall harvest. Adverse weather conditions (i.e., hurricanes, heavy rain events) can impact the annual landings. Ten tropical cyclones (hurricanes and tropical storms) have made landfall in North Carolina since 1996 (http://www.nc-climate.ncsu.edu). Freshwater runoff after storm events often increase shellfish harvest area closures and therefore reduce effort in hard clam harvest for short term periods. Hard clams are a live product that have to go to market relatively quickly after harvest. Competition with hard clams grown in private culture from other states is also a known contributor to reduced market demand for hard clams in the wild since a more consistent product can be provided from private grow out facilities.
Annual average hard clam landings from 1994-2014 was 520,430 pounds of meats (Figure 1). Annual landings in 2011 were the lowest on record since 1975 at 295,467 pounds of meat. There has been a slight uptick in hard clam landings since the low in 2011 still are at one- fourth at their peak in the 1980s. Hard clams are a live-product and must to go to market and sold relatively quickly after harvest because of a short shelf life. Competition with hard clams grown in private culture from other states is also a known contributor to reduced market demand for hard clams in the wild since a more consistent product can be provided from private growers.

Recreational Landings

Unknown.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Currently, the only data available for the stock in all areas are the commercial landings and associated effort from the Trip Ticket Program. Sampling of commercial catches of hard clams has been ongoing in the Southern District, Morehead City Office since 1998. Additional sampling of other areas followed later as funding became available for expansion. Hard clam catches are sampled at the dealers year round when available. Trip ticket information is also obtained of the total catch in the trip. Information on the location(s) of the catch should be obtained in as much detail as possible (e.g. water body, nearest landmark, marker number,

etc.). Questions for the fisherman include: What gear or gears were used, gear parameters, (i.e. length of teeth, width of escalator, headrope length), how many minutes fished with each gear, location and depth of water fished. Additional questions include whether the catch came from public bottom or leased bottom, and if catch originated from a NCDMF Shellfish Rehabilitation area. Biological information on landed catch of hard clams is collected, including: shell length (mm) and shell width (depth) (mm) by market grade.

A total of 40,634 hard clams were measured from 2005 to 2014 (Table 2). Mean shell length (mm) has ranged from 60 mm to 69 mm in that timeframe with a minimum shell length of 25 mm to a maximum shell length of 120 mm seen in the measurements (Table 2).

Fishery-Independent Monitoring

A fisheries-independent monitoring program (Program 640) is currently underway in Core Sound to provide baseline data on hard clam abundance and gather quantitative environmental parameters. In the future it may be possible to expand this sampling into other areas to evaluate the entire population. Thirty randomly selected stations are sampled each year within three strata. The three designated strata were: Shellfish Mapping Strata (ST), Known Fishing Areas (FA), and Closed Shellfish Areas (CA). Sampling is performed at each station location within each stratum using a small patent tong on a 25-ft flat bottom boat. The patent tong has an opening of 0.51 square meters. Samples are quantified by station. Three replicates at each station location are taken.

All hard clams are measured for thickness and length to the nearest mm using calipers. Environmental data collected includes depth (m), surface and bottom salinity (ppt), surface and bottom temperature (°C), surface and bottom dissolved oxygen (mg/L), secchi depth (m), weather and wind elements, water level, distance from shore, and altered state. Sediment type is qualitatively described.

Very few hard clams are caught in this program due to the nature of the gear and random stratified sampling design. The Catch per Unit Effort (CPUE) or number of clams per station has ranged annually from 0.27 to 0.83 clams per station from 2007 to 2014 (Table 3). No trend is apparent from this sampling, but it is considered a short time series with only 8-years in development (Figure 2).

MANAGEMENT STRATEGY

There are no management triggers or methods to track stock abundance, fishing mortality, or recruitment between benchmark reviews from the current FMP. Landings and effort have decreased over time. There are no data to track the recreational fishery.

Amendment 1 to the N.C. hard Clam FMP recommended from public bottom that the hard clam fishery continue harvest at current daily limits, eliminate the mechanical clam harvest rotation in Pamlico Sound, institute a resting period in the northern Core Sound mechanical clam harvest area, and develop sampling programs to collect information necessary for the completion of a hard clam stock assessment (NCDMF 2008). Amendment 1 also endorsed several changes to the shellfish lease program to increase the accountability of the leaseholders and improve public acceptance of the program

See Table 4 for current management strategies under Amendment 1.

MANAGEMENT AND RESEARCH NEEDS

See Table 4 for current management strategies and implementation status of each under Amendment 1. The following research recommendations are part of Amendment 1 of the Hard Clam FMP (NCDMF 2008). Research recommendations with a '*' indicate an immediate need, and those with '**' indicate a less than immediate need.

- *Increase hard clam sampling programs to collect information necessary for the completion of a stock assessment. Programs will require long-term monitoring and a determination of the number of separate stocks in N.C. (needed)
- **Validation of ageing methods in North Carolina (needed)
- Investigate the role of adult dispersion patterns in spawning success (needed)
- **Determine fecundity of clams at each age (needed)
- Determine the importance of flushing rates and larval predation on larval survival (needed)
- Identify factors influencing settlement success (needed)
- Identify source and sink areas (needed)
- Describe spatial and temporal patterns of larvae and juveniles (needed)
- Investigate the role of lateral movement of juveniles in recruitment (needed)
- Determine the effects of harvest methods on juvenile settlement and survival (needed)
- **Develop an adult abundance index (needed)
- Note regional changes in abundance (needed)
- **Determine estimates of natural mortality (needed)
- **Identify factors influencing hard clam growth in North Carolina (needed)
- *Collect recreational landings data (needed)
- Survey recreational participants for demographic and spending data (needed)
- Determine the effect of shellfish filtering capacities on water quality parameters, such as bacteria, nutrients and sediments (needed)
- Support collaborative research to more efficiently track bacterial sources for land-based protection and restoration efforts (ongoing through the CHPP)
- **Quantify the impact of current fishing practices on clam habitat suitability in North Carolina (needed)
- Determine the impact of docks siting practices and bottom disturbing activities on nearby habitats and on the shifting boundaries of habitat itself so that protective buffer distances can be established (ongoing through the CHPP)
- **Quantify the relationship between water quality parameters and the cumulative effect of shoreline development units (i.e., docks, bulkhead sections)(ongoing through the CHPP)
- Utilize standardized monitoring metrics and methodologies with other researchers for clam restoration when possible (standard practice that is strived for all monitoring collaborations)
- Investigate clam larval dispersal and transport (needed)
- Determine the hydrodynamics of the areas for increasing clam production (needed)
- Investigate areas of sanctuary placement (shallow/deep), size, and impacts to the local fishing grounds (ongoing through NCDMF)
- Study the effects of transplanting spawners (needed)
- Determine methodologies to reduce predation (needed)
- Increase seed planting efficiencies (needed)
- Complete a cost analysis of various enhancement approaches (needed)
- Complete stock assessments of clams and oysters located within polluted areas

- Complete a review of current depuration programs in other states (researched through NCDMF)
- Complete a review of current DEH rules and possibly updating the rules may be necessary to fully reflect current technologies (needed)
- Explore new technologies for off-bottom culturing methods (needed)
- Further develop new types of biomarkers that can be used to select more effectively for disease-resistant genetic stock (needed)
- Develop disease-resistant or fast-growing strains of shellfish (needed)
- Establish a brood stock (hard clam and oyster) development program (ongoing through UNCW research hatchery)
- Develop methods to determine health of shellfish stocks to various diseases (needed)
- Assess survival and productivity of relayed oysters vs. natural recruitment on planted cultch (needed)
- Investigate timing of oyster spatfall, larval dispersal and transport (needed)
- **Determine the hydrodynamics of the areas for restoration and culture activities (needed)
- Collect population information on cownose rays (needed)
- Further research on the impacts of clam trawls and escalator dredges on sandy bottom environments (needed)
- Further studies on the effects of clam recruitment and clam mortality in the mechanical harvest areas (needed)
- Stock assessments are also needed in the waterbodies where mechanical harvest takes place (needed)
- Continue research on means and methods for reduction of non-point source pollution and mitigation of pollutant effects in the estuary (ongoing through the CHPP)

FISHERY MANAGEMENT PLAN RECOMMENDATION

Recommend maintain the current timing of the Benchmark Review. Amendment 2 of the N.C. Hard Clam FMP is currently in development and scheduled for NCMFC adoption in November 2016 with any recommended rules changes in effect by April 2017,

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TABLES

Table 1. Current daily mechanical hard clam harvest limits by water body. Season can only be opened from December 1 through March 31 by proclamation.

Waterbody	Daily harvest limit (number of clams)	Additional information
Northern Core Sound	5,000	Rotates one year open and one year closed opposite the open/close rotation of the New River
Southern Core Sound	5,000	Limit reduced from 6,250 in 2001. Open annually
North River	3,750	Open annually
Newport River	3,750	Open annually
Bogue Sound	3,750	Open annually
White Oak River	6,250	Rotates one year open and one year closed opposite the open/close rotation of the New River
New River	6,250	Rotates one year open and one year closed opposite the open/close rotation of the White Oak River and the ICW in the Onlsow/Pender counties areas
New River Inlet	6,250	Open annually from Marker 72A to the New River Inlet
ICW Onslow/Pender counties area	6,250	Intracoastal Waterway (maintained marked channel only) from Marker #65, south of Sallier's Bay, to Marker #49 at Morris Landing. All public bottoms within and 100 feet on either side of the Intracoastal Waterway from Marker #49 at Morris Landing to the "BC" Marker at Banks Channel. Open every other year when the New River is closed.

Table 2. Observed annual mean, minimum and maximum shell length (mm) of hard clams measured from commercial catches at the dealer, 2005 – 2014.

Year	Mean Shell Length	Minimum Shell Length	Maximum Shell Length	Total Number Measured
2005	66	46	96	304
2006	67	25	102	1,558
2007	66	41	111	1,406
2008	69	37	120	1,383
2009	64	39	112	1,862
2010	63	39	104	5,358
2011	64	38	111	10,670
2012	62	40	109	5,851
2013	63	40	108	4,750
2014	60	25	115	7,492

Table 3. Independent hard clam sampling (Program 640) annual estimates of catch per unit effort (CPUE=Number of clams per station) and their standard deviations, 2007 to 2014 for Core Sound.

Year	Total number of stations	Number of stations with zero catch	Number of clams	CPUE (Number of clams/station)	Standard deviation
2007	30	22	10	0.33	0.61
2008	31	24	12	0.39	0.80
2009	30	15	25	0.83	1.02
2010	30	19	15	0.50	0.78
2011	30	26	8	0.27	0.74
2012	30	17	17	0.57	0.77
2013	30	25	8	0.27	0.69
2014	30	24	13	0.43	0.94

Table 4. Summary of the management strategies and their implementation status from Amendment 2 of the N.C. Hard Clam Fishery Management Plan.

Management strategy	Implementation status
INSUFFICIENT DATA	
1. Recommend no change (status quo) to collect information on recreational harvest of shellfish	Accomplished
MANAGEMENT	
1. Rescind the proclamation but keep authority to open the designated area in the ocean for the mechanical harvest of clams if and when necessary	Accomplished; Proclamation SF-3-2009 dated May 1, 2009
2. Define recreational shellfish gear	Accomplished; Rule change to 15A NCAC 03I .0101
3. Allow no sale of weekend shellfish harvest except from leases	Accomplished; Rule change to 15A NCAC 03K .0106
4. Propose repeal of G.S. 113-169.2 license exemption.	Accomplished; Statute G.S. 113-169.2 change and Rule 15A NCAC 03K .0105 change
5. Set recreational limits in rule and proclamation	Accomplished; Rule change for 15A NCAC 03K .0105 and existing proclamation authority
6. Adopt a new rule limiting mechanical harvest of other shellfish to areas where and season when mechanical harvest gear for shellfish is allowed in existing fisheries	Accomplished; Rule change to 15A NCAC 03K .0108
7. Recommend no change to the open shellfish harvest license	Accomplished
8. Require all shellfish to be tagged at the dealer level	Accomplished; Rule change to 15A NCAC 03K .0101
9. Discontinue rotation of Pamlico Sound with northern Core Sound	Accomplished; Existing proclamation authority
10. Institute a resting period within the mechanical clam harvest area in the northern part of Core Sound	Accomplished; Existing proclamation authority
PRIVATE CULTURE	
1. Support the recommendation by the NCMFC that the Shellfish Hatchery Planning Advisory Team consider multiple uses of the demonstration shellfish hatchery facilities for different shellfish species	Accomplished
2. If clam seed grow out is initiated then the hatchery facility should work with the NCMFC Shellfish AC and DMF to determine management criteria for the uses of the clam seed stock	Accomplished
3. Propose an exemption from G.S. 113-168.4(b)(1) when the sale is to lease, UDOC permit, or Aquaculture Operations Permit holders for further rearing	Accomplished; Statute change to G.S. 113-168.4(b)(1)
4. Leave regulations in place as is for depuration facilities	Accomplished
5. Utilize user coordination plans for shellfish lease issuance coast wide	Funding required but was not sought due to budget limitations
6. Develop an independent education package in coordination with the Oyster Hatchery Program, N. C. Sea Grant, and other state agencies, and organizations to be presented at seminars with a mandatory attendance for all new leaseholders, and a mandatory completion of an examination with a passing score to meet education requirements for both new leaseholders and leaseholder transferees	Accomplished
7. Require an examination with a passing score based on pertinent information in the training package irrespective of whether the applicant has obtained instruction voluntarily or	Accomplished

Management strategy	Implementation status
is reviewing the information independently	
8. Request that appropriate agencies such as the Oyster Hatcheries and N.C. Sea Grant conduct shellfish lease training as part of their educational and outreach activities	Under development through the Resource Enhancement Section and NC Sea Grant
9. Modify G.S. 113–201 to include a requirement of an examination with a passing score for persons acquiring shellfish leases by lawful transfers unless they have a shellfish lease that is currently meeting production requirements	Accomplished
10. Support private oyster larvae monitoring programs	Accomplished
11. Support construction of an integrated system of shellfish hatcheries and remote-setting sites	Accomplished
12. Develop a subsidized, fee-for-service disease diagnosis program	Not under consideration at this time
13. Recommend status quo on the movement of seed shellfish from polluted waters	Accomplished
14. Change the current rule specifying a three year running production average to a five year production average and change the statutory provision for a ten year lease contract to a five year contract	Accomplished; Amended G.S. 113-202. Accomplished changes to rule 15A NCAC 03O .0201
15. Limit acreage per shellfish lease application to 5 acres	Accomplished; Rule change to 15A NCAC 03O .0201
16. A leaseholder holding at least 5 acres of shellfish bottom is required to meet shellfish lease production requirements before being approved for any additional lease acreage	Accomplished; Rule changes to 15A NCAC 03O .0201and 15A NCAC 03O .0210
17. Require Lat./Long. coordinates on lease corner locations as part of the requirement of a registered land survey	Accomplished; Rule changes to 15A NCAC 03O .0203
18. Develop regional lease acreage caps based on established use of water bodies	Accomplished; Amend G.S. 113-202
19. Rewrite the statutory provision limiting the amount of shellfish lease acreage that can be held by an individual to include acreage held by corporations where the individual is a member, or any combination of corporate or family holdings	Accomplished; Amend G.S. 113-202
20. Monitor seeded oyster sanctuaries for cownose ray predation	Not completed
21. Provide bilingual (English and Spanish) educational materials to consumers, leaseholders, UDOC permit holders, shellfish dealers, and other DENR state regulatory agencies	Under development by the ISSC and will come through Shellfish Sanitation. Funding limitations have slowed progress.
22. Encourage harvesters to take volunteer time and temperature control measures on their product	Accomplished through permit process.
HABITAT AND WATER QUALITY CONCERNS	
1. Identify and delineate Strategic Habitat Areas that will enhance protection of clam habitats; research physical factors influencing clam abundance predictably	Existing authority through the CHPP implementation plan
2. Coordinate SHAs with land-based conservation and restoration activities such as One North Carolina Naturally and DENR's green infrastructure planning	Existing authority through the CHPP implementation plan
3. Ensure oyster and SAV habitat definitions are consistent across regulating agencies	SAV definition in effect since April 2009. Existing authority through the CHPP implementation plan
4. Completely map all structured habitat (i.e., shell bottom, SAV) in North Carolina, including the deep, subtidal rocks on Pamlico Sound	Ongoing through Resource Enhancement Section Shellfish Mapping Program

Management strategy	Implementation status
5. Remap structured habitats to assess changes in distribution and abundance over time	Ongoing through Resource Enhancement Section Shellfish Mapping Program
6. Restore historical distribution and acreage of oysters and SAV where possible; coordinate with land-based protection and restoration efforts	Existing authority through the CHPP implementation plan
7. Balance protection of oyster beds and SAV (as habitat) with harvest provisions and expand oyster sanctuary planting and designation	Existing authority through the CHPP implementation plan; Accomplished expansion of oyster sanctuaries
8. Monitor biological/ecological condition and effectiveness of oyster sanctuaries and restored SAV beds	Accomplished in oyster sanctuaries. Not under investigation for SAV beds.
9. Cooperate with University researchers on oyster larvae distribution and oyster recruitment studies to aid in restoration planning	Accomplished
10. Develop and implement a comprehensive coastal marina and dock management plan and policy to minimize impacts to oyster and SAV habitat	Existing authority through the CHPP implementation plan
11. Develop permit application survey protocols for shellfish and SAV habitats for CAMA applicants	Accomplished through CHPP implementation plan
12. Evaluate and adjust as necessary dredging and trawling boundaries to protect and enhance oyster and SAV habitat	Existing proclamation authority and ongoing pilot study In Archer Creek to develop protocols
13. Seek additional resources to enhance enforcement of and compliance with expanded bottom disturbing fishing gear restrictions that protect oyster and SAV habitat	Existing authority through the CHPP implementation plan
14. Evaluate making conservation leasing available to non-government organizations for the purpose of oyster restoration and sanctuary development	Scheduled for consideration by CHPP Steering Committee
15. Work with NOAA and DWQ to determine appropriate levels of TSS, turbidity, chlorophyll a, and other water clarity parameters to achieve adequate water quality conditions for SAV growth and clam production	Existing authority through the CHPP implementation plan
16. Seek additional funds and process changes to allow local communities to more rapidly address repairs and upgrades to all aspects of the municipal waste systems, including collection and treatment systems	Existing authority through the CHPP implementation plan
17. Target productive shellfish resources in conditionally approved closed areas for land-based protection and restoration efforts. This could include designation as Strategic Habitat Are or Use-Restoration Water	Existing authority through the CHPP implementation plan
18. Modify mechanical harvest lines to exclude areas currently open to mechanical harvest where oyster habitat and SAV habitat exist based on all available information	Existing proclamation authority
19. Provide educational materials to harvesters in license offices and on DMF webpage, through other training opportunities, and through DMF Port Agent contact with harvesters and dealers and include other state and federal regulatory agencies to reach all coastal waters users	Accomplished
20. Support DWQ's efforts to improve stormwater rules through permit comments and CHPP implementation and co-ordinate with sister agencies	Accomplished. Rule change occurred in Oct. 2008
21. Recommend DWQ to designate Use-Restoration waters in conditionally closed waters where moderate contamination and healthy shellfish beds are present and develop strategies to restore and protect those waters	Accomplished; URW Coordinator hired by DWQ
22. Recommend DWQ designate Use-restoration waters in areas where moderate contamination and appropriate	Accomplished; URW Coordinator hired by DWQ

Management strategy	Implementation status
shellfish culture conditions are present and develop strategies to restore and protect those waters	
23. Recommend to the DWQ to accept a lower threshold of 10,000 square feet to coastal stormwater rules	Partially accomplished. Not as restrictive through DWQ rule changes as of Oct. 2008
24. Recommend a naturally vegetative riparian buffer width of 50 feet	Partially accomplished. Not as restrictive through DWQ rule changes as of Oct. 2008
25. Recommend the exclusion of all wetlands (coastal and non-coastal), from the built-upon area calculations	Partially accomplished. Not as restrictive through DWQ rule changes as of Oct. 2008
26. Recommend repeal of G.S. 113-207 (a) and (b) to end the requirement that all oyster rocks must be posted by the Department	Accomplished; Repeal G.S. 113-207 (a) and (b)
27. Recommend that conservation leasing for constructed oyster rock habitat be studied by DENR counsel for development of a proper mechanism and to develop siting criteria	Scheduled for consideration by CHPP Steering Committee
28. Leave current management practices in place for Ward Creek	Accomplished; Existing proclamation authority

FIGURES

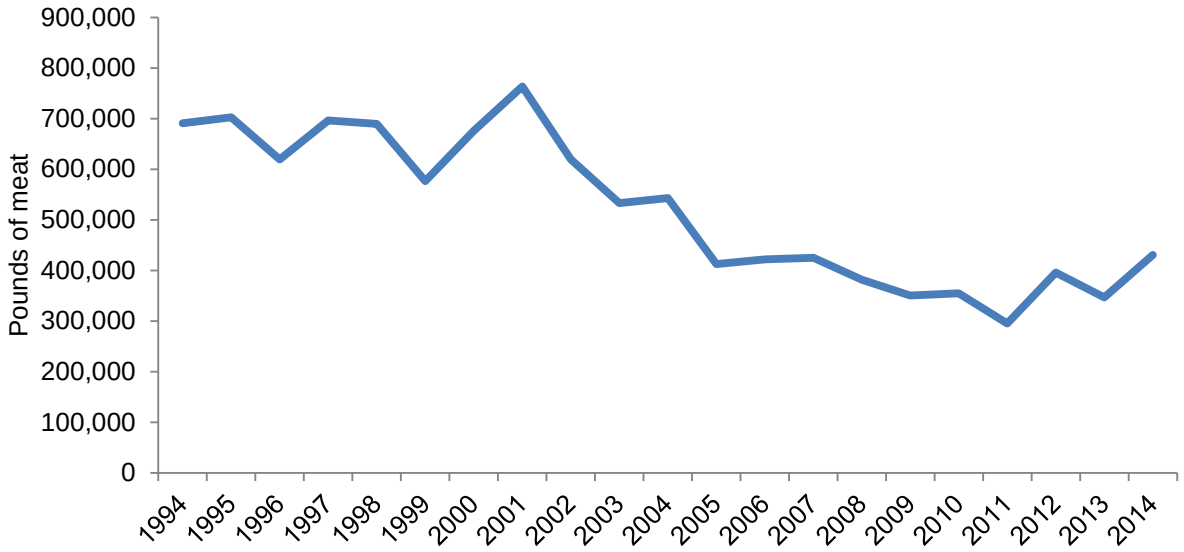

Figure 1. Annual hard clam landings (Pounds of meat) from private and public bottom in North Carolina, 1994-2014.

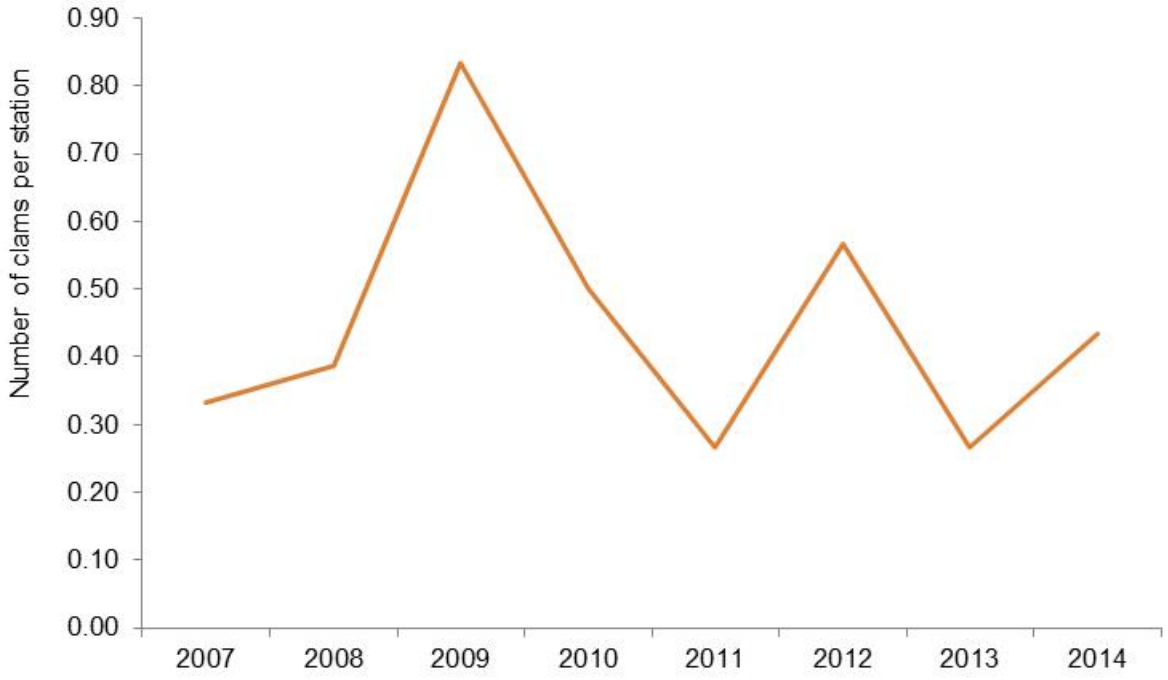

Figure 2. Annual catch per unit effort (Number of clams per stations) of hard clams in Core Sound from the independent sampling program 640, 2007 to 2014.

FISHERY MANAGEMENT PLAN UPDATE
KINGFISHES
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	November 2007
Amendments:	None
Revisions:	None
Supplements:	None
Information Updates:	Scheduled for completion December 2015
Schedule Changes:	None
Next Benchmark Review:	January 2020

The original 2007 Kingfish FMP developed management strategies that ensure a long-term sustainable harvest for recreational and commercial fisheries of North Carolina. The Marine Fisheries Commission approved the kingfish rules which included proclamation authority for the NCDMF director to impose restrictions on season, areas, quantity, gear, or size and a rewording of 15A NCAC 3J .0202. The Kingfish FMP is currently undergoing an Information Update scheduled for completion in December of 2015.

Management Unit

The North Carolina Kingfish FMP applies to all joint and coastal waters throughout North Carolina.

Goal and Objectives

The goal of the 2007 Kingfish Fishery Management Plan is to determine the status of the stock and ensure the long-term sustainability for the kingfishes stock in North Carolina (NCDMF 2007).

Objectives:

1. Develop an objective management program that provides conservation of the resource and sustainable harvest in the fishery.

2. Ensure that the spawning stock is of sufficient capacity to prevent recruitment overfishing.

3. Address socio-economic concerns of all user groups.

4. Restore, improve, and protect critical habitats that affect growth, survival, and reproduction of the North Carolina stock of kingfishes.

5. Evaluate, enhance, and initiate studies to increase our understanding of kingfishes' biology and population dynamics in North Carolina.

6. Promote public awareness regarding the status and management of the North Carolina kingfishes stock.

STATUS OF THE STOCK

Stock Status

The 2014 stock status for kingfish in North Carolina is “viable”. The stock status is based on an annual evaluation of trends in various fishery independent abundance indices and relative fishing mortality.

Stock Assessment

The 2007 Kingfish FMP selected the use of trend analysis and management triggers as the preferred management strategy to monitor the viability of the kingfish stock in North Carolina (NCDMF 2007). The trend analysis incorporates management triggers to alert NCDMF and NCMFC to the potential need for management action based on stock conditions. The activation of any two management triggers (regardless of trigger category) two years in a row warrants further data evaluation and potential management action. The analysis is updated each year and all trends relative to management triggers are provided as part of this annual update. Management triggers are based on fishery independent indices of abundance Young Of Year (YOY), adult fish, and proportion of catch greater than size at 50% maturity (L_{50}) and a relative fishing mortality index. YOY fish includes new young fish that enter the population that year. L_{50} is the length at which 50% of the adult population is sexually mature and ready to spawn. Based on updated analysis, no management triggers have been activated in either 2013 or 2014 and the stock is considered “viable.”

A formal quantitative stock assessment for kingfish is not available for kingfish in North Carolina; therefore no determination can be made relative to an overfishing or overfished status. Prior attempts at a stock assessment during the 2007 FMP development were not successful, primarily due to limited data. From these prior attempts, all reviewers noted a lack of migration (mixing) data to determine the movement patterns of kingfishes along North Carolina and the entire Atlantic coast. A regional (multi-state) stock assessment approach is likely needed to best determine the stock status for kingfish along the Atlantic coast including North Carolina.

STATUS OF THE FISHERY

Current Regulations

For shrimp or crab trawls, there is a three hundred pound trip limit for kingfishes south of Bogue Inlet from December 1 through March 31.

Commercial Landings

Commercial landings for kingfishes include southern, northern, and Gulf kingfishes. Landings have fluctuated historically, but have been on an increasing trend since 2011. The 2014 landings were the highest since 1995 for the entire time series (Figure 1). The vast majority of kingfishes landed are from the ocean gillnet fishery. The average landings from 1994-2014 was 657,666 pounds. Harvest of kingfishes is seasonal with peak landings in April and November. Peaks in landings coincide with seasonal movements of kingfishes along the Atlantic coast.

Recreational Landings

Recreational landings for kingfish include southern, northern, and Gulf kingfishes. Total recreational landings have been on an increasing trend since 1983 (Figure 2). Most kingfishes are landed from the ocean and the majority of the fish from man-made structures, such as piers, jetties, or bridges, or from beaches. A smaller portion of kingfishes are caught in estuarine waters of the state and the majority of those fish are harvested by anglers fishing from private vessels. Recreational harvest of kingfishes is also seasonal with the majority of fish harvested during the spring and the fall, and lowest during the summer.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Kingfishes are sampled from a variety of commercial fishery surveys, including the estuarine long haul, ocean trawl, pound net, ocean gillnet, estuarine gillnet and ocean beach seine fisheries in NC. A total of 38,995 kingfishes were measured from 2005 to 2014 [(32,713 southern, 3,327 northern and 2,955 Gulf)(Table 1)]. Mean length for southern kingfish ranged from 290 to 308 mm, with a minimum of 137 mm and a maximum of 558 mm. Mean length for northern kingfish ranged from 305 to 338 mm, with a minimum of 110 mm and a maximum of 445 mm. Mean length for Gulf kingfish ranged from 302 to 340 mm for with a minimum of 188 mm and a maximum of 448 mm.

Fishery-Independent Monitoring

The Pamlico Sound Survey catches the most kingfishes of any of NCDMF fishery independent sampling programs, and the majority of those are southern kingfishes. This survey has been running, uninterrupted for twenty-five years. From 1991 to present, the Pamlico Sound Survey has been conducted during the middle two weeks in June and September. The stations sampled are randomly selected from strata based upon depth and geographic location. The sample area covers all of Pamlico Sound and its bays, as well as Croatan Sound up to the Highway 64 Bridge, the Pamlico River up to Blounts Bay, the Pungo River up to Smith Creek, and the Neuse River up to Upper Broad Creek. However, most kingfish are caught in Pamlico Sound proper, and very few from the Neuse, Pamlico, and Pungo rivers.

Randomly selected stations (grids- one-minute by one-minute grid system equivalent to one square nautical mile) are sampled over a two week period, the second and third week of the month in both June and September. Tow duration is 20 minutes at 2.5 knots using the R/V Carolina Coast pulling double rigged demersal mongoose trawls. The R/V Carolina Coast is a 44-ft fiberglass hulled double rigged trawler owned and operated by the North Carolina Division of Marine Fisheries (NCDMF). Physical and environmental conditions such as temperature

(^{o}C), salinity (ppt), dissolved oxygen (mg/L), bottom composition, a qualitative assessment of sediment size, and water clarity (began 2008) are recorded at the end of each tow.

Table 2 summarizes the age data for kingfishes (southern, northern, and Gulf), collected from 2005 through 2014. The majority of age kingfish age samples came from Pamlico Sound independent gillnet survey, followed by the commercial ocean gillnet fishery. Southern kingfish ages ranged from 0 to 9 years old. Northern kingfish ages ranges from 0 to 5 years old. Gulf kingfish ages ranged from 0 to 7 year old. The modal ages ranged from 1 to 3 years for southern and Gulf kingfishes, and 0 to 2 for northern kingfish.

MANAGEMENT STRATEGY

The 2007 Kingfish FMP management strategy included three management triggers based on biological, dependent catch per unit effort (CPUE), and independent surveys indices. Management action through proclamation *would be considered* if one trigger was activated. Triggers were to be updated and evaluated annually.

The management triggers adopted in the 2007 Kingfish FMP were evaluated and recommendations were put forth to improve and refine those triggers. Based on the evaluation of the newly updated management triggers, the NCDMF recommended that consideration of management action should not be based on any one trigger alone but some combination of two or more triggers. This change accounts for normal inter-annual variation due to environmental factors.

The Pamlico Sound Trawl Survey and the Southeast Area Monitoring and Assessment Program (SEAMAP) survey data are currently used for management triggers for kingfishes in NC. The L_{50} management trigger is based on a conservative proportion of adults in the population. This is the length at which 50% of the population is mature. For southern kingfish, this is 8.25 inches (210 mm) in length. Data sources for this management trigger come from two fisheries independent surveys; the summer component of the SEAMAP survey, and the June component of the Pamlico Sound Trawl survey. If the proportion of adults ≥ L_{50} falls below 2/3 of the average proportion of adults ≥ L_{50} for the time series, then the trigger will be considered tripped.

The September portion of the Pamlico Sound Survey is also used to calculate a young of year index of relative abundance because there are more southern fish collected in the fall, and more young-of-year fish. The summer portion (June, July, and August) is used to calculate an adult index of abundance and the fall portion of SEAMAP is used as a young of year index of abundance.

The relative index derived from the Program 195 survey was calculated using a stratified generalized linear model (GLM) approach. The indices derived from the SEAMAP survey were computed using standard (non-stratified) GLMs.

Relative *F* is a simple method for estimating trends in *F* (Sinclair 1998). It is estimated as catch (commercial landings plus recreational harvest) divided by a fisheries-independent index of relative abundance. Here, catch (commercial landings plus recreational harvest) was divided by the SEAMAP spring index (Onslow, Raleigh, and Long bays, inner—shallow—strata) of relative abundance, given that the majority of catch occurs in the spring.

Biological Monitoring

Proportion of adults ≥ length at 50% maturity (L_{50}) for NCDMF Program 195 June (Figure 3)
Proportion of adults ≥ L_{50} for SEAMAP summer (Figure 4)

→ If the proportion of adults ≥ L_{50} falls below 2/3 of the average proportion of adults ≥ L_{50} for the time series, then the trigger will be considered tripped.

Fisheries-Independent Surveys—Juvenile and Adult

NCDMF Program 195 September index of YOY relative abundance (Figure 5)
SEAMAP summer index of adult relative abundance (Figure 6)
SEAMAP fall index of YOY relative abundance (Figure 7)

→ If a fisheries-independent survey falls below 2/3 of the average abundance for the time series (through 2014), then the trigger will be considered tripped.

Other

Relative fishing mortality rate (*F*) (Figure 8)

→ If relative *F* rises above the average relative *F* for the time series (through 2014) plus 1/3 of that average, the trigger will be considered tripped.

A summary of the various management triggers by year is provided in Table 3. Bold values indicate years when a particular management trigger was activated. None of the management triggers were activated in 2013 or 2014.

MANAGEMENT AND RESEARCH NEEDS

Table 4 provides a summary of management strategies for kingfishes and Table 5 provides a list of research needs.

FISHERY MANAGEMENT PLAN RECOMMENDATION

The NCDMF recommends maintaining the current timing for the information update. On May 21, 2015, the NC Marine Fisheries Commission (MFC) voted to proceed with an information update, with no management changes for kingfishes. The draft information update will be presented to the commission at its August 2015 business meeting for approval to post on the division web site for public review.

LITERATURE CITED

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Sinclair, A.F. 1998. Estimating trends in fishing mortality at age and length directly from research survey and commercial catch data. Canadian Journal of Fisheries and Aquatic Sciences 55(5):1248–1263.

TABLES

Table 1. Summary of length data sampled from the kingfish commercial fishery.

Southern Kingfish

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	299	160	415	2,871
2006	301	137	438	3,738
2007	290	146	498	5,135
2008	292	160	446	5,915
2009	293	176	418	3,845
2010	295	170	558	2,461
2011	297	206	461	2,074
2012	294	203	433	2,878
2013	308	164	409	1,357
2014	302	211	532	2,439

Northern Kingfish

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	302	173	407	132
2006	322	182	410	392
2007	317	180	439	633
2008	319	110	423	308
2009	315	174	401	271
2010	322	228	406	182
2011	318	219	431	203
2012	323	197	445	293
2013	336	218	406	754
2014	340	277	423	159

Gulf Kingfish

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	312	205	448	252
2006	326	254	437	240
2007	305	188	447	481
2008	306	199	447	445
2009	313	251	406	292
2010	318	260	412	135
2011	338	219	455	309
2012	322	233	406	147
2013	328	235	443	469
2014	310	234	394	185

Table 2. Kingfish age data collected from all sources combined.

Southern Kingfish				
Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	2	0	7	173
2006	2	0	6	438
2007	1	0	7	852
2008	2	0	9	324
2009	2	2	5	15
2010	2	1	5	163
2011	2	0	6	243
2012	1	1	6	228
2013	2	1	5	297
2014	3	0	5	269

Northern Kingfish				
Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	-	1	2	2
2006	1	1	3	39
2007	0	0	2	20
2008	0	0	5	50
2009	1	1	3	14
2010	2	1	3	4
2011	2	0	4	115
2012	1	0	3	17
2013	2	1	3	26
2014	2	2	2	1

Gulf Kingfish				
Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	1	1	6	15
2006	1	1	4	22
2007	1	0	4	118
2008	1	0	7	47
2009	-	-	-	0
2010	3	3	3	1
2011	2	1	6	28
2012	1	0	4	98
2013	1	1	4	44
2014	2	1	4	38

Table 3. Summary of management trigger organized by category. Bold indicate values that activate a trigger.

	BIOLOGICAL MONITORING		**FISHERIES-INDEPENDENT SURVEYS**			**OTHER**
	Proportion of Adults >= L50		**YOY Indices**		**Adult Index**	**Relative *F***
Year	Program 195 June	SEAMAP Summer	Program 195 September	SEAMAP Fall	SEAMAP Summer	Relative *F*
1987	0.602		**0.538**			
1988	0.450		**0.926**			
1989	**0.300**	0.585	**1.31**	10.5	**7.63**	17,627
1990	0.529	0.463	**2.35**	9.93	29.1	**92,209**
1991	0.667	0.894	**3.45**	9.92	41.7	31,107
1992	0.429	0.622	**1.37**	**5.20**	15.7	25,449
1993	0.542	0.456	**0.106**	**4.70**	14.2	**59,442**
1994	0.794	0.917	5.07	11.3	**3.10**	**137,621**
1995	0.440	0.486	8.60	**2.36**	**11.1**	**49,097**
1996	0.872	0.780	**0.208**	9.77	**5.44**	30,411
1997	0.576	**0.373**	**0.452**	**4.00**	**11.0**	20,276
1998	1.00	0.769	**0.207**	10.6	**5.65**	9,743
1999	0.920	0.608	**3.79**	22.6	28.0	24,813
2000	0.733	0.929	8.21	8.31	**11.6**	**83,334**
2001	0.660	**0.303**	4.42	**5.15**	25.6	20,962
2002	0.704	0.882	6.30	14.2	**11.9**	31,765
2003	0.860	0.645	5.81	**4.24**	18.5	5,706
2004	0.513	**0.284**	**2.98**	13.2	45.0	5,579
2005	0.594	0.643	**1.52**	11.0	18.1	5,530
2006	0.541	0.423	20.4	**5.55**	23.7	13,604
2007	**0.338**	0.521	8.97	**6.59**	**8.42**	**45,254**
2008	0.480	0.577	8.79	9.56	**3.99**	41,046
2009	0.591	0.398	24.9	**3.75**	16.2	33,941
2010	0.508	0.786	**1.47**	16.9	**11.9**	20,169
2011	0.447	0.507	16.8	31.3	21.1	31,533
2012	0.523	**0.368**	5.02	9.22	61.9	8,052
2013	0.659	0.558	16.9	10.7	39.5	4,048
2014	0.411	0.664	6.59	10.8	37.2	13,954
Threshold	<0.397	<0.396	<3.98	<6.7	<13.5	>44,219
Total Years	28	26	28	26	26	26
Years Trigger Activated	2	4	14	9	11	6

Table 4. Summary of management strategies and outcomes

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Fisheries Management		
The proposed management strategy for kingfishes in North Carolina is to 1) maintain a sustainable harvest of kingfishes over the long-term and 2) promote public education. The first strategy will be accomplished by developing management triggers based on the biology of kingfishes, landings of kingfishes, independent surveys, and requesting a stock assessment of kingfishes be conducted by Atlantic States Marine Fisheries Commission (ASMFC). The second strategy will be accomplished by the NCDMF working to enhance public information and education.	1, 2, 5, 6	• Management triggers are in place • DMF Director has proclamation authority should it be necessary to implement regulations to manage kingfish • Meetings and presentations have been utilized to educate and inform the public • NC FMP has been finalized and is the most comprehensive document available on the three kingfish species. • Next stock information update is scheduled for December 2015
Recommend ASMFC conduct a coastwide stock assessment on sea mullet.	5	ASMFC determined a stock assessment for the kingfishes was not necessary due to the positive trends in SEAMAP southern kingfish CPUE.
Endorse additional research to reduce bycatch in the shrimp trawl fishery, primarily shrimp trawl characterization studies involving at-sea observers and investigations into fish excluder devices with a higher success rate for reducing the harvest and retention of kingfish in shrimp trawls.	5	Bycatch characterization study of NC commercial shrimp trawl fishery was conducted in 2008.
Implement rule giving DMF director proclamation authority to manage kingfish.	3	Rule **15A NCAC 3M .0518** has been approved
Habitat and Water Quality		
The NCDCM should continue promoting the use of shoreline stabilization alternatives that maintain or enhance fish habitat. That includes using oyster cultch or limestone marl in constructing the sills (granite sills do not attract oyster larvae).	4	Refer to CHPP
To ensure protection of kingfish nursery areas, fish-friendly alternatives to vertical stabilization should be required around	4	Refer to CHPP

primary and secondary nursery areas.		
The location and designation of nursery habitats should be continued and expanded by the NCDMF.	4	Refer to CHPP
No trawl areas and mechanical harvest prohibited areas should be expanded to include recovery/restoration areas for subtidal oyster beds and SAV.	4	Refer to CHPP
Expansion and coordination of habitat monitoring efforts is needed to acquire data for modeling the location of potential recovery/restoration sites for oysters and SAV.	4	Refer to CHPP
Any proposed stabilization project threatening the passage of kingfish larvae through coastal inlets should be avoided.	4	Refer to CHPP
All coastal-draining river basins should be considered for NSW classification because they all deliver excess nutrients to coastal waters, regardless of flushing rate.	4	Refer to CHPP
Efforts to implement phase II stormwater rules must be continued.	4	Refer to CHPP
The EEP process should be extended to other development projects.	4	Refer to CHPP
Reduce sediment and nutrient loading by addressing multiple sources, including: • improvement and continuation of urban and agricultural BMPs, • more stringent sediment controls on construction projects, and • implementation of additional buffers along coastal waters.	4	Refer to CHPP

Table 5. Research needs and outcomes.

Management Related Research Needs	**Outcome**
Determine stock structure using genetics of kingfishes along North Carolina and the Atlantic Coast (LOW)	Grant approved for UNCW and DMF to use genetic markers to delineate the population structure
Conduct a coast-wide stock assessment of southern kingfish along the Atlantic Coast including estimation of biological reference points for sustainable harvest (HIGH)	No action
Validate YOY and adult indices used in trend analysis (HIGH)	UNCW has conducted seine surveys in the ocean to determine trends for all three species.
Develop a fisheries-independent survey in the ocean for juvenile and adult kingfishes (HIGH)	No action
Collect observer data from commercial fishing operations to estimate at-sea species composition of the catch, discard rates, and lengths (HIGH)	DMF has observers collecting data at sea for the flounder gill net fishery and other fisheries
Improve recreational data collection, particularly the species composition of discards, discard rates and associated biological data (HIGH)	Steps have been taken to improve sampling in recreational fisheries, including a carcass collection program
Improve dependent commercial data collection of more sample sizes for life history information (MEDIUM)	NCDMF ageing study collects kingfish from life history data
Evaluate and potentially expand the NCDMF fishery-independent gill-net survey to provide data on species composition, abundance trends, and population age structure by including additional areas of North Carolina's estuarine and near-shore ocean waters (MEDIUM)	No action
Continue bycatch reduction device studies in the shrimp trawl fishery to decrease bycatch (MEDIUM)	Ongoing research through DMF and various federal agencies.
Biological Research Needs	**Outcome**
Develop tagging study to estimate natural and fishing mortality, to investigate stock structure, and to understand movement patterns (HIGH)	No action
Collect histological data to develop maturity schedule with priority to southern kingfish (HIGH)	No action
Conduct study to estimate fecundity with priority to southern kingfish (MEDIUM)	No action
Conduct study to identify spawning areas with priority for southern kingfish (MEDIUM)	No action
Conduct an age validation study with priority to southern kingfish (HIGH)	No action
Sample inlets and river plumes to determine the importance of these areas for kingfishes and other estuarine-dependent species (LOW)	Sampling in the nearshore ocean through NC Adult Fishery Independent Survey was initiated in 2008 but discontinued in 2015. Gill net sampling in Cape Fear, New, Neuse, Pamlico, and Pungo rivers

	continues.
Determine the effects of beach re-nourishment on kingfishes and their prey (LOW).	Grant approved for UNCW to investigate effects of beach renourishment
Conduct a study to investigate how tidal stages and time of day influence feeding in kingfishes (LOW)	No action
Social and Economic Research Needs	**Outcome**
Increase the sample size of surveyed participants in the commercial kingfish fishery to better determine specific business characteristics and the economics of working in the fishery (LOW)	NCDMF conducted a study of CRFL holders in 2009/2010. But
Update information on the participants in the recreational kingfish fishery (LOW)	Socioeconomic study was conducted by NCDMF on piers.

FIGURES

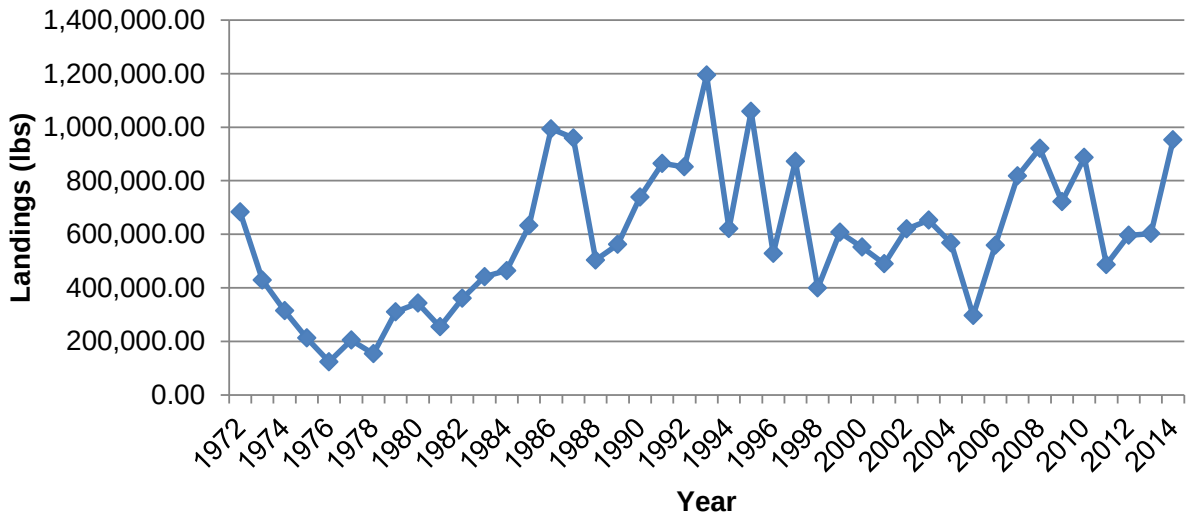

Figure 1. Commercial landings of kingfishes (southern, northern, and Gulf combined) from 1972 to 2014.

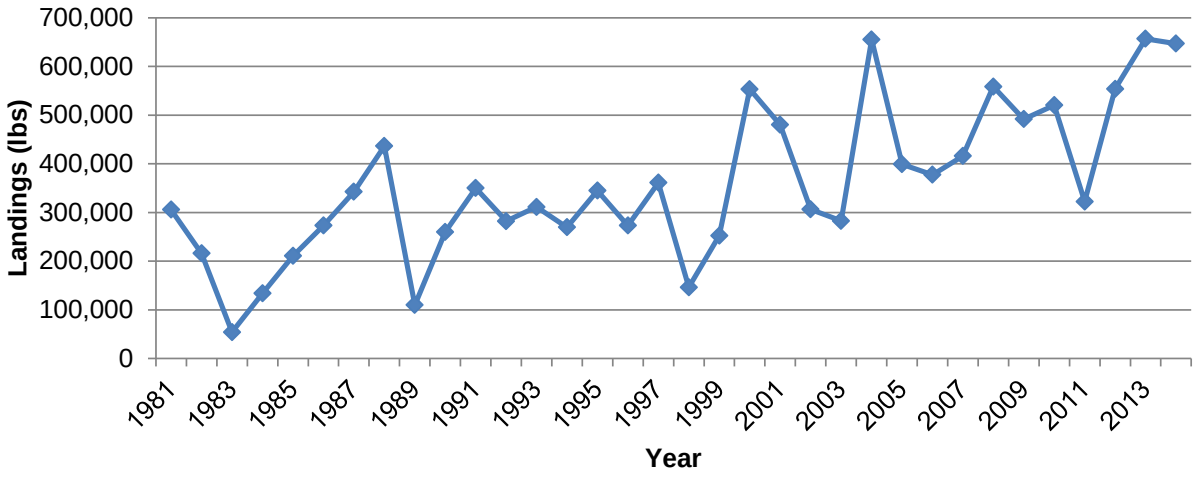

Figure 2. Recreational landings of kingfishes (southern, northern, and Gulf combined) from 1981 to 2014.

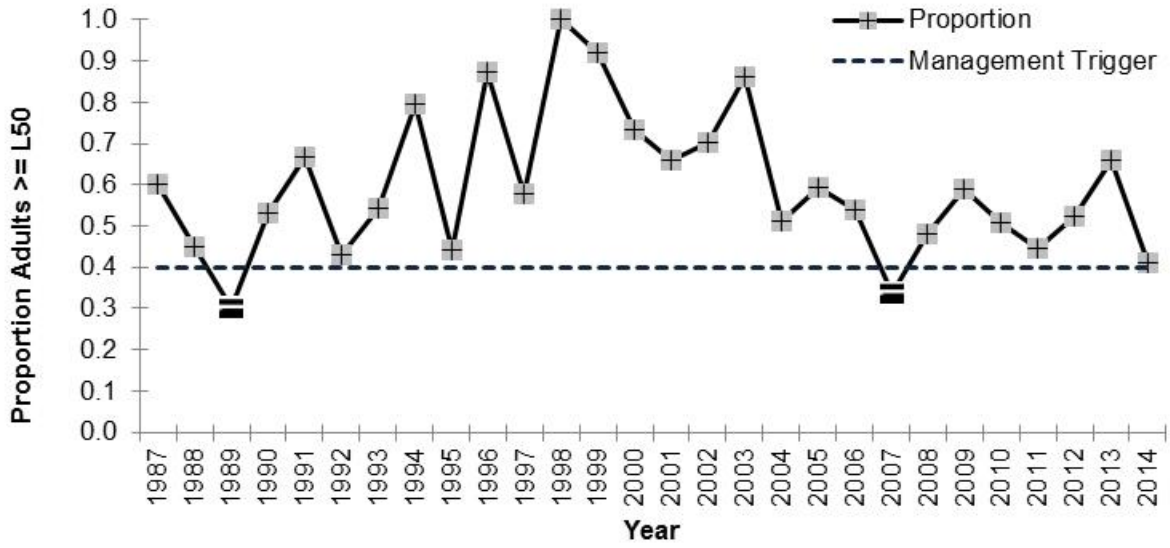

Figure 3. Annual proportions of adults (southern kingfish) greater than or equal to the length at 50% maturity occurring in the June component of the NCDMF Program 195 survey (excluding strata NR, PR, and PUN), 1987–2013. Dotted line represents 2/3 of the average of the time series.

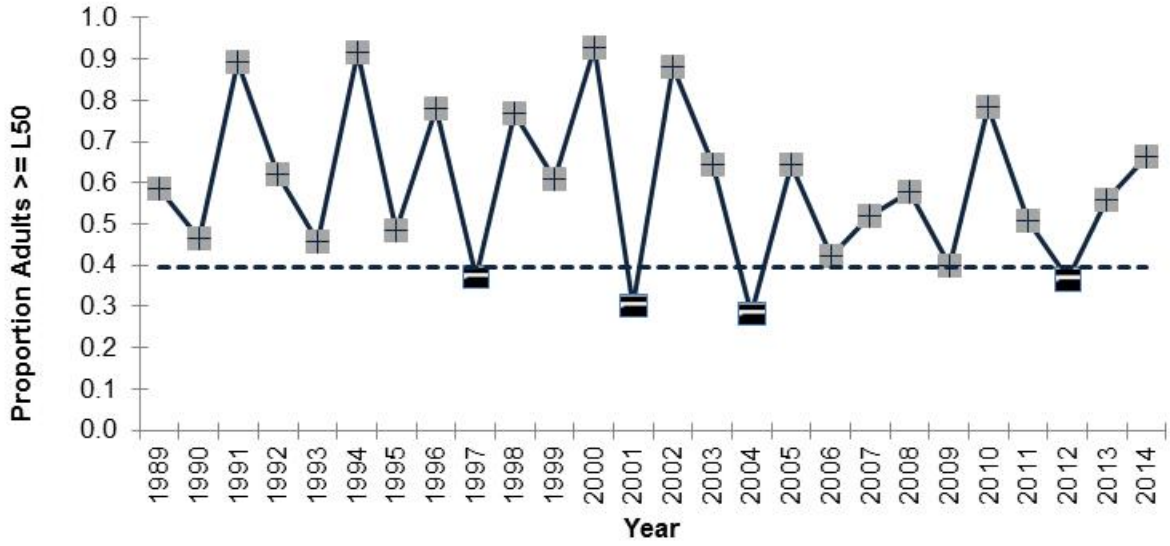

Figure 4. Annual proportions of adults (southern kingfish) greater than or equal to the length at 50% maturity occurring in the summer component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

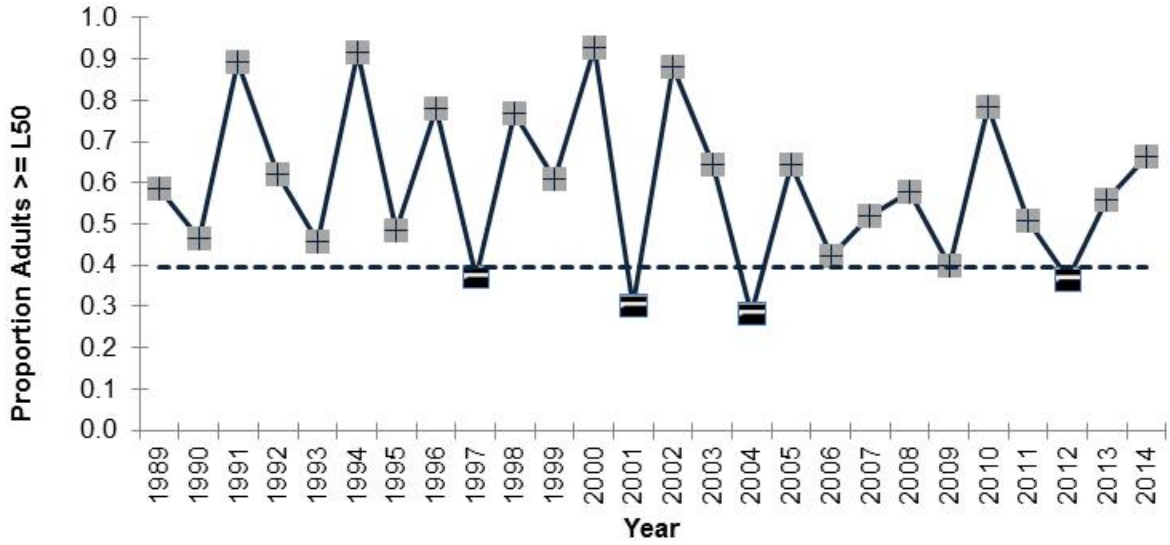

Figure 5. Annual index of relative YOY abundance for southern kingfish derived from the September component of the NCDMF Program 195 survey (excluding strata NR, PR, and PUN), 1987–2013. Dotted line represents 2/3 of the average of the time series.

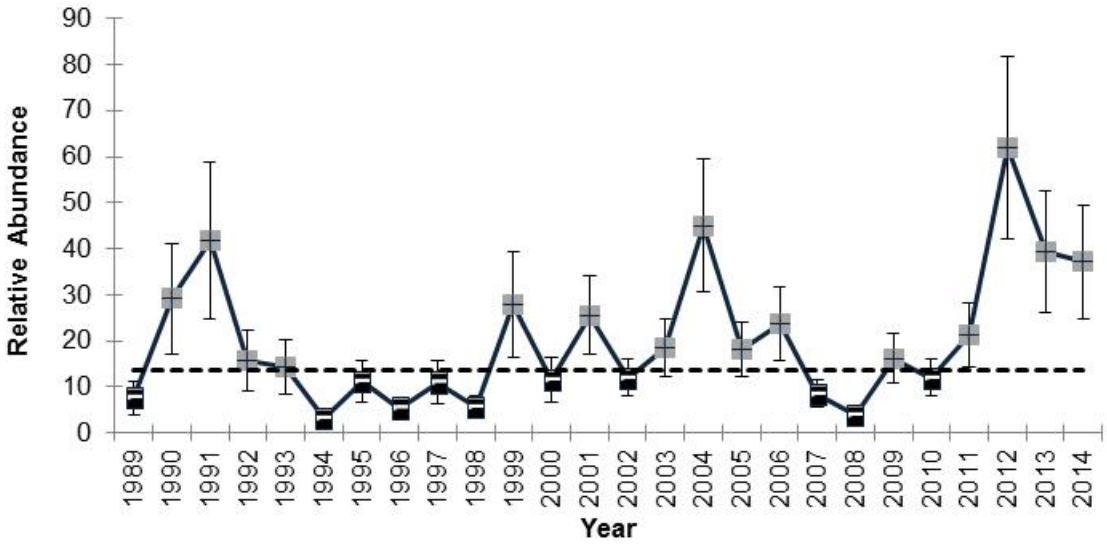

Figure 6. Annual index of relative adult abundance for southern kingfish derived from the summer component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

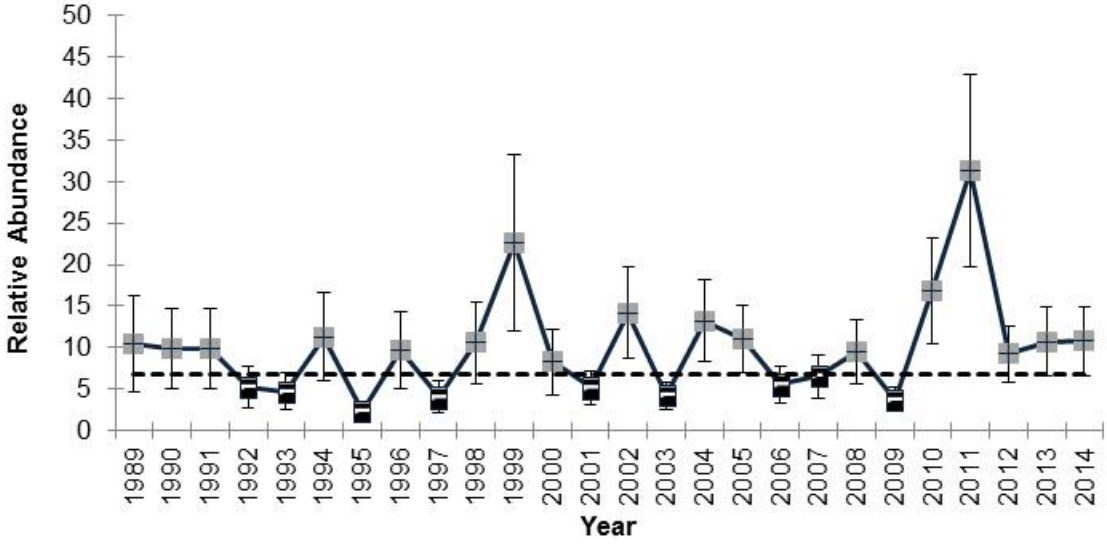

Figure 7. Annual index of relative YOY abundance for southern kingfish derived from the fall component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

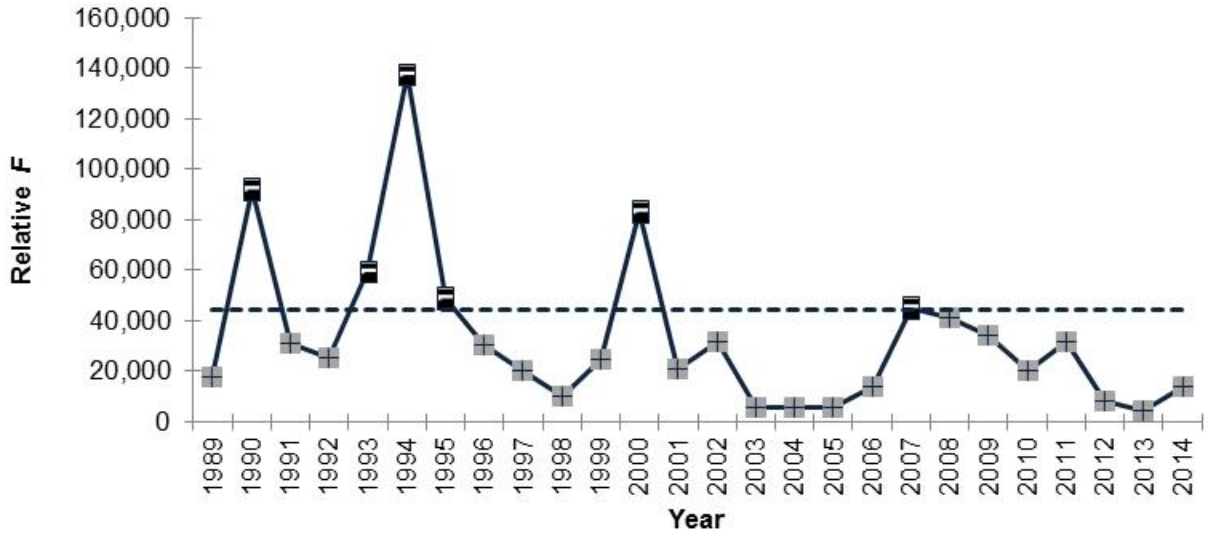

Figure 8. Annual index of relative YOY abundance for southern kingfish derived from the fall component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

FISHERY MANAGEMENT PLAN UPDATE
RED DRUM
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	March 2001
Amendments:	Amendment 1 – November 2008
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	July 2016

Red drum (*Sciaenops ocellatus*) in North Carolina are currently managed under Amendment 1 to the North Carolina Red Drum FMP. Harvest restrictions for the commercial and recreational fisheries were not required with the adoption of Amendment 1 in 2008. Overfishing was not occurring based on the 2007 North Carolina Division of Marine Fisheries (NCDMF) conducted red drum stock assessment (Takade and Paramore 2007). Amendment 1 did however, implement regulations to reduce the impact of mortality associated with regulatory discards. These included requiring circle hooks along with fixed weights and short leaders in the summer adult red drum recreational fishery in Pamlico Sound and further expanded the gill net attendance requirements that were originally implemented as part of the original 2001 North Carolina Red Drum FMP.

The 2001 North Carolina Red Drum FMP did implement restrictive harvest measures. Restrictions went in place in October of 1998 as "interim measures" to prevent overfishing on the stock. Harvest restrictions included: restricting all harvest of red drum to fish between 18 and 27 inches total length (previously allowed 1 over 27 inches), implemented a one fish recreational bag limit (previously 5 fish bag limit); implemented a daily trip limit for the commercial fishery that is set by the Director (previously no daily limit); and maintained the existing 250,000 pound annual commercial cap. The trip limit was designed to be low enough to reduce harvest and to deter targeting of red drum commercially. The original FMP also implemented seasonal small mesh gill net attendance requirements to reduce discard mortality of red drum. The North Carolina Red Drum FMP was approved in March of 2001 and maintained all the interim measures.

In addition to the state FMP, North Carolina also falls under the Atlantic States Marine Fisheries Commission (ASMFC) Red Drum FMP. This plan is currently managed under Amendment 2 to the interstate plan. Adopted in 2002, Amendment 2 required all states to implement management measures by January of 2003 that are projected to result in a 40% static Spawning Potential Ratio. Individual states are also required to maintain these management

strategies in order to ensure that overfishing is not occurring and that Optimum Yield (OY) in the red drum fishery can be obtained. Amendment 2 compliance requirements to the states include:

- Implementing bag and size limits projected by bag and size limit analysis to achieve the minimum 40% spawning potential ratio (SPR).
- Establishing a maximum size limit of 27 inches or less in all red drum fisheries.
- Maintaining current or more restrictive commercial fishery regulations.
- Requires any commercial cap overages from one fishing year to be subtracted from the subsequent year's commercial cap.

As a result of the management measures enacted through the 2001 North Carolina Red Drum FMP, no new management measures were required for North Carolina in order to comply with Amendment 2 to the ASMFC plan.

Management Unit

Red drum in North Carolina have both a state FMP and an interstate FMP through the framework of the ASMFC.

The North Carolina FMP applies to all joint and coastal waters throughout North Carolina.

The ASMFC plan applies to all states from Florida to Maine. The management unit for red drum along the Atlantic coast is divided into a northern and southern stock. North Carolina and all areas north along the Atlantic coast represent the northern stock.

Goal and Objectives

The goal of Amendment 1 to the North Carolina Red Drum FMP is to prevent overfishing in the red drum stocks by allowing the long-term sustainable harvest in the red drum fishery. To achieve these goals, it is recommended that the following objectives be met:

1. Achieve and maintain a minimum overfishing threshold where the rate of juvenile escapement to the adult stock is sufficient to maintain the long-term sustainable harvest in the fishery.

2. Establish a target SPR to provide the Optimum Yield from the fishery in order to maintain a state FMP that is in compliance with the requirements of the ASMFC Red Drum FMP.

3. Continue to develop an information program to educate the public and elevate their awareness of the causes and nature of problems in the red drum stock, its habitat and fisheries, and explain the rationale for management efforts to solve these problems.

4. Develop regulations that while maintaining sustainable harvest from the fishery, considers the needs of all user groups and provides adequate resource protection.

5. Promote harvest practices that minimize the mortality associated with regulatory discards of red drum.

6. In a manner consistent with Coastal Habitat Protection Plan, restore, improve and protect essential red drum habitat and environmental quality to increase growth, survival, and reproduction of red drum.

7. Improve our understanding of red drum population dynamics and ecology through the continuation of current studies and the development of better data collection methods, as well as, through the identification and encouragement of new research.

8. Initiate, enhance, and continue studies to collect and analyze the socio-economic data needed to properly monitor and manage the red drum fishery.

STATUS OF THE STOCK

Stock Status

The stock status of red drum is currently "recovering". A stock assessment, conducted through the ASMFC in 2009 indicates that the red drum stock in North Carolina is not experiencing overfishing. A new stock assessment is scheduled for completion in 2015.

Stock Assessment

Red drum in North Carolina are currently listed as "Recovering". Only the overfishing and not the overfished status can currently be determined for red drum. The threshold (below which the stock is experiencing overfishing) and the target fishing mortality rates correspond to those rates that achieve 30% and 40% static SPR. An assessment was last completed by the ASMFC in 2009. Based on the results of this assessment the spawning potential ratio was at or above target levels (Figure 1). Abundance of age 1 – 3 red drum increased during 1990 – 2000 after which it fluctuated widely (Figure 2). The increase in abundance of these age groups can be explained by the reduction in exploitation rates in the early part of the time series with relative stability since then (Figure 3).

Management measures in place have effectively controlled fishing mortality to a level sufficient to meet management targets. It is critical to note that reaching the target is only the first step in maintaining this fishery. In order for the red drum stock to be considered healthy and viable, the 40% static spawning potential ratio must be maintained continuously over time. Increases in the harvest rates (relaxation of current regulations) of red drum should only be allowed if those increases are not anticipated to lower the static SPR below the management goal (40%).

An updated stock assessment is currently underway through the ASMFC and is slated to be finalized later in 2015. The stock assessment results will be included as part of the upcoming formal review of the state red drum FMP.

STATUS OF THE FISHERY

Current Regulations

All harvest is limited to red drum between an 18 inch total length (TL) minimum size and 27 inch TL maximum size for both the recreational and commercial fishery. The recreational bag limit is one fish per day. A daily commercial bycatch allowance and an annual cap of 250,000 pounds,

with payback of any overage, constrain the commercial harvest. The commercial annual cap is monitored from September 1 to August 31. Within a fishing year, 150,000 pounds is allocated to the period between September 1 and April 30 and the remainder is allocated to the period of May 1 to August 31. Check with the NCDMF for the most recent proclamation on red drum harvest limits including trip limits and bycatch requirements.

Commercial Landings

North Carolina's commercial landings in 2014 were 90,954 pounds; a sharp decline from 2013 landings (371,949 pounds) and lower than the ten-year mean of 182,461 pounds (2005-2014; Table 1 and Figure 4). Gill nets dominated the catch in 2014 accounting for 88% of the commercial landings (Table 2).
Amendment 2 to the North Carolina Red Drum FMP maintained the 250,000 pound annual cap in the commercial fishery, but shifted the commercial fishing year to September 1 through August 31. Since that time, North Carolina's commercial landings during this fishing year have averaged 178,706 pounds. The 2009/2010 and 2013/2014 fishing years had overages (Table 3). All overages were deducted from the following year's cap allowance.

Recreational Landings

Recreational fishing activity is monitored through the Marine Recreational Information Program (MRIP). Recreational landings in 2014 were 598,166 pounds; well above the 2005-2014 ten-year average (333,289 pounds) but a decrease from 2013 landings (676,050 pounds; Table 1 and Figure 4). Releases totaled 383,421 fish in 2014; below the average 580,785 fish from 2005-2014.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fishing activity is monitored through fishery dependent sampling conducted by the NCDMF since 1982. Data collected in this program allow the size and age distribution of red drum to be characterized by gear/fishery. Predominant fisheries for red drum include estuarine gill nets, long haul seine/swipe nets, pound nets, and beach haul seines. Over the past decade gill nets have been the dominant gear used for red drum accounting for >90% of the overall harvest. In 2014, 88% of the red drum harvest was taken in gill nets, followed by pound nets with 11% (Table 2). In all, 444 red drum, primarily from set gill nets, were measured from the commercial fishery in 2014 (Table 4). The average size was 23 inches fork length. Average size has varied little over time ranging from 21 to 23 inches fork length since 2005. With the 18 to 27 inch slot limit on harvest, nearly all landings were from age one and two year old fish.
Similar to the commercial fishery, average size varies little from year to year in the recreational fishery (Table 5). In 2014, the average size recreational fish harvested was 23 inches fork length. From 2005 to 2014 this range varied little (21 to 23 inches fork length).

Fishery-Independent Monitoring

The NCDMF has conducted a juvenile red drum seine survey on an annual basis since 1991. The seine survey provides an index of abundance for juvenile (age-0) red drum with sampling occurring from September through November. The relative abundance of juvenile red drum is highly variable with both high and low abundance occurring in recent years. In 2014, 270 juvenile

red drum were taken in 120 seine samples for an overall state mean CPUE of 2.3. The 2014 overall mean CPUE was higher than 2013 (1.1) but was lower than the long term average of the survey of 5.5 (Table 6; Figure 5). Information gathered from this survey is currently used as an input parameter in the ASMFC Atlantic coast red drum stock assessment.

A fishery independent gill net survey was initiated by the NCDMF in May of 2001. The survey utilizes a stratified random sampling scheme designed to characterize the size and age distribution for key estuarine species in Pamlico Sound. By continuing a long-term database of age composition and developing an index of abundance for red drum this survey will help managers assess the red drum stocks without relying solely on commercial and recreational fishery dependent data. The overall red drum CPUE was 3.14 in 2014, the fourth highest in the time series (Table 7; Figure 6). The survey is currently used in the ASMFC Atlantic coast red drum stock assessment as an annual index of relative abundance for age-1 and age-2 red drum.

North Carolina initiated an adult red drum longline survey in 2007 that has continued through 2014. The primary objective of the survey is to provide a fisheries independent index of abundance for adult red drum occurring in North Carolina. From July through October, a standardized, stratified random sample design is employed. A standard sample consists of 1,500 meters of mainline set with 100 gangions placed at 15 meter intervals (100 hooks/set). Soak times are approximately 30 minutes. All random sampling takes place in Pamlico Sound. During the 2014 season, 322 red drum were captured out of 72 stratified random sets (4.5 red drum per set) which is near the time series average of 5.2 red drum per set (Table 8; Figure 7). Red drum ranged from 30 to 48 inches fork length with most being >40 inches in length. Sampling is scheduled to continue in 2015 and this survey is currently being considered as an input in the 2015 ASMFC red drum stock assessment.

In order to describe the age structure of harvest and indices, red drum age structures are collected from various fishery independent (scientific surveys) and dependent (fisheries) sources throughout the year. In 2014, 560 red drum were collected ranging in age from 0 to 41 years (Table 9). The majority of red drum collected from harvest (18 to 27 inches total length) are ages 1-3.

MANAGEMENT STRATEGY

Red drum in North Carolina are managed under Amendment 1 to the North Carolina Red Drum FMP and Amendment 2 to the ASMFC Red Drum FMP. Both plans have an identical management threshold (overfishing) and management target (30% and 40% static Spawning Potential Ratio). Stock status is determined by a formal, peer reviewed stock assessment. Amendment 2 to the ASMFC Red Drum FMP requires specific compliance criteria, including harvest restrictions designed to achieve the management target. Any changes to harvest that deviate from those options provided in this plan must be approved by the ASMFC South Atlantic Board. Amendment 1 to the North Carolina Red Drum FMP maintained measures for compliance and also implemented measures to reduce losses from discards in both the recreational and commercial fisheries (Table 10).

The current stock status is determined by the results of the 2009 assessment (SEDAR 18). Results of the 2009 assessment indicate that red drum in North Carolina are above the overfishing threshold and likely above the target static spawning potential ratio (Figure 1). A new stock assessment is currently underway and is slated for completion in November of 2015.

MANAGEMENT AND RESEARCH NEEDS

The following management and research needs are summarized from Amendment 1 to the North Carolina Red Drum FMP (status of need provided in parenthesis).

- Assess the size distribution of recreational discards (needed).
- Improved catch and effort data for the red drum recreational fishery, particularly for the fishery that occurs at night (needed).
- Development of independent surveys to monitor both the sub-adult and adult red drum populations. (ongoing through NCDMF gillnet and longline surveys).
- Continued life history studies for age and growth. Additional work needed to update maturity schedule and collect diet information specific to North Carolina (age and growth ongoing through NCDMF; ongoing diet work through NCSU, maturity work needed).
- Identification of spawning areas in North Carolina (studies conducted for Pamlico Sound, additional work needed).
- Characterize the adult recreational fishery with regard to tackle, geographic location, bait, water temperature, seasonality, hook types, etc. (needed).
- Obtain discard estimates from the commercial fisheries including information on size and disposition (ongoing through NCDMF observer program, recent expanded coverage).
- Collect data to determine the catch rates of red drum and targeted species with regard to distance from shore in the gill net fishery (needed, some data through Fishery Resource Grants and NCDMF Independent Gill Net Survey)
- Conduct a comprehensive study of gill net fishers including information on species targeted, gear characteristics and areas fished (needed, valuable ongoing data from fish house sampling and commercial observer program).
- Conduct studies to explore ways to reduce red drum regulatory discards with commercial gear while allowing the retention of targeted species (needed).
- Conduct additional research to determine the release mortality of red drum captured in gill nets (needed).
- Economic analysis of the adult red drum fishery (needed).
- Improved social and economic data collection on the recreational and commercial fishery, including information on current conflicts and potential for future conflicts in these fisheries (needed).
- Determine juvenile habitat preference and examine if recruitment is habitat limited (needed; study conducted by UNCW).
- Examine ecological use and importance of shell bottom to red drum (Needed; some work through CRFL by UNC).
- Identify coastal wetlands and other habitats utilized by juvenile red drum and assess relationship between changes in recruitment success and changes in habitat conditions (needed).
- Assess cumulative impact of large-scale beach nourishment and inlet dredging on red drum and other demersal fish that use the surf zone (needed).
- Determine location and significance of spawning aggregation sites throughout the coast (needed).
- Determine if navigational dredging between August and October significantly impacts spawning activity (needed).
- Determine if designation of spawning areas is needed, and if specific protective measures should be developed (needed).

FISHERY MANAGEMENT PLAN SCHEDULE RECOMMENDATIONS

The North Carolina Red Drum FMP was scheduled for review in 2014. However, a delay in this review was approved by the North Carolina Marine Fisheries Commission. This delay allows for consideration of an updated stock assessment for red drum. The stock assessment is being conducted by the ASMFC and is scheduled for completion in November of 2015. An important note is that there is a potential that the assessment results could prompt an initiation of a review of Amendment 2 to the ASMFC Red Drum FMP. Currently the North Carolina Red Drum FMP is scheduled to begin after completion of the ASMFC red drum stock assessment.

It is recommended that the review schedule for red drum be maintained.

LITERATURE CITED

Atlantic States Marine Fisheries Commission (ASMFC). 2002. Amendment 2 to the Interstate Fishery Management Plan for Red Drum. ASMFC, Washington, DC, Fishery Management Report No. 38, 141 p.

South Atlantic Fishery management Council (SAFMC). 2009. Southeast Data, Assessment and Review 18, Stock Assessment Report, Atlantic Red Drum. North Charleston, SC. 544 p.

Takade, H and L Paramore. 2007. Stock Status of the Northern Red Drum Stock. North Carolina Division of Marine Fisheries. In-House Report, 60 p.

TABLES

Table 1. Red drum recreational harvest and number released (MRIP) and commercial harvest (North Carolina Trip Ticket Program) for 2005-2014. All weights are in pounds.

	Recreational				
	Numbers		Weight (lb)		
Year	Landed	# Released	Landed	Commercial Weight (lb)	Total Weight (lb)
2005	51,807	378,541	239,393	128,770	368,163
2006	55,714	510,264	254,214	169,206	423,420
2007	66,789	416,352	310,715	243,658	554,373
2008	50,809	658,887	231,551	229,809	461,360
2009	57,543	429,776	288,958	200,296	489,254
2010	64,024	635,876	283,286	231,828	515,114
2011	45,143	207,697	212,245	91,980	304,225
2012	52,948	1,533,010	238,312	66,519	304,831
2013	164,218	654,030	676,050	371,949	1,047,999
2014	116,921	383,421	598,166	90,594	688,760

Table 2. North Carolina's 2014 red drum commercial harvest (pounds and percent by gear) by gear type.

Gear	Landings (lb)	%
Long Haul/Seine Net	322	<1
Pound Net	9,585	11
Gill Net	80,145	88
Other Gears	542	<1
Total	90,594	100

Table 3. North Carolina's annual commercial harvest based on a fishing year beginning September 1 and ending August 31.

Fishing Year	Landings (lb)	Annual Cap
2008/2009	134,161	250,000
2009/2010	275,924	250,000
2010/2011*	126,185	224,142
2011/2012	94,298	250,000
2012/2013	134,372	250,000
2013/2014**	262,753	250,000

*adjusted to pay back overage in 2009/2010 fishing year
**2013/2014 overage has been deducted from 2014/2015 allowance

Table 4. Red drum length (FL, inches) data from commercial fish house samples, 2005-2014.

Year	Mean Fork Length	Minimum Fork Length	Maximum Fork Length	Total Number Measured
2005	21	14	28	811
2006	22	14	29	1,289
2007	22	16	31	1,502
2008	23	13	29	1,214
2009	22	14	35	1,168
2010	22	14	31	1,134
2011	22	17	31	647
2012	21	16	28	359
2013	21	12	27	1,677
2014	23	18	28	444

Table 5. Red drum length (FL, inches) data from MRIP recreational samples, 2005-2014.

Year	Mean Fork Length	Minimum Fork Length	Maximum Fork Length	Total Number Measured
2005	22	18	26	48
2006	22	14	30	79
2007	22	17	27	71
2008	22	16	27	90
2009	23	18	28	136
2010	21	11	27	193
2011	22	17	29	147
2012	22	14	41	132
2013	21	17	28	333
2014	23	17	28	316

Table 6. The annual juvenile (age-0) abundance index from the North Carolina Red Drum Juvenile Seine Survey for the period of 1991-2014. N=number of samples; CPUE=Catch per unit effort; SE=Standard Error; PSE=Proportional Standard Error.

Year	N	CPUE	SE	PSE
1991	105	15.12	2.18	14
1992	116	3.71	1.13	31
1993	117	12.65	2.22	18
1994	93	8.29	2.41	29
1995	119	4.61	0.72	16
1996	104	2.63	0.47	18
1997	126	13.13	3.07	23
1998	124	8.23	1.12	14
1999	98	1.84	0.41	23
2000	123	3.14	0.58	18
2001	122	0.97	0.19	19
2002	120	2.23	0.53	24
2003	120	5.01	1.23	25
2004	120	8.32	1.13	14
2005	120	9.02	1.40	16
2006	120	3.44	0.73	21
2007	119	5.46	1.52	28
2008	120	1.58	0.30	19
2009	120	1.89	0.66	35
2010	120	4.69	0.97	21
2011	116	10.82	3.28	30
2012	120	2.69	0.71	26
2013	120	1.11	0.30	27
2014	120	2.25	0.62	27

Table 7. Annual weighted red drum CPUE (ages combined) from the North Carolina Pamlico Sound Independent Gill Net Survey. N=number of samples; CPUE=Catch per unit effort; SE=Standard Error; PSE=Proportional Standard Error.

Year	N	CPUE	SE	PSE
2001	237	1.56	0.31	20
2002	320	3.22	0.43	13
2003	320	1.25	0.22	18
2004	320	1.99	0.29	14
2005	304	2.76	0.41	15
2006	320	2.91	0.34	12
2007	320	3.19	1.02	32
2008	320	2.31	0.34	15
2009	320	4.17	1.27	31
2010	320	2.42	0.32	13
2011	300	0.45	0.07	17
2012	308	3.13	0.59	19
2013	308	6.59	1.12	17
2014	308	3.14	0.38	12

Table 8. Annual adult red drum CPUE (ages combined) from the North Carolina Longline Survey. N=number of samples; CPUE=Catch per unit effort; SE=Standard Error; PSE=Proportional Standard Error.

Year	N	CPUE	SE	PSE
2007	71	5.68	0.92	16.29
2008	72	3.79	0.68	17.86
2009	70	5.97	1.08	18.12
2010	72	5.56	1.14	20.55
2011	72	5.64	1.00	17.74
2012	72	5.22	0.93	17.80
2013	72	4.94	0.78	15.72
2014	72	4.47	0.63	14.18

Table 9. Summary of red drum age samples collected from both dependent (commercial and recreational fisheries) and independent (surveys) sources from 2005-2014.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	1	0	34	484
2006	1	0	32	641
2007	1	0	43	495
2008	1	0	36	574
2009	1	0	40	644
2010	1	0	37	516
2011	1	0	38	256
2012	1	0	39	605
2013	1	0	41	721
2014	1	0	41	560

Table 10. Management action taken as a result of Amendment 1 to the N.C. Red Drum FMP.

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Adult Harvest Limits	Status quo (no harvest over 27 inches TL)	1 & 2	No action required
Recreational Targeting of Adult Red Drum	It is unlawful to use any hook larger than 4/0 from July 1 through September 30 in the internal coastal fishing waters of Pamlico Sound and its tributaries south of the Albemarle Sound Management Area as defined in 15A NCAC 03R .0201 and north of a line beginning at a point 34° 59.7942' N - 76° 14.6514' W on Camp Point; running easterly to a point at 34° 58.7853' N - 76° 09.8922' W on Core Banks while using natural bait from 7:00 p.m. to 7:00 a.m. unless the terminal tackle consists of: A circle hook defined as a hook with the point of the hook directed perpendicularly back toward the shank, and with the barb either compressed or removed. A fixed sinker not less than two ounces in weight, secured not more than six inches from the fixed weight to the circle hook. (also continued education on fishing methods that minimize risk to fish)During July through September, unlawful to use J-hooks larger than 4/0 while fishing natural bait in Pamlico Sound and its tributaries, excluding the ASMA and Core Sound, south (also continued education on fishing methods that minimize risk to fish)	1, 2 & 5	Rule change 3J .0306
Recreational Bag and Size Limits	Status quo (one fish per day between 18 and 27 inches TL)	1, 2 & 4	No action required
Commercial Limits	Trip Limit and Bycatch Provision Status quo (7 fish trip limit with 50% bycatch provision). Director retains authority to modify trip limit and bycatch provision as needed. Allow the possession of up to 3 fish while engaged in fishing without requiring that they be subject to the bycatch provision. Upon landing/sale all red drum possessed would be subject to bycatch provision. Commercial Cap Continue 250,000 lb annual cap monitored from September 1 to August 31.	1, 2, 4 & 5	New proclamation

	Implement a split season on the annual commercial cap, capping the period of September 1 to April 30 at 150,000 lb and conserving the remaining portion of the cap for the period of May 1 to August 31. Unused cap in period one would be available for period two. Any annual commercial harvest limit that is exceeded one year will result in the poundage overage being deducted from the subsequent year’s commercial harvest limit.		Rule Change 3M .0501
Estuarine Gill Net Discarded Bycatch of Red Drum Estuarine Gill Net Discarded Bycatch of Red Drum	Small Mesh Attendance (<5” stretch mesh) Year-round Attendance Expand year-round attendance within 200 yards of shore to include the area of the lower Neuse out to the mouth of the river. Seasonal Attendance 1) Modify the seasonal attendance requirements for small mesh gill nets (currently May 1 to October 31) to include the period of May 1 through November 30 in the following locations: a) All primary and permanent secondary nursery areas and modified no-trawl areas b) Within 200 yards of any shoreline for the areas of Pamlico, Pungo, Neuse and Bay Rivers and bays c) Within 50 yards of any shoreline in the areas of Pamlico and Core Sound south to the NC/SC line d) Area Core Sound and south is excluded from 50 yard shoreline attendance requirement during October and November Modification to current small mesh seasonal attendance area along the Outer Banks (i.e. modified no-trawl area) Modify attendance area between Rodanthe and Gull Island to straighten out line and allow for non-attended nets in area of deeper water	1, 2, & 5	Rule change 3R .0112 Rule change 3J .0103 & 3R .0112 Rule change 3R .0112

	Modify the current attendance line in the area of Oliver Reef, near Hatteras to allow for non-attended nets in area of deeper water. Large Mesh (>5" stretch mesh) Require all unattended large mesh gill nets to be set a minimum of 10 feet from any shoreline from June through October	1, 2, & 5	Rule change 3J .0103
The use of gigs, gaffs or spears to take red drum.	Continue to prohibit and move Proclamation FF-40-2001 into rule	1 & 2	Rule change 3M .0501

FIGURES

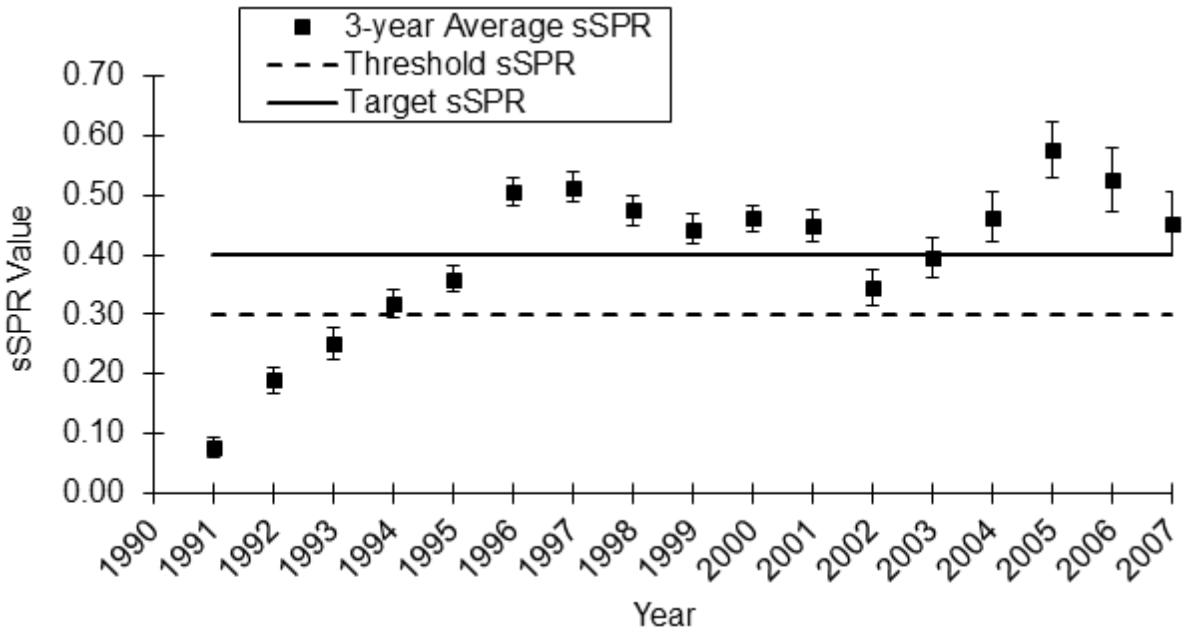

Figure 1. Northern region (North Carolina north) estimates of three-year average static spawning potential ratios. Three-year average include current and previous two year's sSPR estimates. The dashed line shows the 30% overfishing threshold and the solid line shows the 40% target sSPR.

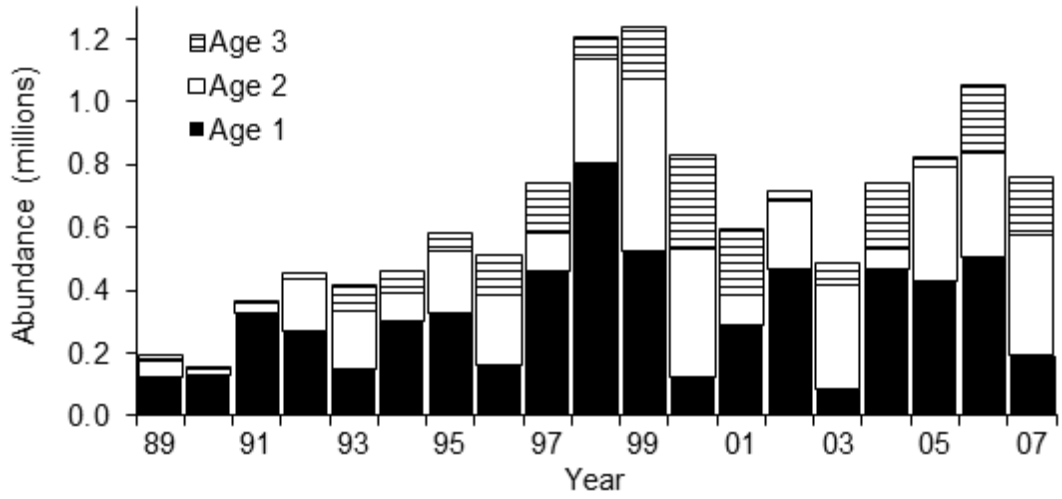

Figure 2. Estimates of abundance of red drum ages 1-3 in the northern region (North Carolina and north) during 1989-2007 (Source: SAFMC 2009).

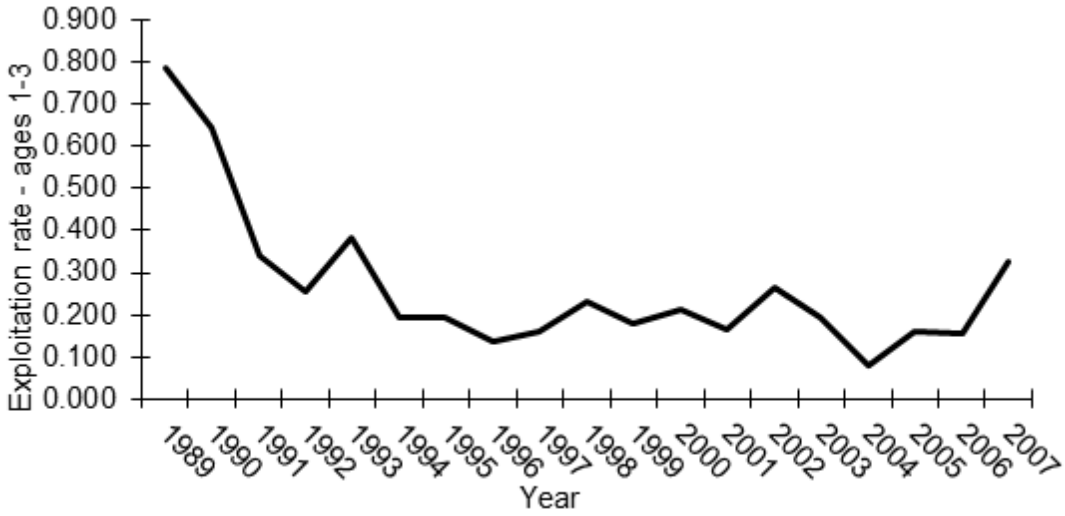

Figure 3. Estimated annual exploitation rate for red drum ages 1-3 in the northern region (North Carolina and north) during 1989-2007 (Source: SAFMC 2009).

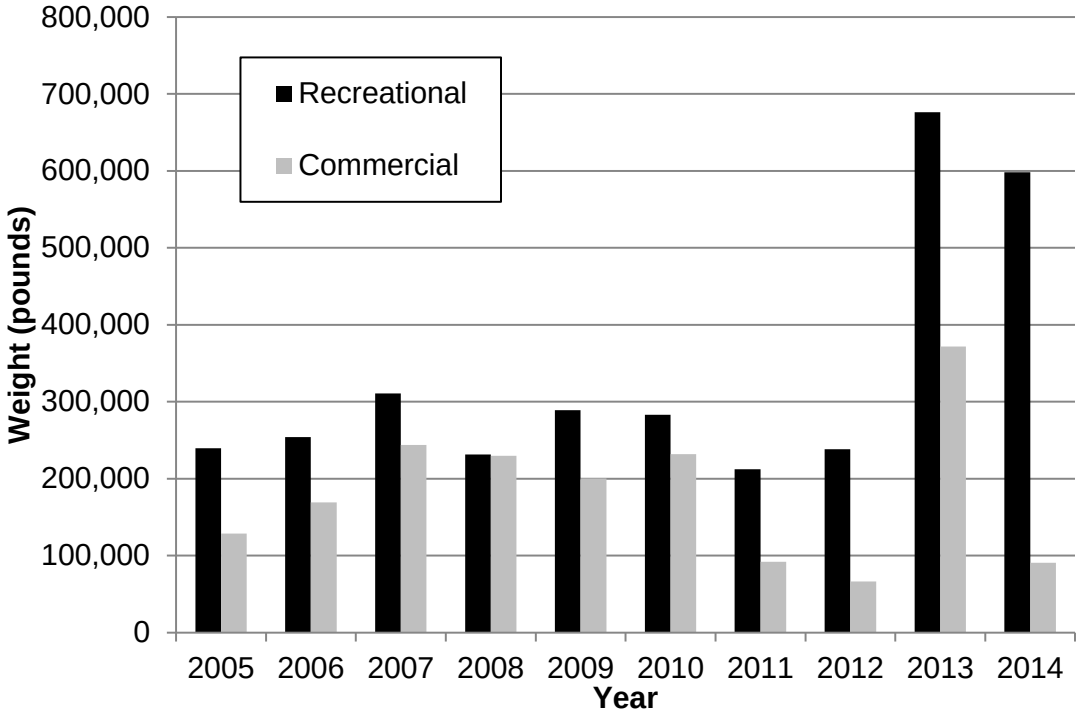

Figure 4. Annual commercial and recreational landings in pounds for red drum in North Carolina from 2005 to 2014.

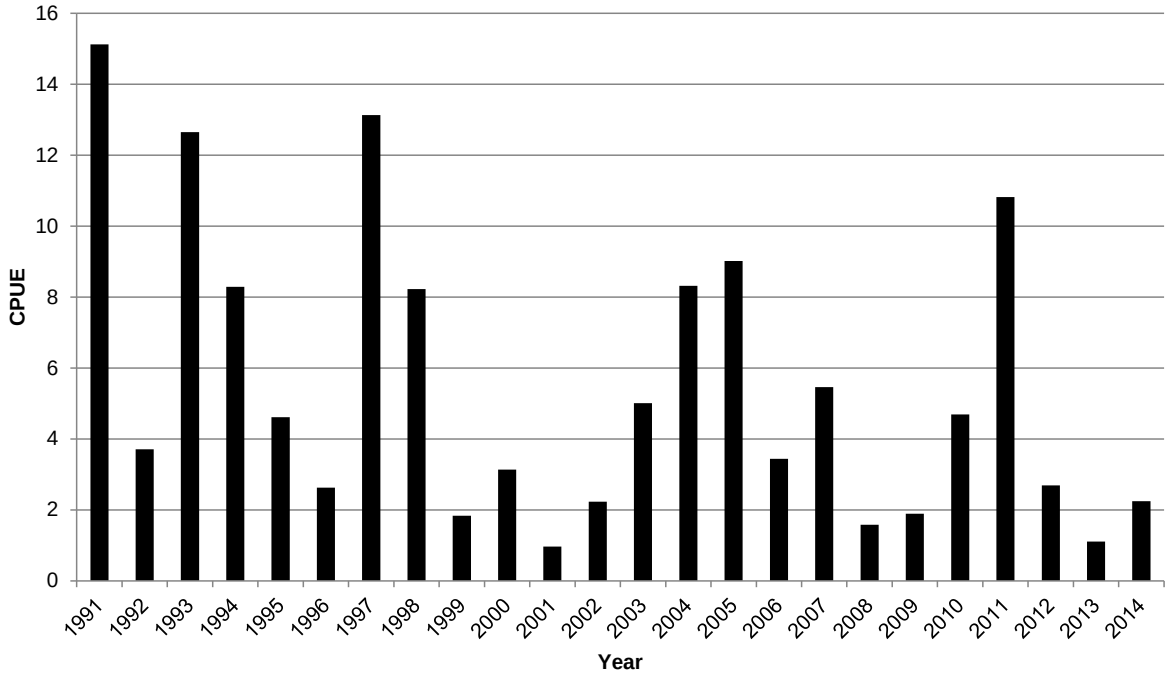

Figure 5. The annual juvenile (age-0) abundance index from the North Carolina Red Drum Juvenile Seine Survey for the period of 1991-2014.

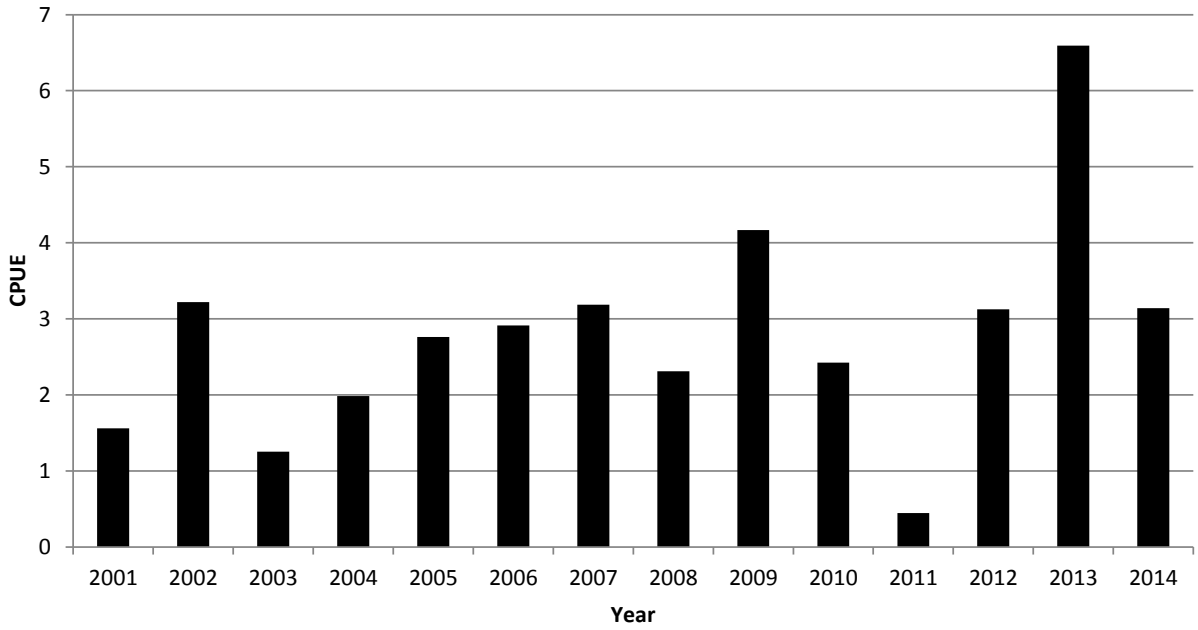

Figure 6. Annual weighted red drum CPUE (number captured ages combined) from the North Carolina Pamlico Sound Independent Gill Net Survey from 2001-2014.

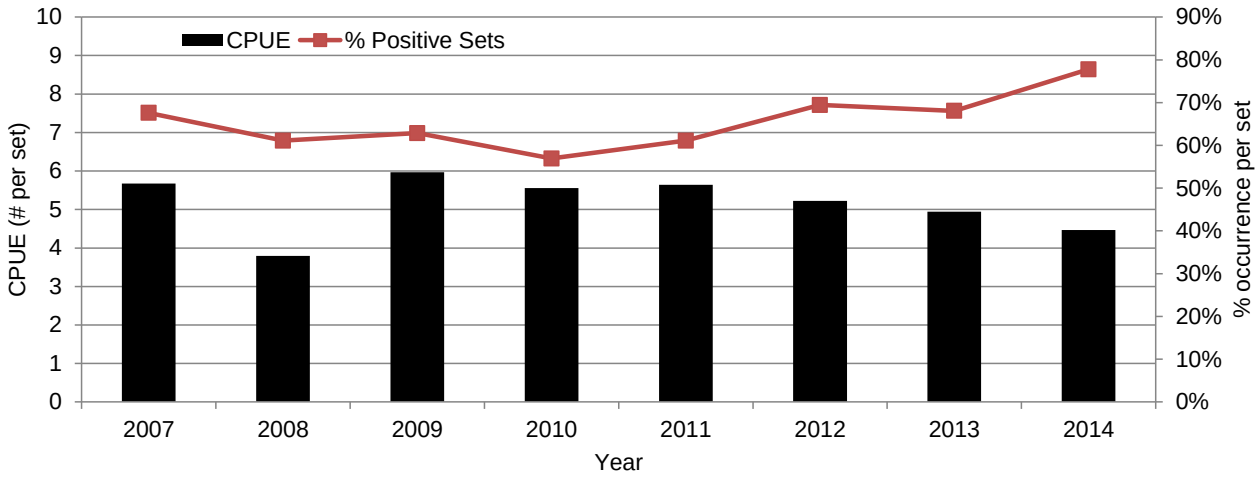

Figure 7. Annual adult red drum CPUE (number captured for ages combined) and percent positive sets from the North Carolina Red Drum Longline Survey from 2007-2014.

FISHERY MANAGEMENT PLAN UPDATE
RIVER HERRING
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	February 2000
Amendments:	Amendment 2 – May 2015 Amendment 1 – September 2007
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	May 2025

Amendment 2 to the North Carolina River Herring Fishery Management Plan (FMP) was finalized with three issues: 1) eliminating the discretionary river herring harvest season and permit since it was not serving the intended purposes of providing biological data for stock analysis and local product; 2) moving the Albemarle Sound/Chowan River Herring Management Areas to 15A NCAC 03R .0202, which corrected a reference and corrected the boundary of the Cashie River Anadromous Fish Spawning Area, and 3) removing alewife and blueback herring from exceptions in the Mutilated Finfish Rule 15A NCAC 03M .0101.

Due to the Rules Review Committee receiving at least 10 letters requesting legislative review (pursuant to G.S. 150B), a portion of the third issue to prohibit possession of river herring (alewife and blueback herring) greater than six inches aboard a vessel or while engaged in fishing from the shore or a pier is currently undergoing a legislative review (scheduled for May 2016).

Amendment 1 to the North Carolina River Herring FMP implemented a no-harvest provision for commercial and recreational fisheries of river herring in coastal waters of the state, effective in 2007. This was a result of the North Carolina Division of Marine Fisheries (NCDMF) 2005 stock assessment of river herring (data through 2003) that determined blueback herring and alewife were overfished and overfishing was occurring, there was minimal recruitment with continued declines for both species, and high fishing mortality rates. Additional management strategies included gear restrictions and stock recovery indicators. It also included a 7,500 pound limited research set-aside harvest to be used for data collection and to provide product to local herring festivals. The NCDMF Director allocated a maximum of 4,000 pounds to be used for this research season, which occurred in the Chowan River Herring Management Area around Easter week each year.

Additional outcomes of Amendment I included implementing monitoring programs, endorsing additional research on predation, restoration, impediments, bycatch and supporting spawning area habitat protection.

The original North Carolina River Herring FMP focused on issues pertaining to stock conditions (overfished and recruitment overfishing), habitat degradations, and research/monitoring expansion to provide assessment data and socioeconomic data.

Management Unit

Blueback herring and alewife management authority lies with the Atlantic Coastal states and is coordinated through the Atlantic States Marine Fisheries Commission (ASMFC). Responsibility for management action in the Economic Exclusive Zone (EEZ), located from 3-200 miles from shore, lies with the Secretary of Commerce through the Atlantic Coastal Fisheries Cooperative Management Act in the absence of a federal FMP. The NCDMF also has an FMP in place for statewide management of river herring.

Goal and Objectives

The goal of Amendment 2 to the North Carolina River Herring FMP is to restore the long-term viability of the river herring population. To achieve this goal, the plan adopts the following objectives:

1. Identify and describe population attributes necessary to sustain long-term stock viability.

2. Protect, restore, and enhance spawning and nursery area habitats.

3. Initiate, enhance, and/or continue programs to collect and analyze biological, social, economic, fishery, and environmental data needed to effectively monitor and manage the river herring fishery.

4. Promote education and public information to help the public understand the causes and nature of problems in the river herring stocks, its habitats and fisheries, and the rationale for management efforts to solve these problems.

The goal of Amendment 2 to the ASMFC Interstate Fishery Management Plan for Shad and River Herring (River Herring Management) is to protect, enhance, and restore East Coast migratory spawning stocks of alewife and blueback herring in order to achieve stock restoration and maintain sustainable levels of spawning stock biomass. To achieve this goal, the plan adopts the following objectives:

1. Prevent further declines in river herring (alewife and blueback herring) abundance.

2. Improve our understanding of bycatch mortality by collecting and analyzing bycatch data.

3. Increase our understanding of river herring fisheries, stock dynamics and population health through fishery-dependent and independent monitoring, in order to allow for evaluation of management performance.

4. Retain existing or more conservative regulations for American shad and hickory shad.

5. Promote improvements in degraded or historic alosine critical habitat throughout the species' range.

STATUS OF THE STOCK

Stock Status

The ASMFC completed a stock assessment on river herring in 2012 (ASMFC 2012), including data through 2009 (See Section 15, Appendix 15.3). The coast-wide assessment found river herring to be depleted throughout their range. The North Carolina portion of the stock assessment found that, although the stock was not experiencing overfishing, it remained overfished. The spawning stock biomass was less than five percent of the amount necessary for replacement and due to the biology of the species, significant improvements would not be likely within such a short time frame.

Stock Assessment

The North Carolina stock assessment (2005) used a forward-projecting, age-structured statistical catch-at-age model for the Chowan River blueback herring stock. This stock assessment was constructed for river herring and used to estimate the population sex-specific numbers-at-age, exploitation rates, and annual recruitment of age-3 fish during 1972-2009 using four data sources: total in-river catches, age and length compositions, a fisheries-independent young-of-year index, and assumed rates of age and sex-specific natural mortality. Biological samples for sex, age, and length data were collected from fishery landings, and natural mortality values were estimated using average weight at age and the Lorenzen (1996) method. Only ages 3 through 8+ were represented in the model because these are the only ages caught by the fishery and therefore the ages with the best data.

Three stock status indicators were adopted by the River Herring FMP plan development team, each based on a three-year moving average. The plan development team recommended using the first two stock status indicators (juvenile abundance and repeat spawners) as a trigger for doing a stock assessment earlier than ten years. If a three-year moving average of each of the indicators was above the threshold, it would trigger the need for a new stock assessment, which would determine the third stock status indicator.

1. Catch per unit effort (CPUE) of 60 young-of-the-year per haul in the Albemarle Sound juvenile abundance survey
2. Ten percent repeat spawners observed in fishery-dependent pound net samples
3. Spawning stock biomass (SSB) of 30% unfished SSB, estimated in stock assessment model.

STATUS OF THE FISHERY

Current Regulations

In 2007, Amendment 1 to the North Carolina River Herring FMP implemented a no-harvest provision for commercial and recreational fisheries of river herring in coastal waters. The North Carolina River Herring FMP Amendment 2, adopted by the North Carolina Marine Fisheries Commission (NCMFC) in May 2015, eliminated the discretionary river herring harvest season

and permit and removed alewife and blueback herring from exceptions in the Mutilated Finfish Rule.

Commercial Landings

Since Amendment 1 implemented a no-harvest provision the landings figure below (Figure 1) contains data only through 2006. Table 1 includes information on landings data from 2007 – 2014 when the discretionary harvest season was prosecuted.

Recreational Landings

There is currently no recreational fishery for river herring per the no harvest provision outlined in Amendment 1. Formerly, most river herring caught recreationally were likely used for personal consumption or for bait. For the years leading up to the 2007 harvest closure, the extent of river herring harvest for personal consumption in coastal North Carolina is unknown.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fishing activity is monitored through fishery dependent sampling conducted by the NCDMF since 1982. The dominant gears for river herring were gill nets and pound nets. In 2007, the no-harvest provision restricted commercial landings. However, the Chowan River Pound Net survey was implemented in 2008 to provide estimates of catch-per-unit effort (CPUE), percent of repeat spawners, and age and sex data for alewife and blueback herring. Tables 2 and 3 describe the mean, minimum and maximum length data for the last ten years and tables 4 and 5 describe the modal age, minimum and maximum age, and total number aged from this survey. Total pound net effort, total river herring catch, and CPUE for the Chowan River Pound Net Survey (Table 6) shows a downward trend through 2012 followed by an increasing trend through 2014.

According to the stock status indicators in order to restore the long-term viability of the river herring population, the stock status indicator objective is to see ten percent repeat spawners (blueback herring only) observed in the Chowan River Pound Net Survey. Figure 2 shows the current ten year average of repeat spawners to be 3.3%, with the last three years (2012-2014) falling below that average.

Fishery-Independent Monitoring

River herring are monitored regularly in several of the division's fishery independent monitoring programs, including Program 100 (Juvenile Anadromous Independent Fishery), Program 135 (Striped Bass Independent Gill Net Survey), Program 150 (Adult Anadromous Spawning Area Survey), and Program 160 (Anadromous Egg and Larval Survey). Tables 7 and 8 show the modal, minimum, and maximum age for alewife and blueback for the last ten years.

Data from Program 100 is used to annually calculate the juvenile abundance index (JAI) for blueback herring. The first of the stock status indices, it involves a CPUE of 60 young-of-the-year blueback herring for three consistent years in the Program 100 survey. The average JAI for the last ten years is 2.7, well below the needed stock status indicator requirements (Figure 3).

MANAGEMENT STRATEGY

River herring are currently monitored using the three stock status indicators based on blueback herring:

1. Catch per unit effort (CPUE) of 60 young-of-the-year in the Albemarle Sound juvenile abundance survey
2. Ten percent repeat spawners observed in the Chowan River Pound Net Survey
3. Spawning stock biomass (SSB) of 30 percent unfished SSB, estimated in stock assessment model.

Collectively, these indices represent *minimal* stock rebuilding goals for the recovery of river herring stocks in the Albemarle Sound and Chowan River. In the 2012 stock assessment ASMFC recommended a ten-year interval between stock assessments (ASMFC 2012). The plan development team recommended using the first two stock status indicators (juvenile abundance and repeat spawners) as a trigger for doing a stock assessment earlier than ten years. If a three-year moving average of each of the indicators was above the threshold, it would trigger the need for a new stock assessment, which would determine the third stock status indicator.

Currently the first two indicators are well below the threshold that would trigger a stock assessment which is needed to evaluate the third indicator. The spawning stock biomass was less than five percent of the amount necessary for replacement. Due to the biology of the species, significant improvements would not be likely within such a short time frame.

MANAGEMENT AND RESEARCH NEEDS

Included is a list of the management and research recommendations identified in the current FMP (Amendment 2) and the priority and status of each.

Life History

- Conduct studies of river herring egg and larval survival and development in North Carolina river systems. **High priority**
- Conduct research on predation of all life stages of river herring in the Albemarle Sound and other systems in North Carolina (including invasive species such as blue catfish and other predators). **Medium priority**
- Conduct studies on energetics of feeding and spawning migrations of river herring in North Carolina. **Medium priority**

Stock Status

- Estimate bycatch and discard mortality of river herring captured incidentally in Atlantic Ocean fisheries coastwide. **High priority**
- Estimate bycatch and discard mortality of river herring captured incidentally in inside fisheries. **Medium priority**

Environmental Factors

Water Quality Recommendations

- Evaluate effects of existing and future water withdrawals on water quality, quantity and fisheries habitat in coastal watersheds. NCDCM and NCWRC review and comment on water withdrawals and their effect on fisheries and habitat. **High priority**
- Determine if contaminants are present and identify those that are potentially detrimental to various life history stages of river herring. Long term water quality monitoring devices have been maintained and deployed to identify shifts or swings in water quality in multiple tributaries in the Albemarle Sound area. **High priority**
- Evaluate the impacts/effects of reverse osmosis (RO) plants on receiving waters and aquatic resources. NCDCM and NCWRC provide comments on permit applications for RO plants; some work by universities to evaluate effects of RO plants in local river systems. **Low priority**

Obstruction Recommendations

- Identify all man-made physical obstructions to river herring migrations (update Collier and Odom project) and prioritize impediments for removal /replacement after identification. The NCDMF has surveyed culverts in the Chowan River area and developed a priority list for replacement or repair. This information will be used by a paid graduate student to investigate fish friendly culverts. **High priority**
- Identify research needs regarding impediments to river herring migration**. High priority**

Impingement and Entrainment Recommendations

- Research is needed to determine the fate of river herring eggs, larvae and juveniles that are impinged, and then released through screen cleaning operations. **Low priority**

Climate change

- The specific effects of climate change, including warming water, increased drought severity, and loss of flood plain spawning habitat should be further investigated. **Low priority**

FISHERY MANAGEMENT PLAN SCHEDULE RECOMMENDATION

Pertaining to the current FMP schedule, the plan development team recommended using the first two stock status indicators (juvenile abundance and repeat spawners) as a trigger for doing a stock assessment earlier than ten years. If a three-year moving average of each of the indicators was above the threshold, it would trigger the need for a new stock assessment, which would determine the third stock status indicator.

It is recommended the review schedule for river herring remain the same.

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TABLES

Table 1. Harvest landings and value of discretionary river herring harvest season in North Carolina, 2007-2014.

Year	# of Permits Issued	Quota (lb/permit/period)	Harvest (lb)	Value ($)
2007	15	200	1,103	856
2008	13	250	1,292	775
2009	27	125	643	836
2010	30	125	1,765	1,765
2011	23	150	1,611	1,611
2012	18	150	678	678
2013	12	150	743	743
2014	27	150	989	1,319

Table 2. Blueback herring mean, minimum and maximum length data from 2005-2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	226	196	275	305
2006	225	196	257	156
2007	228	195	276	231
2008*	225	191	279	928
2009*	225	198	267	546
2010*	224	192	260	833
2011*	229	190	264	500
2012*	229	180	265	412
2013*	229	196	276	492
2014*	217	191	260	691

*2008 a no-harvest provision went into effect and the Chowan River Pound Net survey began

Table 3. Alewife mean, minimum and maximum length data from 2005-2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	244	200	286	539
2006	242	198	311	553
2007	229	196	278	45
2008*	227	190	287	1872
2009*	236	197	276	1000
2010*	241	203	282	822
2011*	247	201	283	806
2012*	248	190	286	641
2013*	234	196	330	854
2014*	234	202	295	1037

*2008 a no-harvest provision went into effect and the Chowan River Pound Net survey began

Table 4. Alewife ages from the dependent sampling surveys.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	5	3	7	253
2006	4	3	7	260
2007	3	3	6	30
2008*	5	4	8	588
2009*	5	3	7	342
2010*	6	3	7	277
2011*	6	3	8	211
2012*	4	3	8	259
2013*	3	2	7	308
2014*	3	2	6	328

*samples from the Chowan River pound net survey

Table 5. Blueback herring ages from the dependent sampling surveys.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	4	3	6	162
2006	4	3	5	86
2007	5	3	6	143
2008*	4	3	7	474
2009*	4	3	7	251
2010*	4	3	7	247
2011*	4	3	6	172
2012*	4	3	6	191
2013*	3	2	5	216
2014*	2	2	5	198

*samples from the Chowan River pound net survey

Table 6. Total pound net effort, catch and CPUE for the Chowan River Pound Net Survey 2009-2014.

Year	Total Effort (PN Weeks)	Total RH (lbs)	Total CPUE
2009	217	89,245	411.27
2010	260	71,532	275.12
2011	286	74,485	260.44
2012	315	18,415	58.46
2013	238	27,396	115.11
2014	271	45,619	168.34
Total	1,587	326,692	235.32

Table 7. Alewife ages from the independent sampling surveys.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	5	3	7	148
2006	5	3	7	284
2007	4	3	8	473
2008	5	3	7	428
2009	5	2	7	472
2010	6	3	8	490
2011	6	3	8	388
2012	5	3	7	181
2013	4	3	6	319
2014	4	3	7	361

Table 8. Blueback herring ages from the independent sampling surveys.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	4	2	7	174
2006	5	3	7	213
2007	5	3	7	379
2008	4	2	7	254
2009	5	3	7	330
2010	4	3	6	127
2011	4	3	6	112
2012	5	3	6	69
2013	3	2	6	211
2014	3	2	5	320

FIGURES

Figure 1. Statewide NC Commercial River Herring Landings, 1950 - 2006.

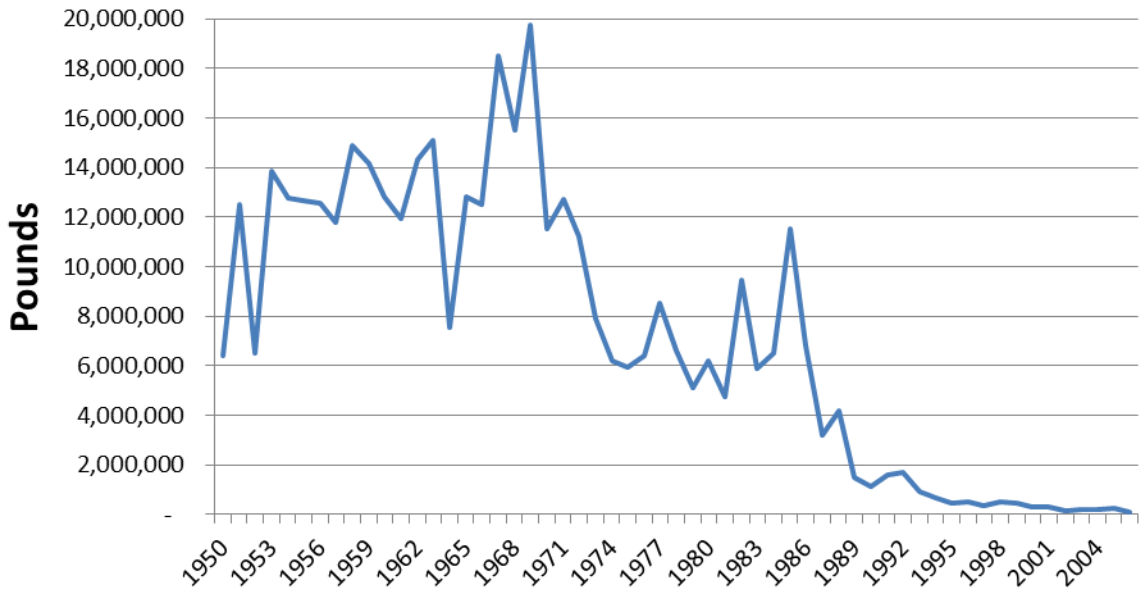


Figure 2. Percent of repeat spawners in the Chowan River Pound Net Survey, 2005-2014.

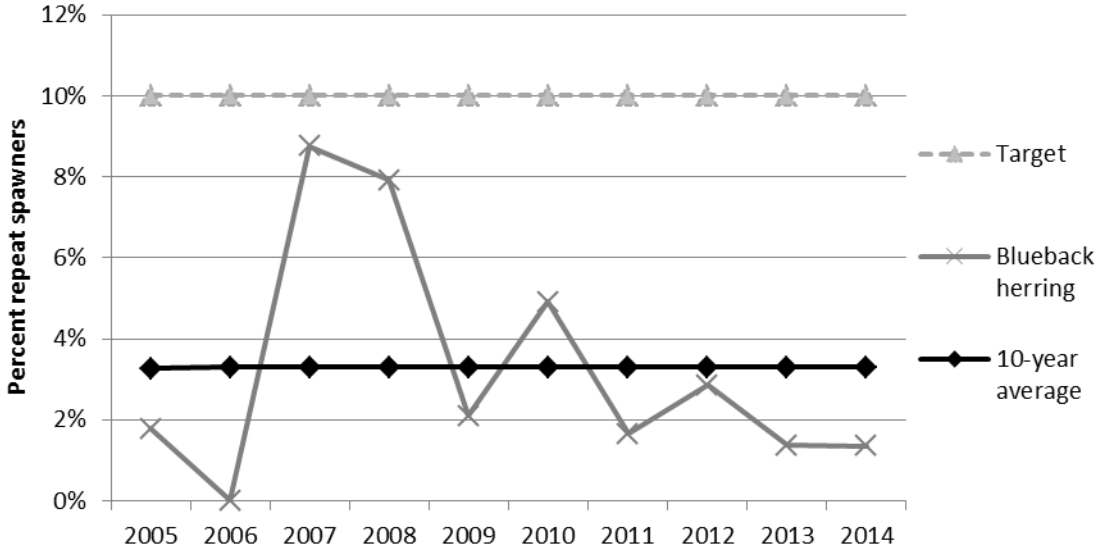
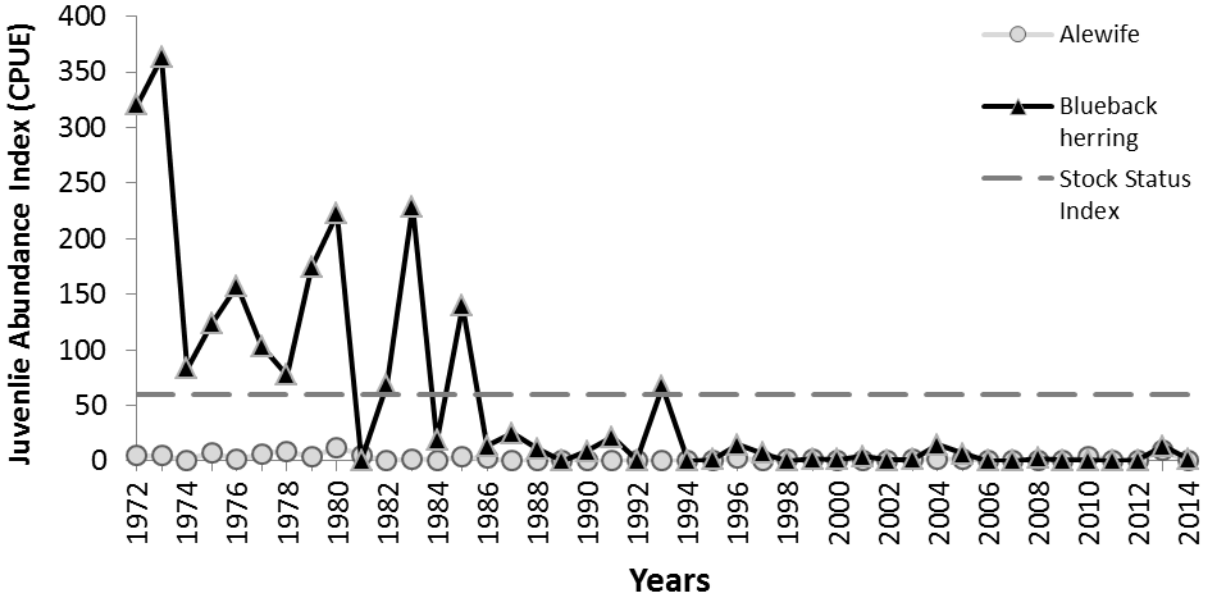


Figure 3. Blueback herring juvenile abundance index, North Carolina.



FISHERY MANAGEMENT PLAN UPDATE
SHRIMP
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	April, 2006
Amendments:	Amendment 1 – February 2015
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	July 2020

The N.C. Shrimp Fishery Management Plan (FMP) was approved in April 2006 by the N.C. Marine Fisheries Commission (NCMFC). The plan included a 90-foot headrope limit in some internal waters, allowed skimmer trawls as a Recreational Commercial Gear License (RCGL) gear and made recommendations on the minimum shrimp size at which some water bodies open to trawling. The plan also closed some areas in the state to protect habitats and juvenile finfish and established a 48-quart recreational limit. A restriction on the use of shrimp trawls above the Highway 172 Bridge over New River took effect in 2010 and this area above the bridge is now limited to skimmer trawls only. This strategy was codified into rule through Amendment 1.

Amendment 1 was adopted in February 2015 and was limited in scope to bycatch issues in the commercial and recreational fisheries. It recommended a wider range of certified bycatch reduction devices to choose from, the requirement of two bycatch reduction devices in shrimp trawls and skimmer trawls (beginning June 1, 2015), and increased the daily harvest limit for cast nets in closed areas. Amendment 1 also established a maximum combined headrope length of 220 feet in all internal coastal waters where there are no existing maximum combined headrope requirements, allowing for a phase-out period until January 1, 2017. Shrimp trawling was also prohibited, effective May 1, 2015 in the Intracoastal Waterway channel from the Sunset Beach Bridge to the South Carolina line, including the Shallotte River, Eastern Channel and lower Calabash River, to protect small shrimp. An industry workgroup, as a management strategy through Amendment 1, is currently working to test gear modifications to reduce bycatch to the extent practicable with a 40 percent target reduction in the shrimp trawl fishery.

Management Unit

The management unit includes the three major shrimp species of shrimp: brown (*Farfantepenaeus aztecus),* pink (*Farfantepenaeus duorarum*), and white (*Litopenaeus*

setiferus) and its fisheries in all coastal fishing waters of North Carolina, which includes the Atlantic Ocean offshore to three miles.

Goal and Objectives

The goal of the N.C. Shrimp Fishery Management Plan is to utilize a management strategy that provides adequate resource protection, optimizes the long-term commercial harvest, maximizes social and economic value, provides sufficient opportunity for recreational shrimpers, and considers the needs of all user groups. To achieve this goal, it is recommended that the following objectives be met:

1. Minimize waste and enhance economic value of the shrimp resource by promoting more effective harvesting practices.

2. Minimize harvest of non-target species of finfish and crustaceans and protected, threatened, and endangered species.

3. Promote the protection, restoration, and enhancement of habitats and environmental quality necessary for enhancing the shrimp resource.

4. Maintain a clear distinction between conservation goals and allocation issues.

5. Reduce conflicts among and within user groups, including non-shrimping user groups and activities.

6. Encourage research and education to improve the understanding and management of the shrimp resource.

STATUS OF THE STOCK

Stock Status

Shrimp stocks of all three species in North Carolina are still considered viable. Population size is regulated by environmental conditions, and while fishing reduces the population size over the season, fishing is not believed to have any impact on subsequent year class strength unless the spawning stock has been reduced below a minimum threshold level by environmental conditions. Because of high fecundity and migratory behavior, the three species are all capable of rebounding from a very low population size in one year to a large population size in the next, provided environmental conditions are favorable.

Stock Assessment

Estimates of population size are not available but since the fishery is considered to be an annual crop and fished at near maximum levels, annual landings are probably a good indication of relative abundance. Annual variations in catch are presumed to be due to a combination of prevailing environmental conditions, fishing effort, and the effects of changes in the economics of the fishery.

STATUS OF THE FISHERY

Current Regulations

General Rules

- Channel net is defined as a net used to take shrimp which is anchored or attached to the bottom at both ends or with one end anchored or attached to the bottom and the other end attached to a boat [15A NCAC 03I .0101 (3)(b)].
- Headrope is defined as a support structure for the mesh or webbing of a trawl that is nearest to the water surface when in use [15A NCAC 03I .0101 (3)(i)].
- Nursery areas are defined as areas in which for reasons such as food, cover, bottom type, salinity, temperature and other factors, young finfish and crustaceans spend the major portion of their initial growing season [15A NCAC 03I .0101 (4)(f)].
- Military danger zones and restricted areas are designated in 15A NCAC 3R .0102 and are enforced by the appropriate federal agency [15A NCAC 03I .0110 (a)].
- Maps or charts showing the boundaries of areas identified by rule or in proclamations are available for inspection [15A NCAC 03I .0121 (a)].
- The NCDMF shall mark boundaries with signs insofar as may be practical. No removal or relocation of signs shall have the effect of changing the classification or affect the applicability of any rule pertaining to that body of water [15A NCAC 03I .0121 (b)].

Rules Specific to Commercial Nets, Pots, Dredges, and Other Fishing Devices

- It is unlawful to use or set a fixed or stationary net in the Intracoastal Waterway where it may be a hazard to navigation, block more than two-thirds of any natural or manmade waterway, in the middle third of any marked navigation channel [15A NCAC 03J .0101 (1)(2)(3)].
- It is unlawful to possess aboard a vessel while using a trawl in internal waters more than 500 pounds of finfish from December 1 through February 28 and 1,000 pounds of finfish from March 1 through November 30 [15A NCAC 03J .0104 (a)].
- It is unlawful to use trawls nets in internal coastal waters from 9:00 p.m. on Friday through 5:00 p.m. on Sunday, except for the areas described in the next bullet [15A NCAC 03J .0104 (b) (1)].
- It is unlawful to use trawl nets from December 1 through February 28 from one hour after sunset to one hour before sunrise in portions of the Pungo, Pamlico, Bay, Neuse, and New rivers [15A NCAC 03J .0104 (b) (5)(A)(B)(C)(D)(E)].
- It is unlawful to use trawl nets in Albemarle Sound and its tributaries [15A NCAC 03J .0104 (b) (3)].
- The Director may by proclamation, require bycatch reduction devices or codend modifications in trawl nets to reduce the catch of finfish that do not meet size limits or are unmarketable as individual foodfish by reason of size [15A NCAC 03J .0104 (d)].
- It is unlawful to use trawl nets in designated pot areas opened to the use of pots by 15A NCAC 03J .0301(a)(2) within an area bound by the shoreline to the depth of six feet [15A NCAC 03J .0104 (6)].
- It is unlawful to use shrimp trawls for the taking of blue crabs in internal waters, except that it shall be permissible to take or possess blue crabs incidental to commercial shrimp trawling provided that the weight of the crabs shall not exceed 50 percent of the total weight of the combined crab and shrimp catch; or 300 pounds, whichever is greater [15A NCAC 03J .0104 (f)(2)].

- It is unlawful to use shrimp trawls for recreational purposes unless the trawl is marked with a pink buoy on the tailbag [15A NCAC 03J .0104 (e)].
- The Fisheries Director may, by proclamation, close any area to trawling for specific time periods in order to secure compliance with this rule [15A NCAC 03J .0104 (g)].
- It is unlawful to use a channel net until the Director specifies by proclamation when and where channel nets and other fixed nets for shrimping can be used [15A NCAC 03J .0106 (a)(1)].
- It is unlawful to set a channel net without yellow light reflective tape on the staffs, stakes and buoys [15A NCAC 03J .0106 (a)(2)].
- Channel nets cannot be set with any portion of the set within 50 feet of the center line of the Intracoastal Waterway (ICW) channel or in the middle third of any navigation channel marked by the Corps of Engineers or the Coast Guard. Fishermen must attend channel nets by being no more than 50 yards from the set at all times [15A NCAC 03J .0106 (a)(3)(4)(5)].
- The maximum corkline length of a channel net that can be used or possessed is 40 yards. No channel net, net buoys or stakes can be left in coastal waters from December 1 through March 1. From March 2 through November 30, cables and any attached buoy must be connected together with non-metal line when not attached to the net. Metallic floats or buoys to mark sets are unlawful [15A NCAC 03J .0106 (b)(c)(d)(e)].
- Channel nets must be properly marked with yellow light reflective tape and the owner's identification on each buoy. Identification includes one of the following: owner's NC motorboat registration number or the U.S. vessel documentation number or owner's last name and initials. Channel nets, anchor lines or buoys are not to be used in any way that constitutes a hazard to navigation [15A NCAC 03J .0106 (f) and (g)].
- It is unlawful to use channel nets to take blue crabs in internal waters, except that it shall be permissible to take or possess blue crabs incidental to channel net operations provided that the weight of the crabs do not exceed 50% of the total weight of crab and shrimp or 300 lb whichever is greater [15A NCAC 03J .0106 (h)(1)(A)(B)].
- The Director may, by proclamation, close any area to channel net use for specific time periods in order to secure compliance with the above bullet [15A NCAC 03J .0106 (h)(2)].
- It is unlawful to use nets from June 15 through August 15 in the waters of Masonboro Inlet or in the ocean within 300 yards of the beach between Masonboro Inlet and a line running 138° through the water tank on the northern end of Wrightsville Beach, a distance parallel with the beach of 4,400 yards. It is unlawful to use trawls within one-half mile of the beach between the Virginia line and Oregon Inlet [15A NCAC 03J. 0202 (1)(2)].
- It is unlawful to use a trawl with a mesh length less than four inches in the body and three inches in the extension and on and three-fourths inches in the cod end or tail bag from the west side of Beaufort Inlet Channel to the shore off Salter Path within a half mile of shore [15A NCAC 03J .0202 (3)].
- From December 1 through March 31 it is unlawful to possess finfish caught incidental to shrimp and crab trawling in the Atlantic Ocean unless the weight of the combined catch of shrimp and crabs exceeds the weight of finfish; except that crab trawlers working south of Bogue Inlet may keep up to 300 pounds of kingfish, regardless of their shrimp or crab catch weight [15A NCAC 03J .0202 (5)].
- It is unlawful to use shrimp trawls in all waters west of a line beginning at the southeastern tip of Baldhead Island at a point 33^0 50.4833'N – 77^0 57.4667 W; running southerly in the Atlantic Ocean to a point 33^0 46.2667'N – 77^0 56.4000 W from 9:00 PM through 5:00 AM [15A NCAC 03J .0202 (8)].
- It is unlawful to use trawl nets upstream of the Highway 172 Bridge in New River from 9:00 p.m. through 5:00 a.m. when opened by proclamation from August 15 through November

30 (15A NCAC 03J .0208).

- It is unlawful to use any commercial fishing gear in the Southport Boat Harbor, Brunswick County and to use any commercial fishing gear in the Progress Energy Intake Canal between the fish diversion screen and the Brunswick nuclear power plant (15A NCAC 3J .0206, 15A NCAC 03J .0207).
- It is unlawful to use shrimp pots with mesh lengths smaller than one and one-fourth inches stretch or five-eighths inch bar [15A NCAC 03J .0301(e)].
- It is unlawful to use pots with leads or leaders to take shrimp. Leads are defined as any fixed or stationary net or device used to direct fish into any gear [15A NCAC 03J .0301(l)].
- In Dare County commercial fishing gear may not be used within 750 feet of licensed fishing piers when opened to the public. Commercial fishing gear may not be used in the Atlantic Ocean off of portions of Onslow, Pender, and New Hanover counties during specified time frames [15A NCAC 03J .0402(a)(1)(A)(ii)(2)(A)(B)(i)(ii)(3)(A)(B)(i)(iii)(4)].
- Shrimp pound net set is defined as a pound net set constructed of stretch mesh equal to or greater than one and one-fourth inches and less than or equal to two inches [15A NCAC 03J .0501(a)(6)].
- A permit is required to deploy a pound net set and must be operational for a minimum of 30 consecutive days during the permit period. Each pound required the permittee's identification on a sign attached to a stake at the permitted ends of each set at all times. They must have yellow light reflective tape or yellow light reflective devices on each pound and have a marked navigational opening at least 25 feet wide at the end of every third pound and marked with yellow light reflective tape or yellow light reflective devices [15A NCAC 03J .0501 (b)(c)].
- It is unlawful to use a RCGL shrimp pound net unless it is marked by attaching to the offshore lead, one hot pink floating buoy. The owner shall be identified on the buoy by engraving the gear owner's current boat registration number or the owners US vessel documentation name. Each shrimp pound must be set a minimum of 100 yards from a RCGL pound net set or 300 yards from an operational permitted shrimp pound net set [15A NCAC 03J .0501(d)(1)(2)].
- It is unlawful within 30 days of abandonment of a permitted pound net set to fail to remove all stakes and associated gear from coastal fishing waters [15A NCAC 03J .0501(g)].
- Pound net permit applications, renewals and transfers are to comply with the permitting procedures and requirements for obtaining all NCDMF-issued permits. Application process, criteria for the granting of the permit, operational requirements and other elements of the shrimp pound net set permits are found in 15A NCAC 03J .0502, 15A NCAC 03J .0503, 15A NCAC 03J .0504 and 15A NCAC 03J .0505.

Rules Specific to Shrimp

- It is unlawful to take shrimp with nets until the Director opens the season in various waters by proclamation (15A NCAC 03L .0101).

Proclamations may specify any hours of day or night or both and any other conditions appropriate to manage the fishery. Some areas never open to shrimping, some areas are open year round, and some areas open and close throughout the year dependent upon shrimp movement and their size. Open areas to trawling are considered the shrimp open areas for all other gears including cast nets. All proclamations beginning with SH identify the open and closed areas and are found here throughout the year: http://portal.ncdenr.org/web/mf/2014-proclamation-archives.

- It is unlawful to take shrimp by any method from 9:00 PM on Friday through 5:00 p.m. on Sunday except in the Atlantic ocean or with the use of fixed and channel nets, hand seines, shrimp pots and cast nets [15A NCAC 03L .0102 (1)(2)].
- It is unlawful to take shrimp with mesh lengths less than one and one-half inches in trawls, one and one-fourth inches in fixed nets, channel nets, float nets, butterfly nets and hand seines [15A NCAC 03L .0103)(a)(1)(2].
- It is unlawful to take shrimp with a net constructed in a manner as to contain an inner our outer liner of any mesh size. Net material used as chafing gear shall be no less than four inches mesh length [15A NCAC 03L .0103) (b)].
- It is unlawful to take shrimp with trawls which have a combined headrope of greater than 90 feet in internal coastal waters except in Pamlico Sound, Pamlico River downstream of Pamlico Point/ Willow Point and Neuse River downstream of Winthrop Point/Windmill Point [15A NCAC 03L .0103)(c)(1)(2)(3)].
- It is unlawful to use a shrimp trawl in the Pungo River, upstream of Wades Point/Abel Bay, Pamlico River upstream of the entrance to Goose Creek/Wades Point and Neuse River upstream of Cherry Point/Wilkerson Point 15A [NCAC 03L .0103)(d)].
- It is unlawful to possess more than 48 quarts, heads-on or 30 quarts heads-off of shrimp per person per day or per vessel per day for recreational purposes [15A NCAC 03L .0105)(1)].
- It is unlawful to take or possess shrimp taken from any area closed to the taking of shrimp except for 2 quarts per person per day may be taken with a cast net in a closed area [15A NCAC 03L .0105(2)].
- It is unlawful to use trawls in the crab spawning sanctuaries from March 1 through August 31 [15A NCAC 03L .0205(a)].
- It is unlawful to use a trawl net in any primary or permanent secondary nursery area [15A NCAC 3N .0104, 3N .0105 (a)].
- Special secondary nursery areas may be opened to shrimp and crab trawling from August 16 through May 14 [15A NCAC 3N .0105(b)].

These areas open by proclamation and vary in their open time periods within the August 16th through May 14th window. They are opened once the finfish amount has declined to reduce bycatch. All proclamations beginning with SH identify the open and closed areas and are found here throughout the year: http://portal.ncdenr.org/web/mf/2014-proclamation-archives.

Recreational Licenses and Limits

- RCGL gear includes one shrimp trawl with a headrope not exceeding 26 feet in length per vessel, five shrimp pots, skimmer trawls, not exceeding 26 feet in total combined width and one shrimp pound net with each lead 10 feet or less in length and with a minimum lead net mesh of 1 ½ inches and enclosures constructed of net mesh of 1 ¼ inches or greater and with all dimensions being 36 inches or less. Attendance is required at all times for shrimp pounds [15A NCAC 03O .0302(a)(2)(3)(7)(8)].
- It is unlawful for a RCGL holder to use pots, including shrimp pots unless each pot is marked by attaching one hot pink floating buoy; the buoy should be engraved with the gear owners boat registration number or U.S. vessel documentation name [15A NCAC 03J .0302(a)(1)(2)].
- It is unlawful to possess more than 48 quarts, heads-on, or 30 quarts, heads-off, of shrimp per person per day or per vessel per day [15A NCAC 03L .0105].
- It is unlawful to possess more than 48 quarts, heads-on, or 030 quarts, heads-off, of shrimp when only one person aboard a vessel possesses a valid RCGL and recreational

commercial fishing equipment [15A NCAC 03O .0303(e)].
- It is unlawful to possess more than 96 quarts, heads on or 60 quarts, heads off of shrimp if more than one person aboard a vessel possesses a valid RCGL and recreational commercial fishing equipment [15A NCAC 03O .0303(f)].

Turtle Excluder Device Requirements

- It is unlawful to use a shrimp trawl that does not conform with the federal requirements for TEDs [15A NCAC 03L .0103)(g)].
- It is unlawful to trawl for shrimp in the Atlantic Ocean without TEDs within one nautical mile of shore from Browns Inlet to Rich's Inlet without a valid permit to waive the requirement to use TEDs in the Atlantic Ocean when allowed by proclamation from April 1 through November 30. It is unlawful to tow more than 55 minutes from April 1 through October 31 and 75 minutes from November 1 through November 30. It is unlawful to not fully empty the contents of each net after each tow. It is unlawful to refuse to take observers. It is unlawful to fail to report any sea turtle captured [15A NCAC 03O .0503 (d) (1)(2)(3)(4)(5)].

Federal Regulations

33 CFR 334.410 through 334.450

These rules designate prohibited and restricted military areas, including locations within North Carolina coastal fishing waters, and specify activities allowed in these areas.

50 CFR 223.206 - Exceptions to prohibitions relating to sea turtles.

The incidental taking of sea turtles in the shrimp trawl fishery is exempted from section 9 of the Endangered Species Act (ESA) if conservation regulations are followed and include the installation of NOAA Fisheries approved TEDs and alternative tow times for skimmer trawls, pusher-head trawls and butterfly trawls.

50 CFR 223.207 – Approved TEDs
This lists NOAA Fisheries approved TEDs such as the single-grid hard TEDs, hooped hard TEDs, special hard TEDs and soft TEDs, along with materials and gear specifications. Testing protocols for TEDs are also included in this rule.

50 CFR 229.7 – Monitoring of incidental mortalities
This requires that fishermen who participate in a Category I or II fishery are required to accommodate an observer onboard your vessel(s) up on request

50 CFR 622, Appendix D – Approved BRDs
This lists NOAA Fisheries approved BRDs and provides technical specifications for the construction and subsequent legal enforcement of these BRDs.

Rules implemented in Amendment 1 to the N.C. Shrimp Fishery Management Plan on May 1, 2015

- Modify the definition of mesh length to apply to diamond-mesh and square-mesh nets in support of a management strategy to require an additional bycatch reduction device in skimmer and otter trawls, which can include a square-mesh T-90 panel.

- Codify an existing management strategy prohibiting the use of trawl nets, except skimmer trawls, upstream of the N.C. 172 Bridge over the New River in Onslow County to continue reducing bycatch.
- Clarify the Division of Marine Fisheries director's proclamation authority for shrimp harvest restrictions;
- Establish a maximum combined headrope length of 220 feet in all internal coastal waters where there are no existing maximum combined headrope requirements, allowing for a phase-out period until Jan. 1, 2017.
- Allow cast-netting of shrimp in all areas otherwise closed to shrimping and increasing the harvest limit in these areas to 4 quarts, heads-on, or 2 ½ quarts, heads-off.
- Prohibit shrimp trawling in the Intracoastal Waterway channel from the Sunset Beach Bridge to the South Carolina line, including the Shallotte River, Eastern Channel and lower Calabash River, to protect small shrimp.

Commercial Landings

Landings in the North Carolina shrimp fishery vary from year to year and are dependent primarily on environmental conditions. Environmental factors, principally temperature especially severity of winter temperatures, and salinity can have a major influence on the yearly harvest. North Carolina's shrimp fishery is unusual in the southeast because all three species are taken here and the majority of the effort occurs in internal waters. While South Carolina, Georgia and Florida allow limited inside waters shrimping, the majority of their fisheries are conducted in the Atlantic Ocean and white shrimp comprise most of their harvest (NCDMF 2015).

The shrimp fishery in the northern portion of the state is conducted in Pamlico, Croatan, and Roanoke sounds and Pamlico, Pungo, Bay and Neuse rivers. The otter trawl is the predominant gear used in this portion of the state. Commercial activity occurs in all waters. The shrimp fishery in the central coastal area of the state occurs in Neuse River, Core Sound, North River, Newport River, Bogue Sound, and White Oak River. A variety of methods are used to catch shrimp including trawls, skimmer trawls, channel nets, shrimp pounds, and cast nets. Trawls are used on all three species in both the estuary and the ocean with two seam trawls used for brown and pink shrimp and four seam and tongue trawls for white shrimp, which tend to swim higher in the water column and have the ability to jump to the surface when disturbed. Most trawling in the central portion of the state is conducted at night. Channel nets are popular around Harkers Island in the Straits and North River while skimmer trawling is very popular in Newport River and New River.

In the southern portion of the state, the fishery is characterized by a large number of small boats fishing internal waters (primarily the Intracoastal Waterway, New and Cape Fear rivers) and larger vessels fishing the Atlantic Ocean primarily off New River, Carolina Beach, and Brunswick County. Many of the small boats are fished by individuals who shrimp part-time or for personal consumption. Use of gears other than trawls has increased primarily in the area from New River to Rich's Inlet. Channel, float, and butterfly nets make use of tidal currents to push shrimp into the nets and offer the advantages of less fuel consumption and less bycatch than traditional shrimp trawls. Channel nets are fished extensively in the areas around New River and Topsail inlets. To shrimp with a "float net", fishermen attach large floats to the doors and top lines of trawls to make the net fish up in the water column and are pulled slowly forward to harvest shrimp that are migrating to the inlets at night. Butterfly nets use this same harvest strategy but are attached to a metal frame and are held stationary in the water column to capture shrimp as the current carries them into the net. Skimmer trawls have become more popular around New River and Topsail Sound. These alternative gears are employed very little

in areas south of Rich's Inlet, however tidal conditions seem favorable for their use. Cast nets and seines are also used to harvest shrimp to provide live shrimp for the commercial bait fishery.

Landings provided by the trip ticket program are combined for all three shrimp species (Figure 1). Total landings from 1994 to 2014 have averaged 6,557,691 lb per year (Figure 1). The contribution to the landings continues to be 75% for inshore waters and 25% for the Atlantic Ocean (NCDMF 2015). Annual shrimping effort has fluctuated with shrimp abundance, but it appears to have gradually declined since 1994 (NCDMF 2015). This is due to a number of things including cheaper imported shrimp prices, increasing fuel prices, increased regulations, and fishermen retiring out of the industry. Landings in 2005 were lowest on record likely from several reasons; many large trawlers remained scalloping instead of shrimping because prices were high and the days at sea were extended (NCDMF 2015). Hurricanes Katrina (8/29/05) and Rita (9/4/05) hit the Gulf coast, negatively affecting the fishing industry. Shrimp breading operations in the Gulf shut down with only one operational in September and so some North Carolina shrimpers could not sell their product (NCDMF 2015).

Recreational Landings

Shrimp are harvested recreationally throughout the state by otter trawls, skimmer trawls, seines, cast nets, shrimp pots and shrimp pounds with specific gear limitations. Since July 1, 1999, anyone wishing to harvest shrimp recreationally with commercial gear is required to purchase a Recreational Commercial Gear License (RCGL). The RCGL is an annual license that allows recreational fishermen to use limited amounts of commercial gear to harvest seafood for their personal consumption. Seafood harvested under this license cannot be sold. Fishermen using this license are held to recreational size and possession limits, gear marking and gear limit and configuration requirements. Many of the species taken by recreational users of commercial gear are included in fisheries management plans. Until 2002, the influence that RCGL holders may have on these species was unknown. Two survey strategies were used to collect information from RCGL holders; a socioeconomic survey, conducted in 2001, 2004, and 2007, and catch and effort surveys conducted monthly from 2002 through 2008. Both of these surveys were terminated in 2008 due to budget constraints. RCGL holders harvested an average of 52,352 pound of shrimp a year from 2002 to 2008 (Table 1 from NCDMF 2015). The highest landings occurred in 2002 (101,766 lb), followed by 2008 (54,359 lb) and 2003 (50,961 lb) (NCDMF 2015).

Recreational landings of shrimp are unknown since this survey was discontinued in 2008.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Currently, the only data available for the stock in all areas are the commercial landings and associated effort from the Trip Ticket Program. No fishery dependent monitoring program exists for shrimp.

Fishery-Independent Monitoring

The Estuarine Trawl Survey (Program 120) is a fishery-independent multispecies monitoring program that has been ongoing since 1971 in the months of May and June. One of the key

objectives of this program is to provide a long-term data base of annual juvenile recruitment for economically important species. This survey samples fixed stations, a set of 104 core stations with additional stations as needed. The core stations are sampled from western Albemarle Sound south through the South Carolina border each year without deviation two times in the months of May and June. This survey targets juvenile finfish, blue crabs, and Penaeid shrimp. A two-seam 10.5 foot headrope trawl with a ¼ inch mesh in the body and 1/8 inch mesh in the tailbag is used. A one-minute tow is conducted covering a distance of 75 yards. All species taken are sorted, identified, and a total number is recorded for each species. For target species, a subset of at least 30 to 60 individuals is measured. Environmental data is collected, including salinity, dissolved oxygen, temperature, wind speed and direction.

Trends in the annual brown shrimp catch per unit effort (CPUE) as the number of brown shrimp per station in Program 120 sampling shows fluctuations from year to year (Figure 2). The proportional standard error was below 20 in all but 2 years from 1988 to 2014 (Table 2). A PSE of “20” and less was established by the Atlantic Coast Cooperative Statistics Program (ACCSP) as a standard when considering the precision of a given metric. The margin of error for the annual brown shrimp CPUE is low therefore providing greater confidence in the samples as an expression to the population (Table 2).

As indicated in the stock status section, annual landings are probably a good indication of relative abundance. When comparing the Program 120 brown shrimp CPUE to the landings from the months of June and July, that are predominantly brown shrimp in the harvest, you can see very similar trends (Figure 3).

MANAGEMENT STRATEGY

The management strategy for the shrimp fisheries in North Carolina is to continue to: 1) optimize resource use over the long-term, and 2) minimize waste. The first strategy is accomplished by protection of critical habitats, and gear and area restrictions to protect the stock. Minimization of waste is accomplished by gear modifications, bycatch reduction devices, area closures, and harvest restrictions.

There are no management triggers or methods to track stock abundance, fishing mortality, or recruitment between benchmark reviews from the current FMP. Landings and effort have decreased over time (NCDMF 2015). There are no data to track the recreational fishery.

Amendment 1 was adopted in February 2015 and was limited in scope to bycatch issues in the commercial and recreational fisheries. The management strategy for this amendment recommended a wider range of certified bycatch reduction devices to choose from, the requirement of two bycatch reduction devices in shrimp trawls and skimmer trawls (beginning June 1, 2015), and increased the daily harvest limit for cast nets in closed areas. Amendment 1 also established a maximum combined headrope length of 220 feet in all internal coastal waters where there are no existing maximum combined headrope requirements, allowing for a phase-out period until January 1, 2017. Shrimp trawling was also prohibited, effective May 1, 2015 in the Intracoastal Waterway channel from the Sunset Beach Bridge to the South Carolina line, including the Shallotte River, Eastern Channel and lower Calabash River, to protect small shrimp. An industry workgroup, is also currently working to test gear modifications to reduce bycatch to the extent practicable with a 40 percent target reduction in the shrimp trawl fishery. See Table 3 for the specific current management strategies.

MANAGEMENT AND RESEARCH NEEDS

The N.C. Marine Fisheries Commission selected management strategies and implementation status are provided in Table 3. Proposed research needs and status of need is provided in parenthesis from Amendment 1 include:

Management

High Priority

- Continue to conduct bycatch characterization work across all strata (for example: dominant species, season, areas, vessel type, number of nets/rigs, headrope length)(ongoing through NCDMF)
- Initiate/increase state monitoring and reporting on the extent of unutilized bycatch and fishing mortality on fish less than age-1 in the shrimp trawl fishery (needed)
- Continue to develop and test methods to reduce bycatch in the commercial and recreational shrimp trawl fisheries (ongoing in commercial shrimp trawl fishery through NCDMF)
- Obtain mortality (immediate and post-harvest) estimates of culled (active and passive) bycatch from gears used in the recreational and commercial shrimp fisheries (needed)
- Continue to develop standard protocol for bycatch estimations (ongoing at NCDMF with collaborative efforts with other agencies and researchers)

Medium Priority

- Conduct research to quantify the number of protected species interactions with the shrimp fishery (ongoing through current NCDMF grants)
- Continue to develop and test methods to reduce interactions with protected species in the commercial and recreational shrimp trawl fisheries (ongoing work being conducted by NOAA)
- Initiate sampling to investigate if additional areas currently open to shrimping need changes to their habitat designations (needed)
- Evaluate the effectiveness and efficiency of the current sampling protocol used to manage shrimp (needed)

Low Priority

- Continue to support research to determine the status of protected species along the N.C. coast to better anticipate and prevent interactions (for example: migration patterns and habitat utilization) (ongoing support continued to provide information as interactions with protected species occurs)

Biological

High Priority

- Continue to define and quantify the intensity, duration and spatial scale of trawling effort in N.C. estuaries (ongoing through NCDMF)
- Determine species interactions and predator/prey relationships for prominent shrimp trawl bycatch (needed)
- Determine how the resuspension of sediment, siltation, and non-point source pollution from adjacent land use practices impacts trends in shrimp abundance and habitat degradation (needed)

- Determine the spatial and biological characteristics of submerged aquatic vegetation that maximize their ecological value to shrimp for restoration and conservation purposes (ongoing through the CHPP)

Medium Priority
- Continue to map and quantify the habitat structure and sediment types in North Carolina estuaries (ongoing through NCDMF)
- Continue to measure the effects of trawling on sediment size distribution and organic carbon content (needed)

Low Priority
- Continue to investigate the impact of tiger shrimp in NC waters (research conducted through NOAA)
- Initiate research to determine the impacts of endocrine disrupting chemicals (EDCs) on the various life stages of shrimp (needed)

Social and Economic

Medium Priority
- Expand current social and economic surveys to specifically collect information on shrimp fishermen (needed)
- Continue to determine the extent of recreational shrimp harvest that is occurring. This group primarily use cast nets to take shrimp either for bait or personal consumption (needed)

Data Needs

High Priority
- Effort data needs to be collected to provide estimates based on actual time fished (or number of tows), rather than number of trips (needed)
- Improve accuracy of self-reported license gear survey data, or investigate other means of accurately obtaining shrimp fleet characteristic (needed)

Education

High Priority
- Encourage research and education to improve the understanding of new innovative BRDs and TEDs (ongoing through NCDMF; update proclamation in May 2015, outreach being conducted by staff and Marine Patrol to help the public understand the various BRDs available and proper placement within the trawls)
- Encourage research and education to improve the understanding and management of the shrimp resource as well as the fishery (needed)

FISHERY MANAGEMENT PLAN RECOMMENDATION

Recommend maintain the current timing of the Benchmark Review. Amendment 1 of the N.C. Shrimp FMP was just adopted in February 2015 with rule changes in effect May 1, 2015. Work in ongoing with a stakeholder group to test gear modifications to reduce bycatch to the extent practicable with a 40 percent target reduction in the shrimp trawl fishery.

LITERATURE CITED

North Carolina Division of Marine Fisheries. 2015. North Carolina Shrimp Fishery Management Plan. Amendment 1. North Carolina department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. Morehead City, NC. 519 pp.

TABLES

Table 1. Harvest (pounds) and pounds per trip of shrimp (three species combined) by RCGL gear from 2002 through 2008 (NCDMF 2015).

Year	Pounds	Pounds/trip
2002	101,766	19.1
2003	50,961	18.5
2004	43,698	9.3
2005	32,542	13.4
2006	49,362	20.3
2007	33,778	15.2
2008	54,359	22.3
Mean	52,352	16.8

Table 2. Program 120 annual sampling for brown shrimp from core stations in May and June combined. Number of samples (stations), brown shrimp arithmetic catch per unit effort (CPUE) as the number of shrimp per station, standard error, standard deviation, coefficient of variation (CV), minimum number caught at a station, maximum number caught at a stations, total number caught, proportional standard error (PSE), 1988-2014.

Year	Number of stations	CPUE (No. shrimp/tow)	Standard error	Standard deviation	CV	Minimum number per station	Maximum number per station	Total number of shrimp	PSE
1988	209	21.24	3.20	46.31	218.01	0	348	4,440	15
1989	207	29.23	5.40	77.68	265.78	0	775	6,050	18
1990	206	44.17	6.83	98.03	221.97	0	1,094	9,098	15
1991	207	48.57	5.36	77.18	158.88	0	520	10,055	11
1992	210	25.85	5.03	72.93	282.16	0	664	5,428	19
1993	205	23.79	4.35	62.31	261.95	0	348	4,876	18
1994	205	29.92	4.29	61.41	205.23	0	459	6,134	14
1995	208	38.62	5.72	82.53	213.72	0	615	8,032	15
1996	207	34.78	6.39	91.87	264.16	0	696	7,199	18
1997	207	25.62	6.24	89.80	350.45	0	856	5,304	24
1998	208	13.04	2.77	39.99	306.74	0	369	2,712	21
1999	206	49.67	7.55	108.34	218.09	0	675	10,233	15
2000	209	56.77	7.06	102.08	179.82	0	759	11,865	12
2001	209	42.81	6.30	91.03	212.64	0	717	8,947	15
2002	208	59.68	6.89	99.38	166.52	0	793	12,414	12
2003	208	31.17	4.32	62.32	199.91	0	563	6,484	14
2004	208	24.93	3.99	57.61	231.12	0	334	5,185	16
2005	208	23.17	4.35	62.75	270.81	0	551	4,820	19
2006	208	25.88	3.44	49.67	191.93	0	308	5,383	13
2007	208	18.49	1.89	27.20	147.16	0	170	3,845	10
2008	208	95.71	13.45	193.92	202.61	0	1,718	19,908	14
2009	208	60.29	8.16	117.73	195.27	0	1,001	12,540	14
2010	208	15.25	13.17	189.97	252.47	0	1,622	15,651	18
2011	208	52.17	7.41	106.82	204.74	0	930	10,852	14
2012	208	40.13	4.26	61.47	153.17	0	343	8,347	11
2013	208	27.53	4.39	63.25	229.77	0	459	5,726	16
2014	208	34.98	4.47	64.46	184.28	0	409	7,276	13

Table 3. The N.C. Marine Fisheries Commission selected management strategies, and implementation status to reduce bycatch.

Management Strategy	Implementation Status
Status quo (continue to prohibit otter trawls in the New River special secondary nursery area above the Highway 172 Bridge).	Rule change required in 15A NCAC 03J .0208; Rule change in effect on May 1, 2015.
Allow hand cast netting of shrimp in all closed areas and increase the limit to four quarts, with heads on per person.	Rule change required in 15A NCAC 03L .0105; Rule change in effect on May 1, 2015.
Status quo on a license requirement to fish a cast net for shrimp.	No action required
Upon federal adoption of TEDs in skimmer trawls, the division will support the federal requirement.	No action required
Establish a permitted live shrimp bait fishery and for DMF to craft the guidelines and permit fees after reviewing permitted operations in other states, and to allow live bait fishermen with a permit to fish until 12 p.m. (noon) on Saturday.	Based on review of other state operations, future rule changes will be required and include 15A NCAC 03J .0104, 03L .0102, 03O .0105, 03O .0503; Rule change in effect on May 1, 2015.
Allow any federally certified BRD in all internal and offshore waters of NC.	Existing proclamation authority; Proclamation issued with complete list of BRDs, SH-2-2015
Update the scientific testing protocol for the state's BRD certification program.	Plans to update the testing protocols to use the federal standards.
Convene a stakeholder group to initiate industry testing of minimum tail bag mesh size, T-90 panels, skylight panels, and reduced bar spacing in TEDs to reduce bycatch to the extent practicable with a 40 percent target reduction. • Upon securing funding, testing in the ocean and internal waters will consist of three years of data using test nets compared to a control net with a Florida fish eye, a federally approved TED and a 1.5-inch mesh tail bag. • Results should minimize shrimp loss and maximize reduction of bycatch of finfish. Promising configurations will be brought back to the commission for consideration for mandatory use. • The stakeholder group may be partnered with the division and Sea Grant. • Members should consist of fishermen, net/gear manufacturers and scientific/gear specialists.	Stakeholder group convened and industry testing underway in 2015.
Require either a T-90/square mesh tailbag or other applications of square mesh panels (e.g., skylight panel), reduced bar spacing in a TED, or another federal or state certified BRD in addition to existing TED and BRD requirements in all skimmer and otter trawls.	Existing proclamation authority Rule change required in 15A NCAC 03I .0101; Rule change in effect on May 1, 2015. Proclamation issued for second BRD requirement to begin on June 1, 2015, SH-2-2015, http://portal.ncdenr.org/web/mf/proclamation-sh-02-2015
Status quo on effort management (no change in season, weekend, or night time fishing).	No action required
In order to put a cap on fleet capacity as a management tool, establish a maximum combined	Rule change required in 15A NCAC 03L .0103; Rule change in effect on May 1, 2015.

Management Strategy	Implementation Status
headrope length of 220 feet in all internal coastal waters where there are no existing maximum combined headrope requirements with a two-year phase out period.	
Prohibit shrimp trawling in the IWW channel from Sunset Beach to the SC state line, including Eastern Channel, lower Calabash River and Shallotte River.	Rule change required in 15A NCAC 03R .0114; Rule change in effect May 1, 2015.
Recommend the MFC Habitat and Water Quality Advisory Committee to consider changing designation of special secondary nursery areas that have not been opened to trawling since 1991 to permanent secondary nursery areas.	Rule changes required in 15A NCAC 03R .0104 and 03R .0105; Rule change in effect May 1, 2015.

FIGURES

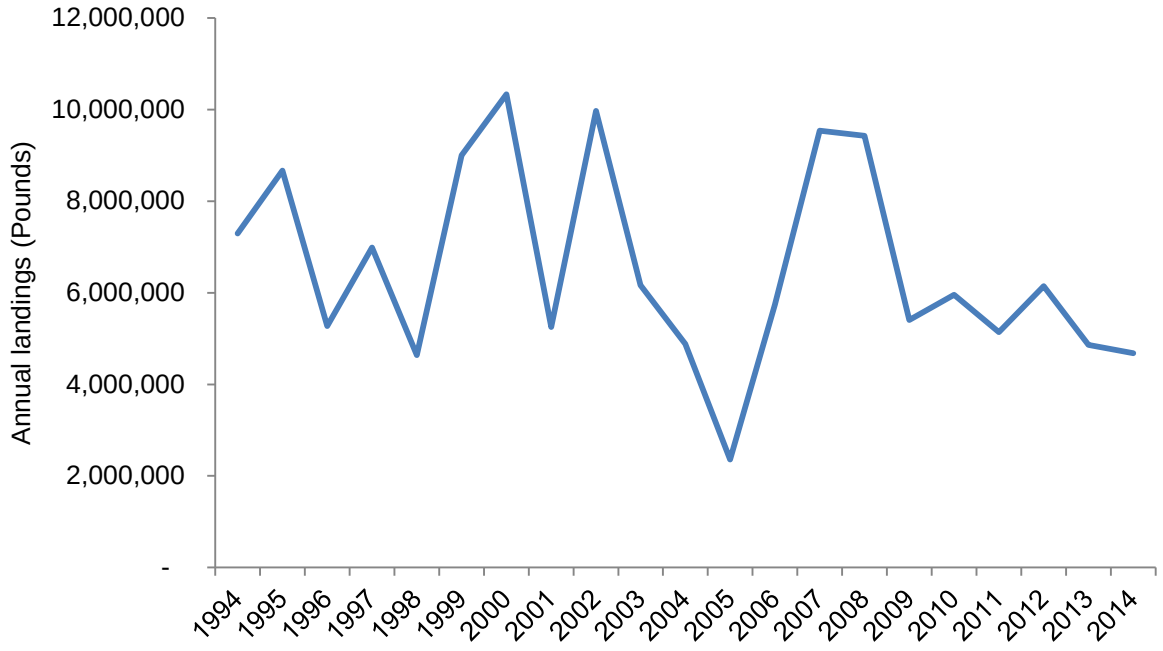


Figure 1. Annual shrimp landings (pounds) from all three species combined in North Carolina, 1994-2014. Data from the NCDMF Trip Ticket Program.

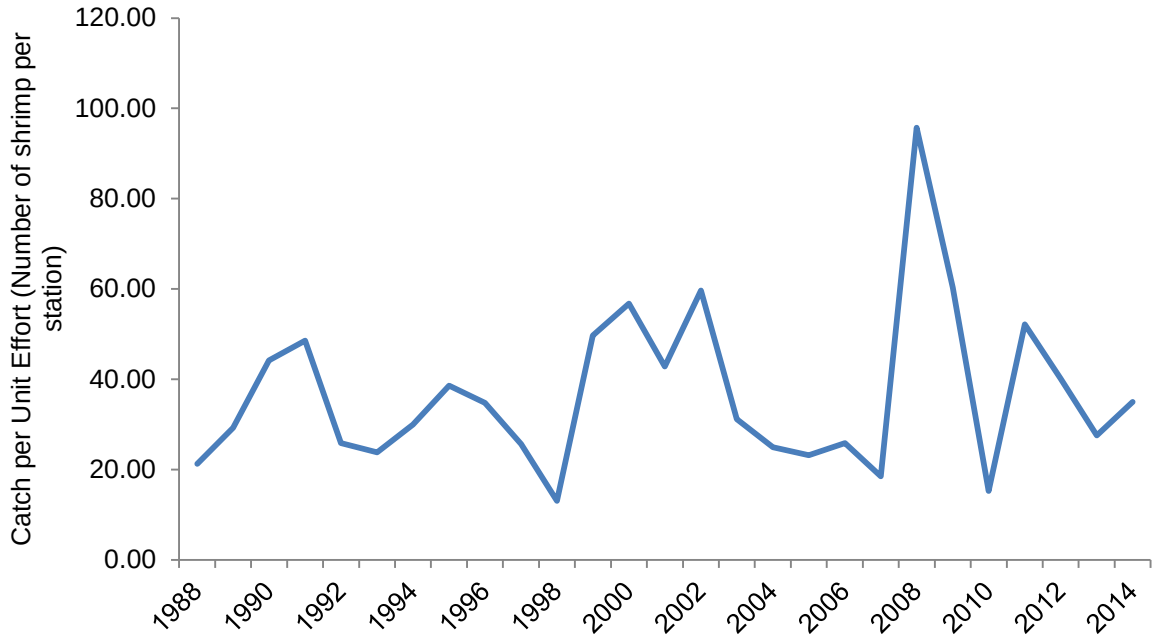


Figure 2. Annual catch per unit effort (number of shrimp per station) of brown shrimp from Program 120 estuarine trawl survey, 1988-2014.

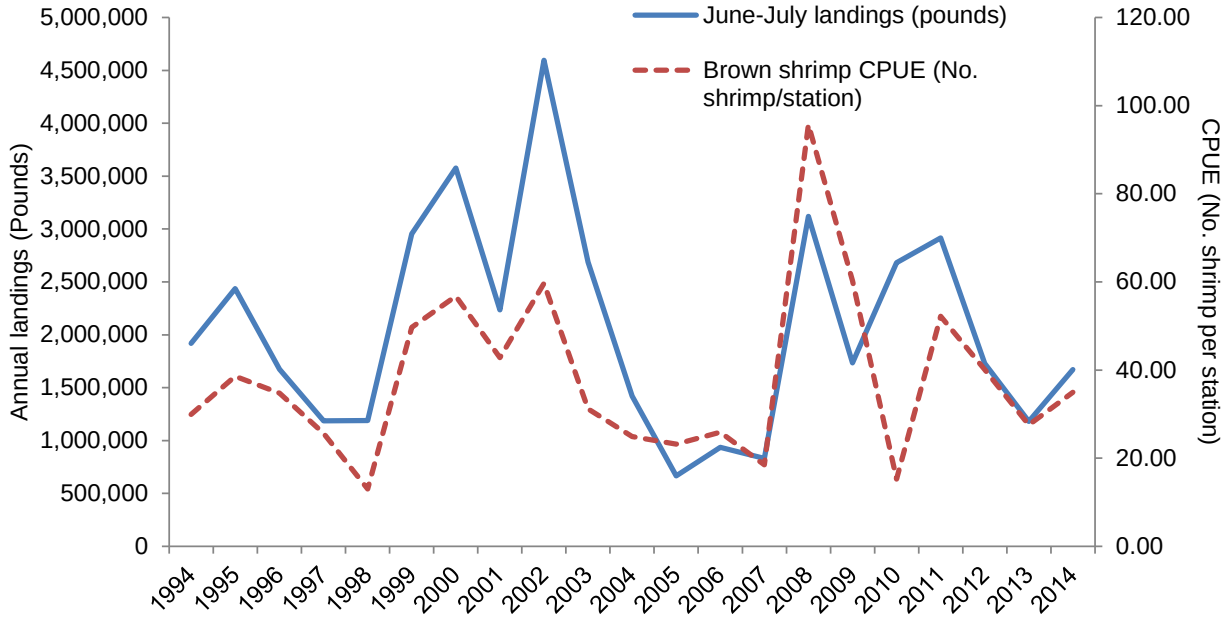


Figure 3. Comparison of shrimp commercial landings in the months of June and July to the brown shrimp Program 120 index of abundance or catch per unit effort (Number of shrimp per station), 1994-2014.

FISHERY MANAGEMENT PLAN UPDATE
SOUTHERN FLOUNDER
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	February 2005
Amendments:	Amendment 1 – February 2013
Revisions:	None
Supplements:	Supplement A to the 2005 FMP – February 2011 Draft Supplement A to Amendment 1 Currently in Development with Scheduled Approval in August 2015
Information Updates:	None
Schedule Changes:	None

Next Benchmark Review: Next 5-year review of the N.C. Southern Flounder Fishery Management Plan (FMP) is scheduled to begin July 2018. In May 2015 the N.C. Marine Fisheries Commission (NCMFC) requested a change to the FMP schedule to begin a new amendment and this request is currently under review by the Department of Environment and Natural Resources Secretary.

Actions to achieve sustainable harvest in Amendment 1 include: 1) accept management measures to reduce protected species interactions as the management strategy for achieving sustainable harvest in the commercial southern flounder fishery; 2) increase the recreational minimum size limit to 15 inches and decrease the creel limit to 6 fish. Amendment 1 also set new sustainability benchmarks at 25% SPR (threshold) and 35% SPR (target).

Draft Supplement A to Amendment 1 is in development and will be considered for final approval in August 2015.

Management Unit

North Carolina coastal and joint waters.

Goal and Objectives

The goal of Amendment 1 to the North Carolina Southern Flounder Fishery Management Plan (FMP) is to end overfishing and rebuild the spawning stock for long-term sustainable harvest and maintain the integrity of the stock. To achieve this goal, the following objectives must be met:

1. Ensure that the spawning stock biomass of southern flounder is adequate to produce recruitment levels necessary to increase spawning stock biomass and expand age distribution.

2. Implement management measures that will achieve sustainable harvest.

3. Promote harvesting practices that minimize bycatch.

4. Continue to develop an information program to educate the public and elevate their awareness of the causes and nature of problems in the southern flounder stock, its habitat and fisheries, and explain the rationale for management efforts to sustain the stock.

5. Address social and economic concerns of all user groups, including issues such as user conflicts.

6. Promote the protection, restoration, and enhancement of habitats and environmental quality for the conservation of the southern flounder population.

7. Initiate, enhance, and/or continue studies to improve the understanding of southern flounder population ecology and dynamics.

8. Initiate, enhance, and/or continue studies to collect and analyze the socio-economic data needed to properly monitor and manage the southern flounder fishery.

STATUS OF THE STOCK

Stock Status

The current status of the southern flounder stock is 'concern.' There are concerns about the sustainability of current harvest levels due to coastwide trends in juvenile and adult abundance and the high percentage of immature fish in the harvest. A regional stock assessment should be considered to determine stock status.

Stock Assessment

The 2009 stock assessment used a statistical catch-at-age model run using the Age Structured Assessment Program. Results showed the stock to be overfished with overfishing occurring throughout the time-series. These were the most recent assessment results included in Amendment 1. The 2014 Southern Flounder Stock Assessment used a statistical catch-at-age model run using Stock Synthesis. Upon review of the assessment, external peer reviewers and the NCDMF determined the model could not fully account for stock mixing during spawning and quantify migration of southern flounder to and from North Carolina waters. Consequently, the assessment was not accepted for determining stock status so it is currently unknown whether the stock is overfished or if overfishing is occurring.

STATUS OF THE FISHERY

Current Regulations

Commercial: 14–inches total length (TL) minimum size limit in internal and ocean waters, closed season in internal waters from December 1–31; no trip limits in internal waters and a 100-pound trip limit in ocean waters unless the individual has a License to Land Flounder from the Atlantic Ocean.

Recreational: 15–inches TL minimum size limit, 6-fish creel limit for all joint and coastal waters, and year-round season.

Commercial Landings

Any landings reported as caught in inshore waters are considered to be southern flounder by NCDMF Trip Ticket Program. Most southern flounder landings were from gill nets and pound nets, although gigs and other inshore gears (e.g. trawls) catch flounder in smaller numbers. Historically, pound nets were the dominant gear but landings from gill nets were higher in 1994-2013 (Figure 1). Peak commercial landings occurred in 1994. Since 1994, pound net landings decreased greatly while gill net landings remained relatively high until 2010. Decreases in gill net harvest in 2010-2012 were mainly due to lower landings in the Albemarle Sound. The Sea Turtle Settlement Agreement (2010) added regulations to gill nets in some areas of the state, resulting in lower effort in many areas, however the Albemarle Sound was mostly unaffected by these regulations. The Albemarle Sound is typically where the majority of southern flounder gill net harvest occurs. In 2013 gill net harvest increased greatly in the Albemarle Sound but decreased in Pamlico Sound and Core Sound; pound net landings also increased greatly in 2013. In 2014 gill net harvest decreased in all areas of the state but especially in the Albemarle Sound, due to widespread gill net closures to avoid catches of red drum. Pound net harvest remained relatively high and surpassed gill net harvest for the first time since 1994. Gig harvest of southern flounder has generally increased, especially since 2010, but remains less than 10% of total commercial harvest. Harvest by other commercial gears has generally decreased and currently makes up a small portion of commercial harvest. Commercial harvest is highest in fall months.

Trends in commercial trips have generally followed landings trends (Figure 2). Trips include the number of trip ticket records with landings reported. Some trips may represent more than one day of fishing. The majority of trips that harvest flounder are from gill nets. Gill net trips decreased greatly since 2010. Pound net trips decreased greatly until 2002 and were fairly consistent after that year. Gigging trips have increased greatly since 2010.

Recreational Landings

Recreational harvest of southern flounder is mainly by hook and line and gigs, with a small amount of harvest by spearfishing or RCGL gears. NCDMF does not have information on long-term trends of the gig fishery. This is because the Marine Recreational Information Program (MRIP) rarely encounters gig fishermen. A mail-based survey of gigging that began in 2010 indicates the gig harvest in 2010-2013 made up less than 25% of the recreational harvest (with hook and line harvest making up the remainder). Hook and line harvest can be split into ocean and inshore harvest, with most southern flounder harvested inshore (Figure 3). Hook and line harvest peaked in 2010 but by 2014 had declined to the lowest level since 1999. Harvest is highest during summer months.

Trends in recreational trips are somewhat difficult to interpret because they represent all paralichthid flounder species commonly caught in North Carolina (southern, summer and Gulf). This is because anglers simply report targeting 'flounder' rather than a particular species of flounder. Trips can be defined in several ways but in this document all trips that harvested or released any paralichthid flounder species were included. Trends in trips and harvest are roughly similar throughout most of the time-series but in 2012 to 2014 harvest declined while trips remained relatively high (Figure 4).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fishing activity is monitored through fishery-dependent sampling conducted by the division since 1982. Data collected in this program allow the size and age distribution of southern flounder to be characterized by gear/fishery. Several NCDMF sampling programs collect biological data on commercial and recreational fisheries that catch southern flounder. The primary programs that collect length and age data for harvested southern flounder include: 461 (gill net and seine), 476 (gig and spear), 432 (pound net) and 437 (long haul seine). Programs 466 and 570 collect length data on harvested and discarded flounder. Other commercial sampling programs focusing on fisheries that do not target southern flounder collect biological data rarely. NCDMF sampling of the recreational fishery through the MRIP collects length data on southern flounder. The NCDMF mail-based gigging survey collects harvest data for the recreational gig fishery but does not collect length or age data. Age data from the recreational fishery are collected mainly via voluntary angler donations.

There were no clear trends in commercial length and age data in 2005-2014 (Table 1). Annual mean lengths were fairly consistent and 2014 was similar to previous years. However, the number of fish measured in 2014 was the lowest of any year 2005-2014. The modal and maximum ages were also fairly consistent throughout the time-series. The annual number of age samples collected and aged was low from the commercial fisheries. 2014 age data were not complete.

There were no clear trends in recreational length and age data in 2005-2014 (Table 2). Annual mean lengths were fairly consistent and 2014 was similar to previous years. The modal and maximum ages were also fairly consistent throughout the time-series. The annual number of age samples collected and aged was generally low but increased in 2013 from the recreational fisheries. 2014 age data were not complete.

Fishery-Independent Monitoring

Several NCDMF independent sampling programs collect biological data on southern flounder. The primary surveys that collect length data for southern flounder and were included as indices of abundance in recent stock assessments were: 120 (Estuarine Trawl Survey), 195 (Pamlico Sound Survey), 135 (Striped Bass Independent Gill Net Survey) and 915 (Pamlico Sound Independent Gill Net Survey). Age data primarily come from program 915 although the other three surveys do collect age data also. Methodology for analyzing trends in CPUE for each survey changed with the 2014 stock assessment when generalized linear models (GLMs) were used to calculate relative yearly abundance index values. The indices were updated for this report through 2014 using the same methodology

There were no clear trends in fishery-independent length and age data in 2005-2014 (Table 3). Annual mean lengths were fairly consistent and 2014 was similar to previous years. However, the number of fish measured in 2014 was the lowest of any year 2005-2014. The modal age decreased slightly after 2006 but the maximum age increased slightly. The annual number of age samples collected and aged generally increased since 2005. 2014 age data were not complete.

Data collected by Program 915 were used for an index of general (juvenile and adult) abundance in recent stock assessments. The survey is designed to characterize the size and age distribution for key estuarine species in Pamlico Sound and its major river tributaries. Sampling began in Pamlico Sound in 2001 and was expanded to the current sampling area (including tributaries) in 2003. Each array of nets consists of floating gill nets in 30-yard segments of 3-, 3.5-, 4-, 4.5-, 5-, 5.5-, 6-, and 6.5-inch stretched mesh, for a total of 240 yards of nets. Catches from an array of gill nets comprise a single sample; two samples (one shallow, one deep) totaling 480 yards of gill net are completed each trip. Gill nets are typically deployed within an hour of sunset and fished the following morning. Efforts are made to keep all soak times within 12 hours. All gill nets are constructed with a hanging ratio of 2:1. Gill net sets are made using a random stratified survey design, based on area and water depth. Each region is overlaid with a one-minute by one-minute grid system (equivalent to one square nautical mile) and delineated into shallow (<6 feet) and deep (>6 feet) strata. Deep strata were not included in data analysis for this report. Sampling in Pamlico Sound is divided into two regions: Region 1, which includes areas of eastern Pamlico Sound adjacent to the Outer Banks from southern Roanoke Island to the northern end of Portsmouth Island; and Region 2, which includes Hyde County bays from Stumpy Point Bay to Abel's Bay and adjacent areas of western Pamlico Sound. Each of the two regions is further segregated into four similar sized areas, denoted by either Hyde or Dare and numbers 1 through 4. The rivers are divided into four areas in the Neuse River, three areas in the Pamlico River, and one area for the Pungo River. Although the survey is conducted in all months except January, only July-September data were used to analyze CPUE trends because these months had the peak catches of southern flounder. The survey was expanded to include areas in the southern portion of the state in 2008, but these data were not analyzed for the index due to the short time-series. The abundance index for Program 915 peaked in 2010 and the low point was in 2007 for the time-series analyzed (2003-2014) but has no clear trend overall (Table 4; Figure 5). In 2014 the abundance index declined relative to recent years.

Data collected by Program 135 were used for an index of general (juvenile and adult) abundance in recent stock assessments. Beginning in 1990, Program 135 has conducted gill net sets in waters of Albemarle Sound and Roanoke River. The survey was designed to monitor the striped bass population. The survey follows a random stratified design, stratified by geographic area. This survey divides the Albemarle region into six sample zones that are further subdivided into one-mile square quadrants with an average of 22 quadrants per zone. Four arrays of twelve meshes (2.5-, 3-, 3.5-, 4-, 4.5-, 5-, 5.5-, 6-, 6.5-, 7-, 8-, 10-inch stretch) of gill nets are set in each quadrant by the fishing crew, two arrays are sinking gill nets and two are floating. One unit of effort is defined as each 40-yard net fished for 24 hours. Only samples from November and December were included in analysis of CPUE trends (when the most extensive sampling coverage occurs). The abundance index for Program 135 peaked in 1992 and the low point was in 2011 for the time-series analyzed (1991-2014) and has been at a lower level since the mid-1990s (Table 4; Figure 5). In 2014 the abundance index was typical of recent years.

Data collected by Program 120 were used for a juvenile abundance index (JAI) in recent stock assessments. The Estuarine Trawl Survey (Program 120) is a fishery-independent multispecies

monitoring program that has been ongoing since 1971 in the months of May and June. One of the key objectives of this program is to provide a long-term data base of annual juvenile recruitment for economically important species. This survey samples fixed stations, a set of 104 core stations with additional stations as needed. The core stations are sampled from western Albemarle Sound south through the South Carolina border each year without deviation two times in the months of May and June. This survey targets juvenile finfish, blue crabs, and Penaeid shrimp. A two-seam 10.5 foot headrope trawl with a ¼ inch mesh in the body and 1/8 inch mesh in the tailbag is used. A one-minute tow is conducted covering a distance of 75 yards. All species taken are sorted, identified, and a total number is recorded for each species. For target species, a subset of at least 30 to 60 individuals is measured. Environmental data is collected, including salinity, dissolved oxygen, temperature, wind speed and direction. Data from this survey were used to produce juvenile abundance indices for southern flounder from 1991 to 2014. The abundance index for Program 120 peaked in 1996 and the low point was in 1998 for the time-series analyzed (1991-2014) but shows no clear trend (Table 4; Figure 6). In 2014 the abundance index declined slightly from 2013 but was typical of index values in recent years.

Data collected by Program 195 were used for a juvenile abundance index (JAI) in recent stock assessments. Program 195 conducts trawls using a random stratified survey design in waters of Pamlico Sound and major river tributaries in June and September. Only data from September were used for the JAI in the 2014 stock assessment. Stations are randomly selected from strata based upon depth and geographic location. Randomly selected stations are optimally allocated among the strata based upon all previous sampling in order to provide the most accurate abundance estimates (PSE <20). Tow duration is 20 minutes; using double rigged demersal mongoose trawls (9.1m headrope, 1.0m X 0.6m doors, 2.2-cm bar mesh body, 1.9-cm bar mesh cod end and a 100-mesh tailbag extension. Data from this survey were used to produce juvenile abundance indices for southern flounder from 1991 to 2014. The abundance index for Program 195 peaked in 1992 and the low point was in 1998 for the time-series analyzed (1991-2014) and has been at a lower level since the mid-1990s (Table 4; Figure 6). In 2014 the abundance index declined slightly from 2013 but was typical of index values in recent years (except 2012).

MANAGEMENT STRATEGY

Southern flounder are managed under Amendment 1 to the Southern Flounder FMP, adopted in February 2013. Amendment 1 established the threshold spawning potential ratio (SPR) of 25% and the target SPR of 35% and implemented management measures for the commercial and recreational fisheries (Table 5). Actions to achieve sustainable harvest in Amendment 1 include: 1) accept management measures to reduce protected species interactions as the management strategy for achieving sustainable harvest in the commercial southern flounder fishery; 2) increase the recreational minimum size limit to 15 inches and decrease the creel limit to 6 fish. Since the adoption of Amendment 1, the 2014 Southern Flounder Stock Assessment was completed. Upon review of the assessment, external peer reviewers and the NCDMF determined the model could not fully account for stock mixing during spawning and quantify migration of southern flounder to and from North Carolina waters. Consequently, the assessment was not accepted for determining stock status so it is currently unknown whether the stock is overfished or if overfishing is occurring. Due to concerns for the health of the stock based on abundance trends and the percentage of immature fish in the harvest, in February 2015 the NCMFC requested a supplement be developed for reducing harvest in the southern

flounder. The supplement process is currently underway and a final decision is expected in August 2015.

MANAGEMENT AND RESEARCH NEEDS

The management strategies and implementation status from Amendment 1 of the N.C. Southern Flounder FMP can be found in Table 5. The following research recommendations were included in Amendment 1; status of need is provided in parentheses:

- Investigate the feasibility of a quota as a management tool for the commercial southern flounder fishery (underway).
- Annual survey of the recreational gig fishery (mail-based survey underway, dockside survey still needed).
- Further research on southern flounder that remain in the ocean after the spawning season (tagging studies underway but other studies may be needed).
- Determine the exact locations of spawning aggregations of southern flounder in the ocean (tagging studies underway but other studies may be needed).
- Continued otolith microchemistry research to gain a better understanding of ocean residency of southern flounder (more research needed).
- Tagging study of southern flounder in the ocean to gain a better understanding of migration patterns into the estuaries (underway).
- Update the southern flounder maturity schedule (completed).
- Fishery dependent sampling of the commercial spear fishery for flounder in the ocean (some sampling done under NCDMF sampling but more may be needed).
- Harvest estimates and fishery dependent sampling of the recreational spear fishery for flounder in the ocean (not done except what MRIP encounters).
- Increased fish house sampling of the Currituck Sound flounder gill net and pound net fisheries (sampling has increased, more may be needed).
- Increased at-sea observer trips with gill netters and pound netters in Currituck Sound (underway for gill nets, pound net observing needed).
- Reestablish a RCGL survey to obtain harvest, discard, and effort information (not underway).
- Establish an at-sea observer program of the RCGL fishery (not underway).
- Formulate a bycatch estimate of southern flounder from crab pots (more research needed).
- Further research on degradable materials to determine which material works best in a given water body and how other parameters, such as microbial activities and the effects of light penetration impact degradation rates and performance of the crab pot (progress unknown).
- Further research on flatfish escapement devices that minimize undersized flounder bycatch and maximize the retention of marketable blue crabs (more research needed).
- Further research on factors that impact release mortality of southern flounder in the recreational hook and line fishery (more research needed).
- Research on deep hooking events of different hook types and sizes on southern flounder (more research needed)
- Population dynamics research for all Atlantic protected species (underway?).
- Continued gear research in the design of gill nets and pound nets to minimize protected species interactions (some research completed, more may be needed).

- Development of alternative gears to catch southern flounder (some research completed, more may be needed).
- Further research on the size distribution of southern flounder retained in pound nets with 5.75-inch and 6-inch escape panels (some research completed, more is needed).
- Research on the species composition and size distribution of fish and crustaceans that escape pound nets through 5.75-inch and 6-inch escape panels (some research completed, more is needed).
- Coast wide at-sea observations of the flounder pound net fishery (still needed).
- Discard mortality estimates of southern flounder from pound nets (still needed).
- Continue at-sea observations of the large mesh gill net fishery, especially outside of the PSGNRA, including acquiring biological data on harvest and discards (underway).
- Increase the number of large mesh gill catches sampled in areas such as Albemarle Sound and the Newport River (sampling has increased, more may be needed).

Research recommendations from 2014 stock assessment, included in Draft Supplement 1 to Amendment 1:

- Retain mail survey of recreational gig survey harvest and discards. Develop methodology to validate mail survey results, possibly using dockside survey (research needed).
- Collect discard data (ages, species ratio, lengths, fates) from gears targeting southern flounder (pound net, gigs, hook and line, trawls) (research on shrimp trawl bycatch underway, research for other gears needed).
- Develop and implement consistent strategies for collecting age and sex samples from commercial/recreational fisheries and independent surveys to achieve desired precision for stock assessment (underway).
- Collect age data from estuarine trawl survey and Pamlico Sound survey to more accurately estimate YOY abundance (instead of using length cutoffs based on length frequency plot interpretations) (underway).
- Tagging study to estimate emigration (unit stock) and mortality rates (underway).
- Expand, improve, or add inshore surveys of southern flounder to develop indices that we can be confident in for future stock assessments (still needed).
- Expand, improve or add fishery-independent surveys of the ocean component of the stock (still needed).
- Conduct studies to better understand ocean residency of southern flounder (still needed).
- Determine locations of spawning aggregations of southern flounder (tagging studies underway but more studies may be needed).
- Conduct sampling of the commercial/recreational ocean spear fishery harvest/discards (underway for commercial, still needed for recreational).
- Re-establish a RCGL survey to obtain harvest, discard, and effort information (still needed).
- Develop spatial model to account for inshore and ocean components of the stock (still needed).

FISHERY MANAGEMENT PLAN RECOMMENDATION

The NCMFC has requested a change to the FMP schedule to begin an amendment, which is currently under review by the secretary of the N.C. Department of Environment and Natural Resources.

LITERATURE CITED

Takade-Heumacher, H., and C. Batsavage. 2009. Stock status of North Carolina southern flounder (*Paralichthys lethostigma*). North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries, Morehead City, North Carolina.

NCDMF. 2015. Stock Assessment of Southern Flounder, *Paralichthys lethostigma*, in North Carolina Waters. North Carolina Department of Environment and Natural Resources. North Carolina Division of Marine Fisheries. SAP-SAR-2015-01. 297 p.

TABLES

Table 1. Summary of total length (mm) and age data for NCDMF commercial fishery sampling programs (includes harvest and some discard information)

Year	Mean length	Minimum length	Maximum length	Total measured	Modal age	Minimum age	Maximum age	Total aged
2005	402	46	793	28,972	2	0	7	83
2006	414	131	796	39,572	3	0	6	80
2007	413	90	745	23,768	2	0	5	94
2008	404	38	710	39,302	2	0	7	212
2009	405	92	719	33,403	2	1	6	34
2010	415	130	724	27,176	2	1	5	33
2011	409	123	770	32,000	3	1	6	90
2012	408	100	756	29,865	2	0	6	38
2013	399	16	804	33,776	1	1	5	245
2014	403	21	721	26,354	NA*	NA*	NA*	NA*

* Age data are not yet complete for 2014

Table 2. Summary of total length (mm) and age data for NCDMF recreational fishery sampling

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	433	334	672	202	3	1	6	112
2006	427	246	789	343	3	1	6	188
2007	437	355	610	220	2	1	8	137
2008	441	338	698	311	3	1	6	79
2009	431	304	661	306	2	1	4	45
2010	429	270	710	754	2	1	7	127
2011	447	347	651	478	2	1	6	102
2012	449	361	758	400	2	1	6	57
2013	440	338	695	390	3	1	5	49
2014	432	347	654	198	NA*	NA*	NA*	NA*

* Age data are not yet complete for 2014

Table 3. Summary of total length (mm) and age data for NCDMF fishery-independent sampling programs

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	198	7	644	3,769	2	0	4	516
2006	219	12	583	3,560	3	0	4	539
2007	190	12	570	3,812	1	0	5	513
2008	242	7	680	4,270	1	0	5	816
2009	251	24	689	3,230	1	0	5	414
2010	227	13	583	4,168	1	0	5	1,072
2011	294	26	736	2,604	1	0	6	720
2012	258	30	655	4,878	1	0	3	1,112
2013	229	20	684	3,534	1	0	6	678
2014	236	22	634	2,339	NA*	NA*	NA*	NA*

* Age data are not yet complete for 2014

Table 4. Annual relative abundance index values for southern flounder as catch per unit effort and standard error (SE) in NCDMF fishery-independent surveys (programs 120, 195, 135 and 915). Indices for programs 120 and 195 are considered juvenile (young of the year) abundance indices.

Year	P915 Index	P915 SE	P135 Index	P135 SE	P195 Index	P195 SE	P120 Index	P120 SE
1991			6.22	0.78	0.59	0.18	0.08	0.03
1992			7.45	1.20	5.69	1.64	0.18	0.07
1993			5.41	0.96	4.53	1.63	0.17	0.07
1994			1.34	0.22	5.50	2.07	0.15	0.06
1995			3.33	0.53	3.50	1.06	0.16	0.07
1996			0.98	0.21	2.82	0.73	0.59	0.23
1997			3.20	0.53	3.09	0.91	0.14	0.06
1998			1.75	0.44	0.13	0.05	0.05	0.02
1999			0.56	0.13	0.55	0.17	0.22	0.08
2000			2.46	0.62	0.30	0.07	0.28	0.11
2001			2.57	0.48	1.50	0.59	0.37	0.14
2002			2.81	0.50	2.62	0.99	0.36	0.14
2003	4.38	0.54	0.58	0.14	0.42	0.15	0.34	0.13
2004	4.82	0.51	2.54	0.47	0.31	0.13	0.28	0.11
2005	3.90	0.40	1.72	0.29	1.45	0.39	0.18	0.07
2006	3.01	0.48	1.79	0.50	0.48	0.16	0.18	0.07
2007	2.84	0.34	5.21	0.84	0.78	0.24	0.26	0.10
2008	6.42	0.83	2.19	0.46	1.66	0.68	0.15	0.06
2009	4.16	0.55	1.90	0.24	0.57	0.26	0.15	0.06
2010	6.45	0.83	1.64	0.44	0.35	0.20	0.27	0.10
2011	4.95	0.76	0.46	0.09	0.88	0.32	0.09	0.03
2012	4.49	0.47	2.52	0.58	5.38	2.60	0.23	0.09
2013	4.82	0.45	1.95	0.39	0.77	0.32	0.18	0.07
2014	3.25	0.36	1.39	0.60	0.50	0.27	0.17	0.07

Table 5. Management action taken as a result of Amendment 1 to the Southern Flounder FMP.

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	IMPLEMENTATION STATUS
Achieving Sustainable Harvest	Commercial: Accept management measures to reduce protected species interactions as the management strategy for achieving sustainable harvest in the commercial southern flounder fishery. Specific minimum measures for the flounder gill net fishery are provided in Issue Paper 10.1.1 (page 129). Recreational: Increase the minimum size limit to 15 inches and decrease the creel limit to 6 fish--20.2% harvest reduction	1, 2, 4	Commercial: No Action Required Recreational: Proclamation FF-29-2011 (refer to Supplement A to the 2005 FMP)
Ocean Harvest of Southern Flounder	Status quo and address research recommendations	1, 2,4,7	No Action Required
Large Mesh Gill Net Related Conflicts	Status quo (implement mediation and proclamation authority to address user conflicts with large mesh gill nets)	5,8	No Action Required
Minimum Distance Between Pound Nets and Gill Nets in Currituck Sound	Status quo (200-yard minimum distance between pound nets and gill nets)	5,8	No Action Required
Exploring the Elimination of the Recreational Commercial Gear License (RCGL)	Status quo and address research recommendations	5,8	No Action Required
Update on Southern Flounder Bycatch in the Commercial Crab Pot Fishery	Status quo and expand research on flatfish escape devices and degradable panels under commercial conditions to other parts of the state	3	No Action Required
Southern Flounder Discards in the Recreational Hook and Line Fishery	Status quo and expand research on factors impacting the release mortality of southern flounder and on deep hooking events of different hook types and sizes	3	No Action Required
Incidental Capture of Protected Species in Southern Flounder Large Mesh Gill Net	• Request funding for state observer program • Apply for Incidental Take Permit for large mesh gill	3	No Action Required

ISSUE	MANAGEMENT STRATEGY	OBJECTIVES	IMPLEMENTATION STATUS
and Pound Net Fisheries	net fishery • Continue gear development research to minimize protected species interactions		
Gear Requirements in the Flounder Pound Net Fishery	Status quo minimum mesh size for escape panels (5.5-inch stretched mesh) and recommend further research on 5.75-inch stretched mesh escape panels	3	No Action Required
Gear Requirements in the Flounder Gill Net Fishery	Status quo minimum mesh size (5.5 inches stretched mesh)	3	No Action Required

FIGURES

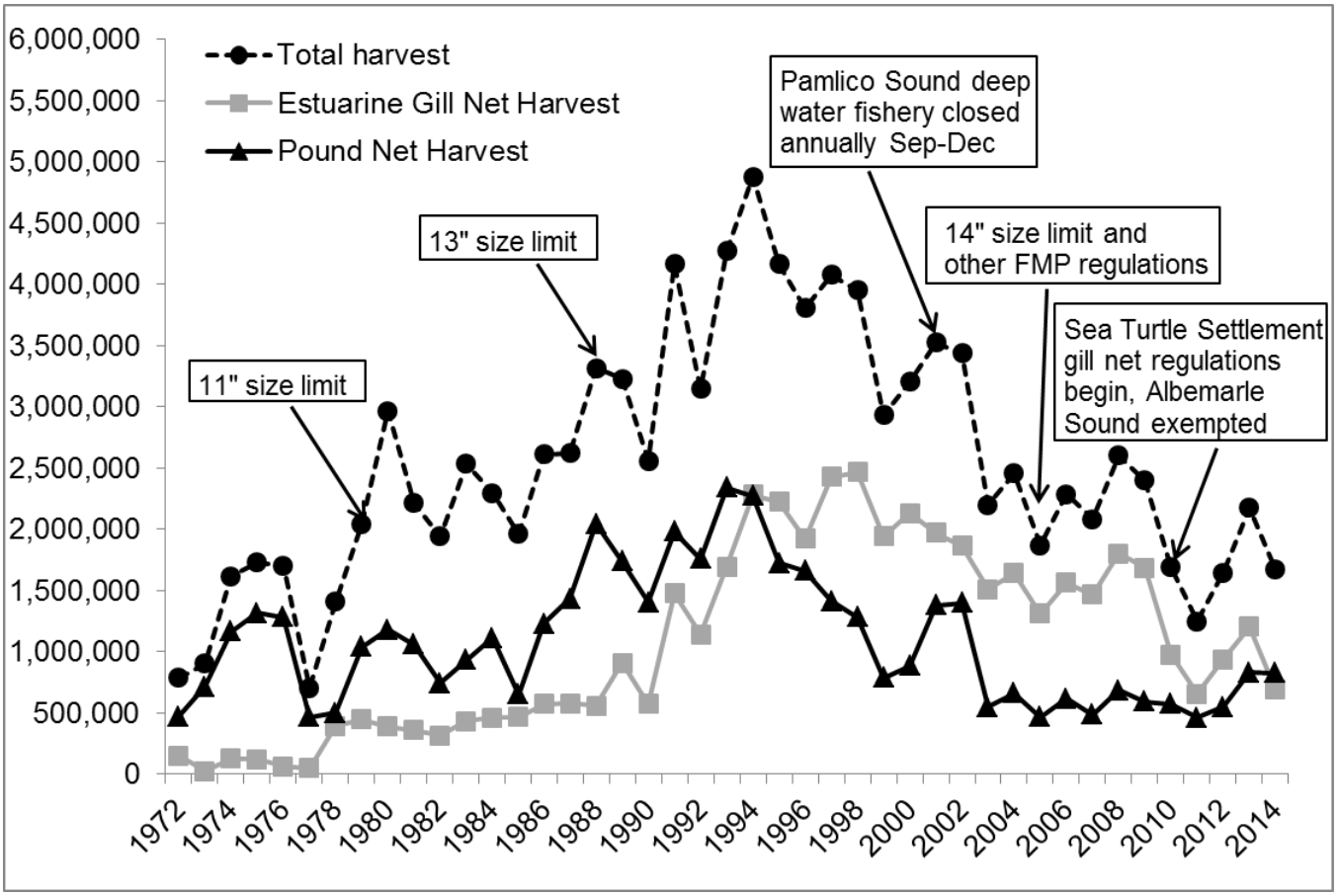


Figure 1. Landings (pounds) for total commercial fishery and top two gears (gill nets and pound nets) from N.C. Trip Ticket Program 1972-2014 with major fishery regulation changes.

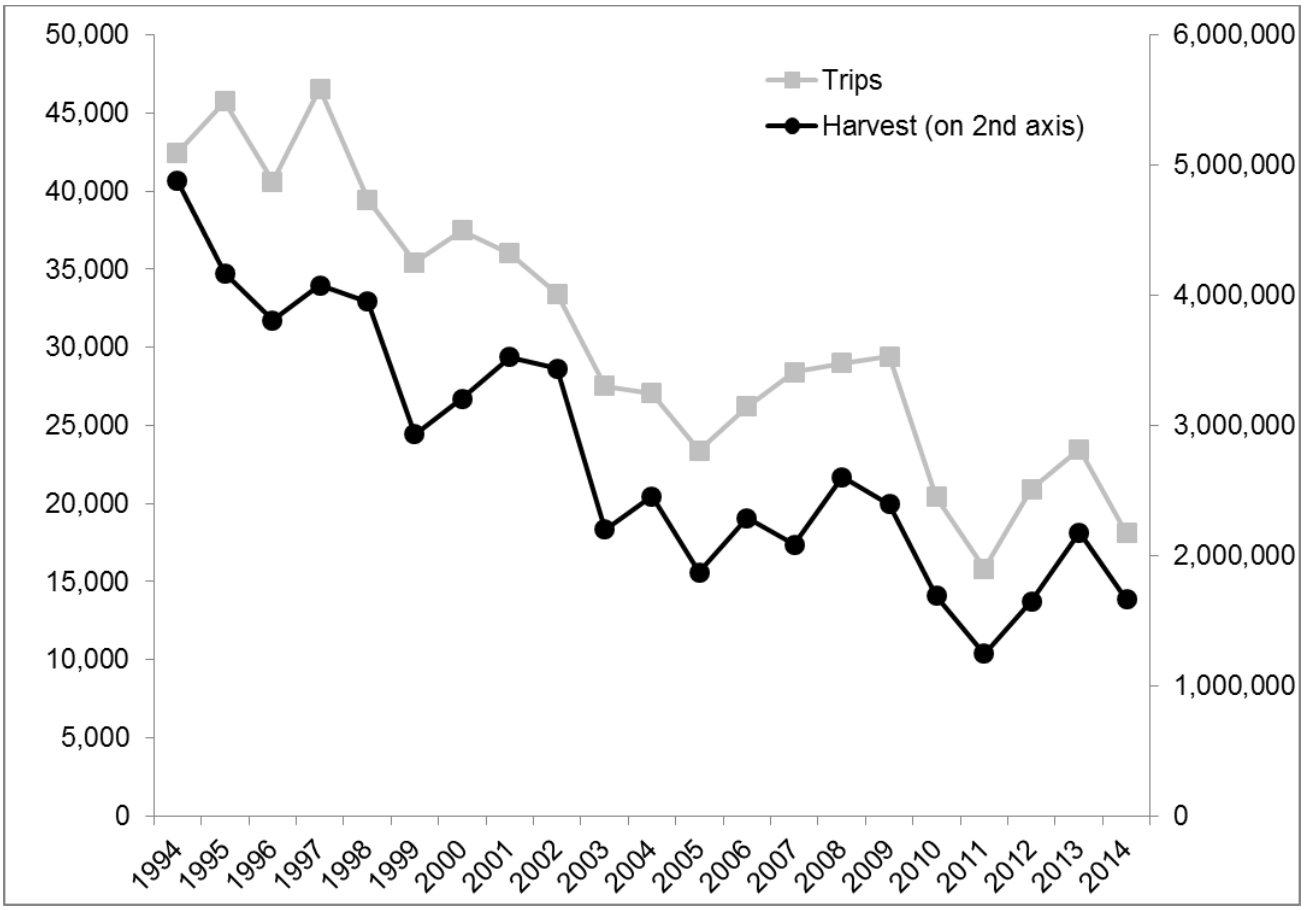


Figure 2. Commercial trips and harvest (pounds) from N.C. Trip Ticket Program, 1994-2014.

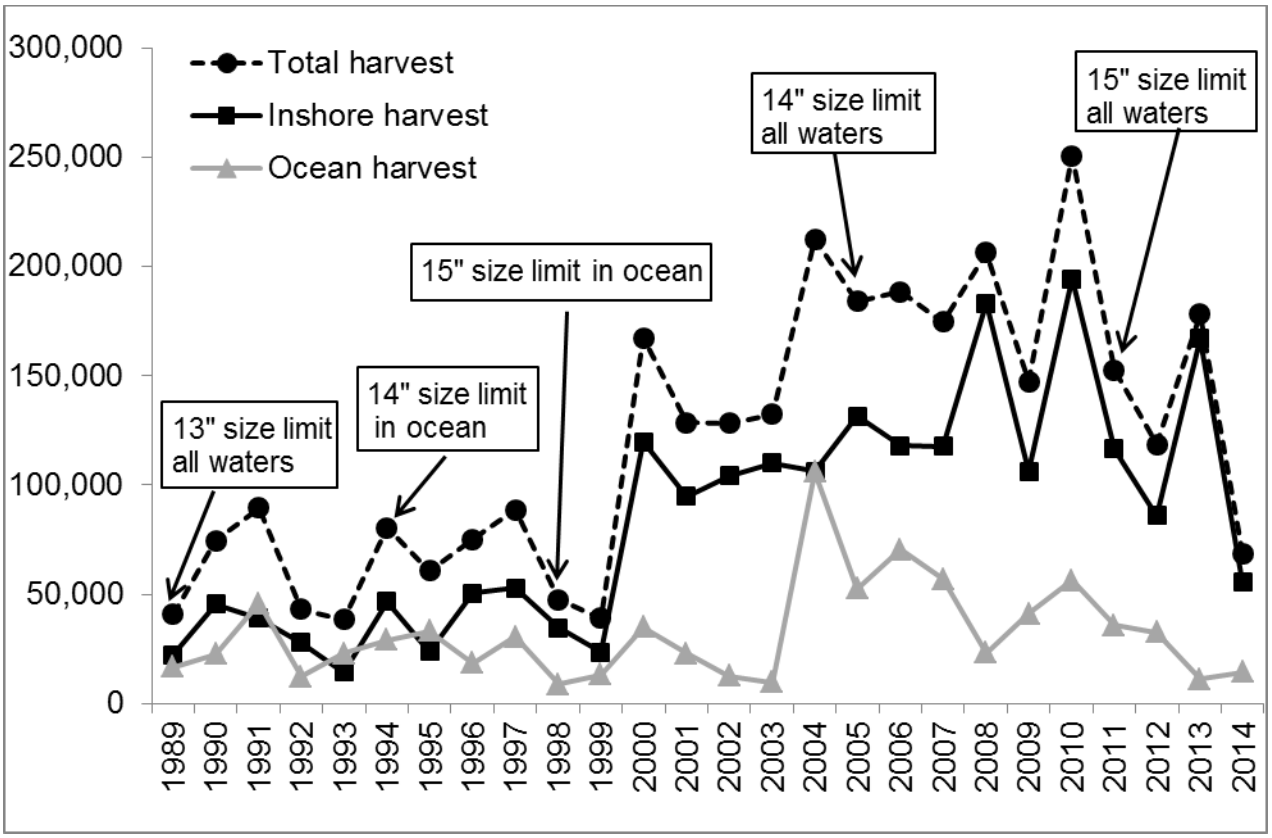


Figure 3. Recreational hook and line harvest in numbers of fish from MRIP data 1989-2014 and major fishery regulation changes.

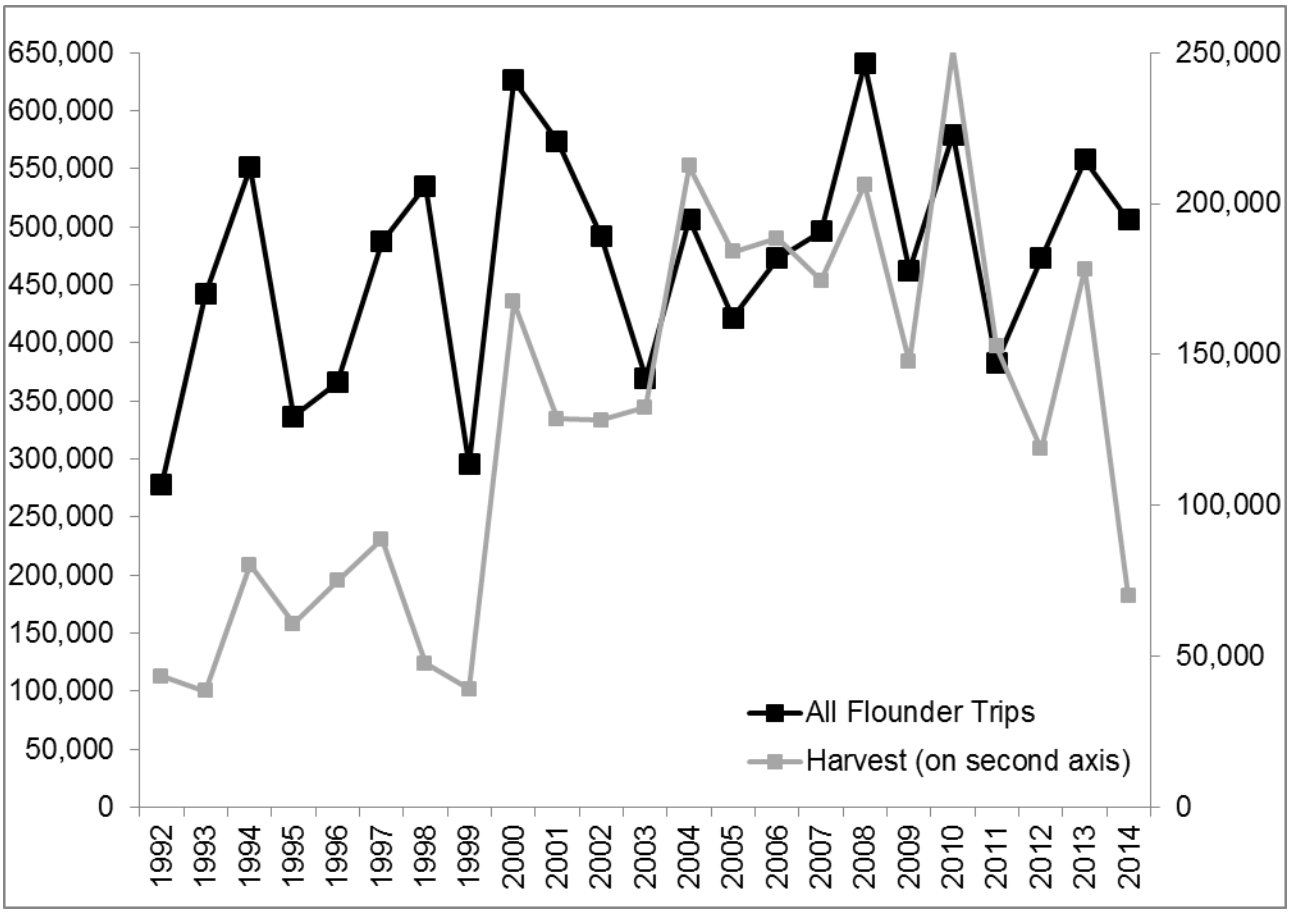


Figure 4. Recreational hook and line harvest (in numbers of fish) and all trips that harvested or released paralichthid flounder species, from MRIP data 1992-2014. Data from prior to 2004 were calibrated to align with MRIP estimates post-2004.

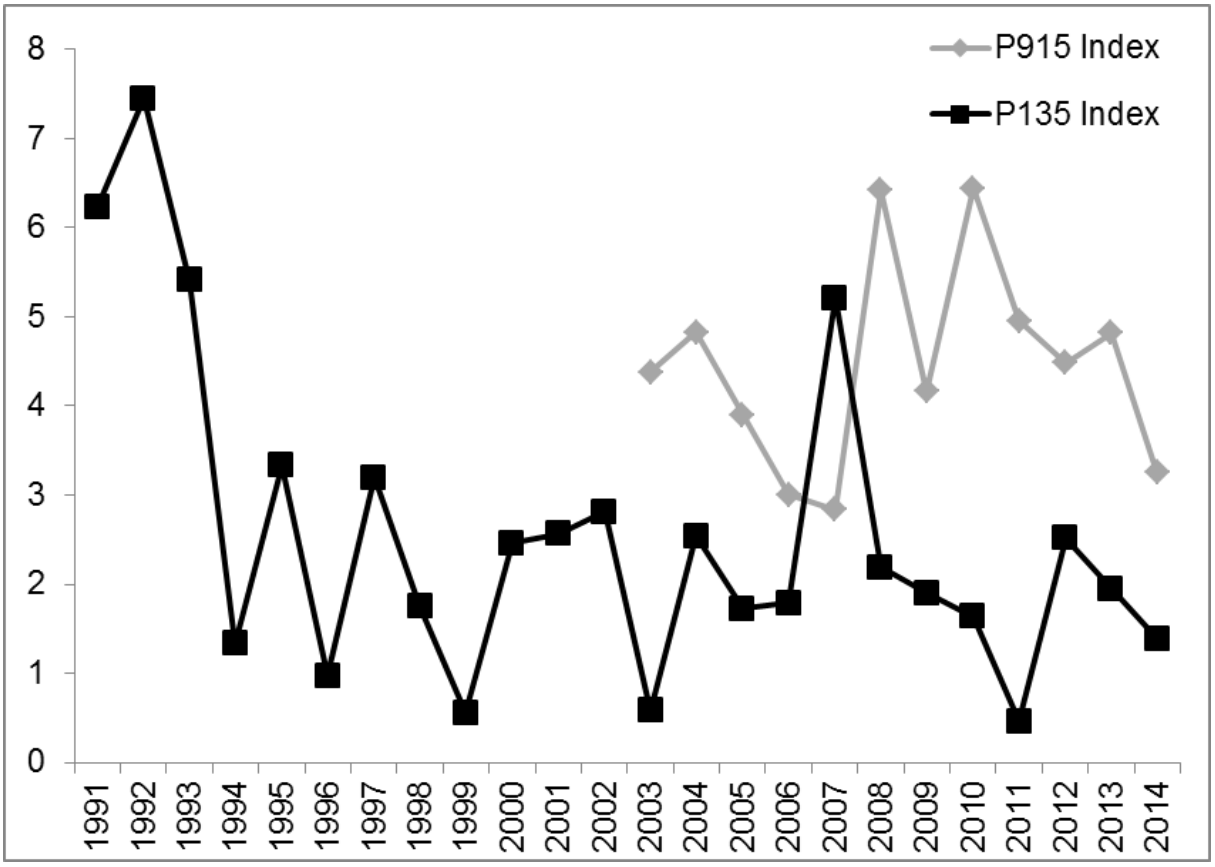


Figure 5. Annual relative abundance index values for southern flounder (juveniles and adults) caught in the Pamlico Sound Independent Gill Net Survey (P915) and Striped Bass Independent Gill Net Survey (P135). Survey catch per unit effort data was standardized using generalized linear models (including all significant variables).

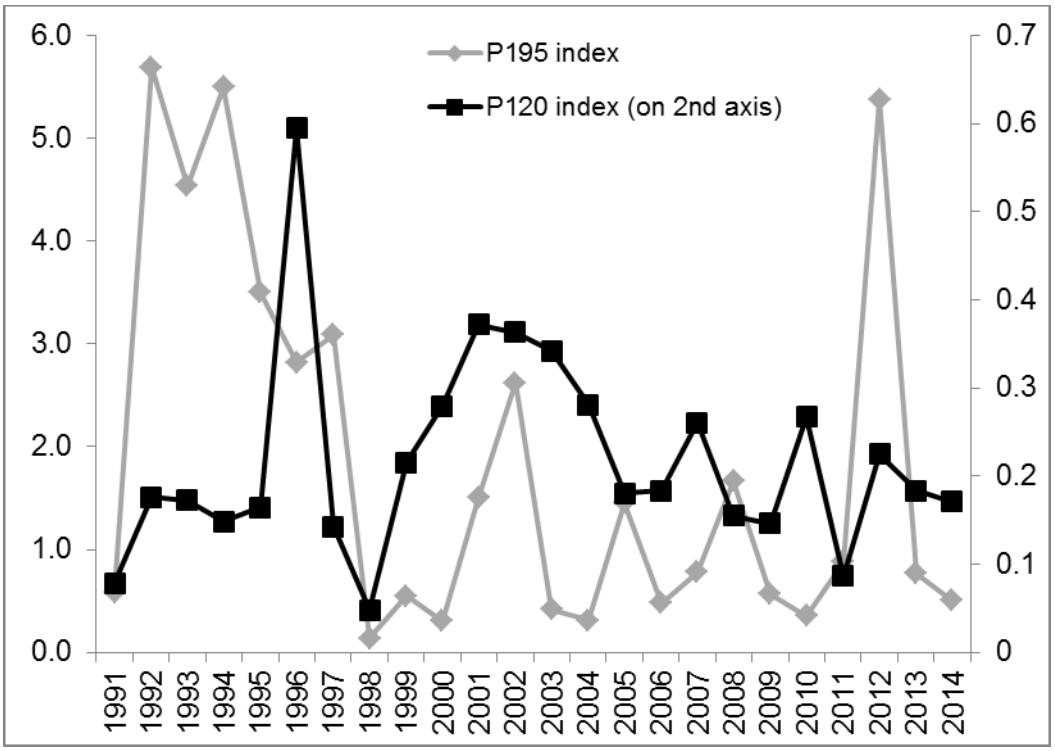


Figure 6. Annual relative abundance index values for southern flounder (juveniles and adults) caught in the Pamlico Sound Survey (P195) and the Estuarine Trawl Survey (P120). Survey catch per unit effort data was standardized using generalized linear models (including all significant variables).

FISHERY MANAGEMENT PLAN UPDATE
SPOTTED SEATROUT
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	NCDMF February 2012; ASMFC October 1984
Amendments:	ASMFC August 2011 – Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout ASMFC October 2011 – Omnibus Implementation Plan
Revisions:	N/A
Supplements:	Supplement A to the 2012 NCDMF FMP February 2014
Information Updates:	N/A
Schedule Changes:	N/A
Next Benchmark Review:	July 2017

Spotted seatrout are currently managed under the 2012 North Carolina Spotted Seatrout Fishery Management Plan (FMP) with guidance provided by the Atlantic States Marine Fisheries Commissions (ASMFC) Omnibus Amendment to the Interstate FMPs for Spanish Mackerel, Spot, and Spotted Seatrout. Supplement A was drafted as a proposal to consider maintaining short–term measures in the spotted seatrout fishery (40% reduction at 14-inch total length minimum size) to address several sources of uncertainty in the stock assessment through acquisition and assessment of additional data. This supplement examined sources of uncertainty in the assessment, the rationale for not implementing on schedule the North Carolina Spotted Seatrout FMP February 2014 management measures, and presented possible interim management measures. Three options were selected for presentation to the North Carolina Marine Fisheries Commission (NCMFC). At the February 2014 MFC meeting the commission voted to maintain short-term management measures in the spotted seatrout fishery (Proclamation FF-13-2012: 14-inch minimum size, 75-fish commercial trip limit with weekend closures in joint waters except in Albemarle and Currituck sounds; Proclamation FF-12-2012: 14-inch minimum size, four-fish recreational bag limit). These measures will remain effective until an amendment is completed.

As required in the approved 2012 FMP, a stock assessment was completed on schedule (2014/2015), peer reviewed, approved for management, and was presented to the NCMFC at its May 2015 business meeting. The North Carolina Division of Marine Fisheries (NCDMF) will present management options for guidance on moving forward with a review of the FMP or delaying the review until 2017. The NCMFC voted and approved changes to the FMP schedule reflecting the commissions desire to delay the review of the 2012 FMP until 2017.

Management Unit

The management unit for the North Carolina Spotted Seatrout FMP includes all spotted seatrout within the coastal and joint waters of North Carolina. The unit stock, or population unit, for North Carolina's assessment of spotted seatrout included all spotted seatrout from North Carolina and Virginia.

Goal and Objectives

The goal of the North Carolina Spotted Seatrout FMP is to determine the status of the stock and ensure long-term sustainability for the spotted seatrout (*Cynoscion nebulosus*) stock in North Carolina. To achieve this goal, it is recommended that the following objectives be met:

1. Develop an objective management program that provides conservation of the resource and sustainable harvest in the fishery.

2. Ensure the spawning stock is of sufficient capacity to prevent recruitment-overfishing.

3. Address socio-economic concerns of all user groups.

4. Restore, improve, and protect important habitats that affect growth, survival, and reproduction of the North Carolina spotted seatrout stock.

5. Evaluate, enhance, and initiate studies to increase understanding of spotted seatrout biology and population dynamics in North Carolina.

6. Promote public awareness regarding the status and management of the North Carolina spotted seatrout stock.

STATUS OF THE STOCK

Stock Status

The 2014 North Carolina spotted seatrout stock assessment indicated that the spotted seatrout stock in North Carolina and Virginia is not overfished and overfishing in not occurring. Based on the results for this current assessment the NCDMF has updated the status of spotted seatrout to viable.

Stock Assessment

The 2014 assessment of the spotted seatrout in North Carolina and Virginia was conducted using a Stock Synthesis model that incorporated data (1991–2013) collected from commercial and recreational fisheries, two fishery-independent surveys, and a tagging study. This approach differs from the previous NCDMF assessment of spotted seatrout, which was applied to data available from 1991 through 2008. The previous assessment utilized the ASAP2 statistical catch-at-age model and used data more limited in both area and time. The previous model relied primarily upon fishery-dependent data, one fishery-independent index, and also included age data from the North Carolina portion of the stock only.

The time period for the new assessment is 1991 through 2012. The Stock Synthesis model has been thoroughly vetted through the stock assessment community and peer reviewed literature. This assessment relied on expanded fishery-independent data sources, included age data from the Virginia portion of the stock, a juvenile abundance index, and tag-return data from research conducted by Tim Ellis with North Carolina State University. The fishing year was changed from a calendar year to a biological year (defined as March 1 through February 28) to allow the model to incorporate cold stun mortalities within a single fishing year instead of across two calendar years. The maximum age was decreased from 12 years (previous assessment) to nine as the 12 year maximum was based on scale ages not otoliths. Only ages derived from otoliths were used in the current assessment.

Tagging data provided by Tim Ellis were included in the model but did not have a significant influence on results. Multiple model configurations were attempted to account for varying natural mortality based on everything from direct tagging estimates to estimates based on water temperature correlations: however, no model configuration incorporating varying natural mortality would produce results (converge). Tim Ellis' data did provide further evidence of the highs and lows associated with spotted seatrout natural mortalities and the need for a custom model that can incorporate these highly variable mortality rates. The NCDMF recognized the need to develop a model that will accept variable natural mortality estimates. Developing a custom model that can incorporate variable natural mortality was added as a research recommendation and the NCDMF will continue to investigate this during the next assessment.

The results of this assessment suggest the age structure of the spotted seatrout stock has been expanding during the last decade. However, an abrupt decline is evident in the model's estimate of recruitment after 2010, although this is not mirrored in the empirical survey data. Spawning stock biomass increased to its maximum in 2007 but has since declined to close to the time series average. In 2012, the estimate of spawning stock biomass was 2,513,270 pounds, which is greater than the currently defined threshold for spawning stock biomass (868,621 pounds); and suggests the stock is not currently overfished (Figure 1). Fishing mortality has varied without apparent trend, but periods of high fishing mortality seem to coincide with the decline in spawning stock biomass and may be attributed to cold stun events. The 2012 estimate of fishing mortality was 0.40, which is less than the fishing mortality threshold (0.66), indicating that the stock is not experiencing overfishing; however, the 2012 estimate of fishing mortality (0.40) is very near the target fishing mortality of 0.42 (Figure 2).

STATUS OF THE FISHERY

Current Regulations

The NCDMF currently allows the recreational harvest of spotted seatrout seven days per week with a minimum size limit of 14 inches total length and a daily bag limit of four fish. The commercial harvest is limited to a daily limit of 75 fish with a minimum size limit of 14 inches total length. It is unlawful for a commercial fishing operation to possess or sell spotted seatrout for commercial purposes taken from Joint Fishing Waters of the state from midnight on Friday to midnight on Sunday each week; the Albemarle and Currituck sounds are exempt from this weekend closure. There was a February 5 through June 15, 2014 closure due to a cold stun event.

Commercial Landings

Total commercial landings for Virginia and North Carolina combined have ranged from 98,988 to 760,595 pounds between 1991 and 2012 (Table 1; Figure 3). During the early to mid-1990s, landings in the ocean and estuarine areas were more similar than in the remainder of the time series in which estuarine landings have dominated.

Recreational Landings

Recreational data are collected through the Marine Recreational Information Program (MRIP). Recreational harvest (Type A + B1) ranged from 245,815 to 1,307,341 pounds between 1991 and 2012 (Table 2; Figure 4). In terms of numbers, recreational landings (Type A + B1) has ranged from 208,110 to 727,714 fish during the same time period (Table 2; Figure 4). Estimates of live releases (Type B2) usually exceeded landings (Type A + B1), especially in recent years. Like live releases (Type B2), estimates of dead discards (dead B2) have shown a general increase from 1991 through 2012 (Table 2; Figure 4).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fishing activity is monitored through fishery dependent sampling conducted by the NCDMF since 1982. Data collected in this program allow the size and age distribution of spotted seatrout to be characterized by gear/fishery. Mean, minimum, and maximum lengths have not varied much between years or across the entire time series for either commercial or recreational data. Data are represented in Tables 3 and 4 and Figure 5.

Fishery-Independent Monitoring

The best-fitting Generalized Linear Model (GLM) for the Program 120 index of age-0 abundance for spotted seatrout included year, sampling location, bottom temperature, and bottom salinity as significant covariates. The resulting index varied without trend over the time series (Table 5; Figure 6). Peaks in age-0 relative abundance were observed in 2008 and 2012, suggesting relatively higher recruitment in those years.

A fishery independent gill net survey was initiated by the NCDMF in May of 2001. The survey utilizes a stratified random sampling scheme designed to characterize the size and age distribution for key estuarine species in Pamlico Sound. By continuing a long-term database of age composition and developing an index of abundance for spotted seatrout this survey will help managers assess the spotted seatrout stocks without relying solely on commercial and recreational fishery dependent data. The best-fitting GLM for the spring index included year, depth, bottom temperature, and bottom DO as significant covariates. The final model for the summer index included year, depth, bottom temperature, and bottom salinity. The best model for the fall index included year, depth, and bottom salinity. The GLM analysis indicated that year was the only significant covariate for the southern index so this index was instead calculated using the traditional estimator for a random stratified average.

All four Program 915 indices varied without trend over the respective time series (Table 5; Figures 7-10). A peak was observed in 2009 in the spring (Figure 7), summer (Figure 8), and southern (Figure 10) indices. This corresponds with the peak observed in 2008 in the Program

120 age-0 index (Figure 6). The fall index exhibited a peak in 2006 (Figure 9). All the Program 915 indices suggest an increase in 2012 to varying degrees.

MANAGEMENT STRATEGY

Reduce F to maintain a 20% SPR which will increase the likelihood of sustainability through an expanded age structure and an increase in the spawning stock biomass. This strategy should provide a greater cushion for the population that would likely lead to faster recovery of the population after cold stun events. Consider revising reference points after the stock is reassessed in the next plan review based on the response of the population to the management measures selected in the initial FMP. The Director will maintain authority to intervene in the event of a catastrophic cold stun event and do what is necessary in terms of temporary closures by water body (Table 8).

MANAGEMENT AND RESEARCH NEEDS

The following research needs were compiled from those listed in the issue papers in Section 10, as well as those outlined in Section 11.1 Data Needs, and in Appendix 4 of the 2012 North Carolina Spotted Seatrout FMP. Improved management of spotted seatrout is dependent upon research needs being met. Research needs are not listed in order of priority**.**

- Develop a juvenile abundance index to gain a better understanding of a stock recruitment relationship – ongoing, using program 120 since 2004
- Research the feasibility of including measures of temperature or salinity into the stock-recruitment relationship could be researched - not completed
- Determine batch fecundity estimates for North Carolina – not completed
- Size specific fecundity estimates for North Carolina spotted seatrout – not completed
- Area specific spawning surveys could help in the delineation of area specific closures to protect females in spawning condition – not completed
- Investigation of the relationship of temperature with both adult and juvenile mortality – not completed
- Incorporate cold stun event information into the modeling of the population – attempted using stock synthesis model, unsuccessful.
- Estimate or develop a model to predict the impact of cold stun events on local and statewide spotted seatrout abundance – attempted using stock synthesis model, unsuccessful.
- Obtain samples (length, age, weight, quantification) of the cold stun events as they occur – obtained samples in 2001, 2014, and 2015 (length, weight, sex, age)(did not quantify extent of kills)
- Define overwintering habitat requirements of spotted seatrout – not conducted
- Determine factors that are most likely to influence the severity of cold stun events in North Carolina, and separate into low and high salinity areas – Tim Ellis and the spotted seatrout Plan Development Team worked on this but were unable to incorporate into models.
- Investigate the distribution of spotted seatrout in nursery and non-nursery areas – not completed
- Further research on the possible influences of salinity on release mortality of spotted seatrout – not completed
- Survey of fishing effort in creeks with conflict complaints – not completed
- Determine targeted species in nursery areas and creeks with conflict complaints – not completed

- Microchemistry, genetic, or tagging studies are needed to verify migration patterns, mixing rates, or origins of spotted seatrout between North Carolina and Virginia – Tim Ellis data (2008-2013), NCDMF CRFL study 2014 - present
- Tagging studies to verify estimates of natural and fishing mortality – Ellis data and ongoing
- Tagging studies to determine if there are localized populations within the state of North Carolina (e.g., a southern and northern stock) – Ellis data and ongoing
- A longer time series and additional sources of fishery-independent information – longer series available as well as 915 survey for rivers and southern portion of state
- Increased observer coverage in a variety of commercial fisheries over a wider area - ongoing
- Expand nursery sampling to include SAV bed sampling in high and low salinity areas during the months of July through September – not completed
- Evaluate the role of shell hash and shell bottom in spotted seatrout recruitment and survival, particularly where SAV is absent – not completed
- Evaluate the role of SAV in the spawning success of spotted seatrout – not completed

FISHERY MANAGEMENT PLAN RECOMMENDATIONS

Based on the 2014 stock assessment the NCDMF recommended to the NCMFC at their May 2015 business meeting to delay review of the 2012 spotted seatrout FMP until 2017 but keeping the review within the 5 year mandatory review cycle.

NCDMF – Delay the review of the 2012 spotted seatrout FMP until 2017.

NCMFC – Voted to approve changes to the FMP schedule reflecting the commission's approval to delay review of the 2012 FMP until 2017.

LITERATURE CITED

NCDMF. 2012. North Carolina spotted seatrout fishery management plan. NCDMF, Morehead City, North Carolina. 344 p.

NCDMF. 2014. Stock Assessment of Spotted Seatrout, *Cynosion nebulosus*, in Virginia and North Carolina Waters. NCDMF, Morehead City, North Carolina. 142 p.

TABLES

Table 1. Commercial landings of spotted seatrout harvested in North Carolina from 1989 through 2014.

Year	Species	Pounds
1989	Spotted Seatrout	451,909
1990	Spotted Seatrout	250,634
1991	Spotted Seatrout	660,662
1992	Spotted Seatrout	526,271
1993	Spotted Seatrout	449,886
1994	Spotted Seatrout	412,358
1995	Spotted Seatrout	574,296
1996	Spotted Seatrout	226,580
1997	Spotted Seatrout	232,497
1998	Spotted Seatrout	307,671
1999	Spotted Seatrout	546,675
2000	Spotted Seatrout	376,574
2001	Spotted Seatrout	105,714
2002	Spotted Seatrout	175,555
2003	Spotted Seatrout	181,462
2004	Spotted Seatrout	130,961
2005	Spotted Seatrout	129,601
2006	Spotted Seatrout	312,620
2007	Spotted Seatrout	374,722
2008	Spotted Seatrout	304,430
2009	Spotted Seatrout	320,247
2010	Spotted Seatrout	200,822
2011	Spotted Seatrout	75,239
2012	Spotted Seatrout	265,016
2013	Spotted Seatrout	367,401
2014	Spotted Seatrout	241,995

Table 2. Annual recreational landings and releases of spotted seatrout in North Carolina and Virginia, 1991–2012.

Biological Year	Landings (A+B1)		Released Alive (B2)	Dead Discards
	Number	Pounds	Number	Number
1991	408,751	612,003	260,832	26,083
1992	387,354	579,154	165,892	16,589
1993	328,397	535,723	228,239	22,824
1994	608,350	883,392	476,756	47,676
1995	442,642	650,805	567,457	56,746
1996	209,698	285,940	379,473	37,947
1997	370,916	608,476	355,763	35,577
1998	350,062	518,748	232,977	23,298
1999	582,633	1,022,945	554,627	55,462
2000	361,517	608,476	523,341	52,334
2001	208,110	245,815	515,052	51,505
2002	227,472	309,970	592,990	59,299
2003	221,098	390,218	349,880	34,988
2004	357,012	526,905	694,776	69,478
2005	651,745	776,909	1,560,866	156,086
2006	585,136	901,470	1,016,368	101,637
2007	706,556	1,307,341	1,776,286	177,629
2008	727,714	1,177,269	1,913,335	191,333
2009	624,731	986,128	1,580,954	158,096
2010	210,692	433,649	2,342,308	234,231
2011	476,920	987,671	3,210,337	321,034
2012	629,219	1,038,377	2,037,673	203,767

Table 3. Mean, minimum, and maximum lengths of spotted seatrout collected from the commercial fishery in North Carolina from 1991 through 2013.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
1991	383	195	730	1,220
1992	422	46	734	2,072
1993	404	144	754	2,192
1994	392	179	738	1,380
1995	432	192	739	2,504
1996	408	179	701	751
1997	395	207	760	2,920
1998	390	212	756	3,098
1999	422	255	768	4,057
2000	448	152	779	2,327
2001	417	272	781	1,363
2002	415	220	735	3,180
2003	435	241	752	1,168
2004	422	242	709	2,193
2005	433	253	698	1,977
2006	418	225	745	4,905
2007	442	57	788	6,577
2008	436	43	770	4,741
2009	425	71	706	5,238
2010	448	300	784	3,208
2011	422	229	706	970
2012	422	222	685	3,805
2013	425	46	723	4,193

Table 4. Numbers of spotted seatrout sampled and measured by MRIP by state, 1991–2012.

Biological Year	North Carolina		Virginia	
	Number Sampled	Number Measured	Number Sampled	Number Measured
1991	1,318	742	53	46
1992	930	543	62	57
1993	672	485	93	69
1994	1,569	1,076	311	195
1995	1,308	853	190	152
1996	642	307	93	72
1997	880	622	164	109
1998	923	551	52	46
1999	934	699	121	97
2000	535	330	87	75
2001	478	326	19	18
2002	414	283	29	23
2003	211	130	117	80
2004	582	294	77	71
2005	1,143	712	21	17
2006	1,417	658	47	30
2007	1,328	529	168	103
2008	1,099	792	152	108
2009	1,045	772	56	45
2010	441	333	42	32
2011	770	652	86	67
2012	1,473	988	164	85

Table 5. GLM-standardized indices of abundance used as input into the 2014 North Carolina spotted seatrout stock assessment model.

Year	Program 120 (age-0) June–July	Program 915 May–June	Program 915 July–August	Program 915 September–November	Program 915 (southern) May–June
2003		0.0368	0.0163	0.0459	
2004	0.188	0.0169	0.0242	0.0361	
2005	0.539	0.0125	0.0188	0.0342	
2006	1.57	0.0482	0.0295	0.0979	
2007	1.26	0.0535	0.0273	0.0432	
2008	3.55	0.0471	0.0307	0.0558	0.442
2009	1.31	0.0818	0.0395	0.0590	1.18
2010	0.435	0.0370	0.0271	0.0484	0.984
2011	0.875	0.0151	0.0270	0.0387	0.162
2012	3.05	0.0644	0.0291	0.0761	0.560

Table 6. Number of females per sample year and age by season from 1990-2013.

Summer											Winter									
Sample Year	0	1	2	3	4	5	6	7	9	Total	Sample Year	0	1	2	3	4	5	6	7	Total
1990											1990	5	11	1		1				18
1991	2	134	36	7	1	1				181	1991	29	207	47	4	1	1			289
1992		89	62	17		1	1			170	1992	4	131	19	17	4				175
1993	1	135	52	24	10		1			223	1993	13	97	10	12	4	3			139
1994	1	82	54	17	9	1		1	1	166	1994	8	241	12	10	4				275
1995	3	106	44	15	6	4				178	1995	49	127	47	15	7				245
1996	7	81	72	21	5	3				189	1996	40	83	55	43	5	3	1		230
1997	1	82	32	39	12	7	2			175	1997	2	139	49	26	7				223
1998	1	56	74	33	30	1				195	1998	23	120	54	7	1	2			207
1999		116	85	70	11	4	3			289	1999	26	121	54	56	8	1	2		268
2000		49	65	7	10			1		132	2000	7	89	44	17	9				166
2001	1	40	30	8	4					83	2001	24	95	43	7		3			172
2002		79	43	75	33	2				232	2002	53	126	43	34	3	4	1		264
2003		42	20	2	2	2	1			69	2003	10	97	36	2	1				146
2004		51	43	9	5		2			110	2004	33	226	41	5	1				306
2005		138	46	24	21	3				232	2005	56	183	24	8	11	1			283
2006		171	53	21	8	6				259	2006	14	330	85	21	4				454
2007		19	98	36	4		1	1		159	2007	13	105	75	19	4	1		1	218
2008		62	63	36	9	1	1			172	2008	4	163	89	36	3				295
2009		28	92	31	8	2	2			163	2009	54	139	63	35	22	2			315
2010		23	38	12	4	1				78	2010	130	81	40	16	7	4			278
2011		33	8	3						44	2011	20	144	5	1					170
2012		93	47	2	2					144	2012	4	224	16	1		1			246
2013		19	141	19	2					181	2013	4	107	71	4					186
Total	17	1,728	1,298	528	196	39	14	3	1	3,824	Total	626	3,419	1,024	396	108	26	4	1	5,604

Table 7. Number of males per sample year and age by season from 1990-2013.

Summer												Winter									
Sample Year	0	1	2	3	4	5	6	7	8	9	Total	Sample Year	0	1	2	3	4	5	6	7	Total
1990												1990	8	10		1					19
1991	3	95	52	3				1			154	1991	13	63	18	3	3	2			102
1992		45	67	5							117	1992	3	50	19	5		1			78
1993		63	36	12	5		1				117	1993	5	77	18	3					103
1994	3	76	20	15	6						120	1994	6	107	8	1	2				124
1995	3	114	23	7	4	2					153	1995	28	55	22	7	5				117
1996	8	97	35	7	1						148	1996	36	75	37	9	2	3	1		163
1997	5	148	15	12	7						187	1997	6	116	23	4	1			1	151
1998		107	63	7	3	2	1			1	184	1998	8	85	18	2	3	1			117
1999		110	68	19	3						200	1999	13	97	28	18	3	2	2		163
2000		37	55	6	6	1					105	2000	2	35	23	6	3				69
2001		45	18	8	1						72	2001	17	62	15	15		1			110
2002		109	26	7	6	2	1	1			152	2002	23	57	6	7	5	2			100
2003		17	10	5	1			1			34	2003	8	75	18	1	2	1	1		106
2004		23	19	11							53	2004	18	108	14	6	1	2			149
2005		44	33	8	4						89	2005	19	103	16	3	6				147
2006		25	47	2	2	2			1		79	2006	9	158	15	8	5	7		1	203
2007		5	82	6	3		2				98	2007	13	69	35				1		118
2008		22	44	21	2			1			90	2008	5	54	23	15	2				99
2009		10	50	16	12						88	2009	31	93	31	9	11	2			177
2010		8	28	7	4	2					49	2010	73	60	23	10	5	1			172
2011		4	2	1							7	2011	6	68	1						75
2012		27	36		4	1					68	2012	3	84	9						96
2013	1	9	91	7	2						110	2013	2	44	49	3					98
Total	23	1,240	920	192	76	12	5	4	1	1	2,474	Total	229	1,488	781	235	81	35	20	2	2,871

Table 8. Management actions taken as a result of development of the N.C. Spotted Seatrout FMP.

ISSUE	MFC SELECTED MANAGEMENT STRATEGY	OBJECTIVES ADDRESSED	REGULATORY ACTION
Achieving Sustainable Harvest	• *½ reduction needed, 6 fish bag, 14-inch minimum size, and weekend closure for commercial gears year-round (no possession on weekends).* • *A maximum of 2 fish over 24 inches for recreational fishermen* • *The small mesh gill net attendance requirement is extended to include weekends, December through February* ***Management Strategy Modified in November 2011*** *Immediately: 14-inch minimum size limit, 4 recreational bag limit, 75 fish commercial trip limit, no gillnets in joint waters on weekends.* *2014: 14-inch minimum size limit, 3 fish recreational bag limit with a December 15- January 31 closure, 25 fish commercial trip limit (no closure)* *If Cold Stun Occurs: close spotted seatrout harvest through June 1and retain 4 fish recreational bag limit and 75 fish commercial trip limit*	1,2	Repeal Rule 3M.0504 and utilize proclamation authority in 3M.0512
	• *Revisit the Spotted Seatrout FMP in 3 years to determine if sustainable harvest measures are working*	1,2	
Enforcement of Size, Creel Limit and Gear Regulations in Joint, Coastal or Inland Fishing Waters	• *Development of a mutual aid agreement between DMF Marine Patrol and WRC Wildlife Enforcement Officers for Inland fishing waters*	1,2,3	
Management Measures to Address User Group Competition	• Move forward with the mediation policy process to resolve conflict between spotted seatrout fishermen	1,2,3	

Impacts of Cold Stun Events on the Population	• Remain status quo with the assumption that the Director will intervene in the event of a catastrophic event and do what is necessary in terms of temporary closures by water body	1,2,3	Repeal Rule 3M.0504 and utilize proclamation authority in 3M.0512
	• *More extensive research on cold stun events by DMF, Universities, etc.*	1,2,3,5	
Use of Gigs to Harvest Spotted Seatrout December-March	• Status quo. DMF to continue to track contributions of gigs to overall landings.	1,2,3	

FIGURES

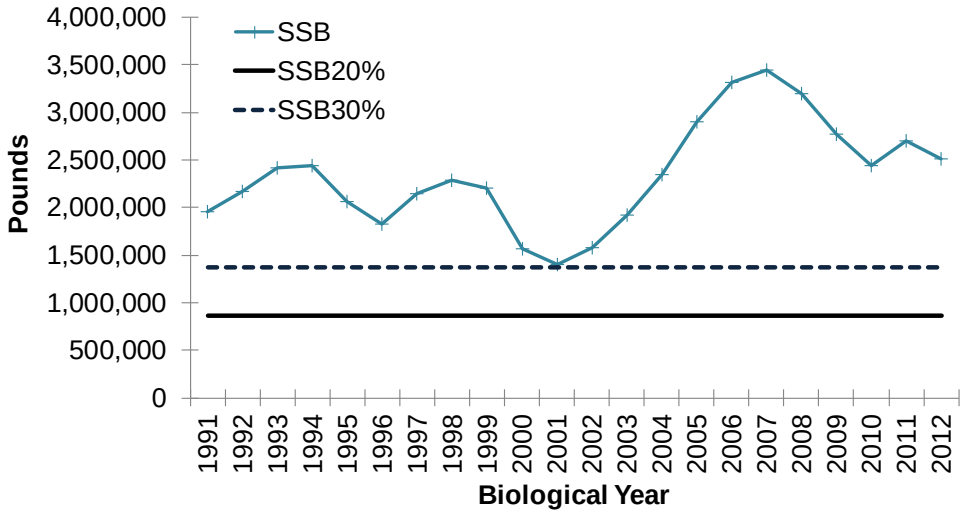


Figure 1. Annual predicted spawning stock biomass compared to estimated $SSB_{Threshold}$ ($SSB_{20\%}$) and SSB_{Target} ($SSB_{30\%}$).

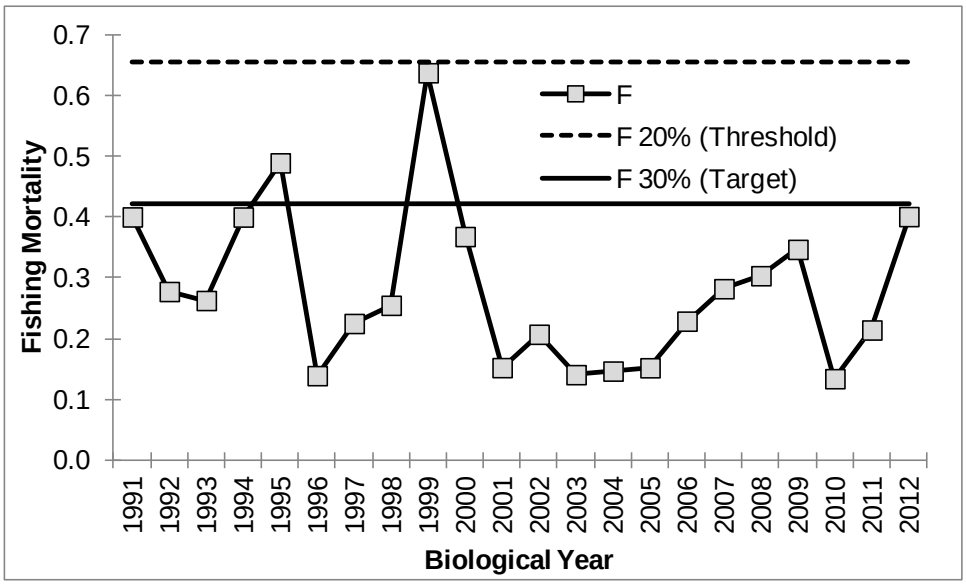


Figure 2. Annual predicted fishing mortality rates (numbers-weighted, ages 1–4) compared to estimated $F_{Threshold}$ ($F_{20\%}$) and F_{Target} ($F_{30\%}$).

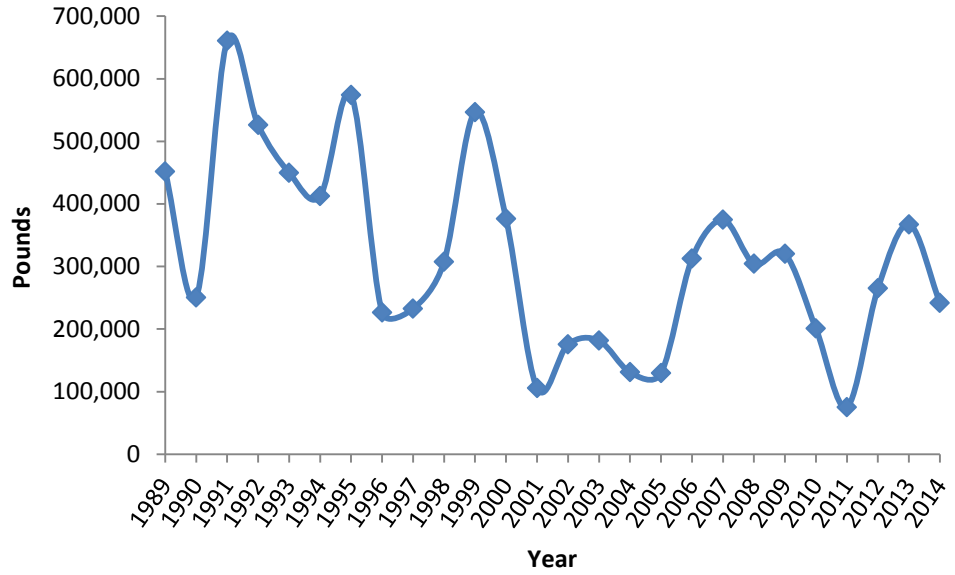


Figure 3. Commercial landings of spotted seatrout harvested in North Carolina from 1989 through 2014.

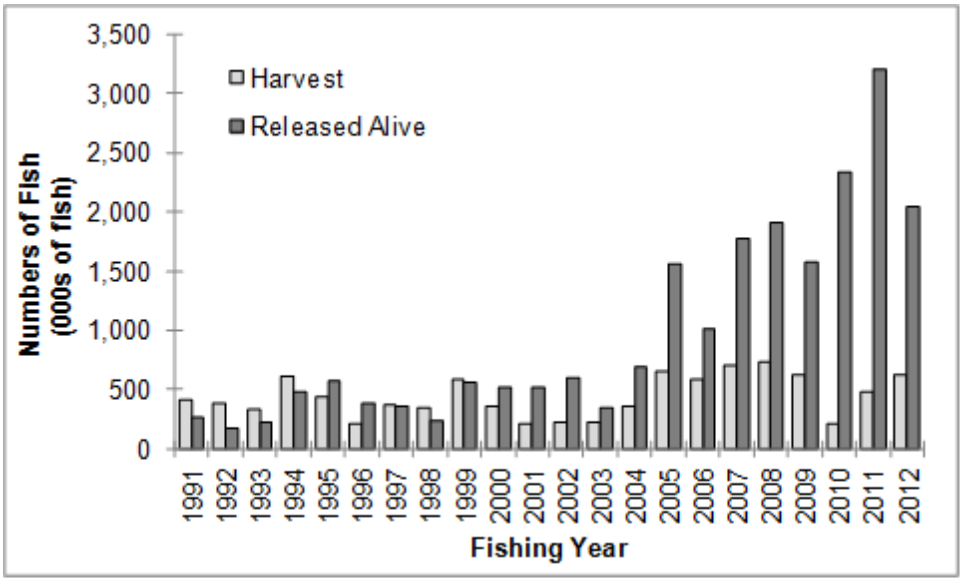


Figure 4. Annual recreational fishery landings (Type A+B1) and live releases (Type B2) of spotted seatrout in Virginia and North Carolina, 1991–2012.

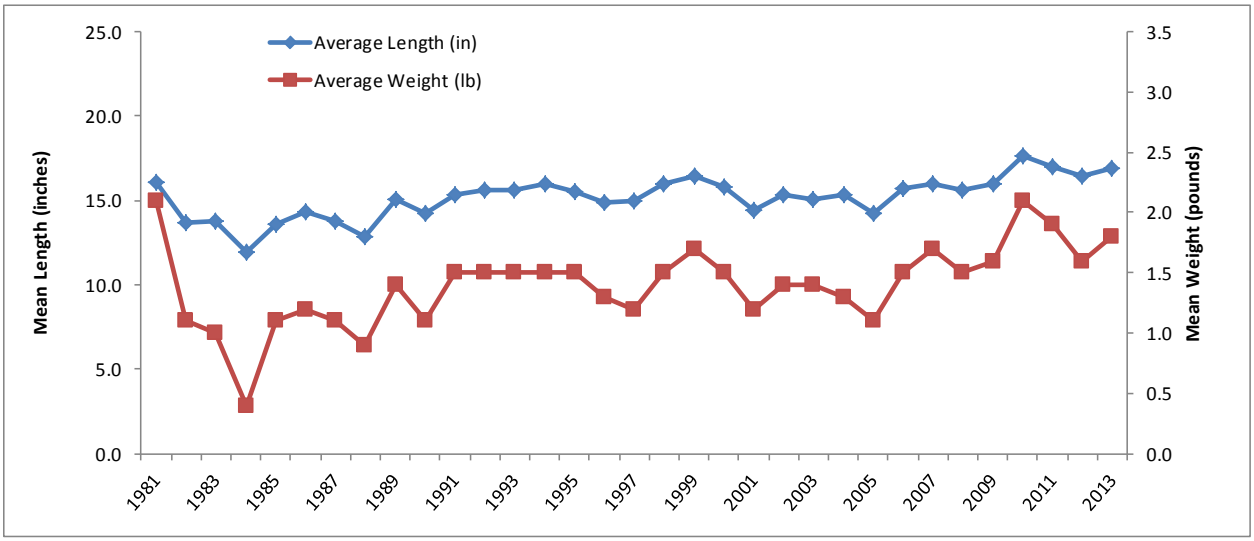


Figure 5. Average length and weight of spotted seatrout measured through the MRIP in North Carolina from 1981 through 2013.

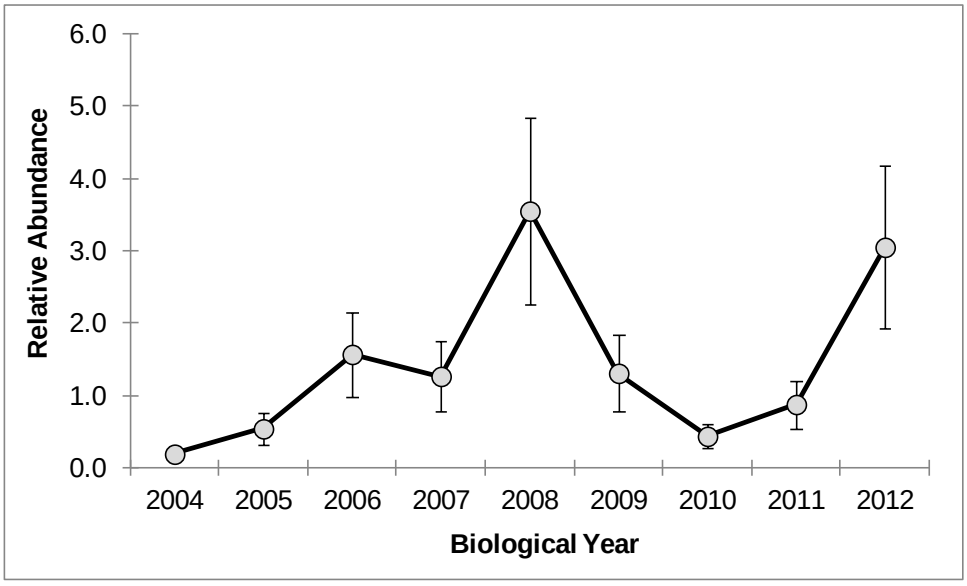


Figure 6. GLM-standardized index of relative abundance for age-0 spotted seatrout collected from Program 120 during June and July, 2004–2012. Error bars represent ± 1 standard error.

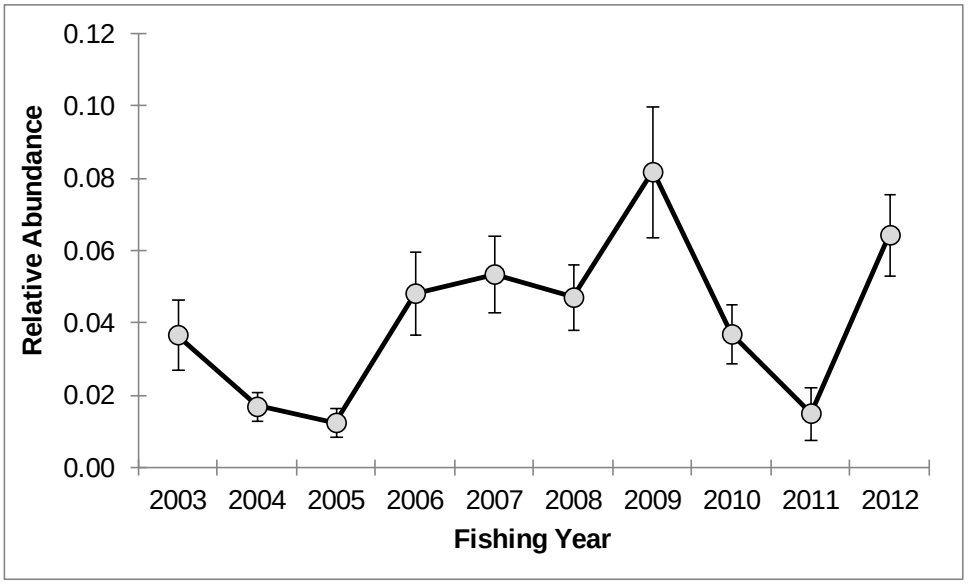


Figure 7. GLM-standardized index of relative abundance for spotted seatrout collected from Program 915 during spring (May–June), 2004–2012. Error bars represent ± 1 standard error.

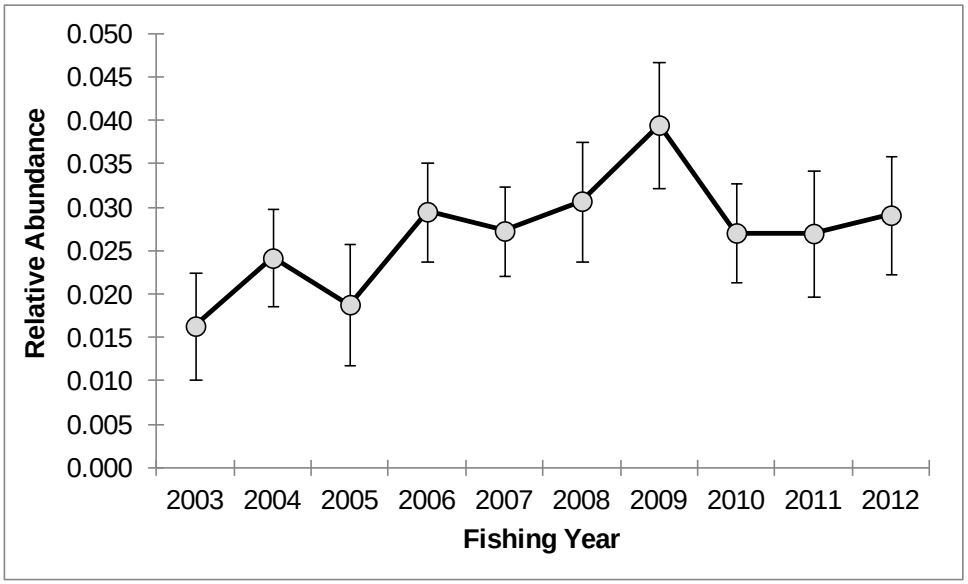


Figure 8. GLM-standardized index of relative abundance for spotted seatrout collected from Program 915 during summer (July–August), 2004–2012. Error bars represent ± 1 standard error.

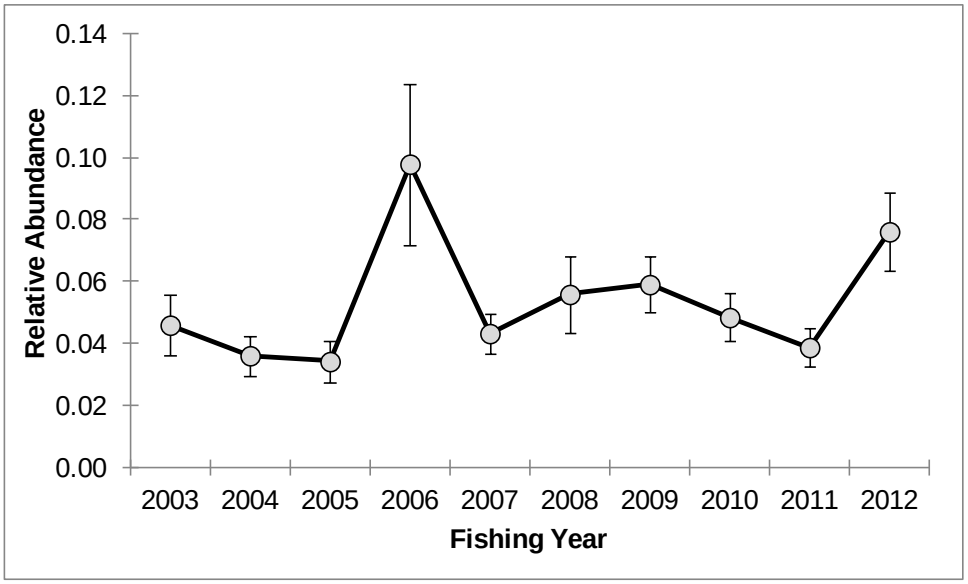


Figure 9. GLM-standardized index of relative abundance for spotted seatrout collected from Program 915 during fall (September–November), 2004–2012. Error bars represent ± 1 standard error.

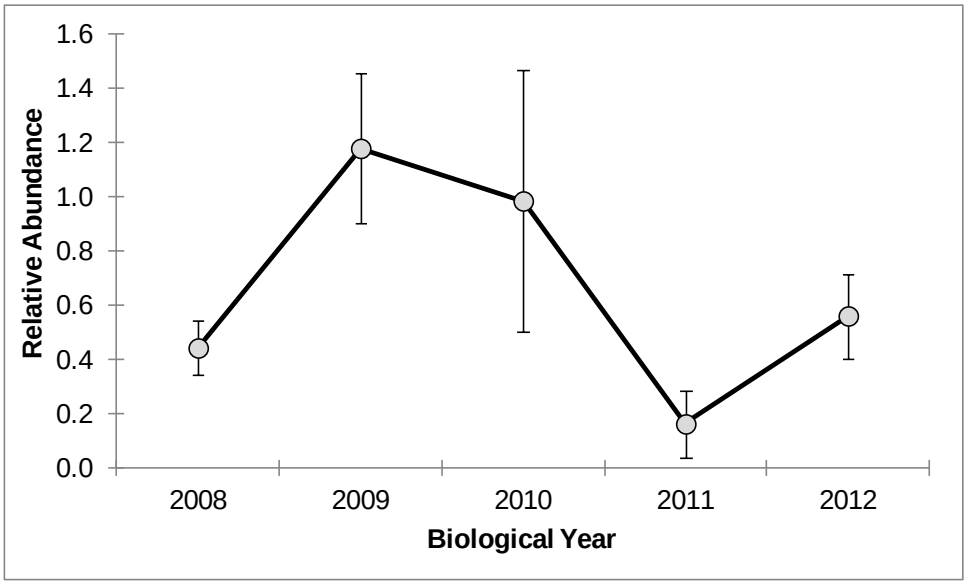


Figure 10. GLM-standardized index of relative abundance for spotted seatrout collected from Program 915 during spring (May–June) in the southern sampling stations, 2008–2012. Error bars represent ± 1 standard error.

FISHERY MANAGEMENT PLAN UPDATE
STRIPED MULLET
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	April 2006
Amendments:	Amendment 1 – Scheduled for completion April 2016
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	2021 (projected)

The North Carolina Fishery Management Plan (FMP) for Striped mullet was adopted in April 2006 and reclassified the stock as viable. The management plan established minimum and maximum landings thresholds of 1.3 million pounds and 3.1 million pounds, respectively. If landings fall below the minimum threshold the North Carolina Division of Marine Fisheries (NCDMF) would initiate further analysis of the data to determine if the decrease in landings is attributed to stock decline or decreased fishing effort. If landings exceed the 3.1 million pounds the NCDMF would initiate analysis to determine if harvest is sustainable and assess what factors are driving the increase in harvest. The striped mullet FMP established a possession limit of 200 mullets (white and striped in aggregate) per person in the recreational fishery.

Preparation of Amendment 1 to the N.C. Striped Mullet FMP began in October 2013 and was approved to be sent for public comment by the Marine Fisheries Commission in August 2014. The revised FMP was presented to the Marine Fisheries Commission in November 2014 and preferred management options were selected. Amendment 1 is scheduled to be completed in November 2015 with implementation of rules in April 2016.

Management Unit

Coastal and joint waters of North Carolina.

Goal and Objectives

The goal of the 2006 North Carolina Striped Mullet FMP is to ensure the long-term self-sustainability and sustainable harvest of the North Carolina striped mullet stock (NCDMF 2006).

Objectives:

1. Develop an objective management program that provides conservation of the resource and sustainable harvest in the fishery.

2. Ensure that the spawning stock is of sufficient capacity to prevent recruitment-overfishing.

3. Address socio-economic concerns of all user groups.

4. Restore, improve, and protect critical habitats that affect growth, survival, and reproduction of the North Carolina striped mullet stock.

5. Evaluate, enhance, and initiate studies to increase our understanding of striped mullet biology and population dynamics in North Carolina.

6. Promote public awareness regarding the status and management of the North Carolina striped mullet stock.

STATUS OF THE STOCK

Stock Status

Results of the 2013 stock assessment determined overfishing was not occurring, the overfished status could not be determined. Based on these results the striped mullet stock is considered "Viable".

Stock Assessment

A population assessment of the North Carolina striped mullet stock was conducted using the Stock Synthesis model, which incorporated data from commercial fisheries and three fishery-independent surveys from 1994 to 2011. Stock Synthesis was also used to calculate reference points. The Stock Synthesis model can incorporate information from multiple fisheries, multiple surveys, and both length and age composition data. The structure of the model allows for a wide range of model complexity depending upon the data available. The strength of the synthesis approach is that it explicitly models both the dynamics of the population and the processes by which one observes the population and its fisheries. That is, the comparison between the model and the data is kept close to the natural basis of the observations, instead of manipulating the observations into the format of a simpler model. Another important advantage is that the Stock Synthesis model can allow for (and estimate) selectivity patterns for each fishing fleet and survey (NCDMF 2013).

Spawning stock biomass increased from 2003 through 2007 and has since declined. Recruitment has also declined in recent years, though a slight increase was observed in 2011. Fishing mortality (F) has increased in recent years, but F in the terminal year (F_{2011} = 0.437) was below both the fishing mortality target ($F_{35\%}$ = 0.566) and threshold ($F_{25\%}$ = 0.932). Based on these results, the stock is not undergoing overfishing. A poor stock-recruit relationship resulting in unreliable biomass-based reference points prevents determining if the stock is currently overfished (NCDMF 2013).

STATUS OF THE FISHERY

Current Regulations

There were no size restrictions, but as of July 1, 2006 there was a 200 mullet (white and striped aggregate) daily possession limit per person in the recreational fishery and the mutilated finfish rule was modified to exempt mullet when used as bait.

Commercial Landings

Since 1994 striped mullet landings have ranged from a low of 1,460,850 pounds in 1994 to a high of 2,829,086 pounds in 2000. From 2003 to 2009 landings were steady between 1,598,617 and 1,728,607 pounds before increasing to 2,082,832 pounds in 2010. Since 2010 landings have fluctuated between approximately 1.5 and 2 million pounds. At no point in the time series have landings dropped below or risen above the established levels that would trigger a closer examination of the data (Figure 1).

Recreational Landings

The Marine Recreational Information Program is primarily designed to sample anglers who use rod and reel as the mode of capture. Since the majority of striped mullet are caught with cast nets for bait, recreational harvest data are imprecise. Misidentification between striped mullet and white mullet is also common. Bait mullet are usually released by anglers before observation by creel clerks and therefore cannot be identified to the species level.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

The total number of striped mullet measured in fishery independent programs has ranged from 5,339 to 8,796 from 2005-2014. Mean length varied little, generally falling between 348 and 363 mm. Minimum and maximum lengths generally fell within a small range, though in 2011 the minimum was 166 mm which is much lower than the minimum in other years (Table 1).

Fishery-Independent Monitoring

Modal age was two in all years except 2005, 2013, and 2014 when the modal age was one. Minimum age was zero in every year except 2010 when the minimum age was one. Maximum age ranged from six in 2012 and 2013 to 14 in 2011. From 2005 through 2008 the maximum age was 10 and in 2009 the maximum age was 13. The number of fish aged varied little from 2005 through 2011 though in 2009 only 349 fish were aged. The number of age samples increased from 2012 through 2014 ranging from 933 to 998 over that time period (Table 2).

To provide the most relevant index from the NCDMF Striped Mullet Electroshock Survey, data were limited to those collected during January through April, when the majority of striped mullet occurred in the Neuse River. Since the survey primarily catches adult striped mullet, juveniles were excluded from analysis. A sample represents all the fish collected over a 500 m transect. Striped mullet CPUE was stable at approximately 100 fish per sample from 2005 through 2009 before spiking in 2010 and 2011 to approximately 160 fish per sample. Striped mullet CPUE

dropped dramatically in 2012, potentially due to hurricanes, before increasing to near the time series average in 2013 and 2014 (Figure 2).

To provide the most relevant index from the Independent Gill Net Survey, data were limited to those collected from shallow river areas during October-November, when and where the majority of striped mullet occurred. Because the survey primarily catches adult striped mullet, juveniles were excluded from analysis. From 2004 through 2012 striped mullet CPUE fluctuated between 3 and 8 striped mullet per sample before jumping to 13.5 striped mullet per sample in 2013 and 19.8 striped mullet per sample in 2014 (Figure 3).

MANAGEMENT STRATEGY

The proposed management strategy for the striped mullet fisheries in North Carolina is to: 1) optimize resource utilization over the long-term, 2) reduce conflict, and 3) promote public education. The first strategy will be accomplished by protecting critical habitats, and monitoring stock status. Inshore gill net conflicts will be dealt with on a case-by-case basis and management actions will be implemented to address specific fishery related problems. Prior to April 2006, user conflicts in the Atlantic Ocean were to be handled by adopting current gill net restrictions on Bogue Banks that currently are in proclamation as Rule. Due to the sale of two of the three subject ocean fishing piers, the restrictions will remain in annually issued proclamations to maintain needed flexibility. A minimum distance requirement will be examined for the conflict between gill netters and stop netters in western Bogue Banks. The DMF will work to enhance public information and education (NCDMF 2006).

The 2006 striped mullet FMP established minimum and maximum commercial landings triggers. These triggers were set two standard deviations from the average of commercial landings from 1994-2002. Commercial landings below the minimum trigger of 1.30 million lb. would initiate further analysis of the striped mullet stock data to determine if a sharp decrease in landings is attributed to stock decline or decreased fishing effort. If commercial landings exceed the maximum landings trigger of 3.10 million lb. the striped mullet stock would be reassessed to determine if it is sustainable and evaluate if market shifts have occurred that need to be addressed. The striped mullet stock will be reassessed after five years (NCDMF 2006). See Table 3 for a summary of management strategies and outcomes.

MANAGEMENT AND RESEARCH NEEDS

See Table 4 for a summary of management and research recommendations pertaining to striped mullet.

FISHERY MANAGEMENT PLAN RECOMMENDATION

Amendment I to the North Carolina Striped Mullet Fishery Management Plan is scheduled for completion in 2016. Landings have not fallen below or exceeded trigger levels established by the 2006 fishery management plan in the time series of landing data. Therefore, it is recommended to maintain the timing of the Benchmark Review “as is” on the current FMP schedule.

LITERATURE CITED

NCDMF (North Carolina Division of Marine Fisheries). 2006. North Carolina fishery management plan—striped mullet. NCDMF, Morehead City, North Carolina. 202 p.

NCDMF (North Carolina Division of Marine Fisheries). 2013. Stock assessment of striped mullet (*Mugil cephalus*) in North Carolina waters. NCDMF, Morehead City, North Carolina. 161 p.

NFT (NOAA Fisheries Toolbox). 2011. Stock Synthesis, text version 3.21d.

TABLES

Table 1. Mean, minimum, and maximum length of striped mullet measured in North Carolina dependent sampling programs from 2005-2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	348.53	199	574	5,636
2006	353.04	197	563	7,202
2007	348.31	180	698	7,340
2008	361.20	208	612	8,341
2009	362.05	202	568	5,693
2010	356.57	206	577	7,561
2011	357.43	166	561	5,339
2012	359.08	200	565	8,796
2013	363.70	212	617	6,434
2014	352.28	195	610	5,390

Table 2. Modal, minimum, and maximum age of striped mullet aged in North Carolina from 2005-2014.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	1	0	10	654
2006	2	0	10	685
2007	2	0	10	699
2008	2	0	10	771
2009	2	0	13	349
2010	2	1	8	748
2011	2	0	14	633
*2012	2	0	6	933
*2013	1	0	6	991
*2014	1	0	7	998

*Ages based on preliminary data.

Table 3. Summary of management strategies and outcomes.

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
MFC Rules (adopted by the MFC on April 27, 2006)		
Implement a recreational harvest limit of 200 mullet per person, per day – currently there are no bag restrictions for mullet.	1, 2, 3, and 6	Completed, MFC Rule April 2006 adoption 15ANCAC 03M.0502 (a), (b)
Modify mutilated finfish rule to exempt mullet when used as bait.	1, 2, 3, and 6	15ANCAC 03M.0101

Table 4. Summary of management and research recommendations from the 2006 striped mullet FMP.

MANAGEMENT STRATEGY	OBJECTIVES	OUTCOME
Environmental Degradation		
Advocate stronger regulatory programs of other agencies as well as work with them to enhance protection of habitat that is critical to striped mullet.	1 and 4	CHPP approved in 2005.
Continue to make recommendations on all state, federal and local permits to minimize impacts to critical habitat areas, especially those pertaining to dredging, beach nourishment and shoreline stabilization (jetties, groins). The MFC should fully utilize its permit commenting authority as outlined in G.S. 143B-289.52.	1 and 4	Ongoing, DMF comments submitted and MFC reviews thru Habitat & Water Quality AC.
Identify, research, and designate additional areas as primary nursery areas that may be important to striped mullet as well as other fisheries.	1 and 4	Ongoing (Program 120 and Program 146).
Develop and maintain accurate maps and documentation of wetlands, soft bottom, SAVs, and water column.	1 and 4	Ongoing CHPPs, SHA work group.
Enhance existing efforts to restore the function and value of degraded wetlands, soft bottom, SAVs, and water column.	1 and 4	Part of CHPPs implementation plan.
Continue to investigate the impacts of bottom disturbing gear on habitat.	1 and 4	CHPP revision scheduled for 2009 and will complete a comprehensive review of all gears and habitat impacts.
Work with the CRC to modify shoreline stabilization regulations and guidelines to minimize impacts to marine and estuarine resources.	1 and 4	Ongoing with CHPPs, shore stabilization workgroup.

Advocate stronger regulatory programs of other agencies as well as work with them to enhance protection of water quality critical to striped mullet.	1 and 4	Ongoing with CHPPs.
Support research on the causes of hypoxia and anoxia and impacts on striped mullet populations in North Carolina's estuarine waters.	1 and 4	No Action
Request that EMC adopts measures needed to fully achieve the identified nutrient reduction goals. Initiate nutrient load reduction planning for all watersheds.	1 and 4	No Action
Support additional research to document and quantify the influences of significant weather events on water quality and assess impacts on the striped mullet population.	1, 4, and 5	No Action
Recommend and support development and implementation of additional measures to reduce sediment delivery and associated turbidity throughout coastal waters.	1 and 4	Ongoing CHPPs, New storm-water rules.
Recommend and support restoration of non-coastal wetlands and floodplains to offset for losses, in order to improve water quality by restoring natural water filtering and storage processes.	1 and 4	Ongoing through permit process.
Fishing Issues		
To fully quantify finfish bycatch in North Carolina commercial fisheries, the establishment of a long-term, fishery-dependent observer program is needed.	1	Ongoing; Began an observer program for PSGNRA in 2000, and expanded into other areas of state. Funding is time-limited. Recently began using observers on alternative platforms which may reduce the type of finfish bycatch data collected.
Establish a 200 daily possession limit per person in the recreational fishery.	1, 2, and 4	Adopted by the MFC on April 27, 2006.
Implement public outreach to reduce waste of mullets in the recreational fishery.	1 and 6	A pamphlet for the WRC fish ID website was updated, but no program was established for public outreach to minimize the waste of mullet in the recreational fishery.
Continue improving estimates of recreational hook and line, and bait harvest.	1	Needed but some MRIP and CRFL mail survey data.

Continue sampling the commercial bait mullet cast net fishery to improve the estimates of striped mullet and white mullet harvest.	1	Ongoing through the division.
Continue ongoing annual socioeconomic surveys with commercial fishermen, including those who participate in the striped mullet fishery, in order to monitor its social and economic components.	1, and 5	Ongoing through the division.
Continue ongoing RCGL surveys in order to monitor landings, as well as the social and economic elements of the striped mullet fishery.	1, 2, 4, and 5	Needed, RCGL survey discontinued 2008.
Research recommendations		
Implement no new management measures at this time but establish minimum and maximum landings thresholds of 1.3 million pounds and 3.1 million pounds, respectively.	1, 2, and 4	Ongoing, annual review for stock status report.
Continue annual age determination and creation of age-length keys.	1, 2, and 4	Age structures are being collected, ongoing.
Validate juvenile abundance indices.	1, 2, and 4	Sampling began in 2003, electroshock juvenile sampling conducted September-April each year; ongoing. NOAA Bridge Net Survey sample back-log funded for processing through CRFL grant beginning July 2013. Seeking SEAMAP funding for long-term continuation of program.
Annual review of commercial and recreational fisheries.	1, 2, 4 and 5	Commercial: ongoing, annual review for stock status report. Recreational: needed.
Improve data on maturity, identification of spawning locations, and larval/juvenile movement	1, 2, and 4	Needed, seeking CRFL funding for updating maturity information.
Establish a long-term database of adult striped mullet from fishery-independent surveys for the development of an annual abundance index	1, 2, and 4	Ongoing through division independent gill net survey and striped mullet electroshock survey.
Continue independent cast net sampling to improve estimates of the proportion of striped mullet and white mullet in this fishery.	1, 2, and 4	Needed; independent sampling discontinued.
User Conflicts		
Adopt the current Bogue Bank gill net proclamation as rule.	3	As of April 2006, due to the sale of two of the three subject ocean fishing piers, proclamation authority was maintained for flexibility. Did not go into rule.

Mediate the conflict between gill netters and stop netters	3	Mediation completed, proclamation M-14-2006 issued for Bogue Banks area.
Inshore gill net conflicts should continue to be handled on a case-by-case basis and to implement management actions to address specific fishery related problems	3	Mediation process for conflicts has been established within the Division and outreach materials developed. Adopted as preferred action in southern flounder and spotted seatrout FMP. Also, recent rule changes to large mesh (4”-6.5”) gill net fishery restricts fishing by area and during certain times as needed to protect sea turtles. Conflict in Deer and Schoolhouse creeks, mediation unsuccessful, Proclamation M-9-2013 issued to address recurring conflict between residents and fishermen using seines and gill nets.

FIGURES

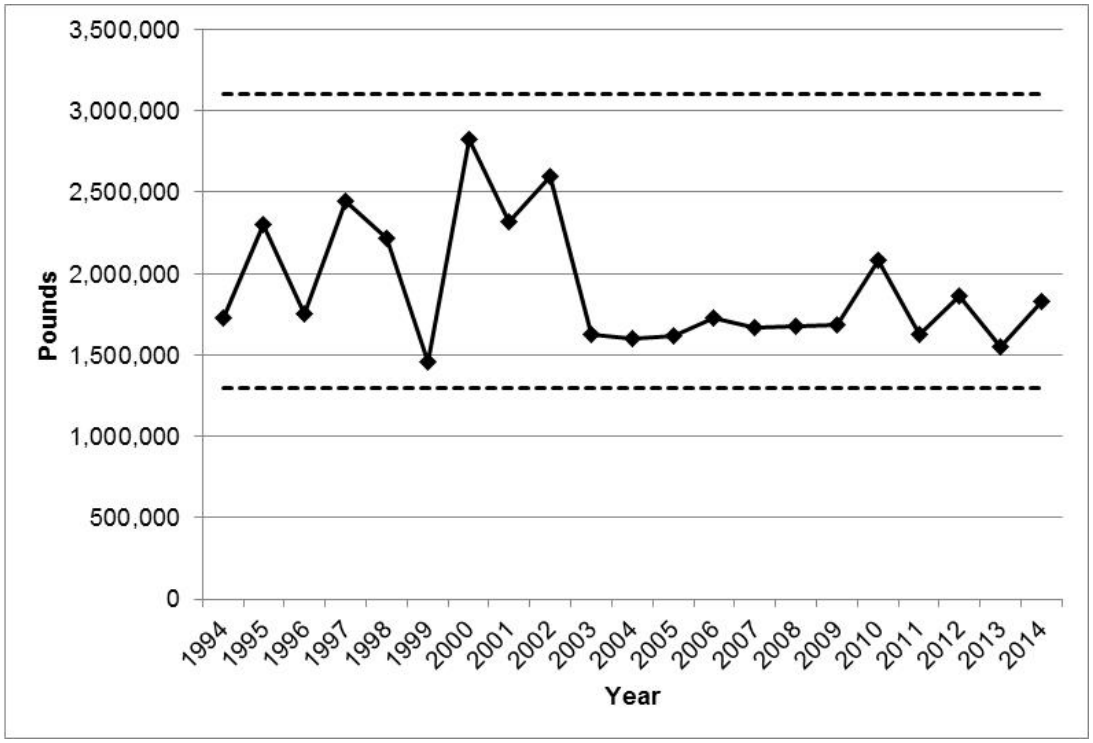


Figure 1. Commercial landings of striped mullet from 1994-2014. Dashed lines represent upper (3.1 million pounds) and lower (1.3 million pounds) landings thresholds that would trigger a closer examination of data.

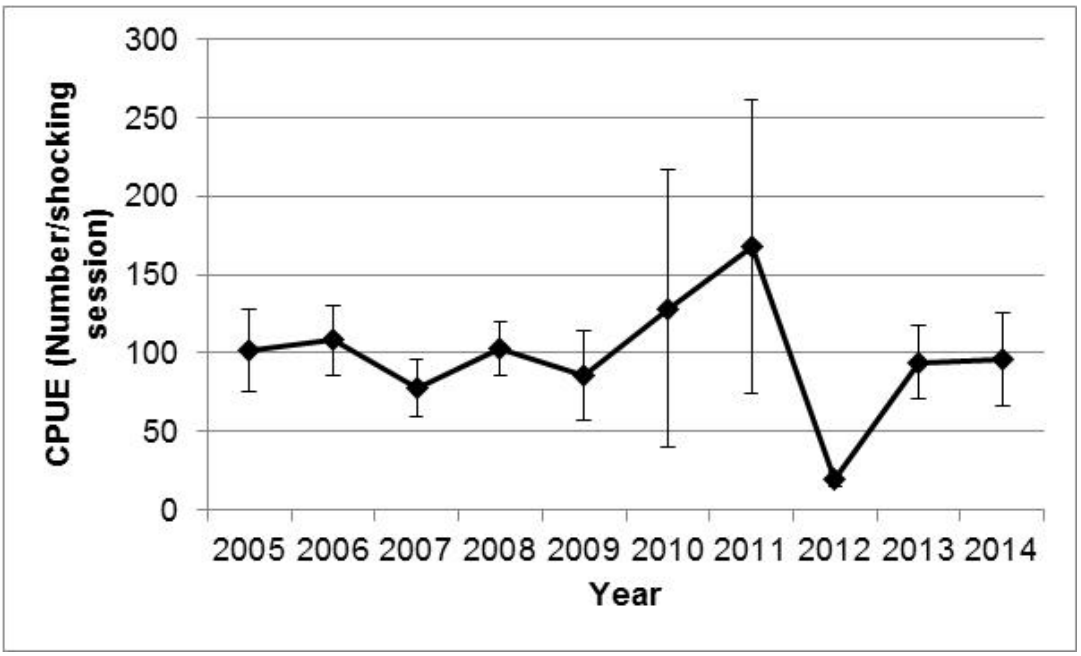


Figure 2. CPUE (number/500 m shocking session) of striped mullet from the Striped Mullet Electroshock Survey (P146) from 2005-2014. To provide the most relevant index data were limited to those collected during January through April. Error bars represent standard error.

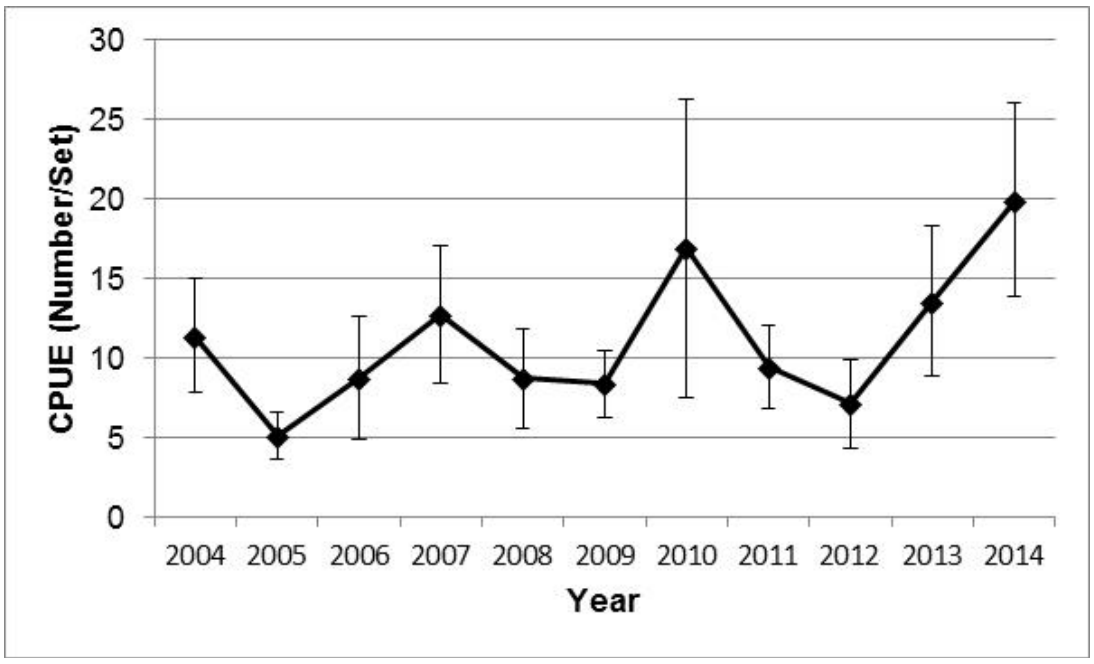


Figure 3. CPUE (number/set) of striped mullet from the Independent Gill Net Survey (P915). In order to provide the most relevant index only shallow river area samples collected during October-November 2004-2014 were included. Error bars represent standard error.

FISHERY MANAGEMENT PLAN UPDATE
AMERICAN SHAD
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	October 1985
Amendments:	Amendment 1 (April 1999) Amendment 3 (February 2010)
Revisions:	Technical Addendum #1 (February 2000) Addendum 1 (August 2002)
Supplements:	Supplement (October 1988)
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	ASMFC scheduled for 2017

The Atlantic States Marine Fisheries Commission (ASMFC) coastwide stock assessment completed in 2007, found that American shad (*Alosa sapidissima*) stocks were at all-time lows and did not appear to be recovering to acceptable levels. Therefore under ASMFC's Fishery Management Plan (FMP) for Shad and River Herring Amendment 3, individual states were required to develop Implementation Plans (ASMFC 2010). Implementation Plans consisted of two parts: 1. Review and update of the fishing/recovery plans required under Amendment 1 for the stocks within their jurisdiction; and 2. Habitat plans. The updated fishing/recovery plan meets the requirements and is known as the North Carolina American Shad Sustainable Fishery Plan (SFP) (NCDMF 2011).

Addendum I (2002) changed the conditions for marking hatchery-reared alosines. The addendum clarifies the definition and intent of *de minimis* status for the American shad fishery. It also further modifies and clarifies the fishery-independent and fishery dependent monitoring requirements of Technical Addendum #1.

Technical Addendum #1 (2000) modified several technical errors and provided clarification of several monitoring requirements in Amendment 1.

Amendment 1 (1999) reported that the majority of American shad stocks to not be overfished, but almost all were believed to be at or near historically low levels. Therefore Amendment 1 required increased annual reporting requirements on juveniles, adult spawning stocks, annual fishing mortality, and habitat. A fishing mortality threshold (overfishing) was defined as a reference point of $F_{30.}$

The Supplement (1988) reassessed the research priorities identified in the original FMP (1985) and created a new listing of research priorities.

The Original 1985 FMP does not require any specific management approach or monitoring programs within the management unit, asking only that states provide annual summaries of restoration efforts and ocean fishery activity. It specified four management objectives: regulate exploitation, improve habitat accessibility and quality, initiate programs to introduce alosine stocks into historic waters, and recommend and support research programs.

Management Unit

American shad and hickory shad management authority lies with the Atlantic Coastal states from Maine through Florida and is coordinated through the ASMFC. Responsibility for management action in the Economic Exclusive Zone (EEZ), located from 3-200 miles from shore, lies with the Secretary of Commerce through the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) in the absence of a federal FMP.

Goal and Objectives

Migratory stocks of American shad have been managed under the ASMFC since 1985. These species are currently managed under Amendment 3 (American shad) and Amendment 1 (hickory shad) to the ASMFC FMP, Technical Addendum #1, and Addendum 1. The goal of Amendment 2 and 3 is to protect, enhance, and restore East Coast migratory spawning stocks of American shad, hickory shad, alewife, and blueback herring in order to achieve stock restoration and maintain sustainable levels of spawning stock biomass. To achieve this goal, the plan adopts the following objectives:

1. Maximize the number of juvenile recruits emigrating from freshwater stock complexes.

2. Restore and maintain spawning stock biomass and age structure to achieve maximum juvenile recruitment.

3. Manage for an optimum yield harvest level that will not compromise Objectives 1 and 2.

4. Maximize cost effectiveness to the local, state, and federal governments, and the ASMFC associated with achieving Objectives 1 through 3.

STATUS OF THE STOCK

Stock Status

The most recent coastwide stock assessment of American shad stated that populations in the Albemarle Sound and Roanoke River are stable and low, whereas a determination of stock status could not definitively be assigned for the Tar/Pamlico, Neuse and Cape Fear rivers due to limited information (ASMFC 2007).

Amendment 3 required all states and jurisdictions without an approved sustainable fishery plan to close their fisheries (with the exception of catch and release fisheries) for American shad by January 1, 2013. In March 2012, the North Carolina Division of Marine Fisheries (NCDMF) North Carolina American Shad SFP was approved by ASMFC; it includes sustainable fishery parameters for the following areas: Albemarle Sound/Roanoke River, Tar/Pamlico River, Neuse River, and Cape Fear River.

Annual updates are completed each year to track those sustainable fishery parameters in each system.

Stock Assessment

The NCDMF American Shad SFP, effective in 2013, identified sustainability parameters for four regions of the state: Albemarle Sound/Roanoke River, Tar/Pamlico, Neuse, and Cape Fear River systems. As a directed roe fishery, all parameters are based on the female portion of the stock.

The Albemarle Sound/Roanoke River system has three sustainability parameters: female catch per unit effort (CPUE) based on the NCDMF Albemarle Sound Independent Gill Net Survey (IGNS), CPUE based on the North Carolina Wildlife Resources Commission (NCWRC) electrofishing survey, and female relative fishing mortality (*F)* based on commercial landings and a three year average of the NCDMF IGNS index. As written in the SFP, exceeding the female CPUE based on IGNS or the female relative *F* parameters for three consecutive years will trigger management action. The female CPUE based on the NCWRC electrofishing survey will be used in conjunction with a second index for triggering management action.

The Tar/Pamlico, Neuse, and Cape Fear River systems have two sustainability parameters for the corresponding areas: female CPUE based on the NCWRC electrofishing survey, and female relative *F* based on the NCWRC electrofishing survey.

In 2013 and 2014, annual updates were completed for all areas to determine if any sustainability parameters were exceeding the thresholds. The Tar/Pamlico, Neuse, and Cape Fear River systems were not exceeding any of the thresholds and no management changes were made to those fisheries. The Albemarle Sound/Roanoke River system exceeded two thresholds, the CPUE index based on the NCWRC electrofishing survey and the female relative *F,* during the 2013 commercial fishing season. These parameters exceeding the threshold required management actions to be implemented for the 2014 fishing season. In February 2014, the North Carolina Marine Fisheries Commission (NCMFC) chose to reduce the American shad season in the Albemarle Sound/Roanoke River to March 3-24 to reduce overall commercial landings. The 2014 fishing season continued with the same seasonal dates.

STATUS OF THE FISHERY

Current Regulations

The NCMFC enacted a rule in 1995, which established a closed season for American shad and hickory shad (*Alosa mediocris*). It is unlawful to take these species by any method except hook-and-line from April 15 through December 31. The ocean intercept fishery for American shad was closed to all harvest January 1, 2005 (ASMFC 2002).

In the Albemarle, Croatan, Roanoke, and Currituck sounds and tributaries, floating gill nets of 5.25 inch stretch mesh (ISM) to 6.5 ISM, were limited to 1,000 yards and could only be utilized from March 3 through March 24, 2014. The western portion of Albemarle Sound near the mouth of the Roanoke River was closed to gill netting from February through mid-November. The large mesh net restrictions were imposed for striped bass conservation but also provided measures of protection for American shad. Gill nets of less than 3.25 ISM were not allowed due

to the river herring closure, except during the discretionary river herring harvest season (Chowan River only). Gill nets with a mesh length of 3.25 ISM could not exceed 800 yards and were allowed the entire spring. Attendance for small mesh gill nets (3.0 – 4.0 ISM) was required June 1-December 1, 2014. In 2014 interim management measures were implemented for sea turtles that made it unlawful to fail to fish nets at least once during a 24 hour period in the Albemarle Sound Management Area (ASMA).

In areas outside of the ASMA there is a rule that limits the amount of large mesh (4.0 -6.5 ISM) gill net sets in internal coastal waters to 3,000 yards. In an effort to reduce sea turtle interactions, that rule has been suspended in the majority of internal coastal waters and net yardage allowance has been reduced to 2,000 or 1,000 yards in the Tar/Pamlico, Neuse and Cape Fear systems. Nets can be set in lengths no greater than 100 yards and must have at least a 25-yard space between each individual length of net. Only single overnight sets are allowed; nets can be set one hour prior to sunset and must be retrieved within one hour of sunrise, with no sets allowed Friday, Saturday or Sunday evenings. Additionally, in certain areas of the Tar/Pamlico and Neuse rivers, gill nets with a mesh size less than 5.0 ISM must be attended at all times.

Commercial Landings

Figure 1 shows all American shad landings in North Carolina from 1950-2013. Landings show a decreasing trend through 1990, until average landings leveled off through 2013. Commercial harvest is sporadic and cyclical and annual trends show these changes. Figure 2 describes that landings break down by the four areas of the state, as stated in the NCDMF American Shad SFP. Albemarle Sound accounts for on average, approximately 75%of total state landings; the last 5 years ranged from 67-79%.

Recreational Landings

Recreational landings for American shad are minimal throughout the Albemarle Sound/Roanoke River, Tar/Pamlico, and Neuse Rivers. These areas accounted for approximately 6,000-9,000 pounds of harvested fish in 2012 and 2013. The bulk of the North Carolina recreational fishery occurs in the Cape Fear River system where harvest numbers average around 30,000 pounds and substantial effort is targeted on American shad.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial landings are reported from the NCDMF Trip Ticket Program (TTP). This program requires dealers to complete a trip ticket for each transaction with a fisherman and to submit these reports to the NCDMF on a monthly basis.

Table 1 includes mean, minimum and maximum lengths and total number of commercial samples pooled across all gears and areas in the state. Table 2 describes the variation in modal, minimum and maximum ages throughout the dependent sampling. The Albemarle Sound area (including Albemarle, Roanoke, Croatan and Currituck sounds and their tributaries) accounts for approximately 70%of the state's total harvest, contributing the highest percentage of the in-river fisheries.

Fishery-Independent Monitoring

American shad are monitored using the NCDMF IGNS and NCWRC electrofishing surveys to estimate CPUEs and fishing mortality in the Albemarle Sound/Roanoke River area. In other areas of the state, NCWRC conducts electrofishing surveys to estimate abundance and the fishing mortality. Table 3 describes the modal, minimum, and maximum age and the number of fish aged throughout 2005 – 2014 in NCDMF independent surveys.

MANAGEMENT STRATEGY

Albemarle Sound/Roanoke River:
Figures 3 shows the female CPUE based on the NCDMF IGNS. Figure 4 shows the CPUE based on the NCWRC electrofishing survey. Figure 5 shows the female relative *F* based on commercial landings and a three year average of the NCDMF IGNS index.

Tar/Pamlico system:
Figure 6 shows the female CPUE based on the NCWRC electrofishing survey and figure 7 shows the female relative *F* based on the NCWRC electrofishing survey.

Neuse system:
Figure 8 shows the female CPUE based on the NCWRC electrofishing survey and figure 9 shows the female relative *F* based on the NCWRC electrofishing survey.

Cape Fear River system:
Figure 10 shows the female CPUE based on the NCWRC electrofishing survey and figure 11 shows the female relative *F* based on the NCWRC electrofishing survey.

The 2014 update of the SFP sustainability parameters throughout the state demonstrated that all of the parameters were within the sustainable targets.

MANAGEMENT AND RESEARCH NEEDS

The following list of research needs have been identified in order to enhance the state or knowledge of the shad and river herring resources, population dynamics, ecology and the various fisheries for alosine species, as found in the ASMFC FMP Amendment 3.

STOCK ASSESSMENT AND POPULATION DYNAMICS

- Continue to assess current aging techniques for shad and river herring, using known-age fish, scales, otoliths and spawning marks. Known age fish will be available from larval stocking programs that mark each year class. Conduct biannual aging workshops to maintain consistency and accuracy in aging fish sampled in state programs.
- Investigate the relation between juvenile production and subsequent year class strength for alosine species, with emphasis on the validity of juvenile abundance indices, rates and sources of immature mortality, migratory behavior of juveniles, natural history and ecology of juveniles, and essential nursery habitat in the first few years of life.
- Validate estimates of natural mortality for American shad stocks.
- Establish management benchmarks for data poor river systems identified within the stock assessment.

- Estimate and evaluate sources of mortality for alosine species from bycatch, and bait and reduction fisheries.
- Determine fishery specific catch, harvest, bycatch, and discard reporting rates.
- Estimate and evaluate river specific mortality from upstream and downstream passage of adults and downriver passage of juveniles past migratory barriers.
- Determine which stocks are impacted by mixed stock fisheries (including bycatch fisheries). Methods to be considered could include otolith microchemistry, oxytetracycline otolith marking, and/or tagging.
- Evaluate assumptions critical to in-river tagging programs in Georgia, South Carolina, and Maryland that are used to estimate exploitation rate and population size.
- Develop approaches to estimate relative abundance of spawning stocks in rivers without passage facilities and in rivers with passage facilities with unknown passage efficiencies. • Evaluate predation by striped bass and other predators as a factor of mortality for alosines. Research predation rates and impacts on alosines.
- Quantify fishing mortality (in-river, ocean bycatch, bait fisheries) for major river stocks after ocean closure of directed fisheries.
- Develop comprehensive and cost effective angler use and harvest survey techniques for use by Atlantic coastal states to assess recreational fisheries for American shad.
- Determine and update biological data inputs used in assessment modeling (fecundity-at-age, mean weight-at-age for both sexes, partial recruitment vector/maturity schedules) for American shad and river herring stocks in a variety of coastal river systems, including both semelparous and iteroparous stocks.
- Evaluate and ultimately validate large-scale hydroacoustic methods to quantify American shad escapement (spawning run numbers) in major river systems. Identify how shad respond (attract/repelled) by various hydroacoustic signals.

HABITAT

- Identify ways to improve fish passage efficiency using hydroacoustics to repel alosines from turbine intakes or discharges or pheromones or other chemical substances to attract them to passage entrances. Test commercially available acoustic equipment at existing fish passage facility to determine effectiveness. Develop methods to isolate/manufacture pheromones or other alosine attractants.
- Determine the effects of passage impediments on all life history stages of American shad including turbine mortality and river and barrier specific passage efficiencies. Highest priority would be the lowermost obstruction.
- Develop and implement techniques to determine shad and herring population targets for tributaries undergoing restoration (dam removals, fishways, supplemental stocking, etc.).
- Characterize tributary habitat quality and quantity for alosine reintroductions and fish passage development.
- Determine impacts to American shad populations from changing ocean environment
- Identify and quantify potential American shad spawning and rearing habitat not presently utilized and conduct an analysis of the cost of recovery.
- Develop appropriate Habitat Suitability Index Models for alosine species in the fishery management plan. Possibly consider expansion of species of importance or go with the most protective criteria for the most susceptible species.
- Determine factors that regulate and potentially limit downstream migration, seawater tolerance, and early ocean survival of juvenile alosines.
- Review studies dealing with the effects of acid deposition on anadromous alosines. • Determine effects of change in temperature and pH for all life stages.
- Determine optimal and tolerance for salinity, dissolved oxygen, pH, substrate, current velocity, depth, temperature, and suspended solids.

- Determine hard limits and range levels for water quality deemed appropriate and defensible for all alosines with emphasis on freshwater migratory, spawning, and nursery areas.
- There has been little research conducted on habitat requirements for hickory shad. Although there are reported ranges of values for some variables, such as temperature or depth, there is no information on tolerances or optimal for all life stages. Research on all life stages is necessary to determine habitat requirements.
- Determine impacts of declining submerged aquatic vegetation beds on juvenile cover and rearing habitat.
- Determine impacts of thermal power generation projects (e.g., nuclear and coal) that withdraw water for cooling (potential entrainment and impingement of fish) and discharge heated water (thermal barriers to migration, habitat degradation) on estuarine juvenile rearing and migration corridors.
- Determine impacts to migrating American shad (both spawning adults and out-migrating juveniles and adults) by proposed in-stream power generation developments such as tidal stream generation that draws energy from currents.
- Determine potential threats and their level of impact to coastal American shad habitat from: marine acidification; pharmaceutical, wastewater, pesticide contamination; 58 invasive species; niche displacement; and global climate change are in need of further study.
- Determine the impacts to migrating American shad (both spawning adults and migrating juveniles) by proposed wind power generation developments in near shore ocean environments.
- Conduct fish passage research and development with the goal of improving the efficiency of existing and future installations of fish passage measures and facilities in order to restore desired access to and utilization of critical American shad spawning and juvenile rearing habitat.
- Conduct studies to determine whether passing migrating adults upstream earlier in the year in some rivers would increase production and larval survival, and opening downstream bypass facilities sooner would reduce mortality of early emigrants (both adult and early-hatched juveniles).
- Conduct studies to determine the effects of dredging on diadromous habitat and migration.

LIFE HISTORY

- Conduct studies on energetics of feeding and spawning migrations of alosines on the Atlantic coast.
- Evaluate impacts of invasive species such as zebra mussels and flathead catfish on larval and juvenile survival.
- Conduct studies of egg and larval survival and development.
- Focus research on within-species variation in genetic, reproductive, morphological, and ecological characteristics, given the wide geographic range and variation at the intraspecific level that occurs in alosines.
- Ascertain how abundance and distribution of potential prey affect growth and mortality of early life stages.
- Conduct research on hickory shad migratory behavior. This may explain why hickory shad populations continue to increase while other alosines are in decline.

STOCKING AND HATCHERIES

- Refine techniques for hormone induced tank spawning of American shad. Secure adequate eggs for culture programs using native broodstock.
- Refine larval marking techniques such that river and year class can be identified when year classes are later recaptured as juveniles or adults.

SOCIOECONOMICS

- Conduct and evaluate historical characterization of socio-economic development (potential pollutant sources and habitat modification) of selected alosine rivers along the Atlantic coast.
- Collect information from consumptive and non-consumptive users on: demographic information (e.g., age, gender, ethnicity/race), social structure information (e.g., historical participation, affiliation with NGOs, perceived conflicts), other cultural information (e.g., occupational motivation, cultural traditions related to resource's use), and community information.
- In order to improve the management-oriented understanding of historical stock trends and related assessments, the social and economic history of the river herring fisheries should be documented for time periods equivalent to the stock return level sought by the biological standards and this analysis should including documenting market trends, consumer preferences including recreational anglers, the role of product substitutes such as Atlantic herring and menhaden, and the levels of subsistence fisheries as can be obtained.
- Before recommending, re-authorizing and/or implementing stock enhancement programs for a given river system, it is recommended that state agencies or other appropriate management organization conduct ex-ante socioeconomic cost and benefit (e.g., estimate non-consumptive and existence values, etc.) analysis of proposed stocking programs

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TABLES

Table 1. Length data sampled from the American shad commercial fishery throughout North Carolina.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	446	186	557	1061
2006	430	296	515	861
2007	438	322	523	1015
2008	436	145	526	899
2009	429	242	741	923
2010	434	305	520	1148
2011	444	245	507	1283
2012	444	235	552	1549
2013	453	304	571	1574
2014	455	295	508	1026

Table 2. Aging data collected from North Carolina American shad dependent sampling programs.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	5	3	8	477
2006	6	3	8	499
2007	6	3	8	440
2008	6	3	9	447
2009	7	4	10	435
2010	6	3	9	453
2011	6	3	8	437
2012	5	3	8	536
2013	7	3	9	471
2014	7	3	9	433

Table 3. Aging data collected from North Carolina American shad independent sampling programs.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	5	3	7	194
2006	3	3	8	180
2007	5	3	8	176
2008	5	3	8	188
2009	6	4	9	126
2010	6	3	8	197
2011	6	2	8	79
2012	5	3	8	156
2013	7	3	8	210
2014	6	3	8	122

FIGURES

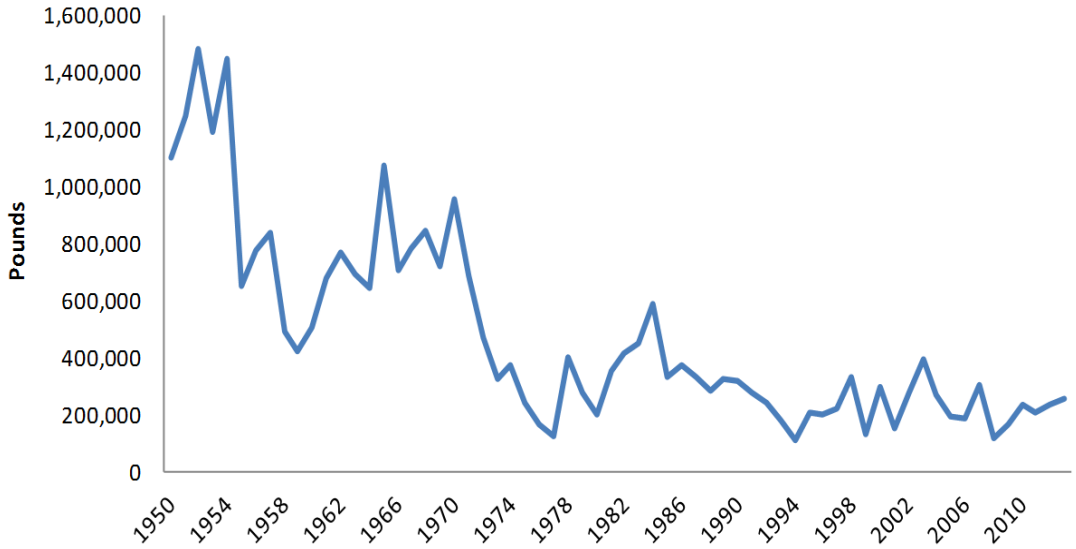

Figure 1. Total historical landings of American shad in North Carolina, all waterbodies combined.

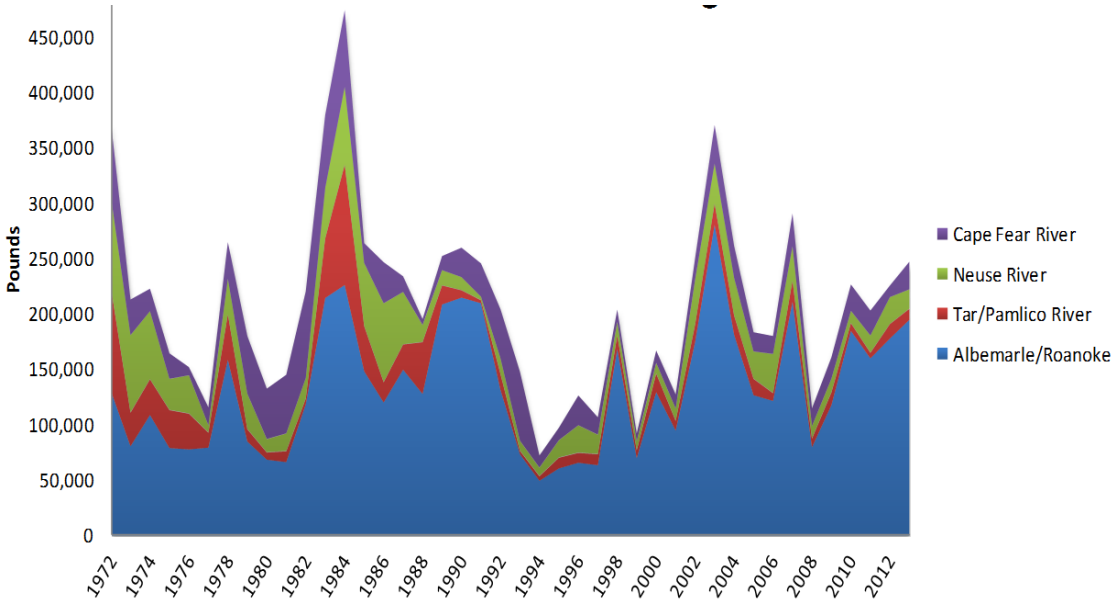

Figure 2. Landings of American shad in North Carolina by major waterbody.

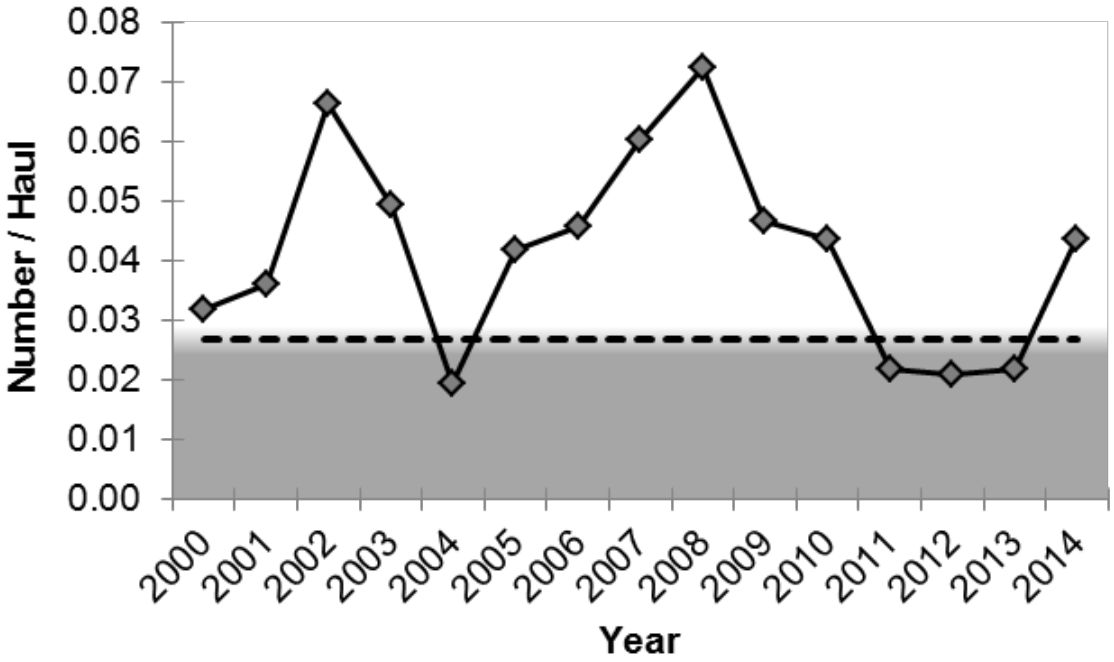

Figure 3. Albemarle Sound/Roanoke River sustainability parameter for female CPUE in the IGNS, 2000-2014. Grey areas represent a parameter exceeding the threshold.

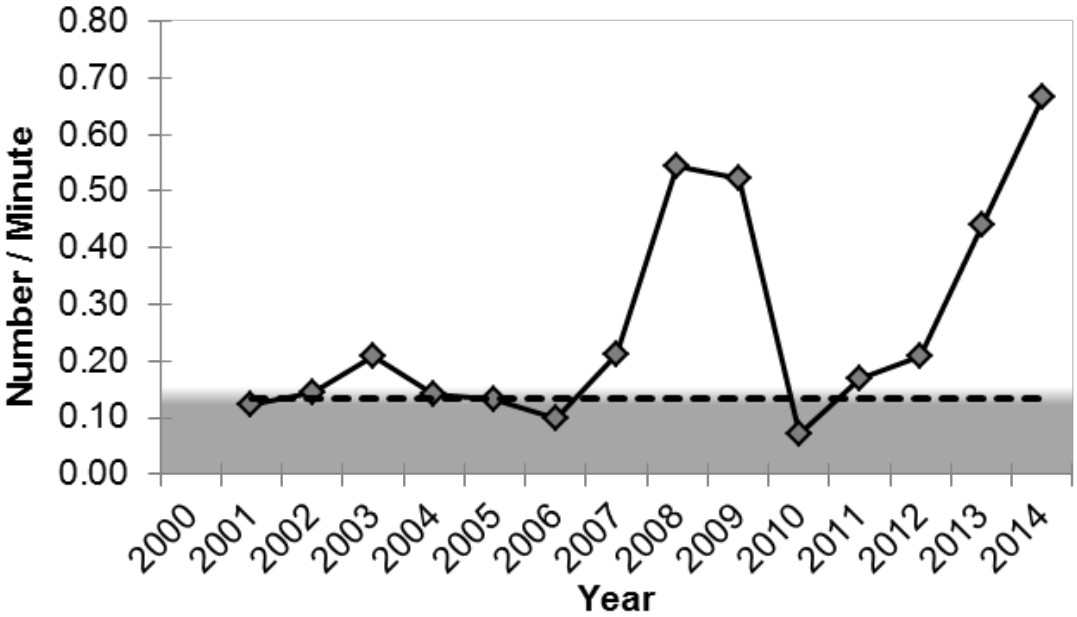

Figure 4. Albemarle Sound/Roanoke River sustainability parameter for female CPUE in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

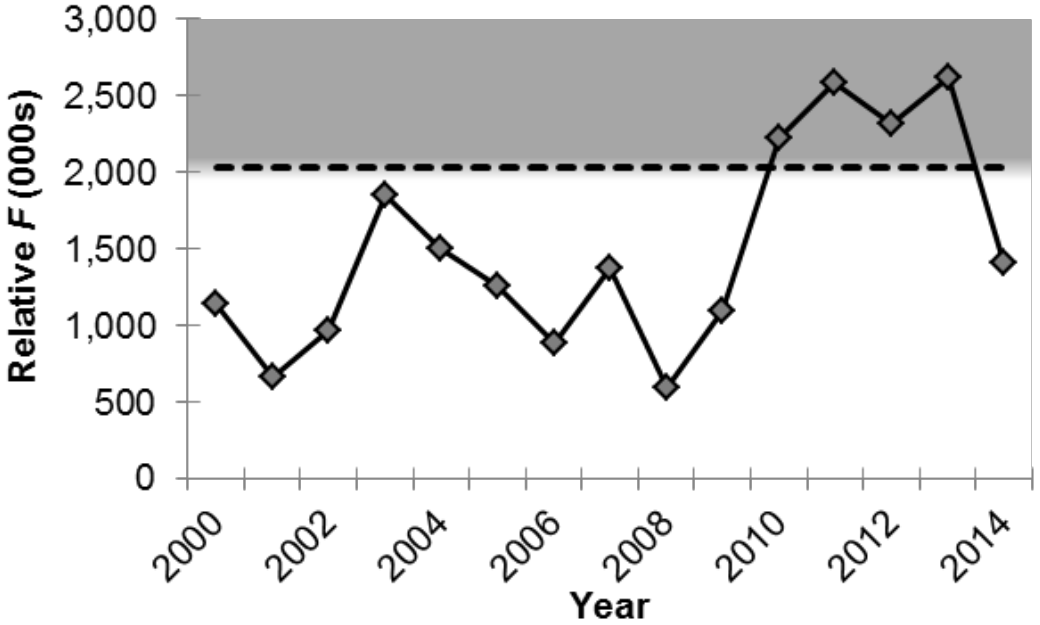

Figure 5. Albemarle Sound/Roanoke River sustainability parameter for female relative *F* in the IGNS, 2000-2014. Grey areas represent a parameter exceeding the threshold.

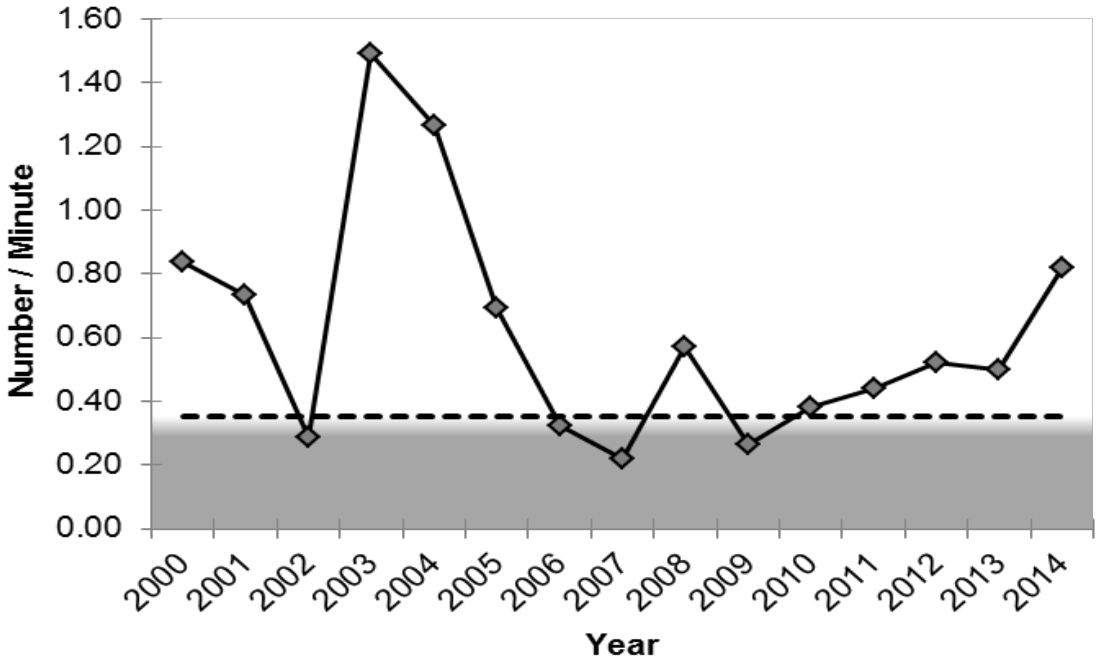

Figure 6. Tar/Pamlico River system sustainability parameter for female CPUE in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

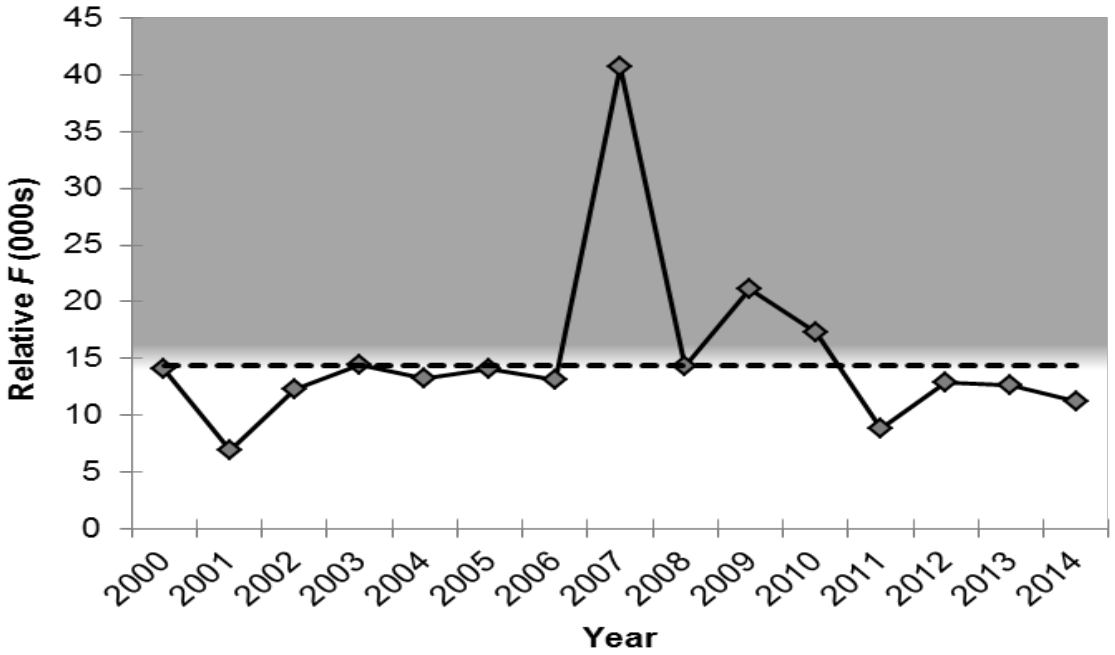

Figure 7. Tar/Pamlico River system sustainability parameter for female relative *F* in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

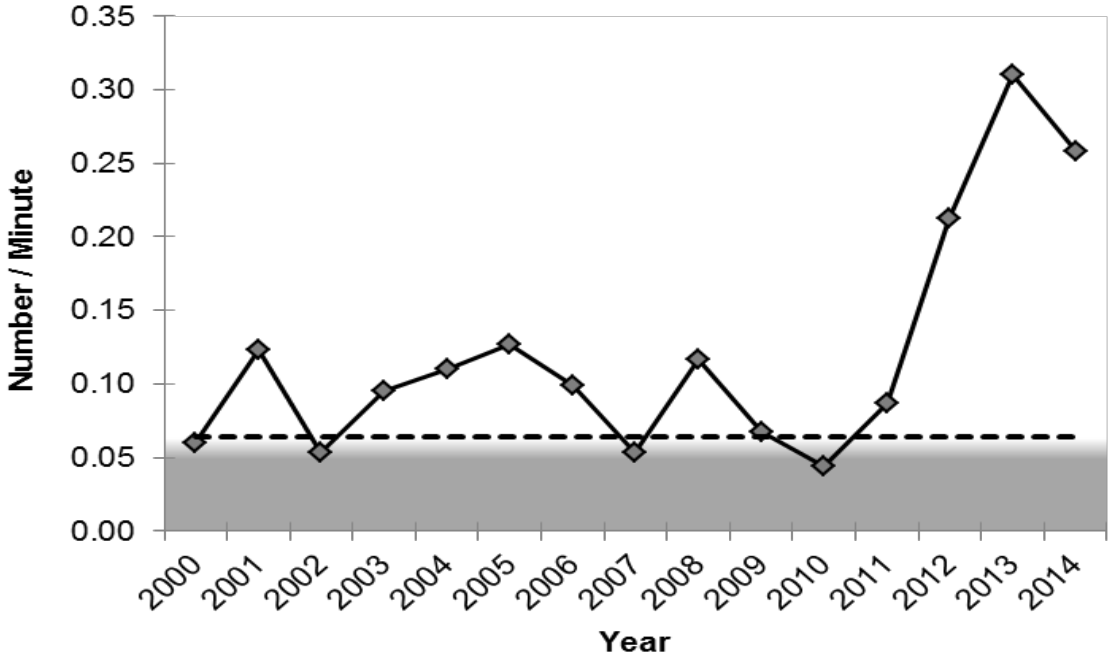

Figure 8. Neuse River system sustainability parameter for female CPUE in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

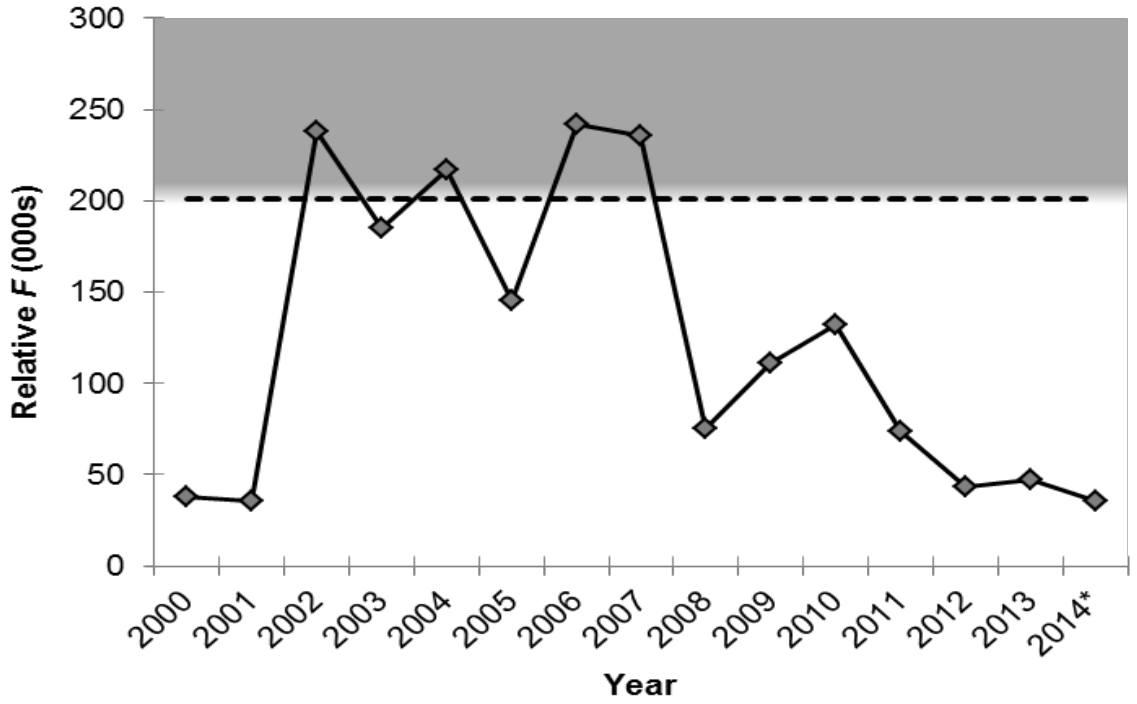

Figure 9. Neuse River system sustainability parameter for female relative *F* in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

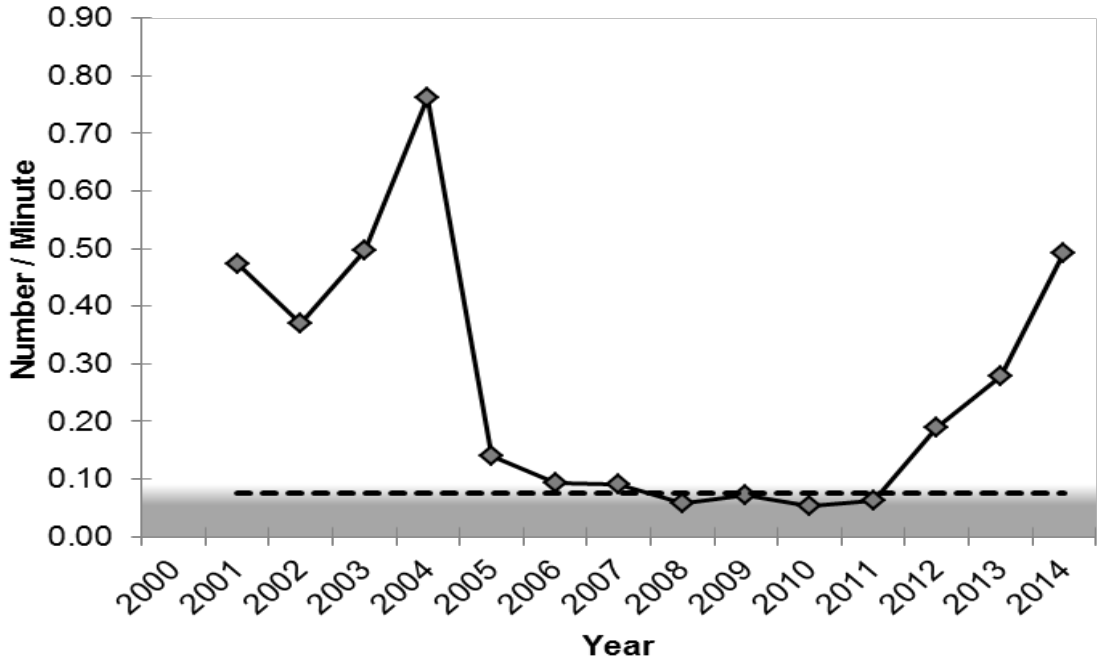

Figure 10. Cape Fear River system sustainability parameter for female CPUE in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

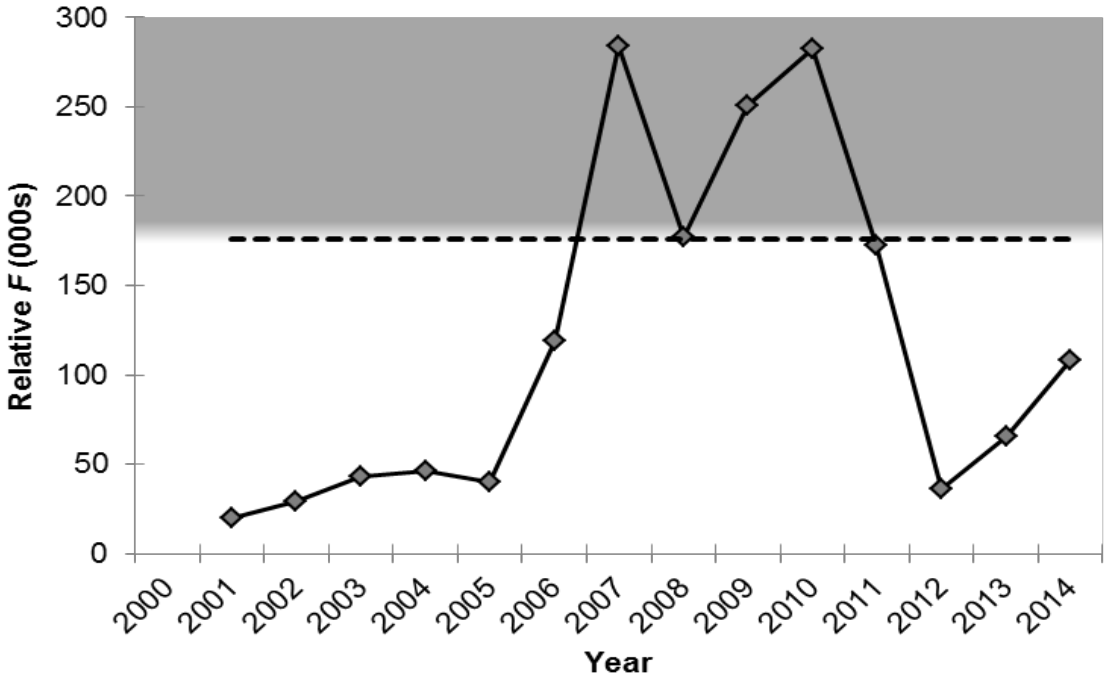

Figure 11. Cape Fear River system sustainability parameter for female relative *F* in NCWRC electrofishing survey, 2000-2014. Grey areas represent a parameter exceeding the threshold.

FISHERY MANAGEMENT PLAN UPDATE
ATLANTIC CROAKER
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	October 1987
Amendments:	Amendment 1 - November 2005 (implemented January 2006) Addendum I - March 2011 Addendum II - August 2014
Revisions:	N/A
Supplements:	N/A
Information Updates:	N/A
Schedule Changes:	N/A
Next Benchmark Review:	2016

The Fishery Management Plan for Atlantic croaker was adopted in 1987 (ASMFC 1987) and included states from Maryland through Florida. Upon review the South Atlantic State/Federal Fisheries Management Board (hereinafter referred to as Board) found its recommendations to be vague and recommended that an amendment be prepared to define management measures necessary to achieve the goals of the FMP. The Interstate Fisheries Management Program Policy Board also adopted the finding that the original FMP did not contain any management measures that states were required to implement (ASMFC 2014).

In 2002, the Board directed the Atlantic Croaker Technical Committee to conduct the first coast wide stock assessment of the species in preparation of developing an amendment. The stock assessment was developed in 2003 and approved by a Southeast Data Assessment Review panel for use in management in June 2004. Amendment 1 was approved in November 2005 and fully implemented by January 1, 2006 (ASMFC 2005).

Amendment 1 expanded the management area to include the states from New Jersey through Florida. The amendment defined two Atlantic coast management regions: the south-Atlantic region, including the states Florida through South Carolina; and the mid-Atlantic region, including the states from North Carolina through New Jersey (ASMFC 2005).

Amendment 1 established biological reference points to define overfished and overfishing stock status for the mid-Atlantic region only. Amendment 1 did not require any specific measures restricting recreational or commercial harvest of Atlantic croaker, though states with more conservative measures were encouraged to maintain those regulations. Through adaptive management, the Board may revise Amendment 1, and regulatory and/or monitoring requirements could be included in the resulting addendum, along with procedures for

determining *de minimis* status and implementing alternative management programs via conservation equivalency.

Amendment 1 specified "triggers" for initiation of a stock assessment in non-assessment years. If upon review of the data the technical committee felt there was sufficient evidence of changes in the stock, a stock assessment could be initiated in the absence of hitting the triggers. The triggers considered by the technical committee were:

1. Relative percent change in landings
    a. A stock assessment will be triggered if the most recent year's commercial landings are less than 70% of the previous two year's landings.
    b. A stock assessment will be triggered if the most recent year's recreational landings are less than 70% of the previous two year's average landings.
2. Biological Data Monitoring:
    a. The technical committee will compare the most recent year's mean length data from the recreational fishery to the average of the last two year's mean lengths.
    b. The technical committee will compare the most recent year's mean size (length and weight) data from the commercial fishery to the average of the last two years mean size (length and weight) data.
    c. The technical committee will monitor the overall age composition (proportion at age) and calculate the mean size at age for the age groups that are present in the state samples.
3. Effort vs. Landings (commercial)
    a. CPUE considerations for the near future: as effort data increases in quality, the trigger should change from a commercial landings basis to commercial CPUE by gear type. At this time, the technical committee will monitor effort (e.g. trips or days fished) vs. landings, on a gear type basis, to track parallel trends.
4. The technical committee will continue to derive a MRFSS CPUE, on a directed trip basis, to examine state-by-state catch rates on an annual basis.
5. Surveys

    The first trigger is the only hard trigger, though the others were monitored annually for substantial changes.

Addendum I to Amendment 1 was initiated in August 2010. Addendum I consolidated the stock into one management unit and established a procedure by which the board may approve peer-reviewed biological reference points without a full administrative process, such as an amendment or addendum (ASMFC 2011).

Addendum II to Amendment 1 was initiated in February 2014 and was approved in August 2014. Addendum II establishes the use of the Traffic Light Approach as a precautionary management framework in the management of Atlantic croaker. The management framework utilizing the Traffic Light Approach replaces the management triggers as stipulated in Addendum I (ASMFC 2014).

Management Unit

Single region New Jersey through east coast of Florida.

Goal and Objectives

The goal of Amendment 1 is to utilize interstate management to perpetuate the self-sustaining Atlantic croaker resource throughout its range and generate the greatest economic and social benefits from its commercial and recreational harvest and utilization over time. The four objectives of Amendment 1 are:

1. Manage the fishing mortality rate for Atlantic croaker to provide adequate spawning potential to sustain long-term abundance of the Atlantic croaker population.

2. Manage the Atlantic croaker stock to maintain the spawning stock biomass above the target biomass levels and restrict fishing mortality to rates below the threshold.

3. Develop a management program for restoring and maintaining essential Atlantic croaker habitat.

4. Develop research priorities that will further refine the Atlantic croaker management program to maximize the biological, social, and economic benefits derived from the Atlantic croaker population.

STATUS OF THE STOCK

Stock Status

Stock status is based on the data and results of the 2010 stock assessment (ASMFC 2010). Atlantic croaker is not experiencing overfishing and likely not overfished. Biomass has been increasing and the age-structure of the population has been expanding since the late 1980s, it is unlikely the stock is in trouble.

Stock Assessment

A statistical catch-at-age model was used to assess Atlantic croaker. This model combines the catch-at-age data from the commercial and recreational fisheries with information from fishery-independent surveys and biological information such as growth rates and natural mortality rates to estimate the size of each age class and the exploitation rate of the population. Biological reference points in the 2010 stock assessment are ratio based and apply to the entire stock. Overfishing is occurring if F/F_{MSY} is greater than 1 and the stock is considered overfished if $SSB/(SSB_{MSY}(1-M))$ is less than 1.

Atlantic croaker is not experiencing overfishing. Biomass has been increasing and fishing mortality decreasing since the late 1980s. Biomass conclusions are based on information from the data compiled for the assessment, namely increasing indices of relative abundance and expanding age structure in the catch and indices. Model estimated values of fishing mortality (*F*), spawning stock biomass (SSB), and biological reference points are too uncertain to be used to determine overfished stock status. Stock status cannot be assessed with confidence until the discards of Atlantic croaker from the South Atlantic shrimp trawl fishery can be adequately estimated and incorporated into the stock assessment (ASMFC 2014).

STATUS OF THE FISHERY

Current Regulations

There are no commercial or recreational regulations on Atlantic croaker in North Carolina.

Commercial Landings

Commercial harvest of Atlantic croaker in North Carolina ranged from 1,928,223 to 14,429,197 pounds from 1994 to 2014 and was estimated at 2,629,793 pounds in 2014. In general harvest has been decreasing since 2003 but between 2013 and 2014 there was a 36% increase in landings (Figure 1) largely due to an in increase in effort from the ocean fly net fishery.

Recreational Landings

Recreational harvest of Atlantic croaker in North Carolina ranged from 99,298 to 355,009 pounds from 1994 to 2014 and was estimated at 227,826 pounds in 2014. While recreational harvest has fluctuated there has generally been a decreasing trend though, the number of releases has generally increased. Harvest increased by 85,946 pounds from 2013 to 2014 and releases increased by 729,877 individuals from 2013 to 2014 (Table 1).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

The number of Atlantic croaker lengths obtained from fishery dependent sources from 2005 through 2014 ranged from 4,265 to 10,313. Mean length varied little ranging from 261.59 mm to 303.83 mm. Minimum length varied ranging from 96 mm to 144 mm. Maximum length varied ranging from 423 mm to 806 mm (Table 2).

Fishery-Independent Monitoring

The Atlantic croaker juvenile abundance index (JAI) from the Pamlico Sound Survey from 2005 through 2015 has varied without trend. The JAI has ranged from 82.7 individuals per tow in 2009 to 1,175.44 individuals per tow in 2010. There has been a decreasing trend since 2012 with a JAI in 2014 of 324.14 individuals per tow. The mean JAI over the 10 year time series is 417.58 individuals per tow (Table 3).

The number of Atlantic croaker aged in North Carolina from 2005 through 2014 has ranged from 237 to 1,071 in 2014. The modal age has ranged from zero in 2008 to five in 2007. While the modal age has varied, in six of the 10 years it was one or two. Minimum age was zero in every year while the maximum age ranged from seven to 15. From 2005-2010 the maximum age was between 13 and 15 and from 2011-2014 the maximum age was between seven and eight (Table 4).

MANAGEMENT STRATEGY

Per Addendum II to Amendment 1 the Traffic Light Approach is used as a precautionary management framework for Atlantic croaker. The Traffic Light Approach provides guidance in

lieu of a current stock assessment for Atlantic croaker. Under this management program, if thresholds for both population characteristics (adult abundance and harvest) achieve or exceed the proportion of threshold for the specified three year period, then management action is taken. See Table 5 for a summary of management strategies.

MANAGEMENT AND RESEARCH NEEDS

There are no research or monitoring programs required of the states except for the submission of an annual compliance report. See Table 6 for a summary of management and research needs.

LITERATURE CITED

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ASMFC. 2014. Addendum II to Amendment I to the Atlantic croaker fishery management plan. Washington (DC): ASMFC. 7 p.

TABLES

Table 1. North Carolina recreational harvest of Atlantic croaker 1994-2014, with landings in number of pounds, and number of discards.

Year*	Harvest Number	Harvest (lb.)	Discard Number
1994	1,179,735	351,230	3,110,528
1995	850,606	326,135	1,172,716
1996	662,240	346,501	1,218,799
1997	661,116	309,457	1,443,568
1998	387,427	161,117	1,060,928
1999	442,185	212,991	1,368,478
2000	391,056	201,306	1,569,385
2001	635,552	355,009	1,256,807
2002	408,944	242,184	925,806
2003	490,399	317,606	1,552,315
2004	511,418	306,029	1,656,049
2005	326,777	168,797	1,401,413
2006	556,024	222,286	2,578,819
2007	461,162	131,185	1,608,120
2008	317,940	132,731	1,419,019
2009	368,990	131,742	1,912,670
2010	478,156	241,993	1,598,139
2011	246,676	99,298	1,798,230
2012	288,813	105,530	1,255,215
2013	411,880	141,880	1,984,701
2014	541,474	227,826	2,714,578

*1994-2003 use old MRFSS calculation method and 2004-2014 use the new MRIP calculation method.

Table 2. Total number measured, mean, minimum, and maximum length of Atlantic croaker from North Carolina commercial landings.

Year	Mean Length (mm)	Minimum Length (mm)	Maximum Length (mm)	Total Number Measured
2005	303.83	125	500	9,514
2006	288.41	120	630	9,121
2007	287.91	118	494	7,541
2008	281.00	116	495	7,299
2009	284.12	123	486	9,344
2010	285.77	128	452	10,313
2011	291.32	96	806	7,780
2012	285.52	144	454	5,008
2013	284.33	143	437	4,265
2014	261.59	113	423	5,945

Table 3. Atlantic croaker juvenile abundance index (number per tow) from the Pamlico Sound Survey (P195) from 2005-2014.

Year	N	CPUE	PSE
2005	52	225.67	20
2006	54	131.54	16
2007	51	113.36	20
2008	54	312.38	22
2009	54	82.7	17
2010	54	1,175.44	17
2011	54	90.47	19
2012	54	1,149.18	14
2013	54	570.95	14
2014	54	324.14	16

Table 4. Total number aged, modal, minimum, and maximum age of Atlantic croaker in North Carolina from 2005-2014.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	3	0	14	597
2006	1	0	13	658
2007	5	0	15	321
2008	0	0	15	739
2009	1	0	14	709
2010	4	0	13	703
2011	1	0	8	237
2012	2	0	7	349
2013	1	0	8	577
2014	2	0	8	1,071

Table 5. Summary of management strategies and needs.

Management Strategy	Objectives	Outcome
Establish Traffic Light method for monitoring the stock in non-assessment years	1,2,3,4	Addendum 2 to Amendment 1, approved August 2014. Replaced triggers established by Amendment 1
Change management unit to single coast wide stock (New Jersey to east coast of Florida and set new biological reference points	1,2,3,4	Addendum 1 to Amendment 1, approved March 2011
Establish triggers to be used in monitoring stock in non-assessment years ASMFC annual state compliance reports submitted in July each year	1,2,3,4	Amendment 1 to the Interstate Fisheries Management Plan for Atlantic croaker, approved November 2005
Encourage the use of circle hooks to minimize recreational discard mortality	1,2,4	Needed
Consider approval of *de minimis* requests from Delaware, South Carolina, Georgia, and Florida	2	Ongoing
Consider basic research and monitoring information needed for informed management in light of budgetary constraints	1,2,3,4	Ongoing

Table 6. Summary of management and research recommendations.

Management Strategy/Research Need	Objectives	Outcome
Fishery-Dependent Priorities		
High		
Encourage fishery-dependent biological sampling, including extraction of ageing structures, to improve age-length keys. Age-length keys should be representative of all gear types in the fishery. Supplement underrepresented length bins with additional ageing samples to avoid the necessity of weighting length-at-age estimates by length frequencies.	1, 2	Ongoing in North Carolina
Obtain gear specific effort information and improve fishery-dependent catch and effort statistics and catch size and age structure.	1, 2	Ongoing in North Carolina
Recover detailed historical landings data from NOAA as indicated by historical summaries.	1, 2, 4	Needed
Moderate		
Develop and implement state-specific commercial scrap	1, 2	Ongoing in North

fisheries monitoring programs to evaluate relative importance of croaker scrap landings.		Carolina
Conduct studies on discard mortality from varying gears in recreational and commercial fisheries.	1, 2, 4	Ongoing; needed in North Carolina
Assess and monitor the effects of bycatch reduction devices (BRD's) on croaker catch.	1, 2, 4	Ongoing in North Carolina
Monitor fisheries with significant croaker bycatch and determine extent of unutilized bycatch and F on fish less than age 1.	1, 2, 4	Ongoing in North Carolina
Determine the onshore versus offshore components of the croaker fishery.	1, 2	Needed
Increase observer coverage of commercial discards.	1, 2	Ongoing in North Carolina
Fishery-Independent Priorities		
Moderate		
Expand fishery-independent surveys and subsample for individual weights and ages, especially in the southern range.	1, 2, 3	Ongoing in North Carolina
Continue monitoring juvenile croaker populations in major nursery areas.	1, 2, 3	Ongoing in North Carolina
Develop coast wide juvenile croaker indices to clarify stock status.	1, 2	Ongoing
Modeling/Quantitative Priorities		
High		
Develop size, age, and sex specific relative abundance estimates from fishery-independent and fishery-dependent data.	1, 2	Ongoing
Identify and evaluate environmental covariates in stock assessment models.	3, 4	Needed
Moderate		
Incorporate bycatch estimates into croaker assessment models.	1, 2	Needed
Analyze croaker YPR to establish a minimum size that maximizes YPR.	1, 2	Needed
Life History, Biological, and Habitat Priorities		
High		
Conduct studies on fecundity and reproductive dynamics and develop maturity schedules.	1, 2, 4	Work by Fabrizio and Tuckey examining the effects of hypoxia on reproduction of Chesapeake Bay croaker in progress
Conduct studies on growth and age structure throughout species range.	1, 2, 4	Ongoing in North Carolina
Conduct collaborative coast wide genetics and tagging studies to determine migratory patterns, stock identification, and stock mixing.	1, 2, 3, 4	Needed
Moderate		
Identify essential habitat requirements.	3, 4	Ongoing in North Carolina

Re-examine historical ichthyoplankton studies of the Chesapeake Bay for an indication of the magnitude of estuarine spawning.	3, 4	Needed
Low		
Determine species interactions and predator-prey relationships between croaker (prey) and predator species targeted in more valued fisheries.	2, 3, 4	Ongoing in North Carolina, work by Binion (NCSU)
Assess the impacts of any dredging activity (i.e., for beach re-nourishment) on all life history stages of croaker.	2, 3, 4	Needed
Management, Law Enforcement, and Socioeconomic Priorities		
Moderate		
Determine the optimum utilization (economic and biological) of a long term fluctuating croaker population.	1, 2, 3, 4	Needed
Evaluate socioeconomic aspects of croaker fisheries.	1, 2, 3, 4	Needed

FIGURES

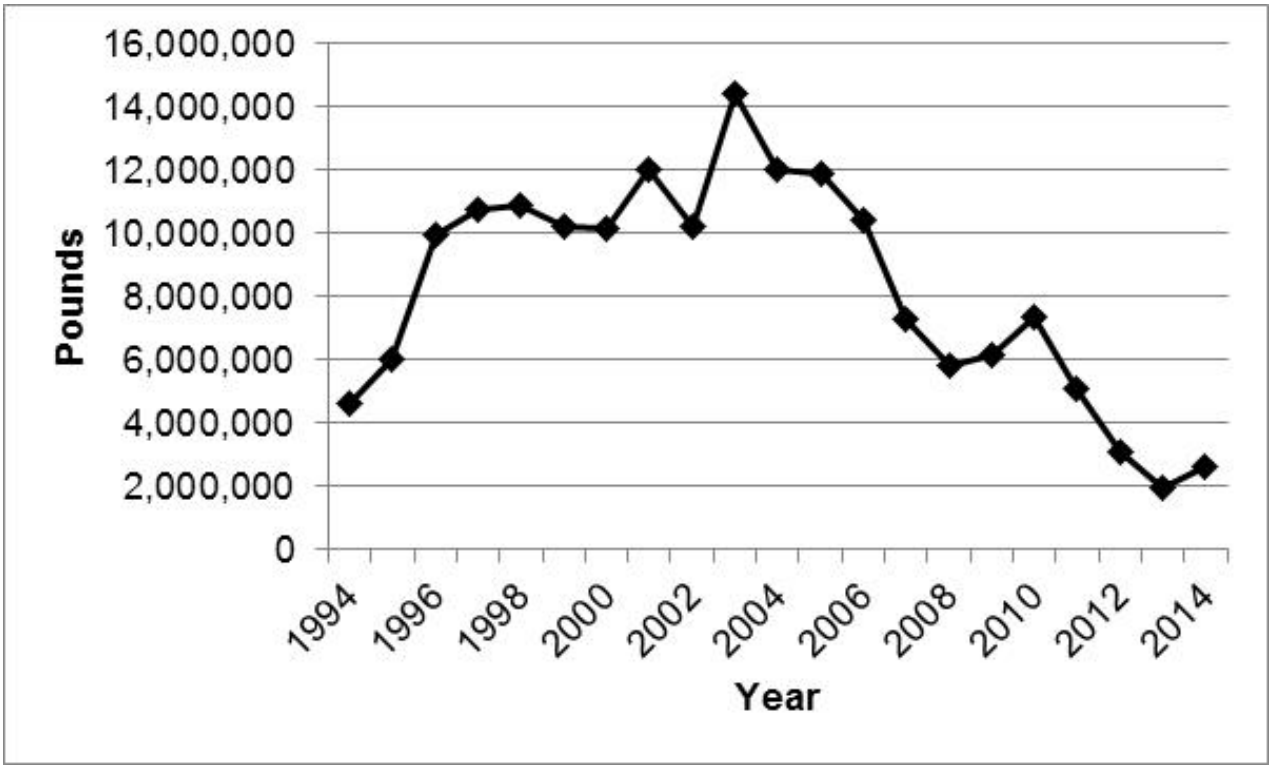

Figure 1. North Carolina commercial landings of Atlantic croaker from 1994-2014.

FISHERY MANAGEMENT PLAN UPDATE
ATLANTIC MENHADEN
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	August 1981
Amendments:	Amendment 1 – July 2001 Amendment 2 – December 2012
Revisions:	Revision – October 1992 Addendum I – August 2004 Addendum II – October 2005 Technical Addendum I – February 2006 Addendum III – October 2006 Addendum IV – November 2009 Addendum V – November 2011 Technical Addendum I – May 2013
Supplements:	Supplement – October 1986
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	2020

The revised Atlantic States Marine Fisheries Commission (ASMFC) Atlantic Menhaden Fishery Management Plan (FMP) was approved in 1992. The revised FMP was the result of an updated stock assessment. In 2001, Amendment 1 to the FMP was approved. This Amendment adopted a new stock assessment, and new overfishing definition, as well as required mandatory reporting for all menhaden purse seine fisheries. Addendum I of Amendment 1 was approved in August 2004 to modify the biological reference points, stock assessment schedule and revise the habitat section. The 2003 stock assessment used a new model with a fecundity-based biological reference point to determine stock status. Addendum II was approved by the ASMFC Atlantic Menhaden Management Board and established a five-year annual cap on reduction fishery landings in Chesapeake Bay and was implemented in 2006. Addendum II also established a research program to determine menhaden population in the Chesapeake Bay and to address localized depletion. Addendum III mirrors the intent and provisions of Addendum II but incorporates 2005 landings data and allows for the transfer of under-harvest to the following year's harvest. Addendum III was passed in November of 2006. The ASMFC Atlantic Menhaden Management Board approved Addendum IV in November of 2009 which extended the Chesapeake Bay reduction fishery harvest cap, established through Addendum III, for an additional three years (2011 to 2013). In 2010, the ASMFC Atlantic Menhaden Management Board tasked the Atlantic Menhaden Technical Committee (TC) to develop alternative reference points. In addition, the Policy Board directed the Multispecies TC to work with the Menhaden TC to explore reference points that account for predation. Addendum V was approved in

November 2011 and established a new interim fishing mortality threshold and target (based on maximum spawning potential or MSP) with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species. The new threshold and target equates to a MSP of 15% and 30%, respectively. The development of Amendment 2 established a 170,800 MT (376,549,545 pounds) total allowable catch (TAC) beginning in 2013 that will continue until completion of and Board action on the next benchmark stock assessment, scheduled in 2014. The Board adopted new biological reference points for biomass based on maximum spawning potential (MSP), with the goal of increasing abundance, spawning stock biomass, and menhaden availability as a forage species. In 2013, Technical Addendum I established a set aside program for episodic events. The 2014 Atlantic menhaden stock assessment was completed and menhaden are not overfished and overfishing is not occurring.

Management Unit

The management unit is defined as the Atlantic menhaden resource throughout the range of the species within U.S. waters of the northwest Atlantic Ocean from the estuaries eastward to the offshore boundary of the EEZ.

Goal and Objectives

The goal of Amendment 2 is to manage the Atlantic menhaden fishery in a manner that is biologically, economically, socially and ecologically sound, while protecting the resource and those who benefit from it. When fully implemented, the Amendment is designed to minimize the chance of a population decline due to overfishing, reduce the risk of recruitment failure, reduce impacts to species which are ecologically dependent on Atlantic menhaden, and minimize adverse effects on participants in the fishery.

STATUS OF THE STOCK

Stock Status

Based on the current adopted benchmarks, the Atlantic menhaden stock status is not overfished and overfishing is not occurring. The biological reference point used to determine the fecundity target is defined as the mature egg production one would expect when the population is being fished at the threshold fishing mortality rate. Population fecundity, a measure of reproductive capacity, was estimated to be well above both the threshold and the target in recent years. In fact, in 2013, fecundity is estimated to have been 71% higher than the target value, which is calculated to be 100 trillion eggs. This means that the spawning stock in 2013 appears to be more than adequate to produce the target number of eggs, and thus the population is not overfished.

Stock Assessment

The 2014 benchmark stock assessment for Atlantic menhaden was initiated in late 2012. The TC initiated the most recent benchmark stock assessment to identify and evaluate all available data sources and explore alternative model configurations as recommended by the 2009 peer review panel. In this benchmark assessment, significant changes were made to growth, maturity, natural mortality, indices of relative abundance, and fishery selectivities. Additionally, this benchmark assessment incorporates a “fleets-as-areas” base model configuration such that

the reduction and bait fisheries were divided into northern and southern regions, creating four separate fleets.

STATUS OF THE FISHERY

Current Regulations

No regulatory changes were made in 2014 to affect menhaden.

Effective January 1, 2013 a law was passed making it unlawful to harvest menhaden with a purse seine net deployed by a mother ship and one or more runner boats within North Carolina's three-mile jurisdiction.

Commercial Landings

Atlantic menhaden landings have been on a decline throughout the last ten years, due to changes in management decisions. Landing exceeded 13 million pounds in 2005 and in 2014 was estimated at almost 800,000 pounds (Table 1). The 2013 and 2014 declines were due to total allowable catch initiated in Amendment 2. Gill nets are the most common gear used throughout the state.

Recreational Landings

Data are not available for recreational landings.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Atlantic menhaden are sampled in a variety of North Carolina Division of Marine Fisheries (NCDMF) dependent surveys for compliance with ASMFC requirements. However, these surveys were not used in the most recent benchmark stock assessment. These include the sink net fishery, the winter trawl fishery , the estuarine gill net fishery and the sciaenid pound net fishery. Commercial landings of Atlantic menhaden are monitored through the NCDMF Trip Ticket Program. Table 2 describes the mean, minimum, and maximum lengths of Atlantic menhaden sampled from the North Carolina commercial fishery. Average lengths in the menhaden commercial fishery have remained fairly consistent from 2005 to 2014.

Fishery-Independent Monitoring

Atlantic menhaden are sampled in a variety of NCDMF independent surveys for compliance with ASMFC. However, these surveys were not used in the most recent benchmark stock assessment. Atlantic menhaden are sampled in the estuarine trawl survey, the Pamlico Sound trawl survey; the striped bass juvenile trawl survey and alosine seine survey in Albemarle Sound. Analysis results include juveniles size categories ranging from <90mm in May, <110 mm in June, <125 mm in July and August, and <150 mm in September and October.

MANAGEMENT STRATEGY

In May 2015, the ASMFC Atlantic Menhaden Management Board approved a TAC for the 2015 and 2016 fishing seasons at 187,880 metric tons (414,204,498 pounds) per year, a 10% increase from the 2014 TAC. The increase responds to the positive findings of the 2015 Atlantic menhaden benchmark assessment which indicates the resource is not overfished nor experiencing overfishing relative to the current biological reference points. The Board also committed to moving forward with the development of an amendment to establish ecological based reference points that reflect Atlantic menhaden's role as a forage species. The amendment will also consider changes to the current state-by-state allocation scheme.

MANAGEMENT AND RESEARCH NEEDS

Many of the research and modeling recommendations from the last benchmark stock assessment remain relevant for the update stock assessment as well. The highest priorities are to:

- Develop a coastwide fishery independent index of adult abundance at age to replace or augment the existing Potomac River pound net index in the model. Possible methodologies include an air spotter survey or an industry-based survey with scientific observers on board collecting the data. In all cases, a sound statistical design is essential (involve statisticians in the development and review of the design; some trial surveys may be necessary). NOTE: An industry funded feasibility study conducted in 2011 further supported the need for this work. A subcommittee of the Atlantic Menhaden Technical Committee began discussions for development of a coastwide aerial survey in 2008. At the time of this update assessment, a contract has been awarded to develop the survey design, with results expected by the end of 2012. The Technical Committee is in consensus that an index of adult abundance is the highest priority research recommendation but recognizes that implementation of the survey will require significant levels of funding.
- Develop a spatially-explicit model, once sufficient age-specific data on movement rates of menhaden are available and develop multispecies statistical catch-at-age model to estimate menhaden natural mortality at age.
- A more complete examination of the industry is needed to properly analyze the potential impacts of the plan and the current amendment.
- Study specific habitat requirements for all life history stages.

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TABLES

Table 1. North Carolina Atlantic menhaden annual commercial landings, 2005-2014.

Year	Landings (pounds)
2005	13,386,245
2006	962,648
2007	1,134,167
2008	645,231
2009	2,124,733
2010	1,299,130
2011	3,529,967
2012	538,783
2013	454,172
2014	794,658

Table 2. Atlantic menhaden length data sampled from the North Carolina commercial fishery, 2005-2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	223	102	341	1,041
2006	203	95	348	1,431
2007	206	122	383	1,112
2008	205	100	325	1,061
2009	230	100	343	1,066
2010	226	147	319	225
2011	236	95	347	1,400
2012	220	70	362	789
2013	237	141	385	847
2014	225	123	324	1,528

FISHERY MANAGEMENT PLAN UPDATE
BLACK DRUM
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	June 2013
Amendments:	None
Revisions:	None
Supplements:	None
Information Updates:	February 2015
Schedule Changes:	None
Next Benchmark Review:	February 2020

The Atlantic States Marine Fisheries Commission (ASMFC) formed a Black Drum Working Group and conducted a series of webinars and conference calls in February and March 2011 compiling data on the status of black drum from New Jersey to Florida. General trends in these black drum fishery dependent and independent data sources and the feasibility of developing a coastwide stock assessment were presented to the Interstate Fisheries Management Program Policy Board in August 2011. The Policy Board accepted the working group's recommendation to initiate an Interstate Fisheries Management Plan (FMP) for black drum. In November 2011, the Management Board also voted to initiate the FMP and a stock assessment concurrently. A Public Information Brochure (PIB) outlining the Commission's intent to develop an Interstate FMP for black drum was released and sent out for public comment in February 2012. In October 2012, the Management Board approved the Draft FMP for black drum for public comment. Public hearings were held in April and March 2013 to solicit comments on a range of issues from the Draft FMP, including management goals and objectives; recreational and commercial management measures; flexibility to react to new assessment information; de minimis levels and exemptions; monitoring requirements and recommendations; and recommended measures for implementation by NOAA Fisheries in federal waters. In April 2013, the Black Drum Technical Committee met for a data workshop to compile fishery independent and dependent data to be used in the first coastwide benchmark stock assessment for black drum. In June 2013, the ASMFC adopted the Interstate FMP for Black Drum and required all states to maintain their current regulations for black drum and implement a maximum possession limit and minimum size limit (of no less than 12 inches) by January 1, 2014. States were also required to further increase the minimum size limit (to no less than 14 inches) by January 1, 2016. In response to the ASMFC request, the North Carolina Marine Fisheries Commission implemented a 14- to 25-inch total length slot size limit (with one fish over 25 inches), 10-fish recreational bag limit and a 500-pound commercial trip limit effective January 1, 2014.

Management Unit

In North Carolina, black drum are included in the Interjurisdictional FMP, which defers to Atlantic States Marine Fisheries Commission (ASMFC) FMP compliance requirements. The FMP includes all states from Florida to New Jersey. The management unit is defined as the black drum (*Pogonias cromis*) resource throughout the range of the species within U.S. waters of the northwest Atlantic Ocean from the estuaries eastward to the offshore boundaries of the EEZ (ASMFC 2013).

Goal and Objectives

The goal of the Black Drum FMP is to provide an efficient management structure to implement coastwide management measures. The objectives of the FMP include:

1. Provide a flexible management system to address future changes in resource abundance, scientific information, and fishing patterns among user groups or area.

2. Promote cooperative collection of biological, economic, and sociological data required to effectively monitor and assess the status of the black drum resource and evaluate the management efforts.

3. Manage the black drum fishery to protect both young individuals and established breeding stock.

4. Develop research priorities that will further refine the black drum management program to maximize the biological, social, and economic benefits derived from the black drum population.

STATUS OF THE STOCK

Stock Status

The stock status of black drum is currently “viable”. The 2015 ASMFC Black Drum Stock Assessment determined that the stock is not overfished and not experiencing overfishing. Prior to the completion of the stock assessment the stock status was listed as “unknown”.

Stock Assessment

Variable catch history in state surveys and fisheries coupled with complex migratory patterns made the use of traditional statistical catch-at-age models difficult, thus a data–poor modeling approach was used for the first coastwide benchmark stock assessment (ASMFC 2015). Data-poor models estimate reference points based on historical catch data and life history information. A Depletion-Based Stock Reduction analysis (DB-SRA) model was used to estimate biomass and maximum sustainable yield (MSY). While the median biomass has declined steadily from the 1900s, the assessment determined that black drum is not overfished and not experiencing overfishing. The median biomass was estimated to be 90.78 million pounds, well above the median biomass that produces maximum sustainable yield (B_{MSY}; 47.26 million pounds).

STATUS OF THE FISHERY

Current Regulations

- Minimum Size Limit
- It is unlawful to possess black drum less than 14 inches total length or greater than 25 inches total length, except that one (1) black drum over 25 inches total length may be retained.

- Harvest Limits
- It is unlawful to possess more than ten (10) black drum per person per day by hook and line or for recreational purposes.

- It is unlawful for any commercial fishing operation, regardless of the number of persons, license holders or vessels involved, to possess more than 500 pounds of black drum per trip.

Commercial Landings

Black drum are primarily caught as bycatch in several North Carolina commercial fisheries; however, they are predominately landed in the estuarine gill net and pound net fisheries. The commercial harvest of black drum has been highly variable over the last ten years (Table 1, Figure 1). On average 116,725 pounds of black drum were landed annually from 2005 to 2014. Commercial landings have ranged from a low of 51,023 pounds in 2014 to a high of 301,998 pounds in 2008. Commercial landings decreased 60% from 2013 to 2014 following the implementation of stricter size and commercial trip limits.

Recreational Landings

The recreational harvest has also been highly variable over the last ten years (Table 2, Figure 1). Recreational anglers landed 713,047 pounds in 2013, almost double the 10-year average. The harvest (pounds of fish) dropped 92% from 2013 to 2014. In 2014, 60,552 pounds of black drum were landed, the lowest of the 10-year time series. Recreational releases (number of fish) increased 198% from 2013 to 2014.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial black drum landings are monitored through the North Carolina trip ticket program. Under this program licensed fishermen can only sell commercial catch to licensed North Carolina Division of Marine Fisheries (NCDMF) fish dealers. The dealer is required to complete a trip ticket every time a licensed fisherman lands fish. Trip tickets capture data on gears used to harvest fish; area fished, species harvested, and total weights of each individual species. Trip tickets are submitted to NCDMF on the 10th of the month following the month in which the landings occurred. Landings are available approximately 30-45 days after they are submitted from the dealers. Commercial fishing activity is monitored through fishery dependent sampling conducted under Title III of the Interjurisdictional Fisheries Act and has been ongoing since 1982. Biological samples (lengths, aggregate weights) are obtained from the NCDMF commercial

fisheries dependent sampling program (P400s). Black drum lengths and aging structures are collected at local fish houses or on the water. Subsequent to sampling a portion of the catch, the total weight of the catch by species and market grade are obtained for each trip, either by using the trip ticket weights or some other reliable estimate.

The mean length of commercially harvested black drum has remained stable over the time series, ranging from 14 inches to 17 inches (Table 3). The minimum and maximum observed total lengths appeared not to change following the implementation of the 14- to 25-inch slot limit. However, the preliminary 2015 data indicates the mean size of commercially caught black drum has increased to 21 inches and the minimum has increased to 17 inches.

The Marine Recreational Intercept Program (MRIP) is the primary survey used to collect data on angler harvest and effort. MRIP provides estimates of catch and effort at a regional level from the recreational fishing community and consists of two components, the Access-Point Angler Intercept Survey (APAIS) and the Coastal Household Telephone Survey (CHTS). The CHTS uses a random digit dialing telephone survey approach to collect marine recreational fishing effort information from residential households located in coastal counties. Individual catch and discard data for calculation of catch rate at the species level are collected through APAIS, an onsite intercept survey conducted at fishing access-sites (e.g., boat ramps, beaches, piers, marinas, etc.). Creel clerks collect intercept data year-round (in two-month waves) by interviewing anglers completing fishing trips in one of four fishing modes (man-made structures, beaches, private boats, and for-hire vessels). Individual lengths (inches-TL) and weights (pounds) are recorded for each individual species sampled. Results from both component surveys are combined at the state, area, fishing mode and wave level to provide estimates of the total number of fish caught, released, and harvested; the weight of the harvest; the total number of trips; and total participation in marine recreational fishing.

The mean total length (TL) of recreational caught black drum ranged from 10 inches to 16 inches (Table 4). The mean length increased 3 inches and the minimum length 6 inches following the implementation of the 14 inch minimum size limit in 2014. The maximum length decreased 3 inches following the implementation of the 14- to 25-inch slot limit in 2014.

Fishery-Independent Monitoring

A fishery independent gill net survey was initiated by the NCDMF in May of 2001. The survey utilizes a stratified random sampling scheme designed to characterize the size and age distribution for key estuarine species in Pamlico Sound (Pamlico Sound Independent Gill Net Survey, North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries Completion Report, Grant F-70, 1991-2013). By continuing a long-term database of age composition and developing index of abundance for black drum this survey will help managers assess the black drum stocks without relying solely on commercial and recreational fishery dependent data. Additionally, data collected is used to help improve bycatch estimates, evaluate the success of management measures, and look at habitat usage.

The annual weighted black drum CPUE from the independent gill net survey has ranged from a high of 3.52 in 2002 to a low of 0.38 in 2012 (Table 5, Figure 3). In 2014, the CPUE was 0.76 slightly below the time-series average. Proportional Standard Error (PSE) has ranged from 12 to 33.

Black drum age structures are collected from various fishery independent (scientific surveys) and dependent (fisheries) sources throughout the year. In 2014, 409 black drum were collected ranging in age from 0 to 31 years (Table 6). The majority of black drum collected from harvest (14 to 25 inches total length) are ages 1-3.

MANAGEMENT STRATEGY

Data poor models such as the one used for 2015 ASMFC Back Drum Stock Assessment are designed to estimate reference points based on historical catch data and the life history of a particular species.. Due to the uncertainty of the inputs and the nature of data poor methods the ASMFC stock assessment subcommittee (SASC) recommended that a precautionary maximum sustainable yield (MSY) estimate of 2.12 million pounds with an interquartile range of 1.60-3.05 million pounds as the recommended target reference point (Figure 2). The threshold MSY or overfishing limit (OFL) was set at 4.12 million pounds. The SASC also recommended that future assessments include “rumble-strip” approach that has been implemented by the Mid-Atlantic Fisheries Management Council for other data poor species. This method allows managers to examine a set of indicators that detect major changes in harvest and F that could trigger a reassessment of the reference points.

See Table 7 for current management strategies and implementation status of the ASMFC Black Drum FMP.

MANAGEMENT AND RESEARCH NEEDS

The FMP outlines management and research needs for black drum. The ASMFC Black Drum Plan Review Team (PRT) will annually review and prioritize the research needs annually as part of the Commission’s FMP Review Process. The research recommendations outlined in the 2015 Black Drum Stock Assessment include:

<u>High Priority</u>

- Age otoliths that have been collected and archived.
- Collect information to characterize the size composition of fish discarded in recreational fisheries.
- Collect information on the magnitude and sizes of commercial discards. Obtain better estimates of bycatch of black drum in other fisheries, especially juvenile fish in the southern Atlantic states.
- Increase biological sampling in commercial fisheries to better characterize the size and age composition of commercial fisheries by state and gear.
- Increase biological sampling in recreational fisheries to better characterize the size and age composition by state and wave.
- Obtain estimates of selectivity-at-age for commercial fisheries by gear, recreational harvest, and recreational discards.
- Continue all current fishery-independent surveys and collect biological samples for black drum on all surveys.
- Develop fishery-independent adult surveys. Consider long line and purse seine surveys. Collect age samples, especially in states where maximum size regulations preclude the collection of adequate adult ages.

Moderate Priority

- Conduct reproductive studies, including: age and size-specific fecundity, spawning frequency, spawning behaviors by region, and movement and site fidelity of spawning adults.
- Conduct a high reward tagging program to obtain improved return rate estimates. Continue and expand current tagging programs to obtain mortality and growth information and movement at size data.
- Improve sampling of night time fisheries.
- Conduct studies to estimate catch and release mortality rates in recreational fisheries.

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TABLES

Table 1. North Carolina commercial black drum landings (lbs), number of dealers and ex-vessel value, 2005-2014 (NCTTP).

Year	Dealers	Ex-Vessel Value	Pounds
2005	120	$12,192	44,989
2006	150	$38,076	125,214
2007	134	$50,320	148,231
2008	156	$104,937	301,998
2009	151	$64,875	148,994
2010	128	$32,805	69,194
2011	132	$26,432	56,083
2012	157	$54,133	94,352
2013	151	$79,480	127,170
2014	120	$32,178	51,023

Table 2. North Carolina recreational black drum harvest (lbs), harvest number (n) and number released (n) and PSE=Proportional Standard Error, 2005-2014 (MRIP).

	Harvest Weight		Harvest Number		Released Alive	
Year	Pounds	PSE	Number	PSE	Number	PSE
2005	63,161	32.7	75,924	27.0	95,255	25.6
2006	162,932	22.4	92,956	21.5	93,229	25.4
2007	220,454	19.1	209,372	22.3	226,463	27.0
2008	524,138	27.4	359,702	20.6	188,680	24.8
2009	121,038	19.5	92,058	22.8	69,484	28.5
2010	305,517	34.9	122,709	20.5	102,348	20.6
2011	151,407	18.3	211,396	18.0	104,286	20.8
2012	243,965	18.0	139,363	15.9	91,895	20.0
2013	713,047	26.9	363,466	20.7	121,306	28.1
2014	60,552	25.7	24,118	28.3	361,621	26.4

Table 3. Commercial black drum length data from NCDMF fisheries dependent sampling programs (P400s), 2005-2014.

Year	Mean TL (inches)	Minimum TL (inches)	Maximum TL (inches)	Total Measured (number
2005	14	5	44	479
2006	14	6	48	2,033
2007	15	7	50	1,973
2008	15	7	50	3,074
2009	16	6	48	1,166

Table 3 (continued).

Year	Mean TL (inches)	Minimum TL (inches)	Maximum TL (inches)	Total Measured (number
2010	17	8	49	669
2011	14	7	33	1,478
2012	15	6	39	1,462
2013	16	5	36	1,213
2014	16	5	47	788

Table 4. Recreational black drum length data from Marine Recreational Intercept Program (MRIP), 2005-2014.

Year	Mean TL (inches)	Minimum TL (inches)	Maximum TL (inches)	Total Measured (number)
2005	10	7	34	89
2006	14	9	33	104
2007	11	7	20	191
2008	13	7	48	363
2009	12	8	25	191
2010	14	7	29	258
2011	10	7	24	567
2012	13	7	26	237
2013	13	7	26	154
2014	16	13	23	33

Table 5. Annual weighted black drum CPUE (ages combined) from the North Carolina Pamlico Sound Independent Gill Net Survey. N=number of samples; CPUE=Catch per unit effort; SE=Standard Error; PSE=Proportional Standard Error.

Year	N	CPUE	SE	PSE
2001	237	1.91	0.41	21
2002	320	3.52	0.46	13
2003	320	1.16	0.30	26
2004	320	0.46	0.09	20
2005	304	0.49	0.13	27
2006	320	0.78	0.09	12
2007	320	0.76	0.16	21
2008	320	0.87	0.16	18
2009	320	0.79	0.16	20
2010	320	0.54	0.18	33
2011	298	0.84	0.15	18
2012	308	0.38	0.07	18

Table 5 (continued).

Year	N	CPUE	SE	PSE
2013	308	0.42	0.07	17
2014	308	0.76	0.17	22

Table 6. Summary of black drum age samples collected from both dependent (commercial and recreational fisheries) and independent (surveys) sources from 2011-2014.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2011	0	0	60	140
2012	1	0	3	327
2013	2	0	4	187
2014	1	0	31	409

Table 7. Summary of ASMFC management strategies and their implementation status for Black Drum Fishery Management Plan.

Management Strategy	**Implementation Status**
HARVEST MANAGEMENT	
Implement a maximum possession limit and size limit (of no less than 12 inches) by January 1, 2014	Accomplished (other states)
Implement a maximum possession limit and size limit (of no less than 14 inches) by January 1, 2016	Proclamation FF-73-2013
DATA AND RESEARCH NEEDS	
Age otoliths that have been collected and archived.	Ongoing
Collect information to characterize the size composition of fish discarded in recreational fisheries.	Ongoing
Collect information on the magnitude and sizes of commercial discards. Obtain better estimates of bycatch of black drum in other fisheries, especially juvenile fish in south Atlantic states	Ongoing
Increase biological sampling in commercial fisheries to better characterize the size and age composition of commercial fisheries by state and gear	Ongoing
Increase biological sampling in recreational fisheries to better characterize the size and age composition by state and wave	Ongoing
Obtain estimates of selectivity-at-age for commercial fisheries by gear, recreational harvest, and recreational discards	Ongoing
Continue all current fishery-independent surveys and collect biological samples for black drum on all surveys	Ongoing

Table 7 (continued).

Management Strategy	Implementation Status
Develop fishery-independent adult surveys. Consider long line and purse seine surveys. Collect age samples, especially in states where maximum size regulations preclude the collection of adequate adult ages	Ongoing
Conduct reproductive studies, including: age and size-specific fecundity, spawning frequency, spawning behaviors by region, and movement and site fidelity of spawning adults	Needed
Conduct a high reward tagging program to obtain improved return rate estimates. Continue and expand current tagging programs to obtain mortality and growth information and movement at size data	Needed
Improve sampling of night time fisheries	Needed
Conduct studies to estimate catch and release mortality rates in recreational fisheries	Needed

FIGURES

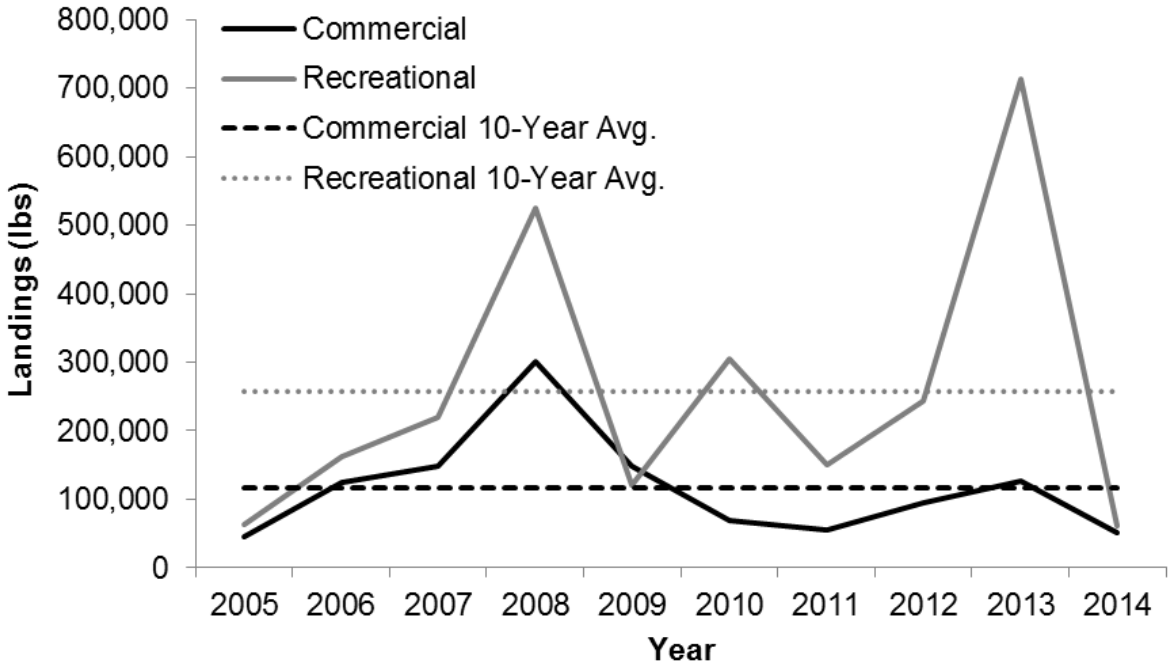

Figure 1. North Carolina commercial (NCTTP) and recreational (MRIP) black drum landings (lbs), 2005-2014.

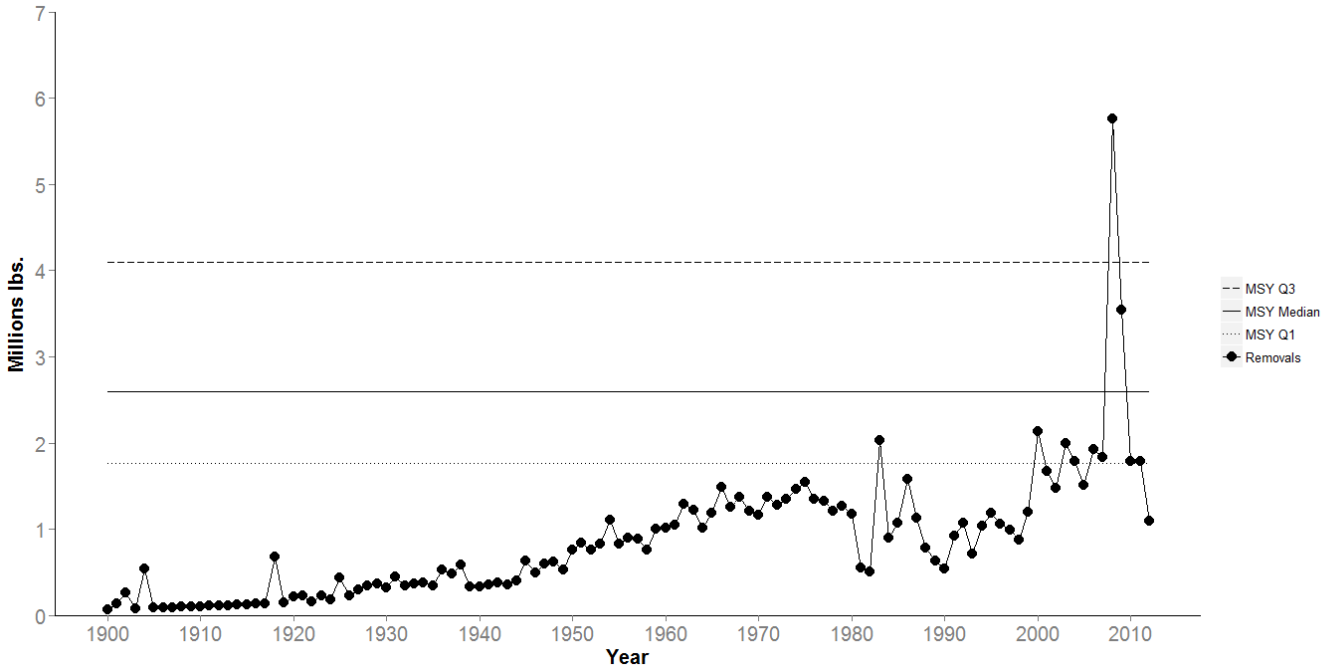

Figure 2. Observed removals and the median (2.60 million pounds) and interquartile range (1.76 – 4.10 million pounds) of the MSY estimate from the DB-SRA base configuration (ASMFC 2015).

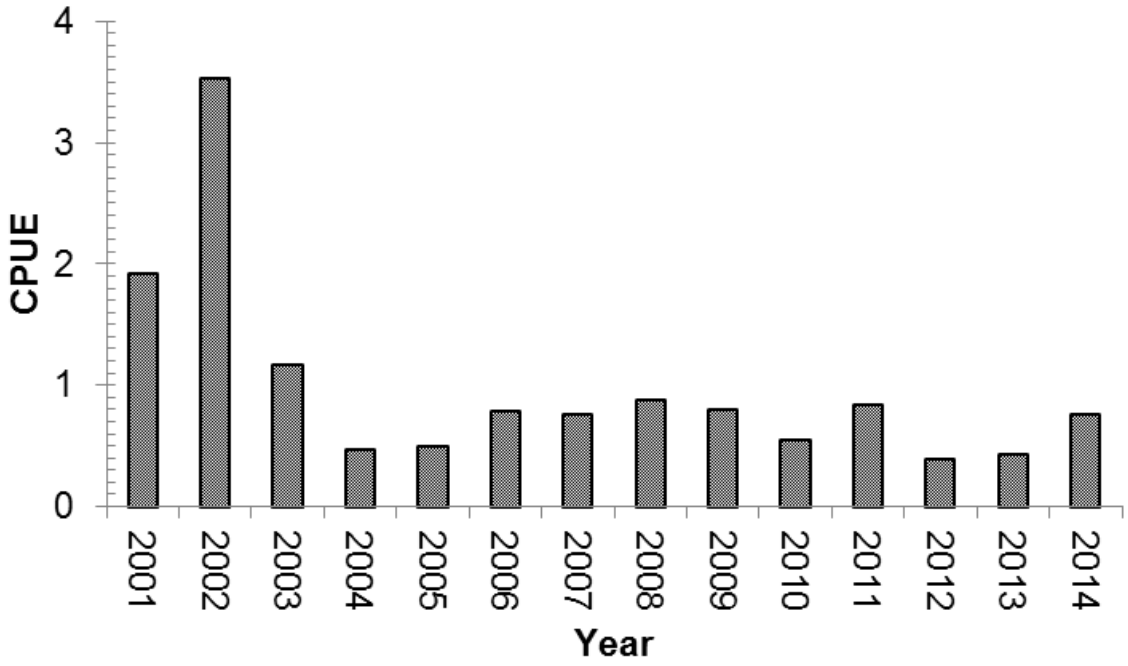

Figure 3. Annual weighted black drum CPUE (ages combined) from the North Carolina Pamlico Sound Independent Gill Net Survey, 2001-2014.

FISHERY MANAGEMENT PLAN UPDATE
BLACK SEA BASS NORTH OF CAPE HATTERAS
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	Incorporated into Summer Flounder FMP through Amendment 9 in 1996
Amendments:	Amendment 11 in 1998 Amendment 12 in 1999 Amendment 13 in 2003 Amendment 15 in 2011 Amendment 16 in 2007
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	Stock assessment to begin in 2016

Because of their presence in, and movement between, state waters (0-3 miles) and federal waters (3-200 miles), the Mid Atlantic Fisheries Management Council manages black sea bass north of Cape Hatteras cooperatively with the Atlantic States Marine Fisheries Commission (ASMFC). The two management entities work in conjunction with the National Marine Fisheries Service (NMFS) as the federal implementation and enforcement entity. The Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP) and amendments use output controls (catch and landings limits) as the primary management tool, with landings divided between the commercial and recreational fisheries. The FMP also includes minimum fish sizes, bag limits, seasons, gear restrictions, permit requirements, and other provisions to prevent overfishing and ensure sustainability of the fisheries. Recreational bag/size limits and seasons are determined on a state-by-state basis using conservation equivalency. The commercial quota is divided into state-by-state quotas based on historical landings. Specific details for each Amendment include:

Amendments 1-8 to the FMP were completed prior to black sea bass being incorporated in the Summer Flounder, Black Sea Bass and Scup FMP

Amendment 9 - Incorporated Black Sea Bass into Summer Flounder FMP; established black sea bass measures, including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements.

Amendment 11 - Modified certain provisions related to vessel replacement and upgrading, permit history transfer, splitting, and permit renewal regulations.

Amendment 12 - Revised FMP to comply with the Sustainable Fisheries Act and established framework adjustment process; established quota set-aside for research for summer flounder, scup, and black sea bass; established state-specific conservation equivalency measures; allowed the rollover of winter scup quota; revised the start date for summer quota period for scup fishery; established a system to transfer scup at sea.

Amendment 13 - Revised black sea bass commercial quota system; addressed other black sea bass mgmt. measures; Established multi-year specification setting of quota for all three species; Established region-specific conservation equivalency measures for summer flounder; built flexibility into process to define and update status determination criteria for each plan species.

Amendment 15 - Established Annual Catch Limits (ACLs) and Accountability Measures

Amendment 16 - Standardized bycatch reporting methodology.

Management Unit

U.S. waters in the western Atlantic Ocean from Cape Hatteras northward to the U.S.-Canadian border.

Goal and Objectives

The objectives of the Summer Flounder, Black Sea Bass and Scup FMP are to:

1. Reduce fishing mortality in the summer flounder, scup and black sea bass fisheries to assure that overfishing does not occur;

2. Reduce fishing mortality on immature summer flounder, scup and black sea bass to increase spawning stock biomass (SSB);

3. Improve the yield from these fisheries;

4. Promote compatible management regulations between state and federal jurisdictions;

5. Promote uniform and effective enforcement of regulations;

6. Minimize regulations to achieve the management objectives stated above.

The 2011 Omnibus Amendment contains Amendment 15 to the Summer Flounder, Black Sea Bass and Scup FMP (the most recent Amendment that impacts the black sea bass fishery). The amendment is intended to formalize the process of addressing scientific and management uncertainty when setting catch limits for the upcoming fishing year(s) and to establish a comprehensive system of accountability for catch (including both landings and discards) relative to those limits, for each of the managed resources subject to this requirement. Specifically: (1) Establish Allowable Biological Catch (ABC) control rules, (2) Establish a Council risk policy, which is one variable needed for the ABC control rules, (3) Establish ACL(s), (4) Establish a system of comprehensive accountability, which addresses all components of the catch, (5) Describe the process by which the performance of the annual catch limit and comprehensive

accountability system will be reviewed, (6) Describe the process to modify the measures above in 1-5 in the future.

Addendum XXV to the Summer Flounder, Black Sea Bass and Scup Fishery Management Plan, established regional management of the summer flounder and black sea bass recreational fisheries for the 2014 fishing year.

STATUS OF THE STOCK

Stock Status

The NCDMF considers the stock status to be 'concern' due to uncertainty in recent stock assessments and low catches in North Carolina waters. Although the ASMFC considers the stock to be rebuilt/sustainable based on the National Marine Fisheries Service's Northeast Fisheries Science Center (NEFSC) 2008 stock assessment, which found that the stock was not overfished and overfishing was not occurring. Subsequent assessments did not pass peer-review due to high uncertainty.

Stock Assessment

The NEFSC 2008 stock assessment used a length based model (SCALE model) due to lack of age data. Although it passed peer-review there was considerable uncertainty about results. The 2011 NEFSC benchmark assessment included a statistical catch at age model calculated using the Age Structured Assessment Program. The 2011 assessment did not pass review for use in management. In 2012 an update of the 2008 SCALE model was completed. However, results from the 2012 assessment are considered too uncertain to provide a reliable stock status determination. A new stock assessment is scheduled for 2016.

STATUS OF THE FISHERY

Current Regulations

Commercial: 11 inches total length (TL) minimum size limit. Landings windows are set by proclamation with variable harvest limits by gear and time-period (see most recent NCDMF proclamation).

Recreational: 12 ½ inches TL minimum size limit, 15-fish bag limit. The 2015 season is May 15 through September 21 and October 22 through December 31.

Commercial Landings

Most black sea bass landings from north of Cape Hatteras were from trawls although flynets, fish pots and rod and reel gears caught small numbers. Landings are constrained by the coastwide quota. Landings generally declined since 2005 but increased notably in 2014 (Figure 1). The low landings in 2012-2013 were partly due to the closure of Oregon Inlet to large vessels (such as trawlers) and the consequent transfer of most of North Carolina's quota allocation to Virginia and other states. In 2014, more winter trawl vessels returned to North Carolina to land catches rather than transferring quota to Virginia and other states. Trends in commercial trips have generally followed landings trends (Figure 1). Trips include the number

of trip ticket records with landings reported. Trips typically represent more than one day of fishing, especially for trawling.

Recreational Landings

Recreational harvest of black sea bass from north of Cape Hatteras generally declined since 2005 with the exception of a peak in 2011 (Figure 2). Recreational trips generally followed harvest trends but with a more clearly declining trend (Figure 2).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Three NCDMF sampling programs collect biological data on commercial and recreational fisheries that catch black sea bass north of Cape Hatteras. Program 433 (Winter Trawl Fishery) and Program 438 (Offshore Live Bottom Fishery) are the primary programs that collect harvest length data. Other commercial sampling programs focusing on fisheries that do not target black sea bass collect biological data rarely. NCDMF sampling of the recreational fishery through the Marine Recreational Information Program (MRIP) collects harvest length data.

There were no clear trends in commercial length data in 2005 to 2014 (Table 1). Annual mean lengths were fairly consistent for the time-series and 2014 was typical. There was a slight decrease in the annual maximum length in recent years compared to earlier years in the time-series. The number of fish measured in 2014 was the highest in the time-series. Age data were not collected for black sea bass north of Cape Hatteras until 2014.

There were some potential trends in length data but sample size was low throughout 2005-2014 (Table 2). Mean lengths were fairly consistent, although higher earliest in the time-series. The maximum annual length may be declining slightly. The number of measurements clearly declined – following the harvest decline with the exception of 2012 (very high harvest). Age data were not collected for black sea bass north of Cape Hatteras from recreational fisheries.

Fishery-Independent Monitoring

NCDMF independent sampling programs rarely encounter black sea bass north of Cape Hatteras (Table 3). Most of the small number of samples came from Program 120 (Estuarine Trawl Survey), which typically collects a few samples of black sea bass juveniles from inshore waters each year. However, it is not clear that samples collected inshore north of Cape Hatteras are from the northern stock of black sea bass; this combined with the small sample numbers means that these data cannot be used in an abundance index. NCDMF currently does not have independent sampling programs in ocean waters north of Cape Hatteras.

MANAGEMENT STRATEGY

Management of black sea bass has been based on results from stock assessments. Despite concerns about data uncertainty etc., results from the 2012 stock assessment update are being used to guide management in combination with a constant catch-based strategy (based on landings in recent years). A new stock assessment is scheduled for 2016.

MANAGEMENT AND RESEARCH NEEDS

At the 2013 Black Sea Bass Data Workshop, a series of research recommendations were developed to address concerns of the MAFMC and SSC had about the 2011 stock assessment. Text in parenthesis for each number indicates known progress made to address needs.

Research to address uncertainty in the spatial structure of the stock:

- Explore the impact of spatial heterogeneity on the stock assessment results. Conduct sensitivity analyses on this topic. Specifically, if you break the stock north-south do you get qualitatively different stock status results than coastwide stock? (progress unknown)
- Explore the use of time-varying catchability to account for changes in density dependent surveys catchability. This was a criticism of use of trawl surveys for a "structure-obligate" species. This will need to be added to the current assessment model (SCALE) code. (progress unknown)
- Use paired trawl experiments coefficient/data as prior's when estimating survey selectivities and estimate the change in selectivity instead of specifying it. This will need to be added to the assessment model code. (progress unknown)
- Build a simulation model that incorporates spatial structure for black sea bass as well as other necessary features (e.g. protogynous life history, sex-specific, etc.). Use existing data to simulate/ determine the scale at which management could be implemented. This simulation exercises should be developed at a complex level, but then be used to determine how simple your models need to be to provide management advice. The simulation can be used to identify critical model features (e.g., plasticity of the size/age at transition from female to male, etc.) and data gaps. (progress unknown)
- Evaluate the ability of the existing data to support a spatially-explicit assessment for management (if needed based on the simulation study above) and implement any necessary data collection protocols to support this approach. (progress unknown)
- If needed, build a spatially-structured, sex-specific assessment model for management. (progress unknown)
- Characterize ageing uncertainty: a) Conduct ageing validation study. b) Conduct formal ageing comparison of NEAMAP & NMFS ageing. c) Conduct formal ageing comparison between south and north Atlantic and borrow their ALKs. Conduct aging exchanges for otoliths (no scales). d) Develop ageing error matrices using this comparison study data for informing model inputs. (progress unknown)
- Explore cohort tracking in surveys (formally check that all surveys with multiple age classes show coherence). Determine if the surveys are tracking strong year classes such that age or length structure in the data could inform the assessment model. (progress unknown)
- Compare the temporal and spatial trends among surveys and report on the evidence of spatial structure of stock among surveys or lack thereof (e.g., spatial autocorrelation of catch and LF, cluster analysis). (progress unknown)
- Explore the catchability of surveys relative to black sea bass migration (e.g., correlation with temperature cues, etc.). Conduct a comprehensive spatio-temporal comparison of availability (side-by-side mapping and analysis of catch in each survey by date and location). (progress unknown)
- Conduct paired scup/BSB pot survey and VAS data with NJ trawl comparison using nearby locations. Explore if BSB are truly structure obligate and if trawls are valid for BSB. Compare catch and length frequency on/off structure. (progress unknown)
- Build an index of relative abundance using Jon Hare's larval survey data (status unknown).
- Look at the implication of pooling samples in the age-length keys (ALK) versus filling parts of the annual keys that are low on samples. (progress unknown)

- Collect additional biological data on all FI surveys. (progress unknown)
- The collection of nearshore commercial trawl and pot fishery biosamples (i.e., lengths and sex) are needed (data collection has begun in NC, other states progress unknown)
- Sex ratio data should be collected from commercial and recreational port/intercept sampling to explore importance of sex information in assessment modeling (data collection has begun in NC, other states progress unknown)
- Ages should be collected from nearshore surveys (MA, RI, CT, NJ) for use in development of regional/local age length keys. (progress unknown)
- Tagging study (natural or artificial) should be conducted to determine mixing/migration. (progress unknown)

Research to address unusual life history:

- Studies should be conducted to understand the general reproductive behavior of black sea bass. What is the role of non-dominant males (e.g., sneaker males) in reproductive stock dynamics? Do black sea bass develop spawning harems or leks? (progress unknown)
- Studies should be conducted to determine the relationship between fertilization rates and sex ratio so this can be included into population dynamics models. A parentage analysis could be used to determine fecundity. (progress unknown)
- Work should be conducted to determine the natural mortality by sex; life stage research is needed. (progress unknown)

LITERATURE CITED

NEFSC. 2011. 53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Report. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center.

TABLES

Table 1. Summary of harvest length (TL, mm) and age data for black sea bass north of Cape Hatteras from NCDMF commercial fishery sampling programs.

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	394	226	650	4,681	ND	ND	ND	ND
2006	389	135	620	4,166	ND	ND	ND	ND
2007	386	235	670	2,476	ND	ND	ND	ND
2008	375	234	656	4,206	ND	ND	ND	ND
2009	381	233	662	2,506	ND	ND	ND	ND
2010	378	226	635	3,415	ND	ND	ND	ND
2011	377	228	631	2,353	ND	ND	ND	ND
2012	373	260	586	858	ND	ND	ND	ND
2013	378	229	611	1,346	ND	ND	ND	ND
2014	381	214	622	5,609	ND*	ND*	ND*	ND*

*2014 age data were collected but are not yet complete

Table 2. Summary of length (TL, mm) and age data for black seas bass north of Cape Hatteras from NCDMF recreational fishery sampling

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	460	266	612	42	ND	ND	ND	ND
2006	342	203	582	64	ND	ND	ND	ND
2007	429	280	553	26	ND	ND	ND	ND
2008	358	273	501	48	ND	ND	ND	ND
2009	379	293	611	48	ND	ND	ND	ND
2010	356	276	529	29	ND	ND	ND	ND
2011	361	273	568	36	ND	ND	ND	ND
2012	384	304	511	14	ND	ND	ND	ND
2013	350	238	518	15	ND	ND	ND	ND
2014	378	314	523	8	ND	ND	ND	ND

Table 3. Summary of length (TL, mm) and age data for black sea bass f north of Cape Hatteras from NCDMF fishery-independent sampling programs

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	79	52	121	7	ND	ND	ND	ND
2006	153	153	153	1	ND	ND	ND	ND
2007	198	194	202	2	ND	ND	ND	ND
2008	123	110	133	5	ND	ND	ND	ND
2009	94	40	111	11	ND	ND	ND	ND
2010	60	42	71	4	ND	ND	ND	ND
2011	76	69	88	3	ND	ND	ND	ND
2012	127	127	127	1	ND	ND	ND	ND
2013	63	32	123	3	ND	ND	ND	ND
2014	ND	ND	ND	0	ND	ND	ND	ND

FIGURES

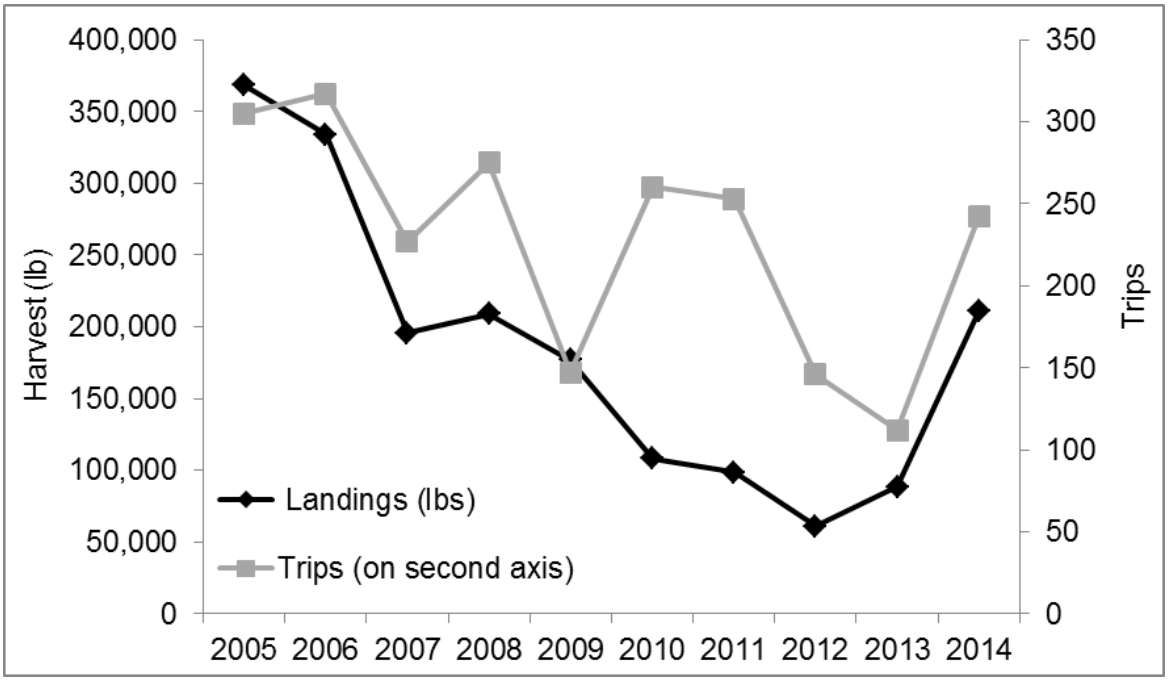

Figure 1. North Carolina commercial landings (lb) and trips for black sea bass north of Cape Hatteras 2005-2014.

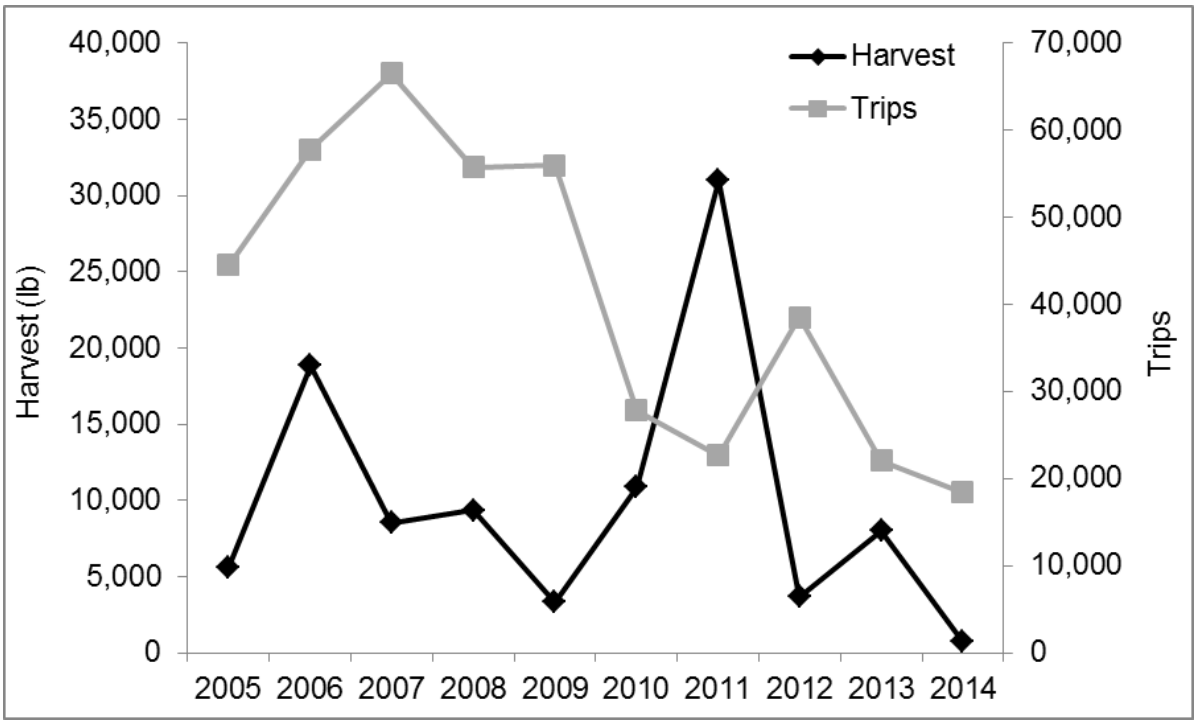

Figure 2. Recreational hook and line harvest of black sea bass in numbers of fish from MRIP data north of Cape Hatteras 2005-2014.

FISHERY MANAGEMENT PLAN UPDATE
BLUEFISH
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	October 1989
Amendments:	Amendment 1 – January 1998 Addendum I – February 2012
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	July 2015

The Bluefish Fishery Management Plan (FMP) is the first plan developed jointly by an interstate commission (Atlantic States Marine Fisheries Commission or ASMFC) and a federal fishery management council (Mid-Atlantic Fishery Management Council or MAFMC). The ASMFC and the MAFMC jointly manage bluefish under Amendment 1 to the Bluefish FMP. After it was implemented in July 2000, Amendment 1 initiated a ten-year rebuilding schedule to eliminate overfishing and allow for stock rebuilding to a level which would support harvest at or near maximum sustainable yield (MSY) by the year 2010 or earlier. The stock was declared rebuilt in 2009.

The FMP allows a state-by-state commercial quota system and a recreational harvest limit to reduce fishing mortality. The ASMFC and MAFMC adjust harvest limits for both sectors annually by the specification setting process that is detailed in Amendment1. Amendment 1 outlines a series of permitting and reporting requirements such as the requirement of operator permits for commercial, party, and charter boats; vessel permits for commercial, party and charter boats, as well as, dealer permits. The Bluefish Monitoring Committee is responsible for reviewing the best available data on an annual basis and recommending commercial and recreational management measures designed to ensure that the resource does not exceed the target fishing mortality rate.

In North Carolina, bluefish is currently included in the Interjurisdictional FMP, which defers to the ASMFC/MAFMC FMP compliance requirements. The FMP allows annually adjusted, state-by-state commercial quota system and recreational harvest limits to reduce fishing mortality.

In 2005, the Stock Assessment Review Committee (SARC) approved the use of an age structured assessment program (ASAP) for bluefish. The bluefish stock successfully rebuilt under the management program in Amendment 1, but the MAFMC and ASMFC were exploring ways to address uncertainties involved in the stock assessment. More specifically, the most

recent benchmark assessment revealed gaps in age length keys used in the ASAP model, and therefore, the assessment results should be used with caution (NEFSC 2005). The purpose of Addendum I was increase the number of aging samples available for the stock assessment and extend the geographic range of age samples to develop a coastwide age-length key.
States that account for more than 5% of total coastwide bluefish harvest (recreational and commercial combined) are required to collect a minimum of 100 bluefish ages (50 from January through June, 50 from July through December). These states are: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and North Carolina.

Management issues are addressed through the ASMFC Bluefish Management Board and the MAFMC Coastal Migratory Species Committee. The ASMFC Bluefish Technical Committee provides technical advice. A joint ASMFC/MAFMC Technical Monitoring Committee conducts annual plan monitoring and provides framework adjustment recommendations. The ASMFC Stock Assessment Subcommittee addresses stock assessment matters.

Management Unit

The FMP defines the management unit as bluefish occurring in U.S. waters of the western Atlantic Ocean and is considered a single stock of fish. States with a declared interest in the bluefish FMP include all member states, with the exception of Pennsylvania and the District of Columbia.

Goal and Objectives

On July 26, 2000, the National Marine Fisheries Service published the final rule to implement the measures contained in Amendment 1 of the ASMFC/MAFMC Bluefish FMP. The goal of Amendment 1 is to conserve the bluefish resource along the Atlantic coast, specifically to:

1. Increase understanding of the stock and fishery.

2. Provide highest availability of bluefish to U.S. fishermen; while maintaining, within limits, traditional uses of bluefish.

3. Provide for cooperation among the coastal states, the various regional marine fishery management councils, and federal agencies involved along the coast to enhance the management of bluefish throughout its range.

4. Prevent recruitment overfishing.

5. Reduce the waste in both the commercial and recreational fisheries.

STATUS OF THE STOCK

Stock Status

The stock is listed as viable. Bluefish are not experiencing overfishing, and are not overfished. Fishing mortality has steadily declined since 1991, with biomass estimates increasing from 1997 to 2006, followed by a decline from 2007 to 2014. A new benchmark stock assessment is scheduled for completion in July 2015.

Stock Assessment

The original ASMFC benchmark bluefish stock assessment was completed in 2005. The assessment passed peer review (SARC 41) and was approved by the ASMFC Bluefish management Board and the MAFMC Coastal Migratory Species Committee. The assessment developed reference points for both bluefish biomass and fishing mortality. The Age Structured Assessment Program (ASAP) model used to calculate population abundance in this assessment is updated annually each spring with landings and survey indices, and the output from the model is used to set the annual Total Allowable Catch (TAC).

The 2014 stock assessment update (utilizing 2013 catch data) indicates that bluefish are not overfished and overfishing is not occurring. Estimates from the Age Structured Assessment Program (ASAP) model using state and federal indices show a decreasing trend in fishing mortality, an increasing trend in population biomass, and an increasing trend in population numbers from 1997 to 2007 followed by a decline from 2007 (86 million fish) to 2014 (59 million fish; Figure 1).

STATUS OF THE FISHERY

Current Regulations

There is a recreational bag limit of 15 fish per day. Only five of the 15 fish bag limit can be greater than 24 inches total length.

Amendment 1 establishes a state-by-state quota system where state quotas are based on the historic proportion of commercial and recreational landings for the period 1981-1989: 17% of the total allowable landings will be allocated to the commercial fishery, and 83% of the total allowable landings would be allocated to the recreational fishery. Each state is required to close its waters to fishing when its share of the commercial quota is landed. The commercial quota can be increased if it is anticipated that the recreational fishery will not land their entire allocation for the upcoming year.

The recreational fishery is managed through an annual framework of possession limits, size limits, and seasonal closures. Since recreational landings decreased in recent years, the Mid-Atlantic Council recommended an increase in the recreational possession limit from 10 to 15 fish in 2001. North Carolina increased the bluefish bag limit to 15 fish (proclamation effective 6/19/2001), and the NC Marine Fisheries Commission adopted a rule whereby only 5 of the 15 fish bag limit can be >24" TL (effective 4/01/2003). The possession limits will remain at 15 fish for 2014.

Commercial Landings

Bluefish landings have fluctuated annually (Figure 2). Landings have been on a relatively stable trend since 1994. Although bluefish landings reached the lowest point in the time series in 2012, landings in the last two years have increased. The vast majority of bluefish are harvested from the ocean gillnet fishery, followed by the estuarine gillnet fishery.

Recreational Landings

Recreational landings for bluefish have been relatively stable since the 1990's (Figure 3). Most of bluefish are harvested from the ocean by anglers fishing from the beach or man-made structures such as piers, jetties, and bridges. Bluefish are one of the most frequently harvested fish in NC.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Bluefish are sampled from a variety of commercial fishery surveys, including the estuarine long haul, ocean trawl, pound net, ocean gill net, estuarine gillnet and ocean beach seine fisheries in North Carolina. A total of 61,566 were measured from 2005 to 2014 (Table 1). Mean fork length (mm) has ranged from 348 mm to 486 mm with a minimum of 122 mm and 886 mm seen in the measurements.

Fishery-Independent Monitoring

The Division's Pamlico Sound Independent Gill Net Survey (PSIGNS) was initiated in May of 2001 and has sampled continuously since. This survey catches more bluefish than any other independent surveys in North Carolina. This survey provides fishery independent indices of relative abundance by size class, which when applied to the appropriate age-length keys can produce annual catch-at-age (CAA) estimates. These estimates provide essential data input for stock assessments. The Catch per Unit of Effort (CPUE) or number of bluefish per set has ranged from 3.6 in 2012 to 7.8 in 2007 during the last 10 years (Figure 4).

The vast majority of bluefish age samples are obtained from the Pamlico Sound Independent Gillnet survey but also come from various fisheries dependent sources. Bluefish ages range from 0 to 11 years old, with modal ages ranging from 1 to 3 years old (Table 2).

MANAGEMENT STRATEGY

The ASMFC uses biological reference points in an Age Structured Assessment Program (ASAP) stock assessment model. These biological reference points include Fishing Mortality at Maximum Sustainable Yield (FMSY) and Biomass at Maximum Sustainable Yield (BMSY). The current biological reference points are FMSY (0.19) and BMSY [147,052 metric tons (MT)]. If the total biomass drops below ½ BMSY of 73,526 MT, then the stock is overfished. If the FMSY rises above 0.19, then overfishing is occurring.

The basis for the reference points was the Sissenwine-Shepherd method using the Beverton-Holt stock recruitment parameters and Spawning Stock Biomass (SSB) per recruit results generated by the ASAP model results. BMSY was calculated using mean weights at age and is therefore comparable to mean biomass in year *t*. The 2013 estimate of mean total biomass is 123,716 MT, which is below BMSY but well above ½ BMSY of 73,526 MT. The 2013 estimate of fishing mortality (0.118) remains well below FMSY (Figure 1).

Bluefish is managed under Amendment 1 to the Fishery Management Plan for the Bluefish Fishery and Addendum I. The Commission and Council approved Amendment 1 to the FMP in

1998. Amendment 1 allocates 83% of the resource to recreational fisheries and 17% to commercial fisheries. However, the commercial quota can be increased up to 10.5 million pounds if the recreational fishery is projected to not land its entire allocation for the upcoming year. The commercial fishery is controlled through state-by-state quotas based on historic landings from 1981-1989. The recreational fishery is managed using a 15 fish bag limit.

A coastwide biological sampling program to improve the quantity and quality of information used in future bluefish stock assessments was approved and implemented in 2012 through Addendum I. A 2013 review the inaugural biological sampling program found the geographic range, distribution of sampling times, and program design are effectively capturing age data and it can be used in the next benchmark assessment, currently scheduled to be completed in July 2015.

The ASMFC FMP allocates 32% of the Atlantic coast total bluefish quota to North Carolina. The FMP for bluefish welcomes individual states to implement management measures in addition to those required by the FMP or FMP amendments. The scope of North Carolina's bluefish proclamation authority is limited to actions which "comply with or utilize conservation equivalency to comply with the management requirements incorporated in the plan" (15A NCAC 2M.0511). North Carolina continues to maintain a 15 fish bag limit on bluefish that has been in place since June 19, 2001. An additional restriction that only 5 of the 15 fish can be >24" TL, did not fall within the proclamation authority of the NCDMF Director, and required a NC rule change. This management measure had full support of recreational anglers and advisory committees, was passed unanimously by the NC Marine Fisheries Commission (4/23/2002), and the rule went into effect 4/01/2003.

MANAGEMENT AND RESEARCH NEEDS

- Collect size, otoliths and age composition of the fisheries by gear type and statistical area. Focus age sampling on as wide a range of sizes as possible
- Target commercial and recreational landings for biological data collection when possible
- Initiate fisheries-dependent and independent sampling of offshore populations of bluefish during the winter months
- Age any archived age data for bluefish and use the data to supplement age keys**
- Test the sensitivity of the bluefish assessment to assumptions concerning age-varying M, level of age-0 discard, and selection patterns
- Evaluate amount and length frequency of discards from the commercial and recreational fisheries
- Continue work on catch and release mortality
- Increase intensity of biological sampling of the NER commercial and coastwide recreational fisheries
- Conduct research to determine the timing of sexual maturity and fecundity of bluefish
- Study tag mortality and retention rates for ALS dorsal loop and other tags used for bluefish
- Initiate research on species interactions and predator-prey relationships
- Initiate a coastal surf-zone seine study to provide more complete indices of juvenile abundance
- Investigate the long term, synergistic effects of combinations of environmental variables on various biological and sociological parameters such as reproductive capability, genetic changes, and suitability for human consumption

- Conduct studies on the interactive effects of pH, contaminants, and other environmental variables on survival of bluefish.

LITERATURE CITED

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Wood, A. D. 2014. Bluefish 2014 Stock Assessment Update: Data and Model Update Through 2013. Coastal Pelagic Working Group, Northeast Fisheries Science Center, NOAA Fisheries. 37 pp.

TABLES

Table 1. Summary of length data sampled from the kingfish commercial fishery.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	486	138	840	7,507
2006	450	122	840	7,751
2007	387	142	833	7,089
2008	416	131	826	6,359
2009	461	145	860	5,784
2010	422	146	886	5,388
2011	406	155	843	4,653
2012	348	134	862	5,731
2013	359	158	830	5,819
2014	371	192	858	5,485

Table 2. Bluefish age data collected from all sources combined, 2006-2014.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2006	3	0	10	532
2007	2	0	11	432
2008	1	0	10	656
2009	3	0	10	489
2010	3	0	8	527
2011	3	0	9	552
2012	1	0	9	811
2013	0	0	9	741
2014	1	0	9	792

FIGURES

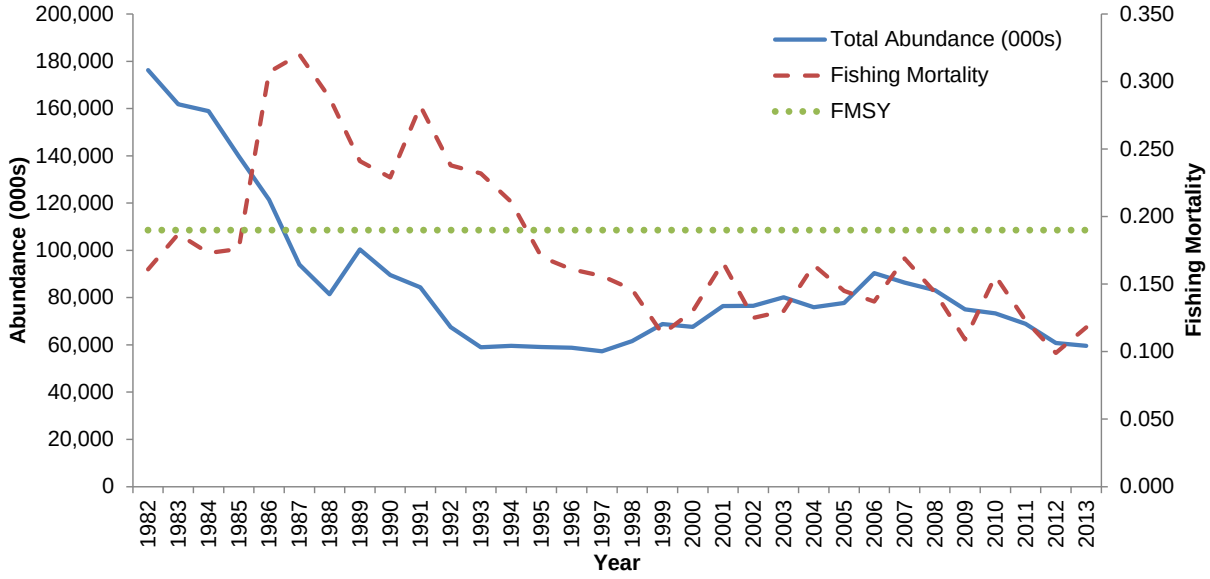

Figure 1. Total bluefish abundance and fishing mortality as estimated in ASAP model updated through 2013. F_{MSY} (fishing mortality at maximum sustainable yield) indicated by dotted horizontal line (cited from Wood (2014)).

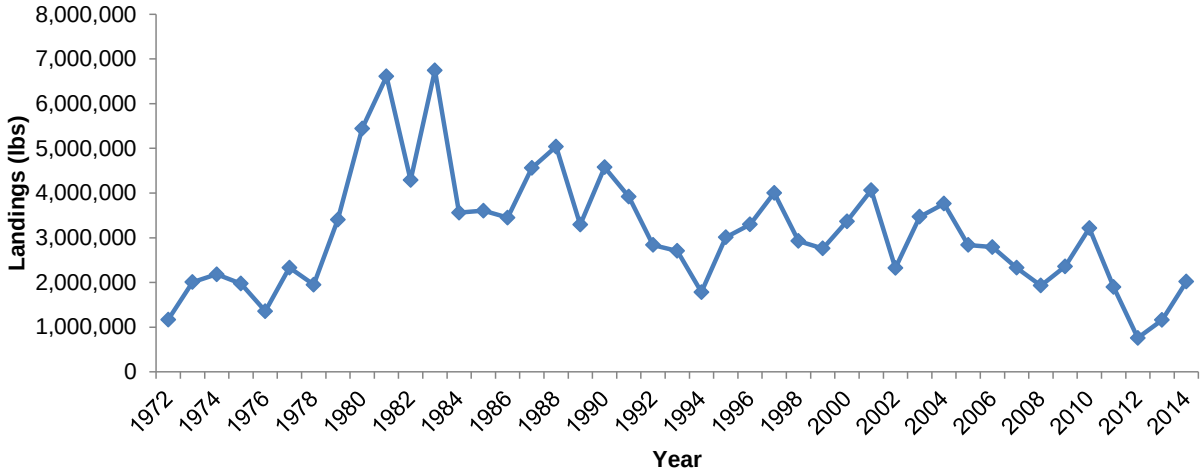

Figure 2. Commercial landings of bluefish from 1972 to 2014.

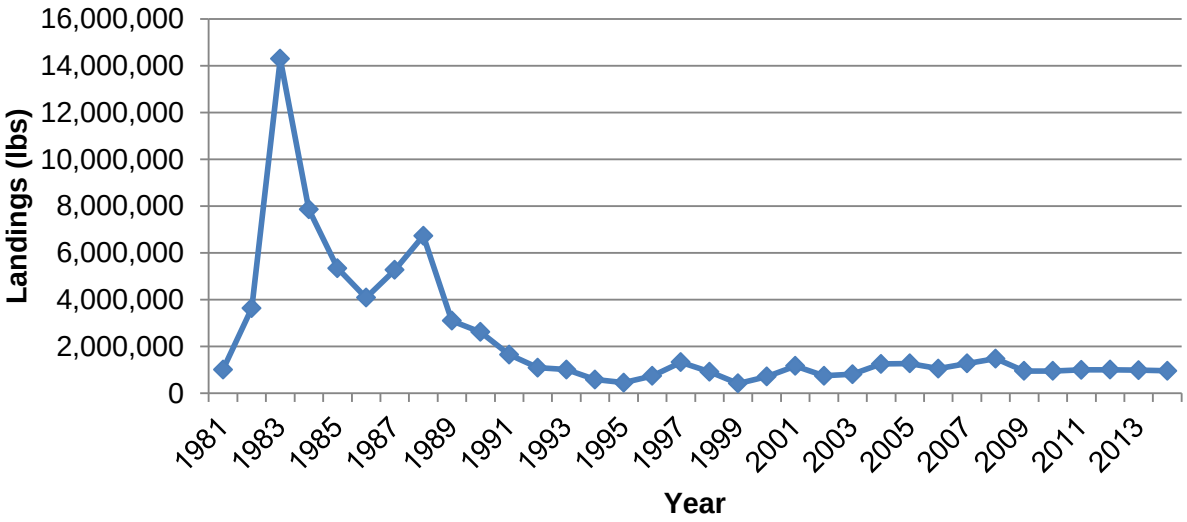

Figure 3. Recreational landings of bluefish from 1981 to 2014.

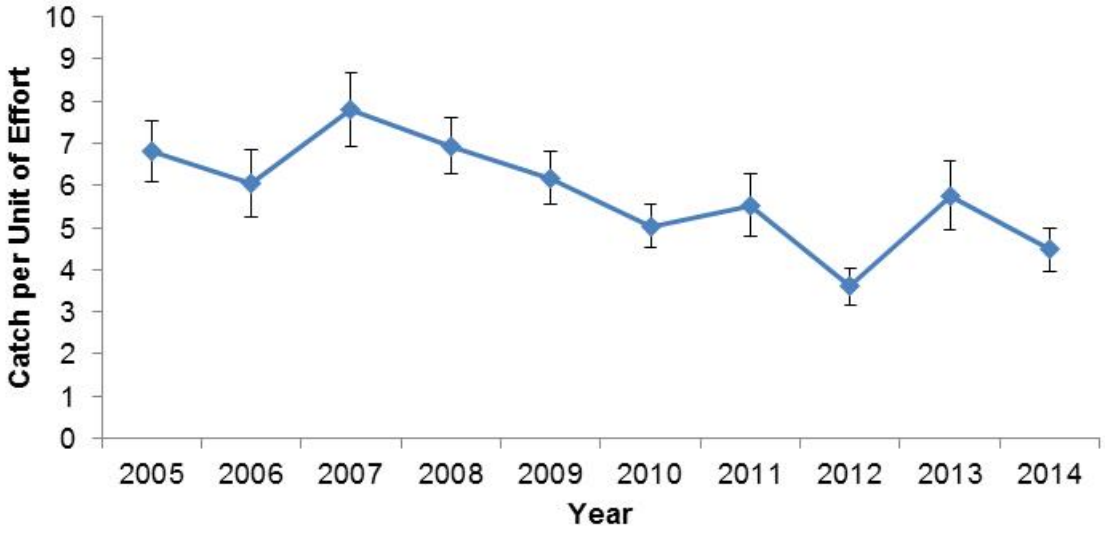

Figure 4. Catch per Unit of Effort of bluefish, from the Pamlico Sound Independent Gillnet Survey from 2005 to 2014.

FISHERY MANAGEMENT PLAN UPDATE
SPOT
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	ASMFC October 1987
Amendments:	ASMFC Omnibus Implementation Plan - October 2011 ASMFC Omnibus Amendment to the Interstate Fishery Management Plans for Spanish mackerel, Spot, and Spotted Seatrout - August 2012 Addendum I - August 2014
Revisions:	N/A
Supplements:	N/A
Information Updates:	N/A
Schedule Changes:	N/A
Next Benchmark Review:	ASMFC benchmark stock assessment scheduled for 2016.

The original interstate Fishery Management Plan (FMP) for spot was adopted in 1987 with recommendations to improve data collection to produce a stock assessment and improve information for management (ASMFC 1987). The original FMP for spot was adopted prior to passage of the Atlantic Coastal Fisheries Cooperative Management Act (1993) and the Atlantic States Marine Fisheries Commission (ASMFC) Interstate Fishery Management Program (ISFMP) Charter (1995). After the passage of the Act, the ASMFC adopted the Charter in order to establish standards and procedures for the preparation and adoption of the FMPs. Once an FMP is amended to incorporate the standards and procedures in the ISFMP Charter, the Commission can also adopt management requirements that can be enforced through the Act. The Omnibus Amendment updates the spot FMP with the Act and Charter requirements and initiated annual trigger exercises to monitor the status of spot resource while also directing the Board to consider management action depending on the results of the trigger exercise (ASMFC 2012). Without coastwide minimum management measures, the trigger exercises did little to provide effective management in between stock assessments and so Addendum 1 to the Amendment was developed. Addendum I establishes the use of the Traffic Light Approach (Caddy and Mahon, 1995; Caddy, 1998, 1999) with precautionary management framework in the management of spot. The management framework utilizing the Traffic Light Approach replaces the management triggers as stipulated in the Omnibus Amendment.

Management Unit

The ASMFC management area extends from Delaware to the east coast of Florida.

Goal and Objectives

The primary goal of the Omnibus Amendment is to bring the FMPs for Spanish mackerel, spot, and spotted seatrout under the authority of the Act, providing for more efficient and effective management and changes to management for the future. The objectives for spot under this amendment include:

1. Increase the level of research and monitoring on spot bycatch in other fisheries, in order to complete a coastwide stock assessment.

2. Manage the spot fishery to encourage reduced mortality on spot stocks until age 1.

3. Develop research priorities that will further refine the spot management program to maximize the biological, social and economic benefits derived from the spot population. The Omnibus Amendment does not require specific fishery management measures in either the recreational or commercial fisheries for states within the management unit range.

STATUS OF THE STOCK

Stock Status

No coastwide assessment has been performed for spot; however spot are a target or component of several state surveys using trawls, gill nets, or seine nets. Abundance indices have been highly variable throughout the survey time series. The status of spot has been considered concerned due the generally declining trends in commercial and recreational landings.

Stock Assessment

An ASMFC benchmark stock assessment is scheduled for 2016.

STATUS OF THE FISHERY

Current Regulations

None.

Commercial Landings

Commercial landings since 1994 have averaged 1.7 million pounds. Three major fisheries accounted for an average of 90% of landings, inshore gill net, ocean gill net, and long haul since 1994, and 94% for 2014. Spot commercial landings in North Carolina's major fisheries (long haul, ocean gill net and inshore gill net) have declined significantly since 2004, reaching a historic low in 2012 but rebounded in 2013 and 2014. Effort measured by trips increased in the ocean gill net and inshore gill net fishery (20% and 45% respectively) and decreased in the long haul fishery (22%) in 2014. Trips in the ocean and inshore gill net fisheries are defined as trips that landed more than 100 pounds of spot. All trips that landed spot in the long haul fishery are included (Figure 1 and 2).

Recreational Landings

Recreational landings of spot have been generally decreasing and reached a historical low in 2012, rebounding in 2013 and 2014. Recreational landings have averaged 893,427 pounds from 2005 to 2014 and were 704,445 pounds in 2014 (Figure 3).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Since 1994, the North Carolina Trip Ticket Program (NCTTP) has collected data on the commercial harvest of spot (Table 1). Commercial fishing activity is also monitored through fishery dependent sampling conducted by the division since 1982. Data collected in this program allow the size and age distribution of spot to be characterized by gear/fishery. Several NCDMF sampling programs collect biological data on commercial fisheries that catch spot. The primary programs that collect length and age data for harvested spot include: 461 (gill net and seine), and 437 (long haul seine). Other commercial sampling programs focusing on fisheries that do not target spot collect biological data rarely.

The average length was longer and more fish were measured in the commercial fisheries in the earlier part of the time series, 2005-2014 (Table 1).

Recreational angler harvest data is collected by the Marine Recreational Information Program (MRIP). There were no clear trends in recreational length data in 2005-2014. Annual mean and minimum lengths were fairly consistent and 2014 was similar to previous years. The maximum lengths have generally been decreasing over the time period (Table 2).

Harvest data from the Recreational Commercial Gear License was collected from 2002 to 2009. This program was discontinued to lack of funding. Spot landings averaged 203,833 pounds. Landings increased 7.8% from 2007 to 2008, while trips increased 3.6%. CPUE (pounds/trip) also increased slightly in 2008, from the lowest on record in 2007. CPUEs (pounds/trip) were consistent 2002 to 2005 but significantly decreased in 2006 and 2007 (Figure 4).
North Carolina awards a citation to applicants for any spot caught by hook and line if the weight exceeds one pound. Low citation years, 1994-1999, year with the highest number of citations was 1999 with ten. Beginning in 2000, many more citation sized fish applications were received, 19 in 2000, 249 in 2001, and 81 in 2005 but there were only two citations received in 2007, none from 2008 to 2013, and one in 2014 (Figure 5).

Fishery-Independent Monitoring

The Pamlico Sound Survey (program 195) samples fifty-two randomly selected stations (grids) in June and again in September. Stations are randomly selected from strata based upon depth and geographic location. Randomly selected stations are optimally allocated among the strata based upon all previous sampling in order to provide the most accurate abundance estimates (PSE <20). Tow duration is 20 minutes; using double rigged demersal mongoose trawls (9.1m headrope, 1.0m X 0.6m doors, 2.2-cm bar mesh body, 1.9-cm bar mesh cod end and a 100-mesh tailbag extension. Data from this survey were used to produce juvenile abundance indices for spot from 1994 to 2014. Catch per Unit Effort (CPUE; Number of spot per tow) have been extremely variable with no clear trend, however since 2006 the trend has been increasing (Figure 6).

The estuarine trawl survey (program 120) samples 105 estuarine core stations along the coast each year without deviation. A two-seam 10.5 foot headrope trawl with a ¼ inch mesh in the body and 1/8 inch mesh in the tailbag is used. Tow duration is calibrated for 1 minute and a span of 75 yards. The data show wide fluctuations with no clear trend (Figure 7).

MANAGEMENT STRATEGY

Addendum I established use of a Traffic Light Analysis (TLA) to evaluate fisheries trends and develop state-specified management actions (e.g. bag limits, size restrictions, time and area closures, and gear restrictions) when harvest and abundance thresholds are exceeded for two consecutive years. The name comes from assigning a color (red, yellow, green) to categorize relative levels of indicators on the condition of the fish population (abundance metric) or fishery (harvest metric). For example, as harvest or abundance decrease, the amount of red in that year becomes more predominant. The TLA improves the management approach as it illustrates long-term trends in the stock and includes specific management recommendations in response to declines in the stock or fishery. The 'harvest' characteristic is comprised of composite commercial and recreational harvest data. Similarly, a composite of fishery-independent survey indices will be used to derive the adult abundance characteristic (Figure 8).

MANAGEMENT AND RESEARCH NEEDS

High Priority

- State monitoring and reporting on the extent of unutilized bycatch and fishing mortality on fish less that age-1 in fisheries that take significant numbers of spot.
- Evaluate the effects of mandated bycatch reduction devices on spot catch in those states with significant commercial harvests.
- Develop fishery-dependent and fishery-independent size and sex specific relative abundance estimates.
- Cooperative coastwide spot juvenile indices should be developed to clarify stock status.
- Continue monitoring long-term changes in spot abundance, growth rates, and age structure.
- Continue monitoring of juvenile spot populations in major nursery areas.
- Improve spot catch and effort statistics from the commercial and recreational fisheries, along with size and age structure of the catch, in order to develop production models.
- Conduct age validation studies.
- Cooperatively develop criteria for aging spot otoliths and scales.
- Develop catch-at-age matrices for recreational and commercial fisheries.
- Determine the effect that anthropogenic perturbations may be having on growth, survival, and recruitment.

Medium Priority

- Develop stock assessment analyses appropriate to current data.
- Cooperatively develop a yield-per-recruit analysis.
- Develop stock identification methods and investigate the degree of mixing between state stocks during the annual fall migration.
- Determine migratory patterns through tagging studies.
- Determine the onshore vs. offshore components of the spot fishery.

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ASMFC. 2014. Addendum I to the Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout.. 7.pp

ASMFC, 2012. Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout.. 131pp.

ASMFC. 1987. Fishery Management Plan for Spot. Washington (DC): ASMFC. Fisheries Management Report #11. 90 p.

Caddy, J.F. 1998. A short review of the precautionary reference points and some proposals for their use in data-poor situations. FAO Fisheries Technical Paper No. 379, 30pp.

Caddy, J.F. 1999. Deciding on precautionary management measures for a stock based on a suite of Limit Reference Points (LRPs) as a basis for a multi-LRP harvest law. NAFO Sci. Council Studies, 32:55-68.

Caddy, J.F. 2002. Limit reference points, traffic lights, and holistic approaches to fisheries management with minimal stock assessment input. Fisheries Research 56:133-137.

TABLES

Table 1. Summary of length data sampled from the commercial fishery for spot, 2005-2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	232	79	370	9,326
2006	214	92	426	7,073
2007	201	100	306	5,311
2008	201	80	337	4,762
2009	207	100	324	4,427
2010	205	87	294	3,636
2011	207	100	334	3,587
2012	203	105	486	1,985
2013	212	107	340	2,725
2014	208	104	391	4,953

Table 2. Summary of length data sampled from the recreational fishery, 2005-2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	218	132	411	1286
2006	226	122	342	1216
2007	230	144	299	1243
2008	213	128	311	1344
2009	216	126	274	682
2010	209	147	306	1096
2011	209	149	283	1534
2012	200	141	298	611
2013	207	115	293	484
2014	210	121	258	344

Table 3. Summary of age data collected from all sources combined.

Year	Modal Age	Minimum Age	Maximum Age	Total Number Aged
2005	1	0	6	529
2006	1	0	5	501
2007	1	0	3	284
2008	1	0	3	408
2009	1	0	3	365
2010	1	0	3	268
2011	1	0	3	413
2012	1	0	4	230
2013	1	0	3	360
2014	1	0	4	702

FIGURES

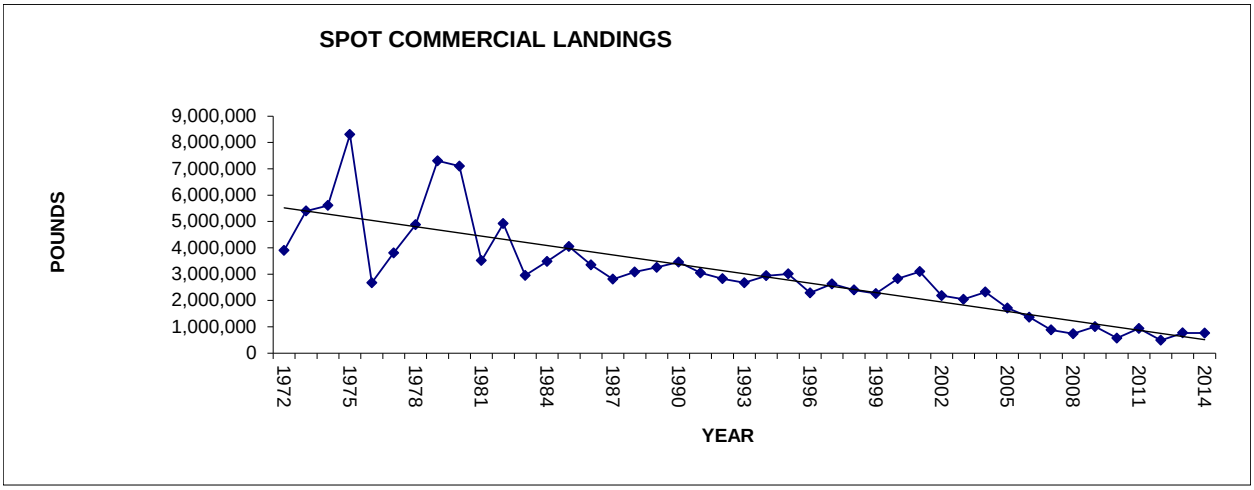

Figure 1. North Carolina commercial landings (pounds), 1972-2014.

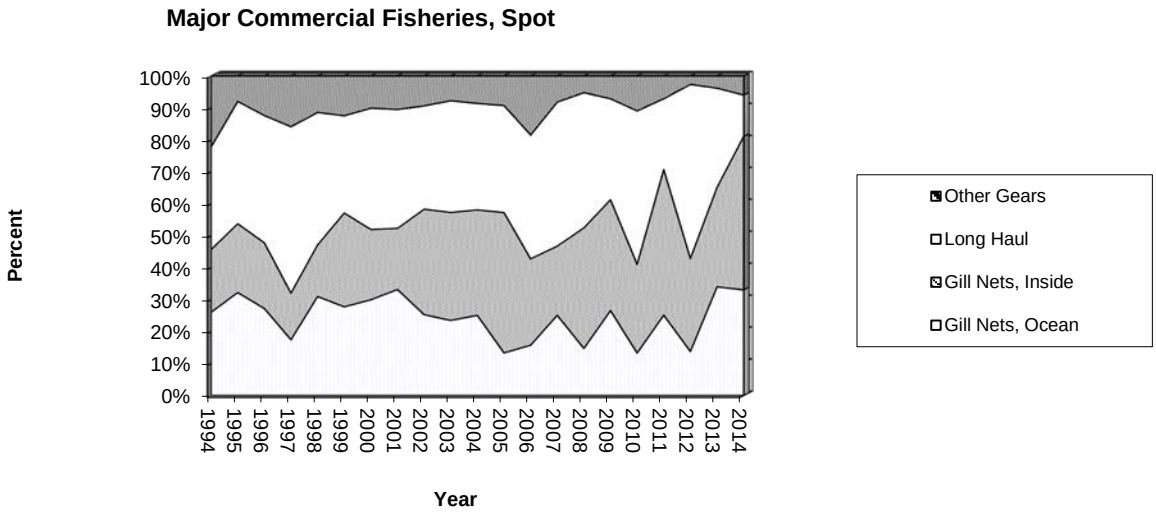

Figure 2. Major commercial gears capturing spot, 1994-2014.

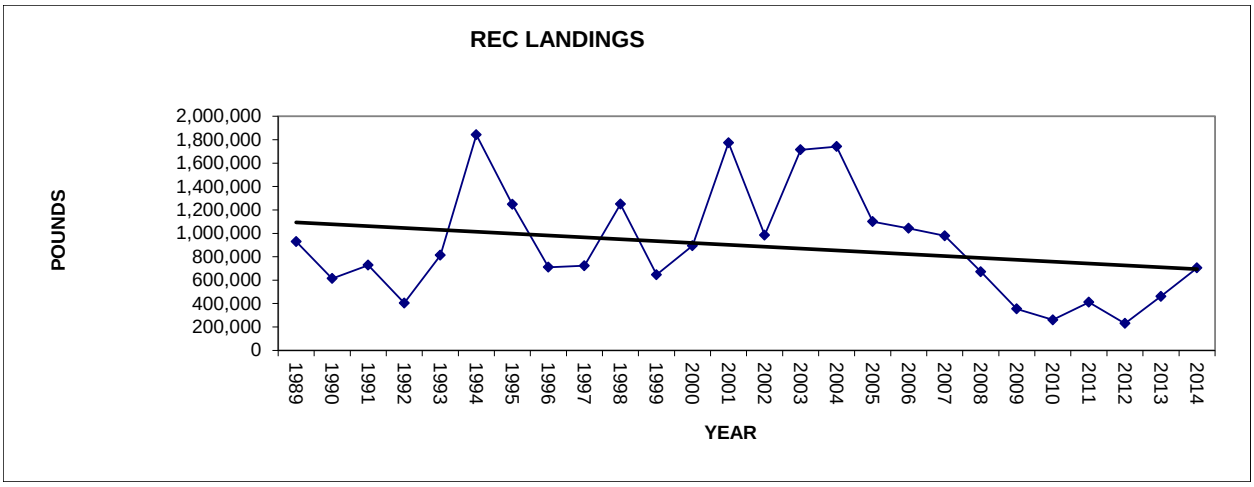

Figure 3. North Carolina recreational landings, 1989-2014.

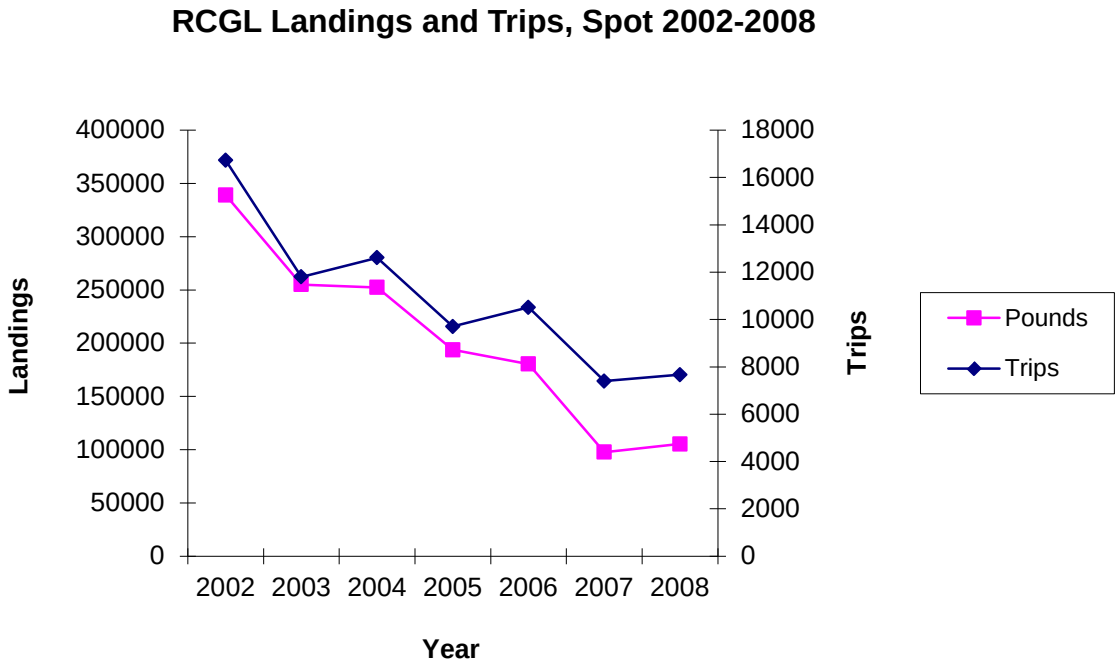

Figure 4. North Carolina spot landings from RCGL license holders, 2002-2008.

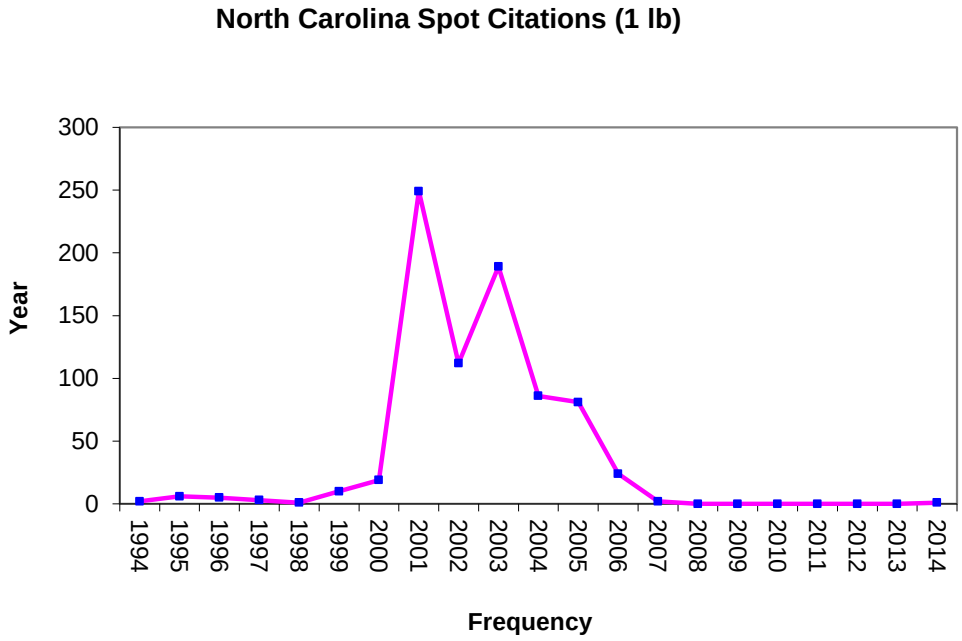

Figure 5. Number of spot citations (issued for hook and line catches >1 lb) issued 1994-2014.

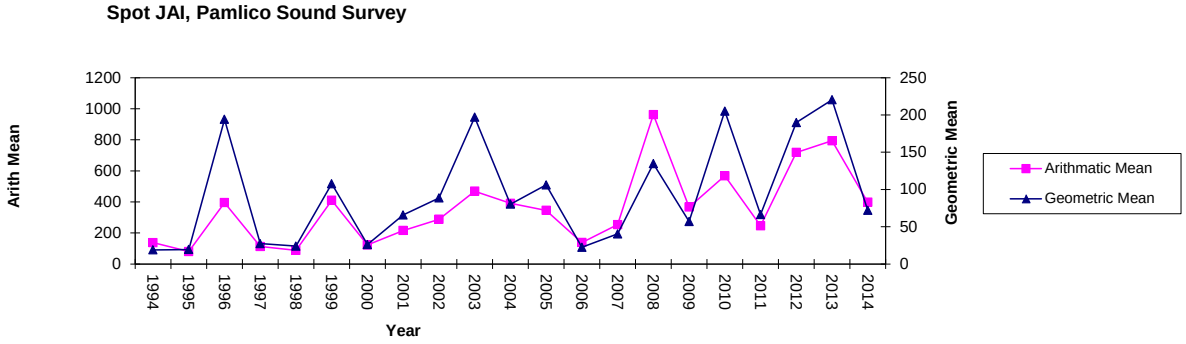

Figure 6. North Carolina Pamlico Sound Survey juvenile indices for spot, 1994-2014.

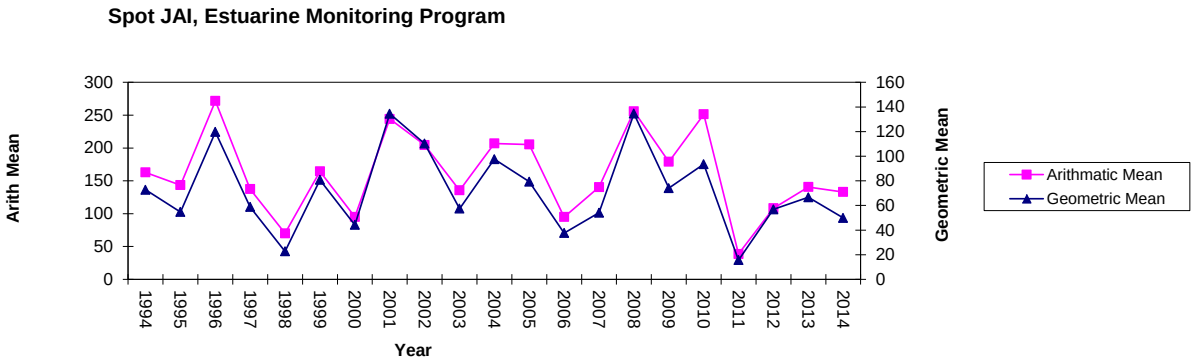

Figure 7. North Carolina Estuarine Trawl Survey juvenile indices for spot, 1994-2014.

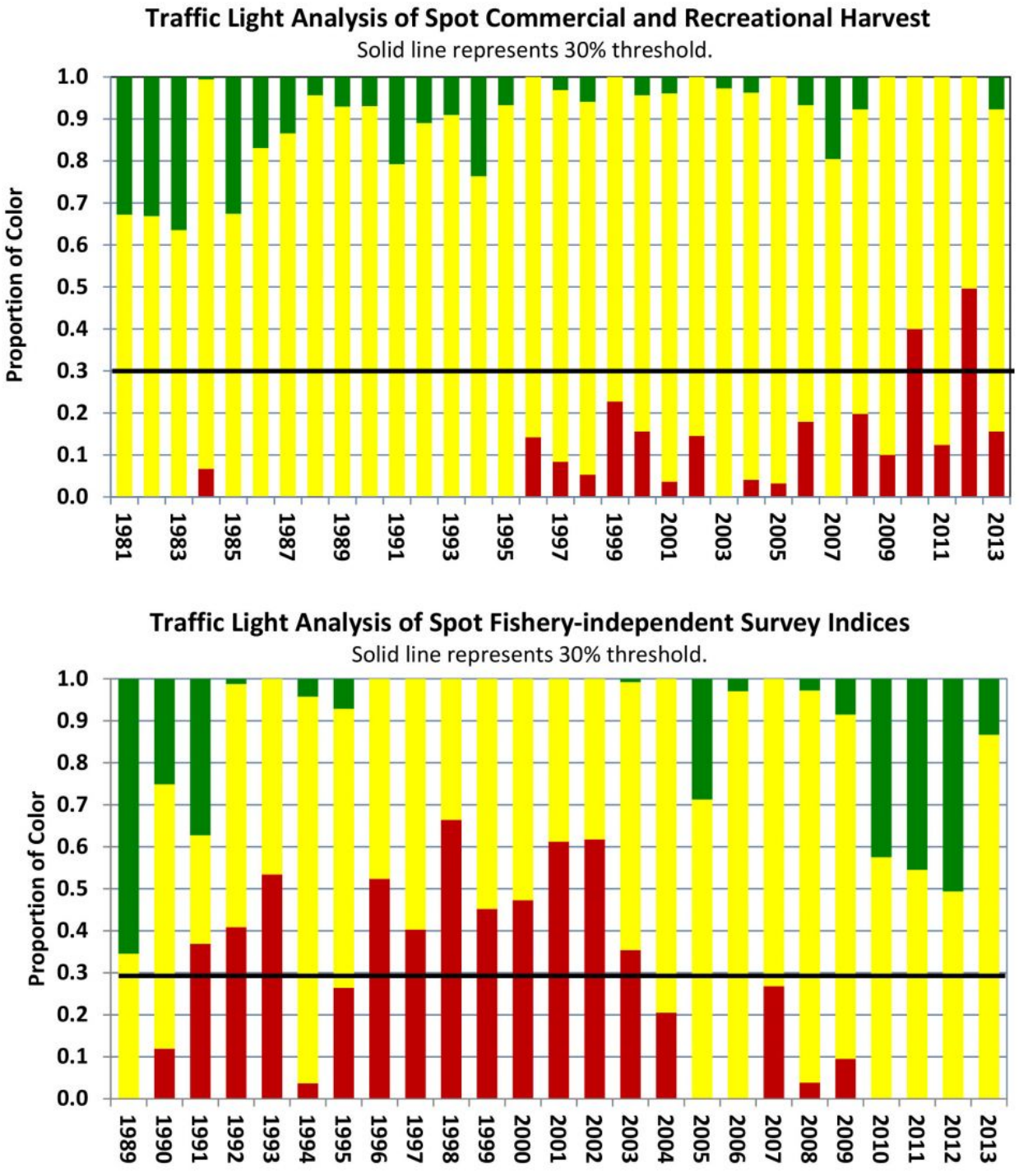

Figure 8. Traffic Light analysis of spot, 1989-2013.

FISHERY MANAGEMENT PLAN UPDATE
SUMMER FLOUNDER
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	Adopted by the ASMFC in 1982 and the MAFMC in 1988
Amendments:	Amendment 1 in 1991 Amendment 2 in 1993 Amendment 3 in 1993 Amendment 4 in 1993 Amendment 5 in 1993 Amendment 6 in 1994 Amendment 7 in 1995 Amendment 8 in 1996 Amendment 9 in 1996 Amendment 10 in 1997 Amendment 11 in 1998 Amendment 12 in 1999 Amendment 13 in 2003 Amendment 15 in 2011 Amendment 16 in 2007
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	A new comprehensive amendment is underway and scheduled to be completed in 2017.

Because of their presence in, and movement between, state waters (0-3 miles) and federal waters (3-200 miles), the Mid Atlantic Fisheries Management Council manages summer flounder cooperatively with the Atlantic States Marine Fisheries Commission (ASMFC). The two management entities work in conjunction with the National Marine Fisheries Service (NMFS) as the federal implementation and enforcement entity. The Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP) and amendments use output controls (catch and landings limits) as the primary management tool, with landings divided between the commercial and recreational fisheries. The FMP also includes minimum fish sizes, bag limits, seasons, gear restrictions, permit requirements, and other provisions to prevent overfishing and ensure sustainability of the fisheries. Recreational bag/size limits and seasons are determined on a state-by-state basis using conservation equivalency. The commercial quota is divided into state-by-state quotas based on historical landings. Specific details for each Amendment include:

Amendment 1 - Established an overfishing definition for summer flounder.

Amendment 2 - Established rebuilding schedule, commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements for summer flounder; created the Summer Flounder Monitoring Committee.

Amendment 3 - Revised the exempted fishery line for summer flounder; increased the large mesh net threshold for summer flounder; established otter trawl retention requirements for large mesh use in the summer flounder fishery.

Amendment 4 - Revised state-specific shares for summer flounder commercial quota allocation.

Amendment 5 - Allowed states to combine or transfer summer flounder commercial quota

Amendment 6 - Set criteria for allowance of multiple nets on board commercial vessels for summer flounder; established deadline for publishing catch limits; established commercial management measures for summer flounder.

Amendment 7 - Revised the fishing mortality rate reduction schedule for summer flounder.

Amendment 8 - Incorporated Scup FMP into Summer Flounder FMP; established scup management measures, including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements.

Amendment 9 - Incorporated Black Sea Bass into Summer Flounder FMP; established black sea bass measures, including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements.

Amendment 10 - Modified commercial minimum mesh requirements; continued commercial vessel moratorium; prohibited transfer of summer flounder at sea; established special permit for party/charter sector for summer flounder.

Amendment 11 - Modified certain provisions related to vessel replacement and upgrading, permit history transfer, splitting, and permit renewal regulations.

Amendment 12 - Revised FMP to comply with the Sustainable Fisheries Act and established framework adjustment process; established quota set-aside for research for summer flounder, scup, and black sea bass; established state-specific conservation equivalency measures; allowed the rollover of winter scup quota; revised the start date for summer quota period for scup fishery; established a system to transfer scup at sea.

Amendment 13 - Revised black sea bass commercial quota system; addressed other black sea bass mgmt. measures; Established multi-year specification setting of quota for all three species; Established region-specific conservation equivalency measures for summer flounder; built flexibility into process to define and update status determination criteria for each plan species.

Amendment 15 - Established Annual Catch Limits (ACLs) and Accountability Measures

Amendment 16 - Standardized bycatch reporting methodology.

Management Unit

U.S. waters in the western Atlantic Ocean from the southern border of North Carolina northward to the U.S.-Canadian border.

Goal and Objectives

The objectives of the Summer Flounder, Black Sea Bass and Scup FMP are to:

1. Reduce fishing mortality in the summer flounder, scup and black sea bass fisheries to assure that overfishing does not occur;

2. Reduce fishing mortality on immature summer flounder, scup and black sea bass to increase spawning stock biomass (SSB);

3. Improve the yield from these fisheries;

4. Promote compatible management regulations between state and federal jurisdictions;

5. Promote uniform and effective enforcement of regulations;

6. Minimize regulations to achieve the management objectives stated above.

The 2011 Omnibus Amendment contains Amendment 15 to the Summer Flounder, Black Sea Bass and Scup FMP (the most recent Amendment that impacts the summer flounder fishery). The amendment is intended to formalize the process of addressing scientific and management uncertainty when setting catch limits for the upcoming fishing year(s) and to establish a comprehensive system of accountability for catch (including both landings and discards) relative to those limits, for each of the managed resources subject to this requirement. Specifically: (1) Establish Allowable Biological Catch (ABC) control rules, (2) Establish a Council risk policy, which is one variable needed for the ABC control rules, (3) Establish ACL(s), (4) Establish a system of comprehensive accountability, which addresses all components of the catch, (5) Describe the process by which the performance of the annual catch limit and comprehensive accountability system will be reviewed, (6) Describe the process to modify the measures above in 1-5 in the future.

Addendum XXVI to the Summer Flounder, Black Sea Bass and Scup Fishery Management Plan, established regional management of the summer flounder and black sea bass recreational fisheries for the 2015 fishing year.

STATUS OF THE STOCK

Stock Status

The stock is considered viable. The 2013 National Marine Fisheries Service's Northeast Fisheries Science Center benchmark stock assessment for U.S. waters north of Cape Hatteras indicated the stock was not overfished and overfishing was not occurring. The 2015 Stock Assessment Update (released in July 2015) found the stock was not overfished but overfishing was occurring in 2014.

Stock Assessment

In the 2013 benchmark assessment, fishing mortality rates and stock sizes were estimated using a statistical catch at age model calculated using the Age Structured Assessment Program (ASAP). Fishing mortality was below the threshold fishing mortality reference point (F35%) and spawning stock biomass (SSB) was above the threshold biomass reference point (one-half SSB_{MSY}) so the stock was not overfished and overfishing was not occurring (although SSB was below the SSB target in 2012). The 2015 Stock Assessment Update included data through 2014 and indicated overfishing was occurring in 2014 relative to the biological reference points established in 2013. Fishing mortality estimates were higher in recent years than previously projected and poor recruitment persisted from 2010 to 2013. However, SSB was above the threshold biomass reference point so the stock was not overfished in 2014.

STATUS OF THE FISHERY

Current Regulations

Commercial: There is a 14-inch total length (TL) minimum size limit as well as harvest seasons and minimum mesh size for the flounder trawl fishery. Trip limits are set for landings windows established by proclamation to constrain harvest to the quota allocation (see most recent NCDMF proclamation on commercial summer flounder fishery). A bycatch trip limit of 100 lb. is in place during the closed trawl season. A license to land flounder from the Atlantic Ocean is required to land more than 100 lb. per trip.

Recreational: There is a 15-inch TL minimum size limit and 6-fish creel limit for all joint and coastal waters.

Commercial Landings

Any landings reported as caught in the ocean are considered to be summer flounder by North Carolina Trip Ticket Program. Most summer flounder landings were from trawls although gill nets and other gears (e.g. spears, gigs, hook and line) catch small numbers of flounder in the ocean. Landings are constrained by the coastwide quota and North Carolina's allocation of the total quota (27.4%). Landings peaked in 2004 and have been generally stable since 2007 aside from the lowest landings in the time-series in 2012 and 2013 (Figure 1). The low landings in 2012-2013 were primarily due to closure of Oregon Inlet to large vessels (such as trawlers) and the consequent transfer of most of North Carolina's quota allocation to Virginia and other states. In 2014, more winter trawl vessels returned to North Carolina to land catches rather than transferring quota to Virginia and other states. Trends in commercial trips have generally followed landings trends (Figure 1). Trips include the number of trip ticket records with landings reported. Trips typically represent more than one day of fishing, especially for trawling.

Recreational Landings

Recreational harvest of summer flounder varied annually but remained relatively high 1992-2002 (Figure 2). After that time harvest declined and remained consistently low. Trends in recreational trips are somewhat difficult to interpret because they represent all paralichthid flounder species commonly caught in North Carolina (southern, summer and Gulf). This is because anglers simply report targeting 'flounder' rather than a particular species of flounder. Trips can be defined in several ways but in this document all trips that harvested or released

paralichthid flounder were included. Trends in trips and harvest are roughly similar in 1992-2007 but in 2008-2014 harvest remained consistently low while trips were variable but remained relatively high (Figure 2).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Several NCDMF sampling programs collect biological data on commercial and recreational fisheries that catch summer flounder. Program 433 (winter trawl fishery) is the primary program that collects length and age data for harvested summer flounder. Other programs that collect information include: 461 (estuarine gill net and seine), 476 (gig and spear), 432 (flounder pound net), 434 (ocean gill net) and 437 (long haul seine). Programs 466 (sea turtle bycatch monitoring) and 570 (commercial shrimp trawl fishery characterization**)**collect length data on harvested and discarded flounder. Other commercial sampling programs focusing on fisheries that do not target summer flounder rarely collect biological data. NCDMF sampling of the recreational fishery through the Marine Recreational Information Program (MRIP) collects length data on summer flounder. The NCDMF mail-based gigging survey collects harvest data for the recreational gig fishery but does not collect length or age data or identify flounder species (and summer flounder are rarely caught by this fishery). Age data from the recreational fishery are collected mainly via voluntary angler donations.

There were no clear trends in commercial length data but some trends in the age data were evident in 2005 to 2014 (Table 1). Annual mean lengths were fairly consistent, but 2014 was the greatest mean length for the time-series. The 2014 maximum length was also the second largest in the time-series. The number of fish measured in 2014 was considerably higher than in 2012 and 2013 (due to low landings 2012-2013) but similar to prior years. The modal age in 2014 was fairly high relative to previous years. The maximum age in 2014 was the oldest in the time-series. Maximum ages since 2010 were higher than previous years, suggesting expansion of the stock age structure. The number of age samples collected and aged in 2014 was the highest in the time-series.

There were no clear trends in recreational length data in 2005 to 2014 (Table 2). The mean length in 2014 was lower than 2011 to 2013 but similar to prior years. The 2014 maximum length was smallest in the time-series. A relatively low number of fish were measured in 2014 but more than in 2013. There were no recreational ages in 2005-2013 so no trends can be discussed.

Fishery-Independent Monitoring

Several NCDMF independent sampling programs collect biological data on southern flounder. However, most surveys do not catch summer flounder regularly enough to provide consistent length, age or abundance data. The main exception is Program 195 (the Pamlico Sound Survey), which conducts trawls using a random stratified survey design in waters of Pamlico Sound and major river tributaries. Stations are randomly selected from strata based upon depth and geographic location. Randomly selected stations are optimally allocated among the strata based upon all previous sampling in order to provide the most accurate abundance estimates (PSE <20). Tow duration is 20 minutes; using double rigged demersal mongoose trawls (9.1m headrope, 1.0m X 0.6m doors, 2.2-cm bar mesh body, 1.9-cm bar mesh cod end and a 100-mesh tailbag extension. The survey takes place in June and September with the samples

collected in June serving as a juvenile abundance index (JAI) for summer flounder in North Carolina. A total of 596 summer flounder were caught in the survey in 2014 and the JAI value was 6.6 fish per tow. The 1987-2014 average JAI value was 9.5, so the 2014 value was relatively low but is similar to recent years (Table 4, Figure 3). The summer flounder JAI from the Pamlico Sound Survey is one of the recruitment indices provided for the annual coastwide stock assessment of summer flounder, although it was not used in the 2013 benchmark stock assessment. It is unclear whether the JAI includes only summer flounder from the stock unit north of Cape Hatteras or if it also includes fish from the population south of Cape Hatteras. Until this question is answered it will be difficult to use the JAI in an assessment. Genetic research on this topic is underway.

MANAGEMENT STRATEGY

An update of the summer flounder stock assessment is completed each year by the Northeast Fishery Science Center (NEFSC). Data are analyzed from the previous year based on decisions made for the previous benchmark assessment. Projections based on stock assessments are used to set the coastwide quota level each year. Amendments to the FMP are undertaken as issues arise that require action. North Carolina has several specific management strategies for summer flounder (Table 5).

MANAGEMENT AND RESEARCH NEEDS

The following research needs were reviewed (existing needs) or developed (new) during the 2013 Stock Assessment Workshop (SAW) by the Southern Demersal Working Group (SDWG) and the Scientific and Statistical Committee (SSC). Text in parenthesis for each number indicates known progress made to address needs.

- Develop a program to annually sample the length and age frequency of summer flounder discards from the recreational fishery (progress has been made in some states outside NC, but more synoptic data and potentially less biased data are needed including the length, age, and sex-frequency of discards).
- A comprehensive collection of otoliths, for all components of the catch-at-age matrix, needs to be collected on a continuing basis for fish larger than 60 cm (~7 years). The collection of otoliths and the proportion at sex for all of the catch components could provide a better indicator of stock productivity (ongoing through NEFSC, NCDMF and other organizations).
- A reference collection of summer flounder scales and otoliths should be developed to facilitate future quality control of summer flounder production aging. In addition, a comparison study between scales and otoliths as aging structures for summer flounder should be completed (an ageing workshop was held in 2014 to compare scales and otoliths, research in ongoing).
- Collect information on overall fecundity for the stock, as both egg condition and production may be a better indicator of stock productivity than weight (ongoing research by NEFSC Sandy Hook Laboratory to address, may require additional data collection).
- Investigate trends in sex ratios and mean lengths and weights of summer flounder in state agency and federal surveys catches (analyzed for the federal survey, state agency data may still need to be analyzed).
- Use NEFSC fishery observer age-length keys for 1994 and later years (as they become

available) to supplement NEFSC survey data in aging the commercial fishery discard (progress unknown - age data may not yet be available).

- Consider use of management strategy evaluation techniques to address the implications of harvest policies that incorporate consideration of retrospective patterns (retrospective pattern has changed since this recommendation was developed - i.e., smaller and less problematic – so this recommendation is no longer considered relevant).
- Consider treating scallop closed areas as separate strata in calculations of summer flounder discards in the commercial fisheries (has not been addressed but may not be an issue in the current discard estimation methods).
- Examine the sensitivity of the summer flounder assessment to the various unit stock hypotheses and evaluate spatial aspects of the stock to facilitate sex and spatially-explicit modeling of summer flounder (progress has been made on aspects of this recommendation, detailed in working papers for 2013 stock assessment).
- Conduct further research to examine the predator-prey interactions of summer flounder and other species, including food habitat studies, to better understand the influence of these other factors on the summer flounder population (research needed).
- Collect and evaluate information on the reporting accuracy of recreational discards estimates in the recreational fishery (Some research has been conducted in the recreational for-hire fishery, but comprehensive work across all fishing modes has not been completed).
- Examine male female ratio at age-0 and potential factors (e.g., environmental) that may influence determination of that ratio (sex ratio was updated, some research completed but more may be needed).
- Evaluate potential changes in fishery selectivity relative to the spawning potential of the stock; analysis should consider the potential influence of the recreational and commercial fisheries (some progress has been made on this topic in a report prepared for the MAFMC SSC describing a MSE for the recreational fishery).
- Collect data to determine the sex ratio for all of the catch components (through a PMAFS study, 2 years of data collection has occurred to determine sex ratios in the commercial and recreational landings).
- Determine the appropriate level for the steepness of the S-R relationship and investigate how that influences the biological reference points (some research completed)
- 16.) Evaluate uncertainties in biomass to determine potential modifications to default OFL CV (progress unknown).
- Evaluate the size distribution of landed and discarded fish, by sex, in the summer flounder fisheries (progress unknown).
- Evaluate past and possible future changes to size regulations on retention and selectivity in stock assessments and projections (progress unknown).
- Incorporate sex -specific differences in size at age into the stock assessment (progress unknown).
- Evaluate range expansion and change in distribution and their implications for stock assessment and management (research ongoing).
- Continued evaluation of natural mortality and the differences between males and females. This should include efforts to estimate natural mortality, such as through mark-recapture programs, telemetry (tagging studies ongoing).
- Further work examining aspects that create greater realism to the summer flounder assessment (e.g., sexually dimorphic growth, sex-specific F, differences in spatial structure [or distribution by size?] should be conducted (progress unknown)
  This could include:
  - Simulation studies to determine the critical data and model components that are necessary to provide reliable advice, and need to determine how simple a model

can be while still providing reliable advice on stock status for management use, and should evaluate both simple and most complex model configurations.
    - Development of models incorporating these factors that would create greater realism.
    - These first steps (a or b) can be used to prioritize data collection, and determine if additional investment in data streams (e.g., collection of sex at age and sex at length and maturity data from the catch, additional information on spatial structure and movement, etc.) are worthwhile in terms of providing more reliable assessment results.
    - The modeling infrastructure should be simultaneously developed to support these types of modeling approaches (flexibility in model framework, MCMC/bootstrap framework, projection framework).
- Develop comprehensive study to determine the contribution of summer flounder nursery area to the overall summer flounder population, based off approaches similar to those developed in WPA12 (otolith microchemistry research ongoing)
- Develop an ongoing sampling program for the recreational fishery landings and discards (i.e., collect age, length, sex) to develop appropriate age-length keys for ageing the recreational catch (progress unknown).
- Apply standardization techniques to all of the state and academic-run surveys, to be evaluated for potential inclusion in the assessment (some progress made).
- Continue efforts to improve understanding of sexually dimorphic mortality and growth patterns. This should include monitoring sex ratios and associated biological information in the fisheries and all ongoing surveys to allow development of sex structured models in the future (progress unknown).
- Conduct sensitivity analyses to identify potential causes of the recent retrospective pattern. Efforts should focus on identifying factors in both survey and catch data that could contribute to the decrease in cohort abundance between initial estimates based largely on survey observations and subsequent estimates influenced by fishery dependent data as the cohort recruits to the fishery (progress unknown).
- Develop methods that more fully characterize uncertainty and ensure coherence between assessments, reference point calculation and projections (progress unknown)

LITERATURE CITED

NMFS NEFSC. 2013. 57th Northeast Regional Stock Assessment Workshop (57th SAW) Assessment Report. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center.

TABLES

Table 1. Summary of length (TL, mm) and age data for NCDMF commercial fishery sampling programs (includes harvest and some discard information)

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	492	95	818	20,754	3	1	11	620
2006	497	123	848	21,093	4	1	11	682
2007	492	110	766	26,488	3	1	11	697
2008	502	77	792	28,550	4	1	11	751
2009	488	83	788	20,311	5	1	11	723
2010	499	217	846	23,492	3	1	14	783
2011	491	87	1095	17,405	4	2	12	417
2012	494	113	846	7,909	3	1	13	541
2013	503	78	794	7,082	4	1	13	575
2014	505	85	900	21,318	5	1	16	1113

Table 2. Summary of length and age data for NCDMF recreational fishery sampling

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	393	328	575	193	ND	ND	ND	ND
2006	394	303	537	217	ND	ND	ND	ND
2007	403	338	538	286	ND	ND	ND	ND
2008	399	331	485	88	ND	ND	ND	ND
2009	400	330	518	136	ND	ND	ND	ND
2010	395	310	550	259	ND	ND	ND	ND
2011	412	336	608	213	ND	ND	ND	ND
2012	410	283	608	228	ND	ND	ND	ND
2013	408	345	584	114	ND	ND	ND	ND
2014	398	338	476	137	2	2	5	8

Table 3. Summary of length (TL, mm) and age data for NCDMF fishery-independent sampling programs

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	134	27	430	799	ND	ND	ND	ND
2006	182	18	454	399	ND	ND	ND	ND
2007	167	40	418	449	ND	ND	ND	ND
2008	159	35	426	1,256	ND	ND	ND	ND
2009	179	37	490	716	ND	ND	ND	ND
2010	156	46	422	770	ND	ND	ND	ND
2011	163	39	431	789	ND	ND	ND	ND
2012	168	38	456	836	ND	ND	ND	ND
2013	153	30	405	1,412	1	0	1	35
2014	151	33	484	698	1	1	2	6

Table 4. Catch per unit effort (arithmetic mean) for summer flounder in Program 195 1987-2014.

Year	CPUE (number of fish per tow)	Standard error
1987	19.86	2.70
1988	2.61	0.89
1989	6.63	1.15
1990	4.27	0.77
1991	5.85	1.41
1992	9.14	1.71
1993	5.13	1.22
1994	8.17	1.94
1995	6.65	1.65
1996	30.67	5.61
1997	14.14	3.00
1998	10.44	4.32
1999*	3.24	0.58
2000	3.94	0.81
2001	22.03	3.31
2002	18.28	3.22
2003	7.23	1.73
2004	5.90	1.32
2005	9.79	1.76
2006	1.96	0.47
2007	3.62	0.67
2008	14.40	3.53
2009	4.53	1.22
2010	14.28	3.72
2011	6.64	1.11
2012	9.26	2.39
2013	9.80	1.92
2014	6.55	1.61
1987-2014 avg.	9.46	
2005-2014 avg.	8.08	

*Sampling occurred in July instead of June

Table 5. Summary of management strategies by North Carolina for summer flounder.

Management Strategy	Objectives	Outcome
14” minimum size limit for the commercial fishery	1,2,3,4,5,6	Size limit accomplished by rule 3M.0503(a)
Minimum trawl stretched mesh size of 5 ½” (diamond) or 6” (square) throughout the body, extensions and tailbag in order to possess more than 100 lb of flounder (exception for flynets)	1,2,3,4,5,6	Rules 3M.0503(b) 3M.0503(f) 3M.0503(g) 3M.0503(h)(1-3)
Licenses to land flounder in Atlantic Ocean and to purchase or offload flounder from the Atlantic Ocean required to possess >100 lb	1	Rules 3M.0503(c)(1,3,4) 3M.0503(c)(2)
Commercial seasons that allocate 80% of the quota to the winter season (starting January 1), a bycatch trip limit of 100 lb during the closed season and the remaining quota allocated to the fall season (starting no earlier than November 1)	1,2	Rules 3M.0503(i)(1-3). Rule suspended for 2013 and 2014 fishing seasons.
Trip limits established for the open seasons	1	Rule 3M.0503(j) Specific trip limits by Proclamation Authority
15” minimum size and 6 fish creel limit for recreational fishery in all joint and coastal waters	1,2,3	Proclamation FF-29-2011

FIGURES

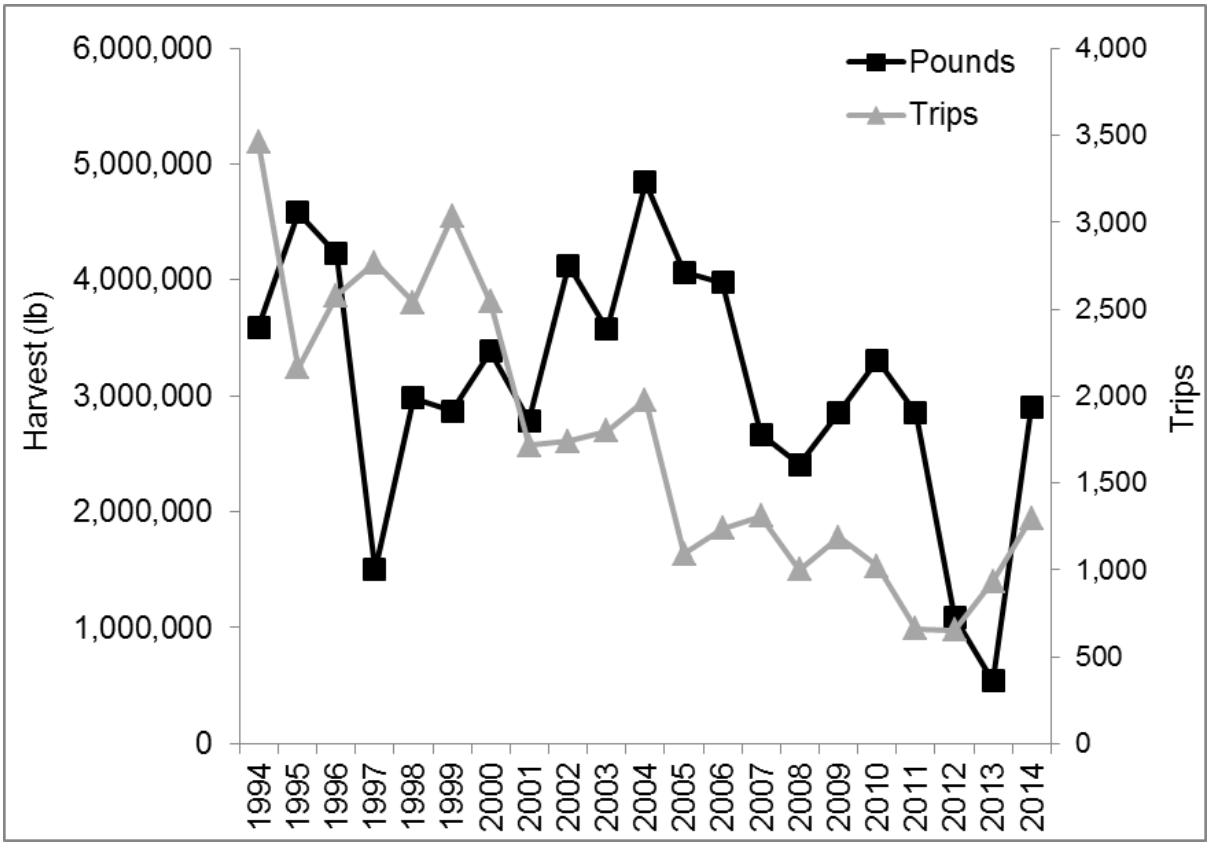

Figure 1. North Carolina commercial landings (lb) and trips for summer flounder 1994-2014.

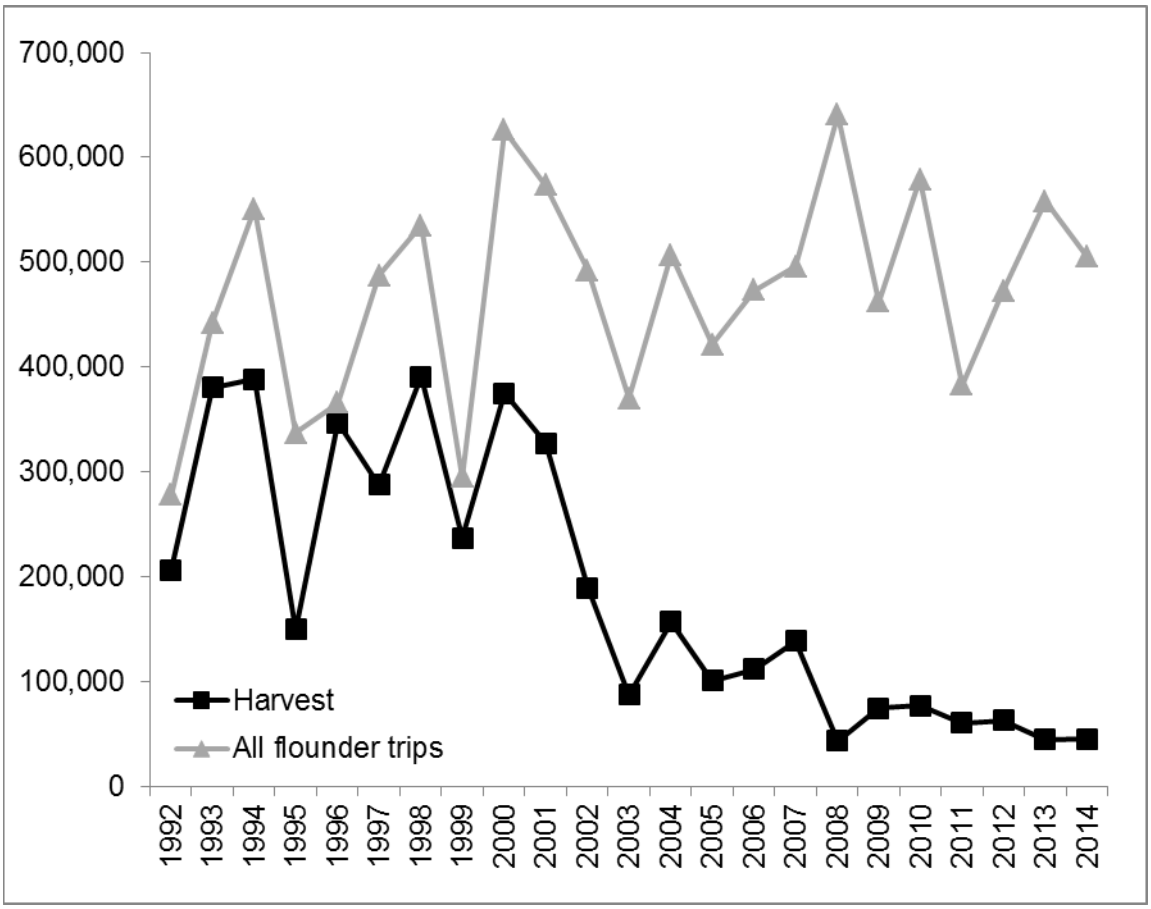

Figure 2. Recreational hook and line harvest (in numbers of fish) and all trips that harvested or released any paralichthid flounder species, from MRIP data 1992-2014.

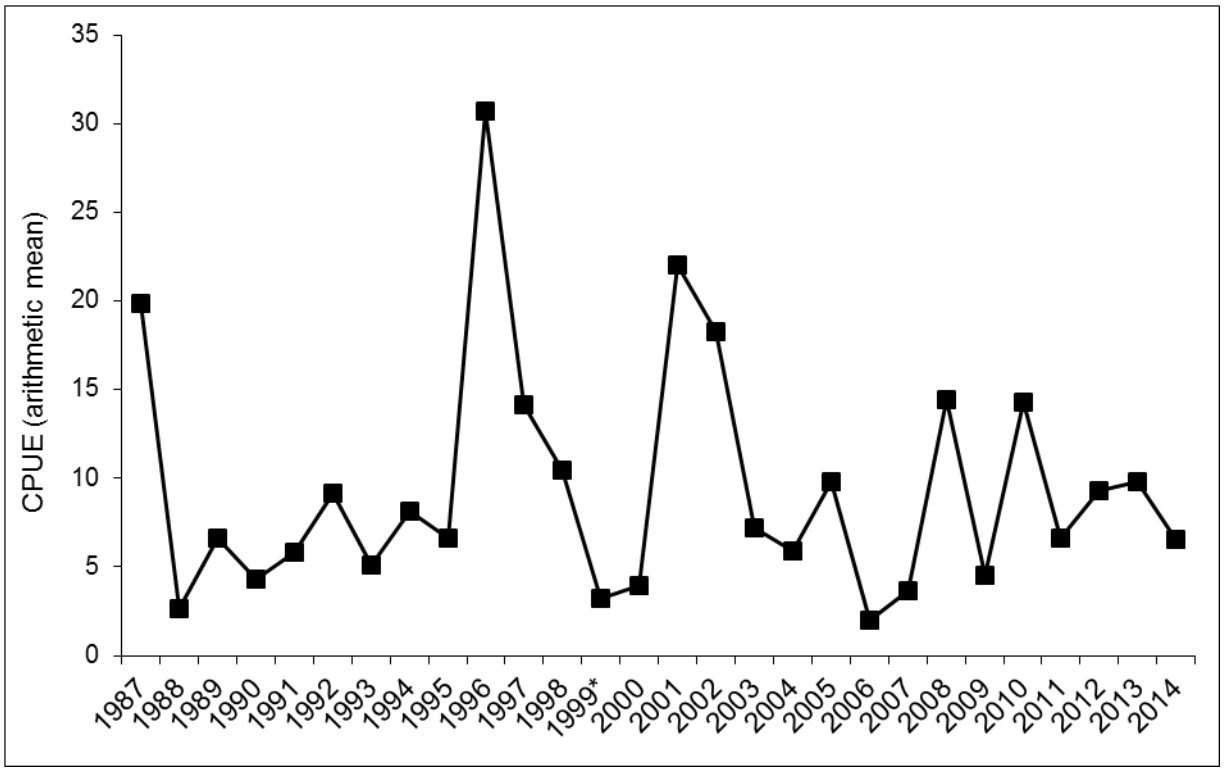

Figure 3. Catch per unit effort for juvenile summer flounder in Program 195 (Pamlico Sound Survey) 1987-2014.

FISHERY MANAGEMENT PLAN UPDATE
WEAKFISH
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	October 1985
Amendments:	Amendment 1 March 1992 Amendment 2 October 1994 Amendment 3 May 1996 Addendum I October 2000 Amendment 4 November 2002 Addendum I December 2005 Addendum II February 2007 Addendum III May 2007 Addendum IV November 2009
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	2016

The Atlantic States Marine Fisheries Commission (ASMFC) adopted its first Fishery Management Plan (FMP) for weakfish in 1985. Amendment 1 to the FMP (1992) unsuccessfully aimed to improve the status of weakfish. Amendment 2 (1994) resulted in some improvement to the stock, but several signs indicated that further improvement was necessary. Thus, Amendment 3 (1996) was implemented to increase the sustainability of the fishery. Addendum I to Amendment 3 was approved in 2000 in order to extend the existing management program until the Weakfish Management Board could approve Amendment 4.

Weakfish are currently managed under the guidelines contained in Amendment 4 (2002). The ASMFC adopted Addendum I to Amendment 4 (2005) to replace the biological sampling program in section 3.0 of Amendment 4. In response to a significant decline in stock abundance and increasing total mortality since 1999, the Board approved Addendum II to Amendment 4 (2007) to reduce the recreational creel limit and commercial bycatch limit, and set landings levels that when met, will trigger the Board to re-evaluate management measures. Addendum III to Amendment 4 (2007) altered the bycatch reduction device certification requirements in Section 4.2.8 of Amendment 4 for consistency with the South Atlantic Fishery Management Council's Shrimp FMP. A new stock assessment was conducted in 2009. The findings indicate that weakfish are currently in a severely depleted state. It is natural mortality, however, rather than fishing mortality (F) that is believed to be the primary culprit in the decline. In response to the continued decline in the weakfish population, the ASMFC Weakfish Management Board has

passed Addendum IV to Amendment 4 (2009). This Addendum requires all states along the east coast to implement severe harvest restrictions on weakfish. These include a one fish daily recreational bag limit and a 100 pound daily commercial trip limit. North Carolina requested and was approved by the Weakfish Management Board to implement a 10% bycatch allowance for weakfish in lieu of the 100 pound daily trip limit. This request was considered to be conservationally equivalent to the 100 pound daily trip limit. The alternate management action allowed weakfish to be landed provided they make up less than 10% of the weight of all finfish landed up to 1,000 pounds per trip or day, whichever is longer. This alternate management strategy was implemented in August of 2010. In November of 2012, based on the recommendation of the North Carolina Marine Fisheires Commission (NCMFC), the 100 pound daily trip limit consistent with Addendum IV was implemented and replaced the alternate management strategy. It was noted by the Weakfish Management Board, that reductions in harvest will not rebuild the depleted stocks until other factors (i.e. natural mortality) become more favorable for weakfish survival. The Board's actions are intended to reduce harvest and poise weakfish for a recovery.

Management Unit

Weakfish are managed under this plan as a single stock throughout their coastal range. All Atlantic coast states from Massachusetts through Florida and the Potomac River Fisheries Commission have a declared interest in weakfish. Responsibility for the FMP is assigned to the Weakfish Management Board, Plan Review Team, Technical Committee, Stock Assessment Sub-Committee, and Advisory Panel.

Goal and Objectives

The goal of Amendment 4 is to utilize interstate management so that Atlantic coastal weakfish recover to healthy levels that will maintain commercial and recreational harvest consistent with a self-sustaining spawning stock and to provide for restoration and maintenance of essential habitat (ASMFC 2002). The management objectives are to:

1. Establish and maintain an overfishing definition that includes target and threshold fishing mortality rates and a threshold spawning stock biomass to prevent overfishing and maintain a sustainable weakfish population;

2. Restore the weakfish age and size structure to that necessary for the restoration of the fishery;

3. Return weakfish to their previous geographic range;

4. Achieve compatible and equitable management measures among jurisdictions throughout the fishery management unit, including states' waters and the federal EEZ;

5. Promote cooperative interstate research, monitoring and law enforcement necessary to support management of weakfish;

6. Promote identification and conservation of habitat essential for the long term stability in the population of weakfish; and

7. Establish standards and procedures for both the implementation of Amendment 4 and for determination of states' compliance with provisions of the management plan.

Amendment 4 defines overfishing through the use of target and threshold F rates (F30%=F=0.31 and F20%=F=0.50, respectively) and a threshold spawning stock biomass (SSB) (SSB20%=31.8 million pounds). In order to achieve annual F targets, recreational harvest of weakfish is constrained by a combination of size limits and possession limits, and commercial harvest by size limits, gear restrictions, and possibly season and/or area closures. After approval, states may implement alternative management plans with conservation equivalency

STATUS OF THE STOCK

Stock Status

The most recent stock assessment indicates that the weakfish stock is depleted and overfishing is not occurring (NEFSC 2009a, NEFSC 2009b). In general, weakfish biomass has declined to an all time low, total mortality is currently high, and non-fishing mortality has increased in recent years. Given this situation, recent fishery removals (landings and dead discards combined) represent a significant proportion of the remaining biomass and further exacerbate the stock decline. While overfishing has not occurred in recent years, harvest was reduced by an estimated 60% in Addendum IV to reduce additional mortality from fishing and poise the stock for a quicker recovery should natural mortality decline.

Currently, the stock's spawning potential is considered to be at only 4% of an unfished stock, well below the 20% spawning potential threshold and 30% spawning potential target adopted in Addendum IV. Trends in F are stable and modest. Thus, while the stock biomass is depleted, overfishing is not occurring.

Stock Assessment

Between 1982 and 1990, age 1+ weakfish biomass declined drastically. Overfishing was the main cause of this decline, with F accounting for about 60-90% of total mortality (fishing plus natural mortality) during the period. Fishing mortality peaked at 1.01 in 1989, but with the implementation of management measures in the early to mid-1990s, F declined to 0.24 in 1995 and biomass responded favorably by increasing to a peak of 62.1 million pounds in 1996. While F remained relatively stable (between 0.26 and 0.58) after that time, the stock began another drastic decline in 2001 to the time-series low of 10.8 million pounds in 2008. However, the contribution of fishing mortality to total mortality was substantially reduced during this period; from 2004-2007 only 10-20% of total mortality is attributed to F. Conversely, natural mortality has risen substantially since 1995, and factors such as predation, competition, and changes in the environment are thus believed to be having a stronger influence on recent weakfish stock dynamics than F. Bycatch and under-reported catches would have to be much greater than those estimated, growing from about 3-4 times the estimates in 1996 to 15-20 times in the most recent years, to account for the biomass decline. Thus far, there is no evidence available of an Atlantic coast fishery capable of generating additional unreported weakfish discards of this magnitude.

These estimates of age 1+ biomass are roughly comparable to spawning stock biomass due to the biology of weakfish (most fish are mature at age one). The 2008 estimate of age 1+ biomass is below the Amendment 4 SSB threshold of 31.8 million pounds (and the stock's spawning potential – 4% of an unfished stock – is also below the 20% spawning potential threshold adopted in Addendum IV). While the F estimates above are not comparable to the target and threshold rates in Amendment 4, the trend indicates a stable and modest fishing mortality. Thus,

while the stock biomass is depleted, overfishing is not occurring. ASMFC is currently working through the process to complete an updated stock assessment with a completion date expected during the fall of 2015.

STATUS OF THE FISHERY

Current Regulations

Recreational - 12 inch minimum size limit with a one fish daily bag limit
Commercial - 12 inch minimum size limit with a 100 lbs daily limit.

- exception – from April 1 through November 15, weakfish 10 inches total length or more may lawfully be taken in North Carolina internal waters by use of long haul seines or pound nets only
- exception – commercial flounder trawl and flynet operations are allowed to land a tolerance of no more than 100 undersized (less than 12 in total length) weakfish per day or trip, whichever is longer. It is unlawful to sell undersized weakfish.

Commercial Landings

Commercial landings of weakfish peaked in 1980 at 20,343,952 pounds. Landings have since steadily dropped and reached their lowest point in 2011 65,897 pounds (Table 1; Figure 1). Recent years have shown little increase, due to low abundance and severe commercial harvest restrictions. The North Carolina commercial weakfish harvest was 105,115 pounds in 2014. This is a 12% decrease over landings in 2013, and is below the 10-year average of 177,502 pounds (Table1; Figure 1). Addendum IV reduced commercial harvest to 100 lbs per trip thus estimating a reduction of 61% from the 2005-2008 harvest levels.

Recreational Landings

Recreational landings have been variable since 1994 with a peak in 2004 at 244,023 pounds. Landings decreased to 25,961 pounds in 2014 and were below the 10-year average of 76,438 pounds (Table 2). The dramatic decrease in landings since 2009 can be attributed to the recreational creel limit being reduced to 1 fish per day as a result of continued stock decline. Addendum IV implemented a 1 fish bag limit at 12 inches minimum TL, and was estimated to reduce recreational harvest by 53% for North Carolina.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Commercial fish houses are sampled on a monthly basis to provide length, weight, and age data to describe the commercial fisheries. The number of weakfish samples has declined in the last 10 years following a similar trend to the commercial landings (Tables 1 and 3). Samples are collected from the ocean fisheries as well as the estuarine fisheries. Ocean commercial fisheries landed 33,322 pounds of weakfish in 2014 (32% of commercial total). The ocean gill net fishery (31,414 lbs) dominated the ocean catches accounting for 30% of the overall commercial catch and 94% of the ocean commercial catch. Estuarine fisheries landed 71,793 pounds of weakfish in 2014 (68% of the commercial total). Landings from estuarine gill nets

(61,720) accounted for 86% of the overall estuarine commercial landings followed by long haul seines (5,258 lbs) at 7%. Pound nets harvested 2,329 pounds. "Other" fisheries (crab trawl, hook and line, and shrimp trawl) accounted for 2,486 pounds. Average, minimum, and maximum lengths have been variable over the last 27 years. The maximum length recorded in 2014 was the second smallest in the entire time series and the minimum size in 2014 was the largest in the time series (Table 3).

Fishery-Independent Monitoring

Fishery independent data are collected through both the program 195 Sound Survey and program 915 Independent Gill Net Survey. The program 195 survey provides an age 0 index calculated from the September stations and an age 1+ index calculated from the June stations. Both program 195 indices have been used in the ASMFC stock assessments and show a variable trend over the years (Tables 4 and 5; Figures 2 and 3). Program 915 collects information in the Pamlico Sound, Pamlico, Pungo, and Neuse rivers, and the Cape Fear and New rivers. The Pamlico Sound portion is used in the ASMFC stock assessment and has shown a declining trend since 2001 (Table 6; Figure 4). The Pamlico, Pungo, and Neuse rivers survey is not used in the assessment as there are minimal catches of weakfish. The Cape Fear and New rivers survey has not been used to date as the survey only dates back to 2008 and does not provide a sufficient time series yet.

Age samples are collected through both dependent and independent sampling. Age samples are collected from all gears possible and during all months. Target sample numbers are set on a monthly basis and the number of samples collected has ranged from 263 to 1,695, however no age samples were collected during 1997. Ages have ranged from 0 to 15 years with an average modal age of 2 years (Table 7).

MANAGEMENT STRATEGY

Addendum IV removes the existing F target and threshold and replaces the existing SSB threshold with percentage-based SSB reference points. The SSB target and threshold are SSB30% and SSB20%, respectively. These reference points represent a level of SSB that is either 30% or 20% of an unfished stock, and reflect the stock's spawning potential. To determine stock status, estimates of spawning stock biomass are divided by estimates of unfished spawning stock biomass, multiplied by 100 to be in the form of a percent, and then compared to the 30% target and 20% threshold. Figure 5 illustrates this approach. A spawning stock biomass reduced to less than 20% of an unfished stock equals an overfished or depleted stock (overfished when fishing mortality is the primary cause of the biomass decline, and depleted when causes other than fishing mortality have resulted in the biomass decline). Under this definition, weakfish are currently considered depleted. As a consequence of this modification to the management plan, the F target and threshold triggers in Amendment 4, Section 2.1 Stock Rebuilding Program are no longer applicable; however, the spawning stock biomass threshold trigger remains relevant and in effect.

MANAGEMENT AND RESEARCH NEEDS

Biological

High

- Collect catch and effort data including size and age composition of the catch, determine stock mortality throughout the range, and define gear characteristics. In particular, increase length-frequency sampling in fisheries from Maryland north.
- Derive estimates of discard mortality rates and the magnitude of discards for all commercial gear types from both directed and non-directed fisheries. In particular, quantify trawl bycatch, refine estimates of mortality for below minimum size fish, and focus on factors such as distance from shore and geographical differences.
- Conduct an age validation study.
- Identify stocks and determine coastal movements and the extent of stock mixing, including characterization of stocks in over-wintering grounds (e.g., tagging).
- Conduct spatial and temporal analysis of the fishery independent survey data. The analysis should assess the impact of the variability of the surveys in regards to gear, time of year, and geographic coverage on their (survey) use as stock indicators.
- Analyze the spawner recruit relationship and examine the relationships between parental stock size and environmental factors on year-class strength.

Medium

- Biological studies should be conducted to better understand migratory aspects and how this relates to observed trends in weight at age. Test for individual growth difference and the geospatial pattern, as well as the geospatial pattern of the catch rate surveys.
- Define reproductive biology of weakfish, including size at sexual maturity, maturity
- schedules, fecundity, and spawning periodicity. Continue research on female spawning patterns: what is the seasonal and geographical extent of "batch" spawning; do females exhibit spawning site fidelity?
- Continue studies on mesh-size selectivity, particularly for trawl fisheries.
- Continue studies on recreational hook-and-release mortality rates, including factors such as depth, warmer water temperatures, and fish size in the analysis. Studies are needed in deep and warm water conditions. Further consideration of release mortality in both the recreational and commercial fisheries is needed, and methods investigated to improve survival among released fish.

Low

- Develop a coastwide tagging database.

Social/Economic

- Assemble socio-demographic-economic data as it becomes available from ACCSP.
- Detailed information on production activities (e.g., fishing effort and labor used by gear, vessel characteristics, areas fished, etc.) and costs and earnings for the harvesting and processing sectors.
- Information on retail sales and demand for weakfish in order to estimate the demand and economic benefits of at-home and away-from home consumption of weakfish.
- Development of bio-economic models that link the underlying population dynamics to the economic aspects of the commercial and recreational fisheries.
- Distribution of weakfish to the various markets and across states.

- Information on the margins of various stages of processing and marketing also need to be obtained; this information is necessary to construct mathematical models that can be used to estimate the economic impacts of management and regulation.
- A directed data collection program for weakfish including the same variables presently collected by NMFS in support of MRFSS and by the economic add-on. Data collected includes information on travel distance, mode of angling, expenditures, area fished, catch on previous trips, and other information.
- Development of commercial decision-making or behavioral models to explain how fishers might respond to various regulations.
- Estimation and assessment of consumer (net economic benefits to consumers) and producer (net economic benefits or profits to producers) surplus; the sum of consumer and producer surplus is a measure of the net economic value to society of a good or service.
- Development of input/output models for all states having commercial weakfish activity, or alternatively, full-blown economic impact models, which might consist of input/output models or General Equilibrium models.
- Determination of the economic value derived from recreational angling including the economic value of a catch and release fishery

Habitat

- Conduct hydrophonic studies to delineate weakfish spawning habitat locations and environmental preferences (temperature, depth, substrate, etc.) and enable quantification of spawning habitat.
- Compile existing data on larval and juvenile distribution from existing databases in order to obtain preliminary indications of spawning and nursery habitat location and extent.
- Document the impact of power plants and other water intakes on larval, post larval and juvenile weakfish mortality in spawning and nursery areas, and calculate the resulting impacts on adult stock size.
- Define restrictions necessary for implementation of projects in spawning and over-wintering areas and develop policies on limiting development projects seasonally or spatially.

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TABLES

Table 1. Commercial landings of weakfish (all gears combined) collected through the North Carolina Trip Ticket Program, 1994-2014.

Year	Landings (lb)	Value	Number of Dealers	Number of Participants	Number of Trips
1994	3,489,929	$1,917,948	180	1,355	17,414
1995	4,113,260	$2,165,276	201	1,455	20,565
1996	3,977,633	$2,304,415	197	1,318	17,653
1997	3,561,060	$1,869,620	203	1,420	21,235
1998	3,354,008	$1,698,336	190	1,170	16,854
1999	2,617,580	$1,390,987	192	1,169	17,074
2000	1,869,042	$1,089,958	170	1,128	13,992
2001	1,960,324	$1,037,169	177	1,029	12,030
2002	1,828,150	$1,051,137	175	970	10,094
2003	848,822	$532,904	161	818	8,791
2004	685,463	$488,894	177	792	8,554
2005	421,779	$357,062	141	726	7,804
2006	363,078	$310,697	142	716	7,239
2007	175,589	$149,202	138	703	6,092
2008	162,516	$142,545	159	756	6,404
2009	163,146	$163,210	133	675	4,718
2010	106,328	$105,293	107	534	4,776
2011	65,897	$78,522	90	461	3,986
2012	91,383	$111,461	112	582	5,485
2013	120,188	$150,725	109	697	7,119
2014	105,115	$140,430	98	582	5,878

Table 2. Recreational landings of weakfish collected through the MRIP program in North Carolina from 1994 through 2014.

Year	Landings (lbs.)	PSE
1994	149,159	11.5
1995	72,413	21.0
1996	79,317	12.3
1997	165,032	9.9
1998	192,210	13.9
1999	161,290	15.0
2000	87,926	20.2
2001	158,423	18.2
2002	82,746	19.1
2003	161,474	16.4
2004	244,023	19.2
2005	142,140	23.8
2006	143,525	19.1
2007	111,754	22.3
2008	114,192	27.4
2009	89,652	34.6
2010	38,721	15.4
2011	17,621	25.0
2012	46,081	22.6
2013	34,731	26.6
2014	25,961	17.7

Table 3. Mean, Minimum, and Maximum lengths of weakfish measured from the commercial fisheries in North Carolina from 1987 through 2014.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
1987	316	112	869	18,710
1988	336	133	856	16,088
1989	368	118	895	11,530
1990	314	105	899	12,110
1991	273	106	662	14,761
1992	316	132	756	10,504
1993	308	102	742	11,797
1994	343	118	710	9,202
1995	330	111	750	11,007
1996	348	116	714	11,483
1997	342	105	755	11,694
1998	352	166	695	9,173
1999	346	130	738	10,112
2000	341	103	758	11,884
2001	379	165	801	8,238
2002	354	154	800	8,155
2003	334	107	847	6,190
2004	346	147	852	6,101
2005	342	143	875	6,544
2006	326	162	826	5,940
2007	324	121	662	4,401
2008	319	127	668	2,745
2009	325	160	857	1,990
2010	320	130	692	1,898
2011	330	197	637	1,542
2012	349	128	575	2,091
2013	359	202	718	2,915
2014	356	204	620	2,608

Table 4. Catch Per Unit Effort from the Program 195 Pamlico Sound Survey Age 0 weakfish collected during September with a total length less than 200 mm from 1987 through 2014.

Year	Number of Trawls	CPUE	SE	Geometric Mean
1987	48	12.14	5.84	1.01
1988	48	101.5	20.17	23.8
1989	46	14.2	3.14	4.04
1990	48	50.2	10.75	9.23
1991	50	36.96	11.74	3.77
1992	49	42.71	8	14.34
1993	50	9.12	3.17	1.71
1994	46	68.34	12.42	20.6
1995	49	38.21	5.73	14.3
1996	50	72.07	12.17	38.01
1997	50	32.79	4.22	16.57
1998	51	70.44	12.81	31.41
1999	49	99.9	10.43	59.65
2000	50	63.19	9.81	35.37
2001	50	30.3	5.82	5.17
2002	49	22	5.28	4
2003	50	24.52	5.77	10.98
2004	50	29.36	6.18	9.55
2005	49	28.76	6.1	9.05
2006	51	40.07	9.11	7.49
2007	51	56.77	11.14	12.93
2008	51	50.26	11.05	12.73
2009	51	58.89	12.72	10.06
2010	51	32.45	6.19	7.87
2011	51	33.69	11.17	5.12
2012	51	40.66	10.79	5.17
2013	51	58.53	12.81	9.72
2014	51	32.82	8.98	3.7

Table 5. Catch Per Unit Effort from the Program 195 Pamlico Sound Survey Age 1+ weakfish collected during June with a total length greater than 140 mm from 1987 through 2014.

Year	Number of Trawls	CPUE	SE	Geometric Mean
1987	48	53.14	9.97	14.07
1988	48	35.55	6.07	12.3
1989	46	13.81	2.89	3.43
1990	48	17.18	3	5.98
1991	50	14.74	2.41	4.67
1992	49	19.92	3.98	6.3
1993	50	70.94	12.69	20.92
1994	46	72.93	20.27	16.77
1995	49	42.28	7.04	14.32
1996	50	32.62	6.12	9.69
1997	50	55.7	9.08	19.05
1998	51	27.31	12.22	3.06
1999	49	48.36	8.3	15.91
2000	50	123.66	16.24	51.52
2001	50	52.75	9.42	9.9
2002	49	20.64	5.4	3.78
2003	50	17.39	5.15	3.22
2004	50	31.24	9.1	4.35
2005	49	29	8.65	4.31
2006	51	90.6	13.78	30.51
2007	51	23.56	6.15	4.38
2008	51	13.34	3.46	2.19
2009	51	10.83	2.79	2.26
2010	51	100.5	20.74	21.42
2011	51	38.09	11.51	4.15
2012	51	23.84	6.61	4.84
2013	51	24.48	8.14	5.17
2014	51	50.26	10.27	11.09

Table 6. Catch Per Unit Effort from the Pamlico Sound portion of Program 915 Independent Gill Net Survey from 2001 through 2014.

Year	Effort	Collection Number	CPUE	SE
2001	237	386	1.4208	0.1355
2002	320	491	1.39984	0.2453
2003	320	396	1.22039	0.1683
2004	320	445	1.32283	0.2404
2005	304	396	1.24107	0.1449
2006	320	347	0.92206	0.1333
2007	320	159	0.43236	0.0516
2008	320	190	0.48958	0.0797
2009	320	124	0.3068	0.0518
2010	320	177	0.48459	0.069
2011	300	133	0.36085	0.0659
2012	308	302	0.92235	0.1556
2013	308	247	0.69078	0.0947
2014	309	180	0.50249	0.0686

Table 7. Modal age, minimum age, maximum age, and number aged for weakfish collected through NCDMF sampling programs from 1988 through 2014.

Year	Modal Age	Min Age	Max Age	Number Aged
1988	2	0	6	419
1989	2	0	7	356
1990	2	1	11	272
1991	2	0	5	481
1992	2	0	6	597
1993	2	0	6	710
1994	2	0	7	689
1995	3	0	6	1,408
1996	4	0	6	1,695
1997				
1998	3	0	7	703
1999	3	0	8	659
2000	1	0	9	616
2001	2	0	10	630
2002	3	0	10	512
2003	4	0	8	491
2004	2	0	11	589
2005	2	0	12	561
2006	3	0	7	752
2007	2	0	6	560
2008	1	0	5	480
2009	1	0	15	263
2010	2	0	5	507
2011	2	0	4	378
2012	3	0	4	497
2013	2	0	5	546
2014	1	0	4	508

FIGURES

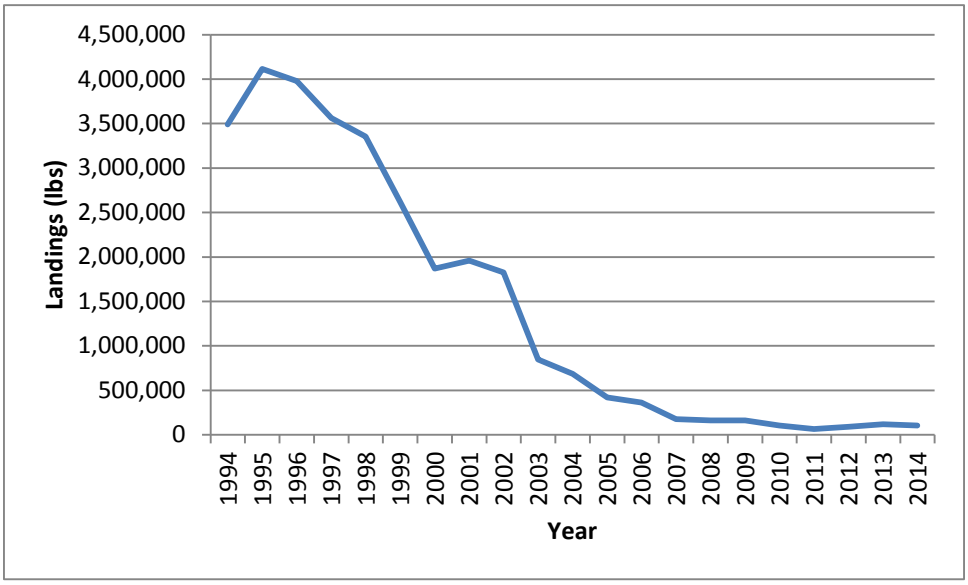

Figure 1. Commercial landings of weakfish (all gears combined) collected through the North Carolina Trip Ticket Program, 1994-2014.

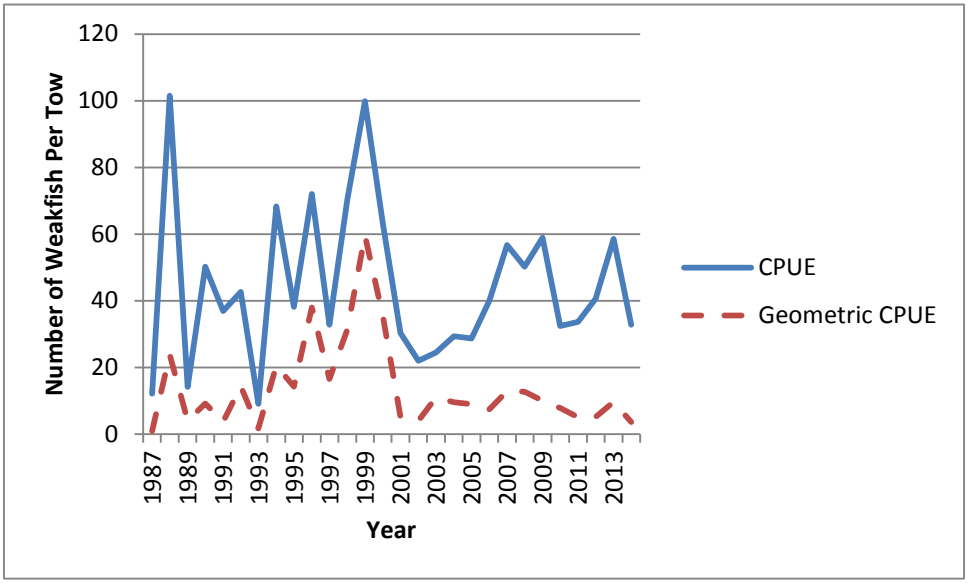

Figure 2. Catch Per Unit Effort from the Program 195 Pamlico Sound Survey Age 0 weakfish collected during September with a total length less than 200 mm from 1987 through 2014.

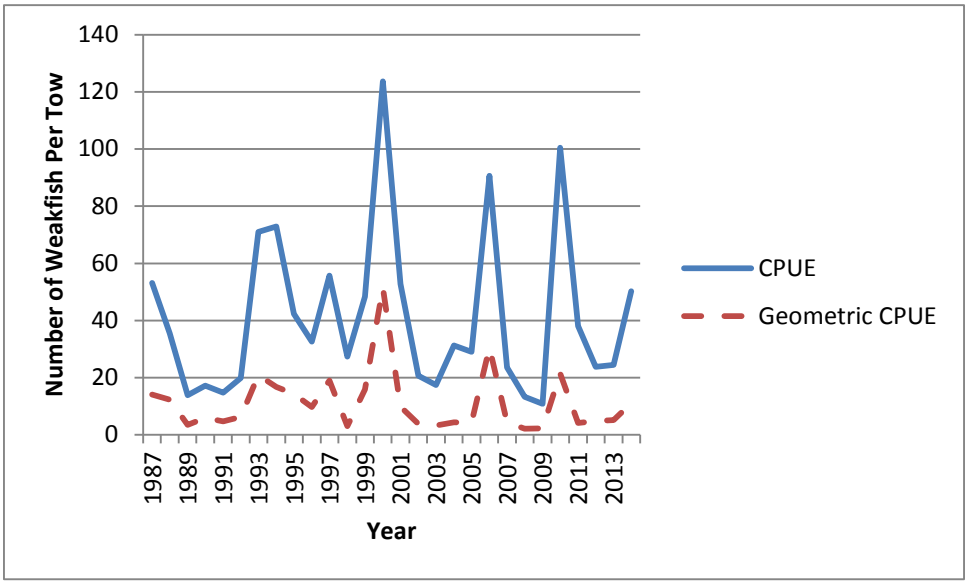

Figure 3. Catch Per Unit Effort from the Program 195 Pamlico Sound Survey Age 1+ weakfish collected during June with a total length greater than 140 mm from 1987 through 2014.

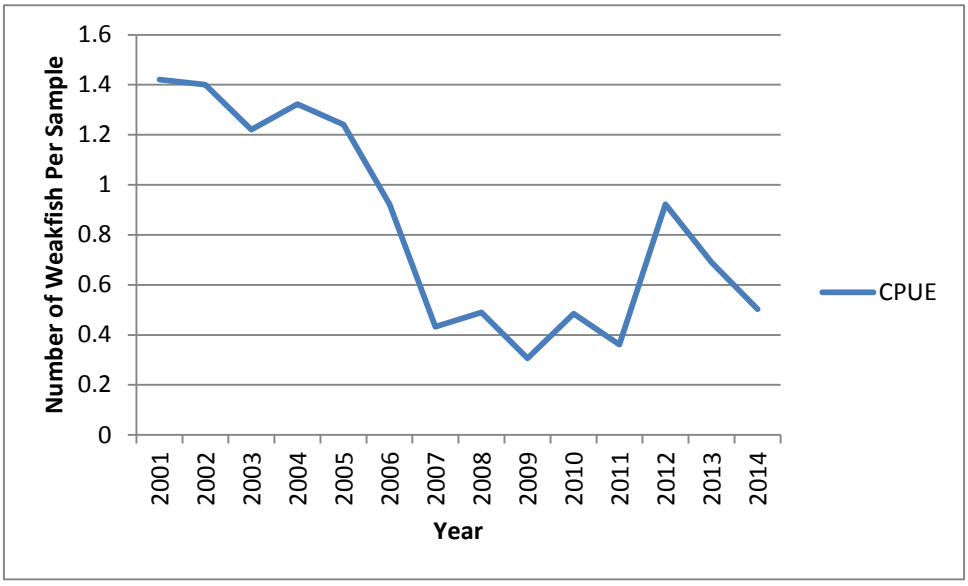

Figure 4. Catch Per Unit Effort from the Pamlico Sound portion of Program 915 Independent Gill Net Survey from 2001 through 2014.

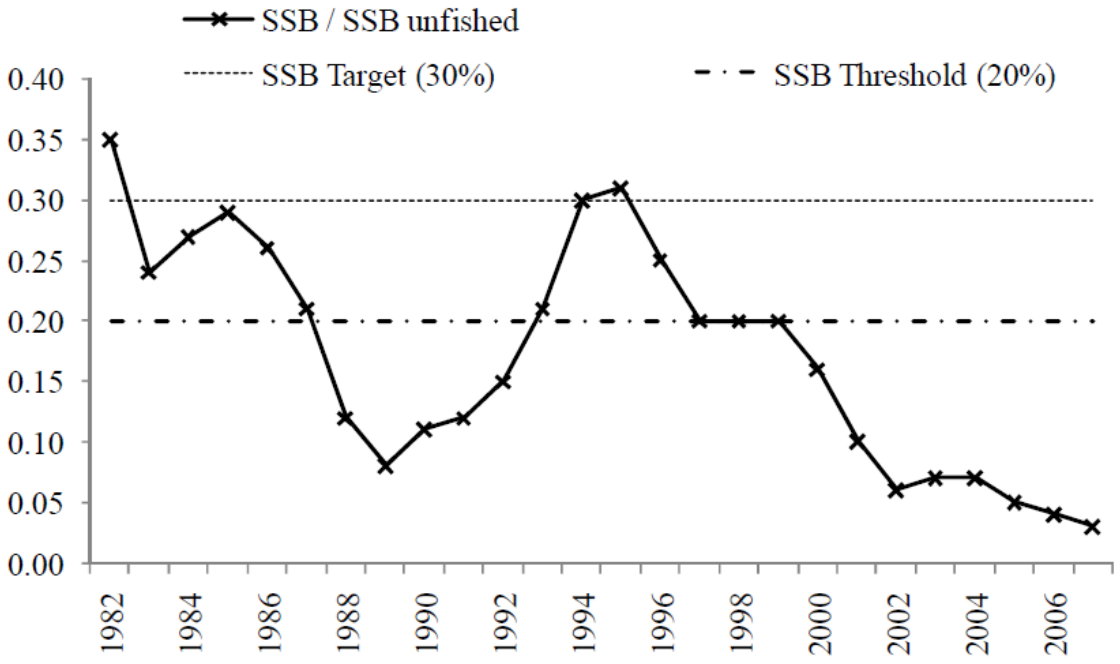

Figure 5. Changes in weakfish percent spawning potential ([spawner biomass (mid-year) /unfished biomass] * 100) during 1982-2007 (NMFS 2009b). Estimates are compared to theSSB20% threshold and SSB30% target.

FISHERY MANAGEMENT PLAN UPDATE
AMERICAN EEL
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	November 1999 Addendum I (February 2006) Addendum II (October 2008) Addendum III (August 2013) Addendum IV (October 2014)
Amendments:	None
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	Assessment last completed in May 2012, the next benchmark review would be at a minimum 5 years from the 2012 benchmark.

American eel is included in the Interjurisdictional Fisheries Management Plan (FMP), which defers to Atlantic States Marine Fisheries Commission (ASMFC) Interstate FMP for American Eel. The initial FMP was approved in 1999, reviewed and updated in 2006 and 2008. In May 2012, the benchmark American eel stock assessment was completed and accepted for use in management. In 2013 and again in 2014, the FMP was reviewed and updated. The FMP implements management measures to protect and enhance the abundance of American eel, while allowing commercial and recreational fisheries to continue. Addendum I, approved November 2006, required states to establish a mandatory trip-level catch and effort monitoring program, including the documentation of the amount of gear fished and soak time (ASMFC 2006). Addendum II, approved in October 2008, maintained status quo on state management measures and placed increased emphasis on improving the upstream and downstream passage of American eel (ASMFC 2008). In August 2013, Addendum III to the ASMFC Interstate FMP for American Eel was approved for management. This addendum predominately focused on the commercial yellow eel and recreational fishery management measures. Addendum III implemented new size and possession limits as well as new pot mesh size requirements and seasonal gear closures (Table 1). Following approval of Addendum III, the ASMFC American eel Management Board initiated the development of Addendum IV which was approved and adopted in October 2014. This addendum addresses concerns and issues in the commercial glass and silver eel fisheries, domestic eel aquaculture, and established a coastwide catch cap that also set up an automatic implementation of a state-by-state commercial yellow eel quota if the catch cap is exceeded. As the second phase of management in response to the 2012 stock assessment, the goal of Addendum IV is to continue

to reduce overall mortality and increase overall conservation of American eel stocks. Information about abundance and status at all life stages, as well as habitat requirements, is very limited. The life history of the species, such as late age of maturity and a tendency for certain life stages to aggregate, can make this species particularly vulnerable to overharvest.

Management Unit

The American eel is managed as a coast wide stock under the ASMFC Interstate FMP for American Eel (ASMFC 2000). The American eel's range extends beyond U.S. borders and more specifically ASMFC member states territorial waters. However, the management unit is limited to ASMFC member states territorial waters.

Goal and Objectives

The goal of the ASMFC American Eel FMP is to protect and enhance the abundance of American eel in inland and territorial waters of the Atlantic states and jurisdictions, and contribute to the viability of the American eel spawning population; and provide for sustainable commercial, subsistence, and recreational fisheries by preventing over-harvest of any eel life stage. The following objectives will be used to achieve this goal:

1. Improve knowledge of eel utilization at all life stages through mandatory reporting of harvest and effort by commercial fishers and dealers, and enhanced recreational fisheries monitoring.

2. Increase understanding of factors affecting eel population dynamics and life history through increased research and monitoring.

3. Protect and enhance American eel abundance in all watersheds where eel now occur.

4. Where practical, restore American eel to those waters where they had historical abundance but may now be absent by providing access to inland waters for glass eel, elvers, and yellow eel and adequate escapement to the ocean for pre-spawning adult eel.

5. Investigate the abundance level of eel at the various life stages necessary to provide adequate forage for natural predators and support ecosystem health and food chain structure.

STATUS OF THE STOCK

Stock Status

The 2012 ASMFC benchmark stock assessment found the stock status of the American eel population to be depleted in U.S. waters. Although no determination of overfishing could be made, the assessment found the stock is at or near historically low levels due to a combination of historical overfishing, habitat loss and alteration, productivity and food web alterations, predation, turbine mortality, changing climatic and oceanic conditions, toxins and contaminants, and disease (ASMFC 2013).

In 2010, the Center for Environmental Science, Accuracy, and Reliability (CESAR) petitioned the US Fish and Wildlife Service (USFWS) to list American eel under the Endangered Species

Act (ESA). In September 2011, USFWS concluded the petition may be warranted and initiated a status review to assess the health of the population and the magnitude of threats facing the species. However, in August 2012, CESAR filed a lawsuit against USFWS for failure to publish a proposed rule within the timeframe specified by the ESA. A Settlement Agreement was approved in April 2013, which requires USFWS to publish its proposed rule by September 30, 2015.

Stock Assessment

A depletion-based stock reduction analysis (DB-SRA) was conducted by the Stock Assessment Subcommittee; results suggested overfishing has been occurring since the 1980s. However, while it is highly likely the American eel stock is depleted; the overfishing and overfished status in relation to the biomass and fishing mortality reference points cannot be stated with confidence.

STATUS OF THE FISHERY

Current Regulations

New management measures dealing with yellow eels went into effect on January 1, 2014 under North Carolina Marine Fisheries Commission (NCMFC) Rule 15A NCAC 03M .0510. These measures included a 9-inch total length (TL) minimum size limit for both the commercial and recreational fishery, a new bag limit for the recreational fishery (25 eels / person / day), and crew members involved in for-hire employment are allowed to maintain the current 50 eels / day bag limit for bait purposes. The rule also made the possession of American eels illegal from September1 through December 31 except when taken by baited pots. NCMFC Rule 15A NCAC 03J .0301 established a ½ by ½ inch minimum mesh requirement for the commercial fishery. Eel pots with an escape panel consisting of a 1 by ½ inch mesh are allowed until January 1, 2017.

Commercial Landings

The average commercial landings and value over a ten year period (2005 – 2014) was 55,115 pounds / $134,342, in 2014 the commercial landings and value was 58,886 pounds / $159.727. Commercial American eel landings have fluctuated over the years; in 1979 and 1980 over 900,000 pounds of eels were landed, however, since the late 1980's American eel landings have averaged less than 100,000 pounds (Figure 1).

Recreational Landings

There are no recreational landings data available for American eels which are not typically a targeted species. Due to the fact that eels are caught incidentally in the estuarine environment by recreational fishermen by hook and line, the Marine Recreational Information Program (MRIP) does not provide reliable harvest data. Also, the survey design of MRIP does not provide information on the recreational harvest of American eel in inland waters. North Carolina does not require a permit or mandatory reporting for recreational fishermen that catch American eels.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Not Available

Fishery-Independent Monitoring

The N.C. Division of Marine Fisheries young-of-year (YOY) American eel sampling was eliminated in 2009 due to budget cuts. Currently, the National Marine Fisheries Service conducts a year round ichthyoplankton survey at Beaufort Inlet which will be used to develop a new North Carolina juvenile abundance index for American eel; a CRFL grant was received to process the backlog of samples. In the future, other resources will be needed to ensure that the YOY eel samples can be processed.

MANAGEMENT STRATEGY

The commercial yellow eel fishery is regulated through an annual coast wide catch cap set at 907,671 pounds (1998 – 2010 harvest level; ASMFC 2014). Contained within Addendum IV are two management triggers (see below), which, if either triggers were tripped, there would be automatic implementation of a state-by-state commercial yellow eel quota. The annual coast wide quota is set at 907,669 pounds, with allocations to each state. North Carolina would receive an 11.8% allocation (107,054 lbs.).

Management Triggers:

1. The coast wide catch cap is exceeded by more than 10% in a given year (998,438 lbs.)

2. The coast wide catch cap is exceeded for two consecutive years, regardless of percent over.

MANAGEMENT AND RESEARCH NEEDS

At this time there are no critical data or management needs from North Carolina Division of Marine Fisheries or the ASMFC. Table 2 identifies research needs as identified in Addendum III to the American Eel FMP and lists progress made towards accomplishing those objectives.

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TABLES

Table 1. Summary of management strategies and outcomes from Addendum IV and previous Addendums.

Issue	Management Strategy	Objectives	Outcome
Maintain commercial harvest level	Establish a Coastwide cap (907,671lbs.)	3	Accomplished with Addendum IV
Increased protection for small yellow eels	Nine (9) inch minimum size limit for both commercial and recreational fisheries.	3	Accomplished by Marine Fisheries Commission Rule 15A NCAC 03M .0510
	Minimum eel pot mesh size of one-half by one-half inch.	3	Accomplished by Marine Fisheries Commission Rule 15A NCAC 03J .0301
Reduce the recreational harvest	Recreational possession limit of 25 eels / person / day.	3	Accomplished by Marine Fisheries Commission Rule 15A NCAC 03M .0510
Protect out-migrating silver eels	No possession of American eels from September 1 to December 31 unless they are taken with baited pots	3	Accomplished by Marine Fisheries Commission Rule 15A NCAC 03M .0510
Collect commercial catch and effort information	Mandatory trip level reporting by life stage, including number of units fished and unit soak time.	1, 2, 5	Accomplished by G.S. 113-170.3 and the American eel log book reporting program where fishermen are notified by letter of the monthly reporting requirement

Table 2. Summary of research needs and outcomes from Addendum IV and monitoring requirements from previous plans Addendums.

Management Strategy	Objectives	Outcome
Mandatory trip level reporting by life stage, including number or units fished and unit soak time	1, 2	Ongoing through the American eel

Management Strategy	Objectives	Outcome
		Logbook Reporting Program
Mandatory young-of-year survey in two river systems over a six week period	1, 2	In 2008, funding was cut for the young-of year survey; however, the Beaufort bridge-net survey is proposed to be used for the young-of-year survey, as approved by the ASMFC American Eel Management Board
Mandatory cross-referencing between dealer and fishery reported harvest	1	Ongoing through the NC Trip Ticket Program and the American Eel Logbook Reporting Program
Development of quantifiable eel habitat enhancement goals through the creation of a coast-wide eel habitat GIS database. The goal of the database would be the generation of coast-wide, regional, state, and watershed maps that would quantify the amount of available habitat relative to historical habitat and identify major barriers to eel migration. This information would allow the ASMFC to prioritize eel habitat enhancement programs at coast-wide, regional, and state scales. Efforts should be coordinated with existing GIS efforts already underway in Canada (see: http://www.dfompo.gc.ca/Library/345546.pdf). Potential funding and coordination with the Atlantic Fish Habitat Partnership should be considered. This project is considered a high priority item and should be completed either prior to the start of the next benchmark stock assessment or in conjunction with the stock assessment	2, 3, 4	No Action
Work with other appropriate ASMFC committees to develop materials to support states of jurisdictions interested in making recommendations to the Federal Energy Regulatory Commission (FERC) for upstream and downstream fish passage provisions for American eels in the hydropower licensing and relicensing process.	3, 4	No Action
Work with states and jurisdictions to develop a list of non-FERC licensed dams and other impoundments which impact eel movements and migration. The Nature Conservancy recently completed an online, interactive inventory of dams from Maine to Virginia (see: The Northeast Aquatic Connectivity and Assessment of Dams) which could be adapted to meet this goal. An evaluation	2, 3, 4	No Action

Management Strategy	Objectives	Outcome
should be conducted on each general type of impoundment to assess the potential for eel passage without assistance (i.e. no eel passage constructed) or determine what type of eel passage for each type of impoundment would be most beneficial for all, or specific, life stages. The recommendations from the workshop proceedings (in preparation) from the ASMFC American Eel Passage Workshop held in Gloucester, MA, (March 2011) should be a useful document to assist in the completion of this task.		
Develop a timeline and target for 1) the amount of habitat to open up through creation of fish passage or dam removal, where feasible and/or 2) the amount of habitat to enhance to increase survival for all, or specific, life stages.	2, 3, 4	No Action
Assess and provide recommendations related to other potential impacts caused by water supply and withdrawal operations, water diversions, and agricultural water use.	2, 3, 4	No Action
Increase coordination with the ASMFC Fish Passage, Habitat, and FERC Guidance Committees. The state marine fisheries agencies should also encourage increased communication and collaboration with their inland fisheries agencies counterparts where applicable. The Commission should also continue the development of a Memorandum of Understanding between the Great Lakes Fisheries Commission, U.S. Fish and Wildlife Service, and NOAA Fisheries in order to reduce mortality on eels throughout their range, as well as improving access to suitable habitat.	2, 3, 4	No Action
Collect biological information by life stage including length, weight, age, and sex of eels caught in fishery-independent sampling programs; at a minimum, length samples should be routinely collected from fishery-independent or fisheries-dependent surveys.	2, 4,	Collecting weight of eels caught in independent sampling programs as well as commercial eel pots
Implement surveys that directly target and measure abundance of yellow- and silver-stage American eels, especially in states where few targeted eel surveys are conducted.	2	No Action
Coast-wide sampling program for yellow and silver American eels should be developed using standardized and statistically robust methodologies.	1, 2	No Action
State marine agencies work with their state inland counterparts, where applicable, to standardize reporting of trip-level landings and effort data that occur in inland waters on diadromous populations of eels	1, 2	No Action

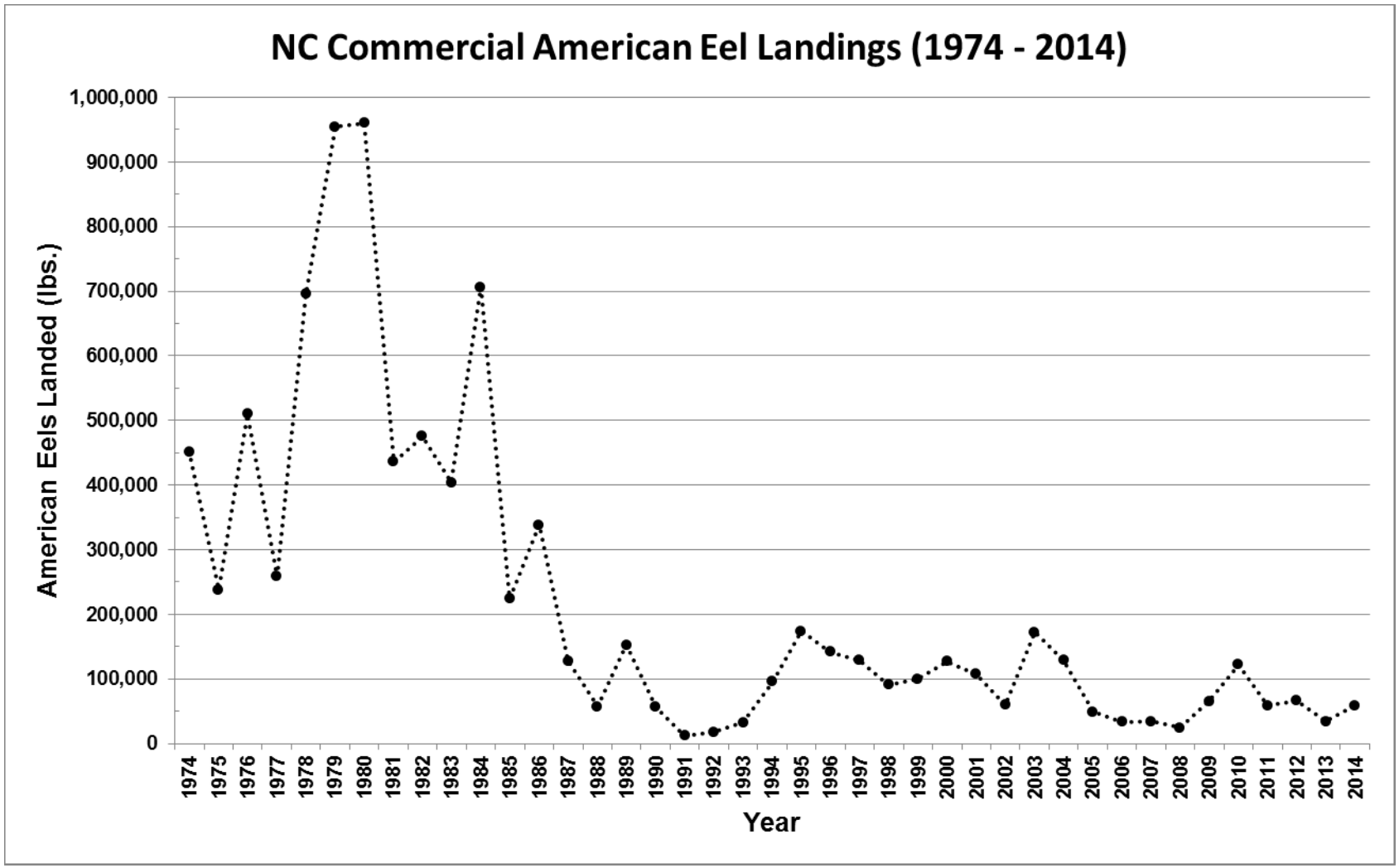


Figure 1. American eel landings in N.C. from 1974 to 2014.

FISHERY MANAGEMENT PLAN UPDATE
ATLANTIC STURGEON
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	November 1990
Amendments:	Amendment 1 July 1998 Technical Addendum #1 to Amendment 1 October 2000 Addendum I January 2001 Addendum II May 2005 Addendum III November 2006 Addendum IV September 2012
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	January 2017

Amendment 1 to the Interstate Fishery Management Plan (FMP) for Atlantic Sturgeon was developed by the Atlantic States Marine Fisheries Commission (ASMFC) with a goal to restore Atlantic sturgeon spawning stocks to a population level which will provide for sustainable fisheries, and ensure viable spawning populations. Addendum I was completed to allow importation on non-indigenous Atlantic sturgeon and permit the development of private aquaculture facilities. Addendum II required the compliance with ASMFC Terms, Limitations, Enforcement and Reporting Requirements for each exemption to the harvest and possession moratoria as outlined in Section 4 of the FMP. It also allowed for Lapaz Inc. to import Atlantic sturgeon fingerlings, produce fish, and sell the meat. Further exemption was provided to Acadian Sturgeon and Caviar to import fish to North Carolina. Addendum III compliments Addendum II and provides authority for LaPaz Inc. to import Atlantic sturgeon from Supreme Sturgeon and Caviar for commercial aquaculture. Addendum IV is the Atlantic Sturgeon Habitat Addendum.

Management Unit

Atlantic Ocean and adjacent estuaries and coastal rivers from Maine through Florida.

Goal and Objectives

The goal is to restore Atlantic sturgeon spawning stocks to population levels which will provide for sustainable fisheries, and ensure viable spawning populations (ASMFC 1998). Amendment

1 to the Atlantic Sturgeon FMP was approved in July 1998. In order to achieve this goal the plan sets forth the following objectives:

- Establish 20 protected year classes of females in each spawning stock;
- Close the fishery for a sufficient time period to reestablish spawning stocks and increase numbers in current spawning stocks;
- Reduce or eliminate bycatch mortality;
- Determine the spawning sites and provide protection of spawning habitats for each spawning stock;
- Where feasible, reestablish access to historical spawning habitats for Atlantic sturgeon; and
- Conduct appropriate research as needed.

STATUS OF THE STOCK

Stock Status

Reported landings peaked in 1890 at 3.4 million kg (7,495,717 pounds) and declined precipitously. Currently, populations of Atlantic sturgeon throughout their range are either extirpated or at historically low abundance. Recruitment is variable at low levels in all regions. The stock is considered overfished but overfishing is not occurring. The target fishing mortality (F) rate was defined as that level of F that generated an eggs-per-recruit (EPR) equal to 50% of the EPR at F = 0.0 (i.e., virgin stock). This rate (F 50) equals 0.03 (annual harvest rate of 3%) for a restored population. This target is far below recent estimates of F prior to enactment of fishing moratoria, which ranged from 0.01 - 0.12 for females and 0.15 - 0.24 for males in the Hudson River. These numbers may not apply to southern stocks, where more signs toward recovery are being seen.

Stock Assessment

The 1998 Atlantic sturgeon assessment relied on data from Maine, the Hudson River, Delaware Bay, South Carolina and Georgia. Egg-per-recruit (EPR) and yield-per-recruit (YPR) models were used to estimate a target F rate and potential yield in number of recent age-one abundance (recruitment) estimates. Mortality rates associated with targeted fisheries were estimated for the Hudson River population through a catch-at-age analysis. The spawning stock biomass (SSB) is undocumented for all river systems. The stock assessment report presented a comprehensive review of the current status of Atlantic sturgeon in the U.S. From this review it is obvious that fishing seriously depleted the Atlantic sturgeon by the early 1900s. Since that time, some stocks are believed to have been extirpated, while others have persisted at very low levels. Catches of juveniles suggest that sporadic spawning is occurring in some of the larger rivers throughout the historic range, but because of the migratory nature of juvenile Atlantic sturgeon, the origin of these juveniles older than age 2 is uncertain. Although time series are sparse for most river stocks, declines in abundance have been noted. The ASMFC has identified members to initiate a new benchmark stock assessment and has completed the initial

data workshops. The estimated completion for a peer reviewed stock assessment is early 2017.

STATUS OF THE FISHERY

Current Regulations

Coastwide commercial and recreational moratorium.

Commercial Landings

No landings recorded since 1991

Recreational Landings

No recreational fishery.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

The NCDMF provides at sea observer coverage for the fall flounder fishery as well as other large and small mesh fisheries throughout the state. Staff observed large mesh trips and small mesh trips throughout the estuaries of North Carolina.

Fishermen participating in the American shad fishery conducted in the Cape Fear (drift nets) and Brunswick rivers (anchored gill nets) were interviewed for interactions with Atlantic sturgeon during nine fishing trips. No Atlantic or shortnose sturgeon were reported during 2013.

North Carolina developed a Section 10 Incidental Take Permit for the estuarine waters of North Carolina relative to gill net fishing. Through this process North Carolina developed a zero inflated poisson general linear model that estimated bycatch in the gill net fisheries. This model divided the state estuarine waters into management units and estimated takes (live and dead) within each of these units, by season, and mesh size (large and small). Results from this model are available in the Application for an Incidental Take Permit submitted to the National Marine Fisheries Service in December 2012 by the NCDMF.

A total of 196 Atlantic sturgeon have been encountered in the North Carolina on board observer program since 2003. These sturgeon have ranged from 330 to 1,524 mm FL and averaged 635 mm FL (Table 1). One-hundred and fifty-three of the 196 sturgeon have been encountered in the Albemarle Sound Management Unit. An additional 15 Atlantic sturgeon were observed through the alternate platform observer program during 2013 and 2014. These fish ranged in size from 410 to 895 mm FL and averaged 668 mm TL. Thirteen of the 15 sturgeon encountered were observed in the Albemarle Sound Management Unit.

Fishery-Independent Monitoring

The North Carolina Division of Marine Fisheries (NCDMF) currently has three independent gill net programs that encounter and tag Atlantic sturgeon. The Albemarle Sound Independent Gill

Net Survey (IGNS) is a stratified random gill net survey that employs gill nets with mesh sizes that range from 2.5 inch stretch mesh (ISM) through 7 ISM (0.5 ISM increments) and 8 ISM and 10 ISM of floating and sinking nets. Gill nets are fished in 40 yard shots totaling 960 yards per set. Each set is fished for approximately 24 hours before retrieval. Nets were fished from January through May, November, and December each year From 1991 through 2014. Lengths of sturgeon collected have ranged from 230 mm FL to 1,498 and average 516 mm FL (Table 2). Six fish were collected with a fork length greater than 1,000 mm, and only 3 of 1,448 fish collected were adults. Catch per unit effort shows an increasing trend over the entire time series but annual CPUE are variable (Figure 1).

The Pamlico Sound Independent Gill Net Survey (PSIGNS) is conducted in Pamlico Sound, Pungo, Pamlico, and Neuse rivers, and consists of gill net sets, ranging in mesh size from 3.0 ISM through 6.5 ISM (0.5 ISM increments) and are fished for approximately 12 hours before retrieval. The Pamlico Sound portion has been conducted since 2001 and the rivers portion since 2003. Less than 50 fish have been collected though sampling in each region. Average lengths are larger than those seen in the Albemarle, indicating capture of more sub-adult fish than young of year fish (Tables 3, 4). Two adults have been collected in the Pamlico Sound Survey and one adult was collected in the Rivers Survey.

The Fisheries Independent Assessment Program (FIAP) is modeled after the PSIGNS. The areas fished include the New and Cape Fear rivers. Two-hundred and forty yards were fished per sample and 120 samples were completed. Trips conducted in the Atlantic Ocean include an additional 2.5 ISM net. The areas fished include the coastal ocean waters off the New and Cape Fear rivers. Two-hundred and seventy yards were fished per sample. Effort has been ongoing since 2008. Four fish have been collected in the Cape Fear River IGNS and they ranged from 569 to 8736 mm FL. No adult Atlantic sturgeon have been collected in this survey.

During 2010, The NCDMF joined a multi-state grant entitled “Research and Management of Endangered and Threatened Species in the Southeast: Riverine Movements of Shortnose and Atlantic Sturgeon” cooperating with South Carolina Department of Natural Resources, The University of Georgia, and North Carolina State University (NCSU). Funding was provided through the National Marine Fisheries Service (NMFS), Section 6. Ninety-four Atlantic sturgeon were tagged with acoustic transmitters from 2011 through 2013 in the Cape Fear River and Albemarle Sound. These fish ranged from 772 to 1,753 mm FL and averaged 928 mm FL (Table 5). Collections in the Albemarle Sound were low, however the Cape Fear River crew were very successful, contrary to the IGNS survey conducted within the same river but in different locations. The Cape Fear River tagging was also conducted using gill nets but were targeting Atlantic sturgeon with appropriate mesh and twine sizes for the species.

MANAGEMENT STRATEGY

Atlantic coastal states implemented a moratorium on harvest and possession of Atlantic sturgeon in 1998. Furthermore, harvest is not permitted in the exclusive economic zone (EEZ). The best available data indicate that river-specific populations are appropriate management units. It is recommended that the moratorium remain in place for each population until it can be documented that the spawning population includes at least 20 year classes of adult females (half the number of year classes that probably existed in unfished populations). Given that female Atlantic sturgeon do not mature until about 20 years of age, the moratorium can be expected to remain in place for several decades from when harvest of a given population ended. As populations increase during restoration, bycatch of sturgeon will increase; hence,

managers should ensure that mechanisms are in place to monitor the level of bycatch and make reductions if necessary.

The NMFS listed the Carolina Distinct Population Segment of Atlantic sturgeon as an endangered species under the 1973 Endangered Species Act (ESA). This listing determination drastically influences the management strategy in North Carolina. The largest influence was the requirement of the NCDMF to obtain a Section 10 Incidental Take Permit to allow the estuarine gill net fisheries to continue. Without the Section 10 Permit interactions in the fishery would have been illegal. Any future fishery for Atlantic sturgeon will only be possible if the NMFS removes Atlantic sturgeon from the ESA. However, additional protections provided through the ESA listing should increase the potential recovery.

MANAGEMENT AND RESEARCH NEEDS

Biological/Captive Propagation

- Standardize and obtain baseline data on population status for important sturgeon rivers. Data should include assessment of stock status in various rivers, size and composition of the spawning population, reproductive success and juvenile production;
- Develop long-term marking/tagging procedures to provide information on individual tagged Atlantic sturgeon for up to 20 years;
- Establish success criteria in order to evaluate the effectiveness of stocking programs;
- Determine size at maturity for Mid- and North Atlantic sturgeon;
- Monitor catch/effort and size/age composition of landings of any future authorized directed fisheries;
- Determine length at age by sex for North, Mid- and South Atlantic stocks;
- Determine maturity at age by sex for North, Mid- and South Atlantic stocks;
- Determine fecundity at age, length, and weight for North, Mid-, and South Atlantic stocks;
- Characterize size and condition of Atlantic sturgeon by gear and season taken as bycatch in various fisheries;
- Establish environmental tolerance levels (D.O., pH, temperature, etc.) for different life stages;
- Establish coastal tagging projects to delineate migratory patterns (This measure is being implemented by the USFWS and member states.);
- Expand tagging of juveniles in major spawning rivers to allow estimates of rates of loss to bycatch;
- Establish a tag recovery clearinghouse and database for consolidation and evaluation of tagging and tag return information including associated biological, geographic, and hydrographic data (This measure is being implemented by the USFWS through the Maryland Fisheries Resources Office located in Annapolis, Maryland.);
- Encourage shortnose sturgeon researchers to include Atlantic sturgeon research in their projects;
- Establish methods for the recovery of tags and associated information (This measure is being implemented through ASMFC/USFWS cooperative efforts.);
- Evaluate existing groundfish survey data to determine what can be learned about at-sea migratory behavior;
- Conduct basic culture experiments to provide information on: a) efficacy of alternative spawning techniques, b) egg incubation and fry production techniques, c) holding and

rearing densities, d) prophylactic treatments, e) nutritional requirements and feeding techniques, and f) optimal environmental rearing conditions and systems;
- Determine the extent to which Atlantic sturgeon are genetically differentiable among rivers;
- Conduct research to identify suitable fish sizes, and time of year for stocking cultured fish;
- Conduct and monitor pilot-scale stocking programs before conducting large-scale efforts over broad geographic areas;
- Determine effects of contaminants on early life stages;
- Develop methods to determine sex and maturity of captured sturgeon;
- Develop sperm cryopreservation techniques and refine to assure availability of male gametes;
- Refine induced spawning procedures;
- Develop the capability to capture wild broodstock and develop adequate holding and transport techniques for large broodstock;
- Conduct studies to identify tissue(s) suitable for genetic analyses and the techniques for their collection and storage. In those states which permit future harvest of Atlantic sturgeon, material for genetic analysis should be collected from up to 50 percent of the fish landed in the commercial fisheries. In states with no future directed fisheries, federal and state programs which encounter sturgeon should be encouraged to collect specified tissues for genetic analysis;
- Standardize collection procedures to obtain biological tissues, and identify a suitable repository to archive all materials;
- Conduct research to determine the susceptibility of Atlantic sturgeon to sturgeon adenovirus and white sturgeon iridovirus. Methods should be developed to isolate the sturgeon adenovirus and an Atlantic sturgeon cell line should be established for infection trials;
- Conduct research to identify the major pathogens of Atlantic sturgeon and a cell line for this species should be developed .

Social

- To evaluate the social impacts the needed data might include the following for consumptive and non-consumptive users: demographic information (e.g. age, gender, ethnicity/race, etc.), social structure information (e.g. historical participation, affiliation with NGOs, perceived conflicts, etc.), other cultural information (e.g. occupational motivation, cultural traditions related to resource's use), and community information.
- A cost and benefit analysis (CBA) of possible stocking protocols is needed.

Monitoring population status through juvenile indices and abundance, characterizing the incidence of bycatch in various fisheries and associated mortalities, conducting tag/recapture studies for estimates of bycatch loss are being addressed through current sampling. It should be noted that any sampling that encounters Atlantic sturgeon whether incidental or targeted now require Section 10 permits through NMFS or a Section 7 consultation if funded through a federal grant program. These permit requirements directly influence the data collection abilities of the NCDMF and the thus completing research recommendations.

LITERATURE CITED

Atlantic States Marine Fisheries Commission (ASMFC). 1998. Amendment 1 to the interstate fishery management plan for Atlantic Sturgeon. Atlantic States Marine Fisheries Commission, Atlantic Sturgeon Plan Development Team, Washington, D.C.

TABLES

Table 1. Mean, minimum, and maximum lengths of Atlantic sturgeon collected from the Albemarle Sound Independent Gill Net survey from 2005 through 2014.

Year	Mean	Minimum	Maximum	Collection Number
2003	N/A	N/A	N/A	1
2004	581	330	820	25
2005	631	467	814	28
2006	600	336	1,135	39
2007				
2008	639	480	845	18
2009				
2010				
2011	763	464	1,386	4
2012	651	464	900	10
2013	643	492	920	29
2014	684	405	1,524	42
Total	635	330	1,524	196

Table 2. Mean, minimum, and maximum lengths of Atlantic sturgeon collected from the Albemarle Sound Independent Gill Net survey from 2005 through 2014.

Year	Mean	Minimum	Maximum	Collection Number
2005	516	231	850	48
2006	570	230	1,473	62
2007	528	230	770	66
2008	543	257	840	124
2009	629	391	800	55
2010	579	395	812	32
2011	604	393	1,498	47
2012	574	296	1,060	64
2013	556	275	1,395	139
2014	609	355	1,180	69

Table 3. Mean, minimum, and maximum lengths of Atlantic sturgeon collected from the Pamlico Sound Independent Gill Net survey from 2005 through 2014.

Year	Mean	Minimum	Maximum	Collection Number
2005	657	574	795	20
2006	765	522	790	13
2007	531	654	1,495	5
2008	663	643	947	2
2009	967	967	967	1
2010	606	200	698	4
2011				0
2012	1,415	1,415	1,415	1
2013				0
2014				0

Table 4. Mean, minimum, and maximum lengths of Atlantic sturgeon collected from the Pamlico, Pungo, and Neuse Rivers Independent Gill Net survey from 2005 through 2014.

Year	Mean	Minimum	Maximum	Collection Number
2005	463	358	794	29
2006	627	480	735	4
2007	516	400	714	3
2008	532	532	532	1
2009	706	716	716	1
2010				0
2011	2,300	2,300	2,300	1
2012	625	625	625	1
2013				0
2014	N?A	N/A	N/A	1

Table 5. Mean, minimum, and maximum lengths of Atlantic sturgeon collected through section 6 funding in the Cape Fear River and Albemarle Sound, North Carolina, 2011-2013.

Year	Mean	Minimum	Maximum	Number
2011	960	630	1,620	45
2012	948	772	1,753	21
2013	862	605	1,162	28
Total	928	772	1,753	94

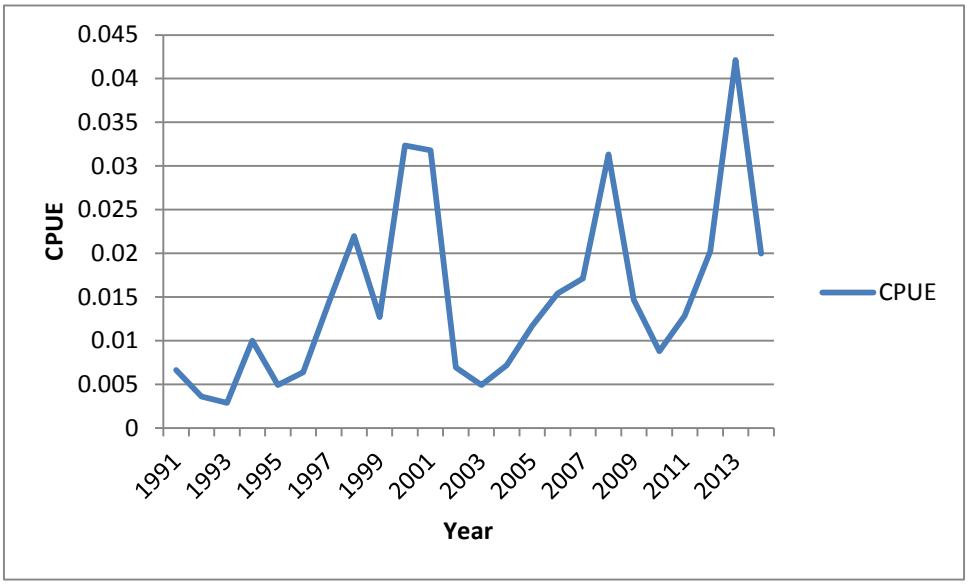


Figure 1. Catch per unit effort of Atlantic sturgeon collected from the Albemarle Sound Independent Gill Net Survey from 1991 through 2014.

FISHERY MANAGEMENT PLAN UPDATE
DOLPHIN
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	December 2003
Amendments:	Amendment 1 – July 2010 Amendment 2 – April 2012 Amendment 5 – July 2013
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	None

The South Atlantic Fisheries Management Council (SAFMC), in cooperation with the Mid-Atlantic and New England Councils, developed a Dolphin/Wahoo Fishery Management Plan (FMP) for the Atlantic in 2004. While dolphin was not overfished, the Council adopted a precautionary and risk-averse approach to management for this fishery and to maintain status quo over the years 1993 through 1997. In 2013, Amendment 5 was approved and adopted by the SAMFC and was the most comprehensive amendment to the Dolphin/Wahoo FMP, in terms of management measures and process updates. Amendment 5 updated the annual catch limits (ACLs) and accountability measures (AM) for both sectors as well as the acceptable biological catch (ABC) values and ACT for the recreational fishery in an effort to achieve optimum yield (OY) of the stock. This amendment also sets up an abbreviated framework procedure whereby modifications to the ACLs, ACTs, and AMs can be implemented by National Marine Fisheries Service (NMFS) without a full FMP supplement.

Management Unit

The management unit for dolphin encompasses all U.S. waters of the Atlantic in the 3 – 200 mile Exclusive Economic Zone (EEZ).

Goals and Objectives

1. Address localized reduction in fish abundance. The Councils remain concerned over the potential shift of effort by longline vessels to traditional recreational fishing grounds and the resulting reduction in local availability if commercial harvest intensifies.

2. Minimize market disruption. Commercial markets (mainly local) may be disrupted if large quantities of dolphin are landed from intense commercial harvest or unregulated catch and landing by charter or other components of the recreational sector.

3. Minimize conflict and/or competition between recreational and commercial user groups. If commercial longlining effort increases, either directing on dolphin and wahoo or targeting these species as a significant bycatch, conflict and/or competition may arise if effort shifts to areas traditionally used by recreational fishermen.

4. Optimize the social and economic benefits of the dolphin and wahoo fishery. Given the significant importance of dolphin and wahoo to the recreational sector throughout the range of these species and management unit, manage the resources to achieve optimum yield on a continuing basis.

5. Reduce bycatch of the dolphin fishery. Bycatch is a problem in the pelagic longline fishery for highly migratory species. Any increase in overall effort, and more specifically shifts of effort into nearer shore, non-traditional fishing grounds by swordfish and tuna vessels, may result in increased bycatch of non-target species. In addition, National Standard 9 requires that: “Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.” Therefore bycatch of the directed dolphin fishery must be addressed. Appendix C (FSEIS for HMS Regulatory Amendment 1) contains data on dolphin-wahoo pelagic longline fishery analysis. The data presented on page C-66 and in Table C-4 indicate that pelagic longlines targeting dolphin do in fact result in a bycatch of HMS species.

6. Direct research to evaluate the role of dolphin and wahoo as predator and prey in the pelagic ecosystem.

7. Direct research to enhance collection of biological, habitat, social, and economic data on dolphin and wahoo stocks and fisheries.

STATUS OF THE STOCK

Stock Status

A surplus production model was fit to abundance indices estimated from long line catches and total landings of the fisheries from years 1985 – 1997. It was concluded that the stock status, as of 1998, is above B_{MSY} and that the species is able to withstand a relatively high rate of exploitation.

Stock Assessment

No formal assessment has been conducted on dolphin in the Atlantic due to uncertainties in the extent of the North Atlantic stock and the jurisdictional cooperation necessary to characterize catch across the range of the species.

STATUS OF THE FISHERY

Current Regulations

There is a 10 fish/day bag limit with a 60 fish per boat/day trip limit (headboats excluded from daily trip limit) for recreationally harvested dolphin North Carolina. No trip limit exists for commercial harvest.

Commercial Landings

Commercial landings have fluctuated over the last 10 years with a high of 611,962 lbs valued at $1,030,145 in 2009 and a low of 94,210 lbs valued at $244,752 in 2011 (Fig. 1). Over 75% of dolphin landings were harvested using surface longlines with the remainder of the harvests coming from the pelagic troll and greenstick fisheries.

Recreational Landings

Recreational landings of dolphin have declined over the last 10 years with a high of 5,850,339 lbs in 2005 and a low of 1,388,209 lbs in 2014 (Figure. 2). This trend is likely due to a decline in effort within the recreational fishery related to the economic downturn in 2008, and likely not due to affects related to over harvest (Figure. 3).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Fishery dependent length-frequency information for the commercial dolphin fishery in North Carolina is collected by port agents through the trip ticket program, specifically programs 438 and 439. Size trends in landed fish appear to correspond with varying levels of commercial harvest (Table 1; Figure. 1).

Fishery-Independent Monitoring

Currently, the division does not have any fishery-independent sampling programs that target or catch dolphin in great numbers.

MANAGEMENT STRATEGY

Dolphin is currently included in the North Carolina Interjurisdictional Fishery Management Plan, which defers to South Atlantic Fishery Management Council Fishery Management Plan compliance requirements. The South Atlantic Fishery Management Council approved a Fishery Management Plan for dolphin in 2004 and is currently managed under recent Amendment 5 (2014). Current regulations for dolphin are as follows:

15A NCAC 03M .0515 DOLPHIN

(a) It is unlawful to possess more than 10 dolphin per person per day taken by hook and line for recreational purposes.

(b) It is unlawful to possess more than 60 dolphin per day per vessel regardless of the number of people on board, except headboat vessels with a valid U.S.

Coast Guard Certificate of Inspection may possess 10 dolphin per paying customer.

(c) It is unlawful to take or possess more than 10 dolphin per person per day, or sell dolphin without a valid Federal Commercial Dolphin/Wahoo vessel permit and either a Standard Commercial Fishing License, a Retired Standard Commercial Fishing License, or a Land or Sell License.

MANAGEMENT AND RESEARCH NEEDS

Prioritized EFH Research Needs for Dolphin and Wahoo

1. What is the areal and seasonal abundance of pelagic *Sargassum* off the southeast U.S.?
2. Develop methodologies to assess remotely assess *Sargassum* using aerial or satellite technologies (e.g., Synthetic Aperture Radar)
4. What is the relative importance of pelagic *Sargassum* weedlines and oceanic fronts for early life stages of dolphin and wahoo?
5. Are there differences in abundance, growth rate, and mortality?
6. What is the age structure of all fishes that utilize pelagic *Sargassum* habitat as a nursery and how does it compare to the age structure of recruits to pelagic and benthic habitats?
7. Is pelagic *Sargassum* mariculture feasible?
8. Determine the species composition and age structure of species associated with pelagic *Sargassum* when it occurs deeper in the water column?
9. Additional research on the dependencies of pelagic *Sargassum* productivity on the marine species using it as habitat.
10. Quantify the contribution of nutrients to deepwater benthic habitat by pelagic *Sargassum*.
11. Studies should be performed on the abundance, seasonality, life cycle, and reproductive strategies of Sargassum and the role this species plays in the marine environment, not only as an essential fish habitat, but as a unique pelagic algae.
12. Research to determine impacts on the *Sargassum* community, as well as the individual species of this community that are associated with, and/or dependent on, pelagic *Sargassum*. Human induced (tanker oil discharge; trash) and natural threats (storm events) to *Sargassum* need to be researched for the purpose of protecting and conserving this natural resource.
13. Develop cooperative research partnerships between the Council, NMFS Protected Resources Division, and state agencies since many of the needs to a) research pelagic *Sargassum*, and b) protect and conserve pelagic *Sargassum* habitat, are the same for both managed fish species and listed sea turtles.
14. Direct specific research to further address the association between pelagic *Sargassum* habitat and post-hatchling sea turtles

Prioritized Biological Research Needs for Dolphin and Wahoo.

1. In the short-term effort should be directed at examining all existing seasonality (effort and landings), mean size, and life history data for dolphin from the northern area.
2. Additional data are needed to develop and/or improve estimates of growth, fecundity, etc. Research in this area is encouraged.
3. There are limited social and economic data available. Additional data need to be obtained and evaluated to better understand the implications of fishery management options.
4. Trophic data should be considered in support of an ecosystem management approach.
5. Essential fish habitats for dolphin and wahoo need to be identified.
6. An overall design should be developed for future tagging work. This could be done by the Working Group. In addition, existing tagging databases should be examined.

7. Long-term work should continue and expand on current research investigating genetic variability of dolphin populations in the western central Atlantic.
8. Observer programs should place observers on longline trips directed on dolphin. Catch and bycatch characterization, condition released (alive or dead), etc. should be collected. Observers could also be used to collect bioprofile data (size, sex, hard parts for aging, etc.).
9. High levels of uncertainty in inter-annual variation in abundance of dolphin should be investigated through an examination of oceanographic and other environmental factors.
10. Release mortality should be investigated as a part of the evaluation of the effectiveness of current minimum size limits in the dolphin fishery.
11. Establish a list serve for dolphin and wahoo which would facilitate research and the exchange of information.

LITERATURE CITED

SAFMC 2003. Fishery management plan for the dolphin and wahoo fishery of the Atlantic. South Atlantic Fishery Management Council. Charleston, SC. 308 pp.

SAFMC 2003. Amendment 5 to the fishery management plan for the dolphin and wahoo fishery of the Atlantic. South Atlantic Fishery Management Council. Charleston, SC. 106 pp.

TABLES

Table 1. Mean, minimum and maximum fork lengths (mm) and total number sampled of dolphin from commercial fish house sampling.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	689	420	1140	184
2006	707	426	1342	172
2007	758	348	1097	228
2008	665	413	1135	231
2009	815	140	1295	555
2010	628	345	1115	451
2011	665	410	1120	269
2012	756	430	1245	579
2013	700	478	1440	176
2014	788	390	1352	339

FIGURES

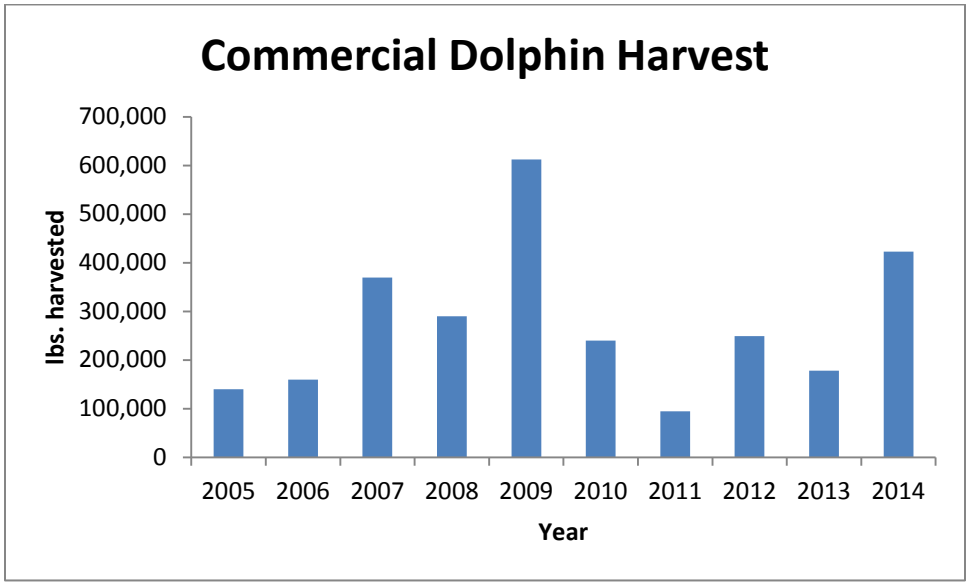


Figure 1. Commercial landings (lbs) of dolphin from 2005-2014.

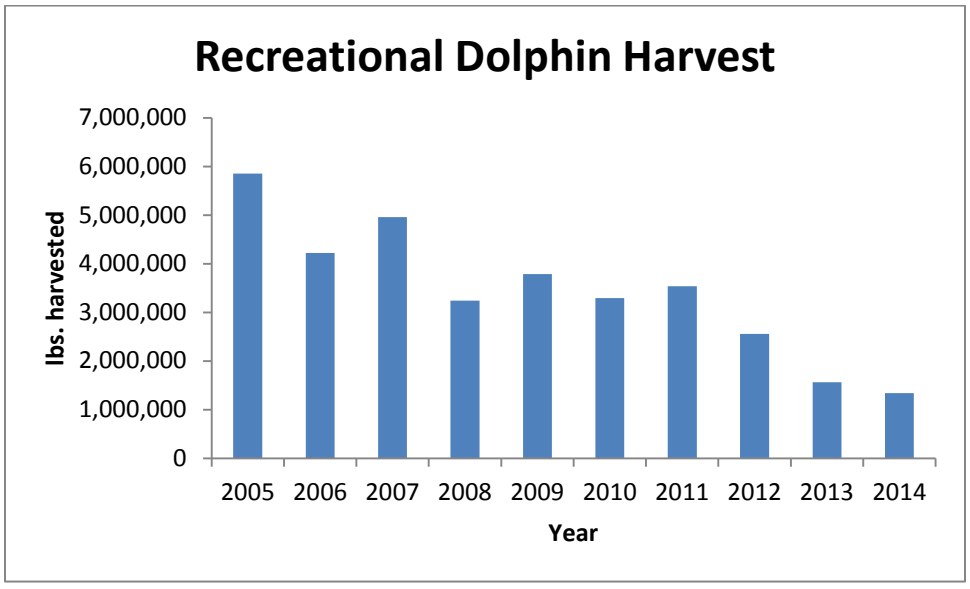


Figure 2. Recreational landings (lbs) of dolphin from 2005-2014.

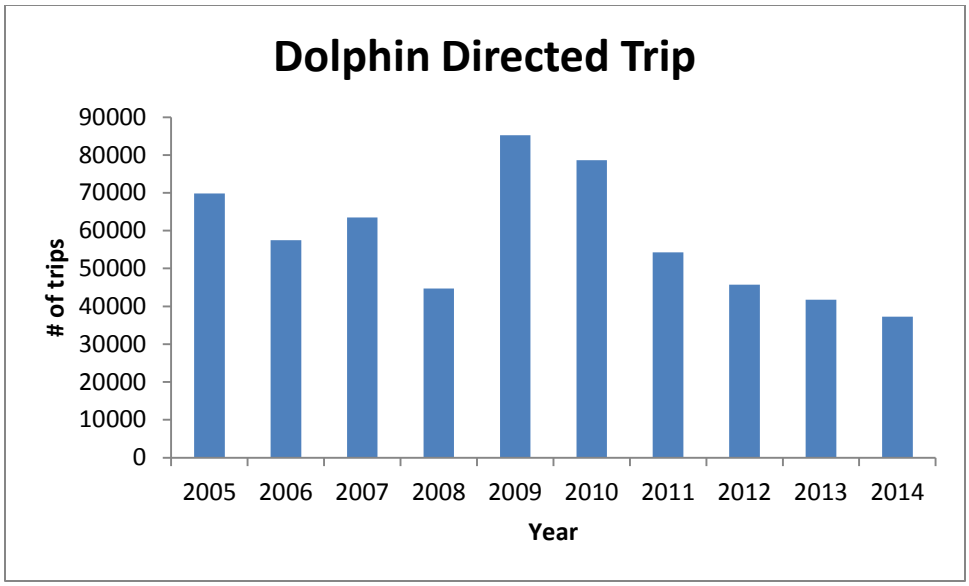


Figure 3. Number of directed recreational trips for dolphin by year.

FISHERY MANAGEMENT PLAN UPDATE
KING MACKEREL
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	February 1983
Amendments:	Amendment 1 – September 1985 Amendment 3 – August 1989 Amendment 5 – August 1990 Amendment 6 – November 1992 Amendment 7 – November 1994 Amendment 8 – March 1998 Amendment 9 – April 2000 Amendment 10 – June 1999 Amendment 11 – December 1999 Amendment 12 – October 2000 Amendment 13 – August 1992 Amendment 14 – July 2002 Amendment 15 – February 2004 Amendment 18 – December 2011 Amendment 20a – July 2014 Amendment 20b – March 2015 Framework action – December 2014 Framework Amendment 1 – December 2014
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	A benchmark stock assessment was completed for king mackerel in the South Atlantic in 2014. The next assessment has not been scheduled.

The original Gulf and South Atlantic Fisheries Management Councils (GSAFMCs) fishery management plan (FMP) for Coastal Migratory Pelagic Resources (mackerels) was approved in 1983. This plan treated king as one U.S. stock. Allocations were established for recreational and commercial fisheries, and the commercial allocation was divided between net and hook–and–line fishermen; Established procedures for the Secretary to take action by regulatory amendment to resolve possible future conflicts in the fishery, such as establish fishing zones and local quotas to each gear or user group. Numerous amendments have been implemented since the first FMP and are described below:

Amendment 1, established in 1985 provided a framework for pre–season adjustment of total allowable catch (TAC), revised king mackerel maximum sustainable yield (MSY) downward, recognized separate Atlantic and Gulf migratory groups of king mackerel, and established fishing permits and bag limits for king mackerel. Commercial allocations among gear users were eliminated.

Amendment 3 (1998) prohibited drift gill nets for coastal pelagics and purse seines and run-around gillnets for the overfished groups of mackerels. The habitat section of the FMP was updated and vessel safety considerations were included in the plan. A new objective to minimize waste and bycatch in the fishery was added to the plan.

Amendment 5 established in 1990 Extended the management area for the Atlantic groups of mackerels through Mid-Atlantic Fishery Management Council (MAFMC) jurisdiction. It revised problems in the fishery and plan objectives, revised the definition of "overfishing", added cobia to the annual stock assessment procedure, provided that the SAFMC will be responsible for pre–season adjustments of TACs and bag limits for the Atlantic migratory groups of mackerels, redefined recreational bag limits as daily limits; created a provision specifying that the bag limit catch of mackerel may be sold, provided guidelines for corporate commercial vessel permits, imposed a bag limit of two cobia per person per day for all fishermen, established a minimum size of 12–inch (30.5 cm.) fork length or 14–inch total length for king mackerel and included a definition of "conflict" to provide guidance to the Secretary.

Amendment 6 (1992) Identified additional problems and an objective in the fishery, provided for rebuilding overfished stocks of mackerels within specific periods, provided for biennial assessments and adjustments, provided for more seasonal adjustment actions, including size limits, vessel trip limits, closed seasons or areas, and gear restrictions, provided for commercial Atlantic Spanish mackerel possession limits, changed commercial permit requirements to allow qualification in one of three preceding years, discontinued the reversion of the bag limit to zero when the recreational quota is filled, modified the recreational fishing year to the calendar year; and changed minimum size limit for king mackerel to 20 inches fork length, and changed all size limit measures to fork length only.

Amendment 7 (1994) equally divided the Gulf commercial allocation in the Eastern Zone at the Dade–Monroe County line in Florida. The sub-allocation for the area from Monroe County through Western Florida is equally divided between commercial hook–and–line and net gear users.

Amendment 8 (1996) Identified additional problems in the fishery, specified allowable gear, established a moratorium on new commercial king mackerel permits and provided for transferability of permits during the moratorium, revised qualifications for a commercial permit, extended the management area of cobia through New York, allowed retention of up to 5 damaged king mackerel on vessels with commercial trip limits, revised the seasonal framework procedures to a). delete a procedure for subdividing the Gulf migratory group of king mackerel, b). request that the stock assessment panel provide additional information on spawning potential ratios and mixing of king mackerel migratory groups, c). provide for consideration of public comment, d). redefine overfishing and allow for adjustment by framework procedure, e). allow changes in allocation ratio of Atlantic Spanish mackerel, f). allow setting zero bag limits, g). allow gear regulation including prohibition.

Amendment 9 (2000) changed the percentage of the commercial allocation of TAC for the Florida east coast (North Area) and Florida west coast (South/West Area) of the Eastern Zone to 46.15 percent North and 53.85 percent South/West (previously, this allocation was

50%/50%); and allowed possession of cut-off (damaged) king or Spanish mackerel that comply with the minimum size limits and the trip limits in the Gulf, Mid-Atlantic, or South Atlantic EEZ (sale of such cut-off fish is allowed and is in addition to the existing allowance for possession and retention of a maximum of 5 cut-off (damaged) king mackerel that are not subject to the size limits or trip limits, but that cannot be sold or purchased, nor counted against the trip limit). (Note: Several other changes were made involving allocation and gear restrictions that affected the Florida west coast and Gulf fisheries).

Amendment 10 (1998) designated Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concerns for coastal migratory pelagics.

Amendment 11 (1998) amended the FMP as required to make definitions of MSY, optimal yield (OY), overfishing and overfished consistent with "National Standard Guidelines"; identified and defined fishing communities and addressed bycatch management measures.

Amendment 12 (1999) extended the commercial king mackerel permit moratorium from October 15, 2000 to October 15, 2005, or until replaced with a license limitation, limited access, and/or individual fishing quota or individual transferable quota system (ITQ), whichever occurs earlier.

Amendment 13 (2002) established two marine reserves in the exclusive economic zone (EEZ) of the Gulf of Mexico in the vicinity of the Dry Tortugas, Florida known as Tortugas North and Tortugas South, in which fishing for coastal migratory pelagic species is prohibited. This action complements previous actions taken under the National Marine Sanctuaries Act.

Amendment 14 (2002) established a 3-year moratorium on the issuance of charter vessel and headboat Gulf group king mackerel permits in the Gulf unless sooner replaced by a comprehensive effort limitation system. The control date for eligibility was established as March 29, 2001. The amendment also includes other provisions for eligibility, application, appeals, and transferability of permits.

Amendment 15 (2005) established an indefinite limited access program for king mackerel in the EEZ under the jurisdiction of the Gulf of Mexico, South Atlantic, and Mid-Atlantic Fishery Management Councils; Changed the fishing year to March 1 through February 28/29 for Atlantic group king and Spanish mackerels.

Amendment 18 establishes Annual Catch Limits and Accountability Measures for king and Spanish mackerel, as well as cobia.

Amendment 20a prohibits the sale of king mackerel caught under the bag limit unless the fish are caught as part of a state-permitted tournament and the proceeds from the sale are donated to charity. In addition, the rule removes the income qualification requirement for king mackerel commercial vessel permits.

Amendment 20b eliminates the 500-pound trip limit that is effective when 75 percent of the respective quotas are landed for king mackerel in the Florida west coast Northern and Southern Subzones, allows transit of commercial vessels with king mackerel through areas closed to king mackerel fishing, if gear is appropriately stowed, creates Northern and Southern Zones for Atlantic migratory group king and Spanish mackerel, each with separate quotas. NOAA Fisheries will close each zone when the respective quota is met or expected to be met. The dividing line between the zones is at the North Carolina/South Carolina state line.

A stock assessment was completed for king mackerel in the South Atlantic in 2014, concluding that the stock was not overfished and overfishing was not occurring.

Management Unit

King mackerel are managed under the jurisdiction of The Coastal Migratory Pelagic FMP jointly with the Gulf of Mexico Fishery Management Council. The management unit is defined as King mackerel within US waters of the South Atlantic and Gulf of Mexico. Current management defines two migratory units: Gulf Migratory Group and Atlantic Migratory Group.

Goals and Objectives

Amendment 12 to the Gulf and South Atlantic Fishery Management Councils FMP for Coastal Migratory Pelagics lists eight plan objectives:

1. The primary objective of the FMP is to stabilized yield at MSY, allow recovery of overfished populations, and maintain population levels sufficient to ensure adequate recruitment.

2. To provide a flexible management system for the resource which minimizes regulatory delay while retaining substantial Council and public input in management decisions and which can rapidly adapt to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups or by areas.

3. To provide necessary information for effective management and establish a mandatory reporting system.

4. To minimize gear and user group conflicts.

5. To distribute the TAC of Atlantic migratory group Spanish mackerel between recreational and commercial user groups based on the catches that occurred during the early to mid-1970s, which is prior to the development of the deep water run-around gill net fishery and when the resource was not overfished.

6. To minimize waste and bycatch in the fishery.

7. To provide appropriate management to address specific migratory groups of king mackerel.

8. To optimize the social and economic benefits of the coastal migratory pelagic fisheries.

STATUS OF THE STOCK

Stock Status

An integrated Stock Synthesis approach was used assess the stock (SEDAR 38) in a benchmark assessment in 2014 and predicts that Atlantic king mackerel are not overfished and overfishing is not occurring.

Stock Assessment

Fishery independent data from the SEAMAP Trawl Survey for the Atlantic and fishery dependent information collected from NMFS MRFSS, Headboat and Logbook survey as well as NCDMF Trip Ticket landings information was used in constructing the assessment model. A Stock Synthesis approach was used which integrated fishery and life history indices into a statistical catch-at-age model to produce observed catch, size and age composition and CPUE

indices. Overall, stock biomass and SSB show little depletion until the 1950s when a slow decline started and then accelerated around 1980 reaching its lowest level in the late 1990s from which it increased until 2010. Since 2010 there has been a slight decrease in SSB (Figure. 1). Key biological reference points and associated benchmarks (SSB_{MSY} and F_{MSY}) were successfully derived and the overall consensus derived from sensitivity analysis of the model predict that the Atlantic stock of king mackerel is not overfished and overfishing is not occurring.

STATUS OF THE FISHERY

Current Regulations

Commercial: 3,500 lb trip limit

Recreational: 24 inches FL minimum size; 3 fish/day

Commercial Landings

Since 2005, commercial landings of king mackerel have declined from a high of 1,246,088 lbs to < 500,000 lbs since 2012 (Figure 2.)

Recreational Landings

During the time series (2005 – 2014), estimated MRIP landings of king mackerel peaked in 2007 at 2,530,097 lbs and declined sharply over the next 4 years to a low of 180,014 lbs in 2011and stayed below 400,000 lbs for the remainder of the series (Figure 3.)

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Length-frequency information for the commercial king mackerel fishery in North Carolina is collected by port agents through the trip ticket program, specifically programs 438 and 439. Ageing structures are collected from king mackerel fishing tournaments statewide and sent to the Southeast Fisheries Science Center in Panama City, Florida for processing and aging (Table 1). Maximum sizes of king mackerel sampled over the last 10 years have remained steady at ~1400 mm while mean annual sizes varied from 730 mm in 2008 to 990 mm in 2013 (Table 2).

Fishery-Independent Monitoring

Currently, the division does not have any fishery-independent sampling programs that target or catch king mackerel in great numbers.

MANAGEMENT STRATEGY

In North Carolina, king mackerel are currently included in the Interjurisdictional Fishery Management Plan, which defers to the South Atlantic Fishery Management Council management measures compliance requirements and is currently managed under recent Amendments 20A (2014) and 20B (2015) to the Coastal Migratory Pelagics Fishery Management Plan. Amendment 20A prohibits the sale of all bag-limit-caught king mackerel,

except those harvested during a state-permitted tournament. Amendment 20B establishes separate commercial quotas of Atlantic king mackerel for a Northern Zone (north of North Carolina/South Carolina line) and Southern Zone (south of North Carolina/South Carolina line NC/SC line). The South Atlantic Fishery Management Council is currently developing Amendment 26 to update the Atlantic king mackerel annual catch limits and adjust the mixing zone based on the results of the 2014 stock assessment, and to provide an incidental catch allowance of Atlantic king mackerel in the small coastal shark gillnet fishery. Current management strategies for king mackerel in South Atlantic waters are summarized in Table 3.

MANAGEMENT AND RESEARCH NEEDS

From SEDAR 38 report:

Develop a survey to obtain reliable age/size composition data and relative abundance of adult fish. This could be done using gillnets or handlines. The review panel recommends that the design of a scientific survey be peer reviewed.

Determine most appropriate methods to deal with changing selectivity in fisheries over time, particularly changing selectivity related to management actions or targeting of specific cohorts. The review panel suggests that historical mark-recapture data available from NMFS SEFSC and FWRI could be used to compare size composition of recaptures for different fishing gears to evaluate selectivity for historic periods.

Determine stock mixing rates using otolith microchemistry and/or otolith shape analysis on a routine basis that would allow future stock assessments to capture the dynamic spatial and temporal nature of mixing of the Atlantic and Gulf of Mexico stocks, and consider evaluating stock mixing within integrated modeling approaches.

More accurately characterize juvenile growth by increasing samples of age-0 and 1 fish. Further investigate 2-phase growth models including different breakpoints and different growth models to better model size and age. Consider if there is temporal (annual and seasonal) variability in growth rates. Results of this analysis in terms of the best model will need to be implementable in SS3 to continue with the integrated modeling approach.

Determine if female spawning periodicity varies by size or age.

Expand the SEAMAP trawl survey below the Cape Canaveral area and potentially into deeper continental shelf waters.

Consider conducting an extensive tagging program to: a) better understand migration patterns; b) provide additional and individual growth rate information; c) better understand fishery selectivity; d) provide fishery exploitation rates; and e) provide information about natural mortality rates. Fishery independent recapture information (i.e., use acoustic and satellite tags) will assist with a). Age at capture information of tagged animals will assist with b). A multi-year tagging program will be required for e). The review panel recommends that a specific workshop be held to consider in detail the design of a tagging program.

LITERATURE CITED

SAFMC Amendment 20a to the fishery management plan for the coastal migratory pelagic resources of the Gulf of Mexico and the South Atlantic. South Atlantic Fishery Management Council. Charleston, SC. 157 pp.

SEDAR 38 Stock Assessment report South Atlantic king mackerel. SEDAR Charleston, SC. 502 pp.

TABLES

Table 1. Mean, minimum and maximum fork lengths (mm) and total number sampled of king mackerel aged through Program 930.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	947.4	498	1400	444
2006	956.4	433	1375	435
2007	961.8	488	1390	507
2008	872.1	595	1365	450
2009	914.3	615	1400	415
2010	961.7	589	1452	386
2011	948.9	595	1448	429
2012	955.8	588	1421	597
2013	1021.3	612	1430	413
2014	1016.3	118	1500	388

Table 2. Mean, minimum and maximum fork lengths (mm) and total number sampled of king mackerel from fishery dependent sampling programs.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	856.0	410	1400	848
2006	894.5	433	1375	725
2007	731.9	70	1390	1047
2008	730.8	43	1365	2179
2009	784.4	383	1405	1477
2010	928.2	589	1452	583
2011	884.4	595	1929	1079
2012	933.7	588	1421	1125
2013	990.4	144	1430	506
2014	881.4	118	1500	826

Table 3. Management strategies and rules for king mackerel in the South Atlantic.

Management Strategy	Outcome
24” minimum size limit	Rule 3M.0301(b)(1)
3 fish creel limit	Rule 3M.0301(b)(2)
NMFS Commercial Vessel Permit requirements	Rule 3M.0301(b)(3)(A) Rule 3M.0301(b)(3)(B)
Unlawful to use gill nets south of Cape Lookout for more than 3 king mackerel	Rules 3M.0501(b)(4)
Charter vessels or head boats with NMFS Commercial Vessel Permit must comply with possession limits when fishing with more than 3 persons	Rules 3M.0501(c)
Commercial trip limit of 3,500 lbs of King, Spanish or aggregate	Rule 3M.0501(d)
Prohibits Purse Gill Nets when taking king or Spanish mackerel	Rule 3M.0302

FIGURES

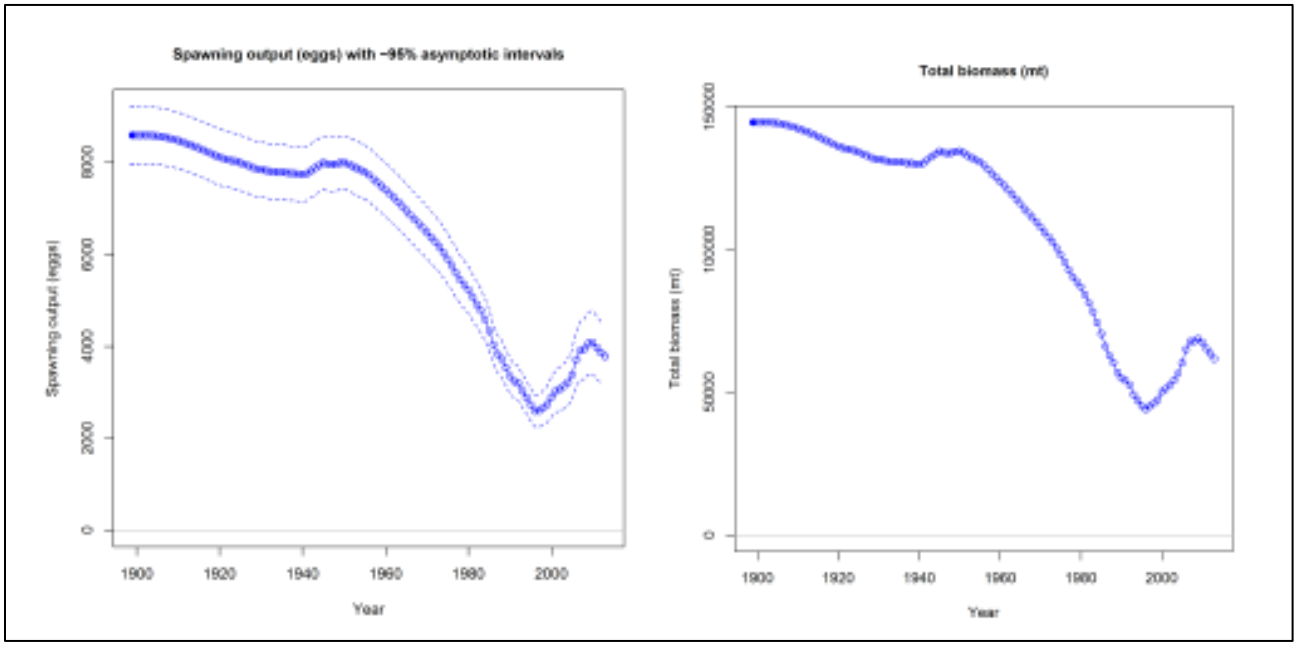


Figure 1. Predicted spawning biomass with 95% CI and total biomass in whole metric tons for king mackerel in Atlantic waters. Figure taken from SEDAR 38.

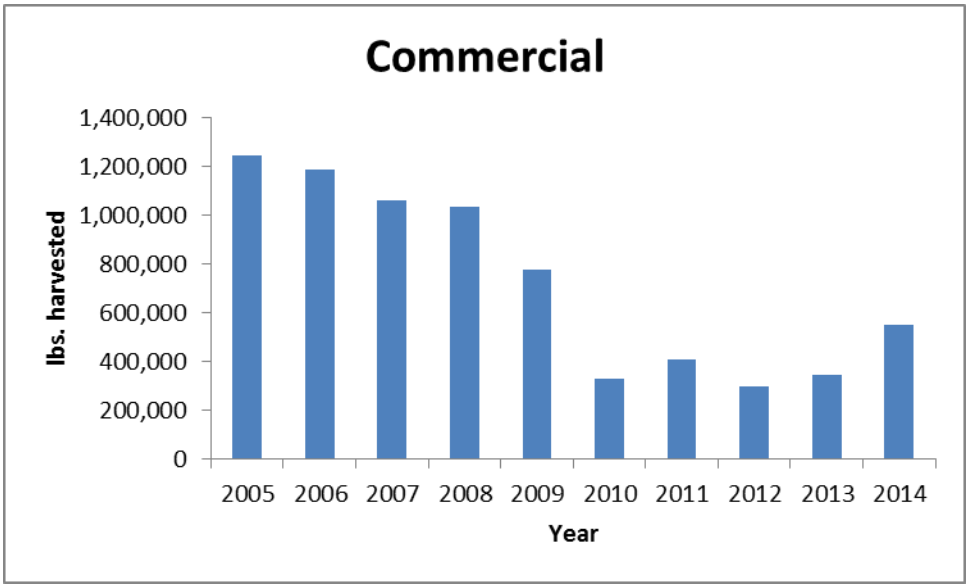


Figure 2. Commercial landings of king mackerel in North Carolina from 2005 - 2014.

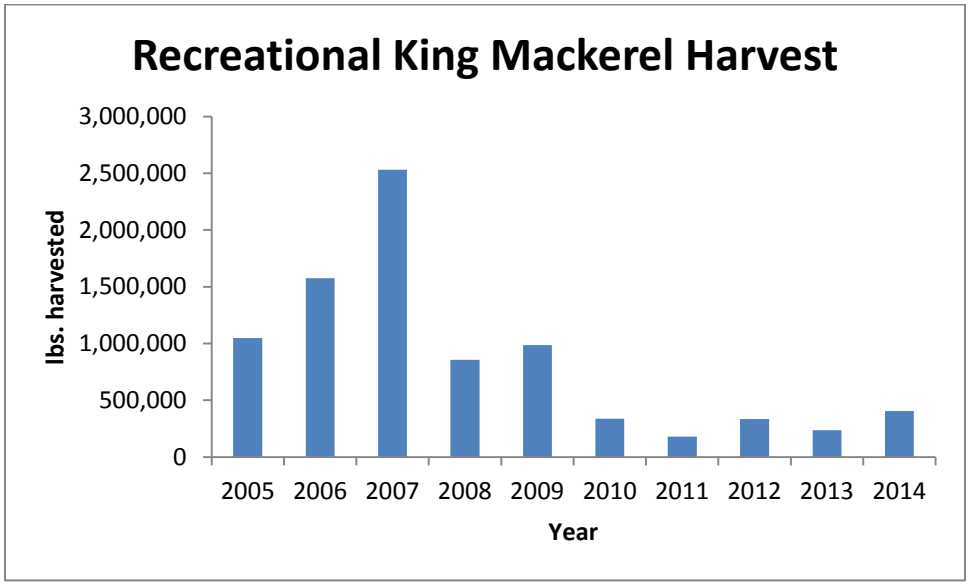


Figure 3. Estimated recreational harvest of King Mackerel in North Carolina from 2005 – 2014.

FISHERY MANAGEMENT PLAN UPDATE
MONKFISH
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	November 1999
Amendments:	Amendment 1 (April 1999) Amendment 2 (May 2005) Amendment 3 (February 2008) Amendment 4 (Under Development) Amendment 5 (March 2011)
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	Fall 2016

The New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Councils (MAFMC) adopted a rebuilding plan for monkfish in November 1999. NEFMC has the administrative lead. The Monkfish Fishery Management Plan (FMP) is designed to stop overfishing and rebuild the stocks through a number of measures, including: limiting the number of vessels with access to the fishery and allocating days-at-sea for those vessels; setting limits for vessels fishing for monkfish; minimum fish size limits; gear restrictions; mandatory time out of the fishery during spawning season; and a framework adjustment process. The Councils manage the fishery as two stocks, Southern Fishery Management Area (SFMA) and Northern Fishery Management Area (NFMA). North Carolina is in the SFMA (SFMA) that ranges from the southern flank of Georges Bank through the Mid-Atlantic Bight to North Carolina.

In 2006, North Carolina and NOAA Fisheries Southeast Regional Office (SERO) entered into an agreement enabling limited large mesh gill net fisheries for striped bass and monkfish in state waters. The large mesh monkfish fishery, for gill nets with a stretched mesh greater than seven inches, is open by proclamation from March 16 through April 14 unless closed sooner by proclamation. The Atlantic Ocean is closed to the use of gill nets greater than seven inches stretched mesh from December 22 through April 14 by proclamation, with the exception of the monkfish and striped bass fisheries. The agreement allows the state to implement Atlantic sturgeon, sea turtle and marine mammal conservation measures under its proclamation authority as well as gear restrictions on large mesh gillnets. Participants in this fishery must confine their fishing efforts to waters from the NC/VA state line to Wimble Shoals (out 2 miles but not more than 3), and report any sea turtle or marine mammal interactions. Each year, North Carolina contacts the NOAA Fisheries SERO to ensure that they have enough days-at-

sea observer coverage for the opening of the fishery. Once NOAA Fisheries has confirmed observer coverage a proclamation is issued opening the large mesh fishery to gill nets greater than seven inches in the Atlantic Ocean. Large mesh gill nets were required to be fished every 48 hours, weather permitting. The area could be closed if reliable sea surface temperature data indicated water temperatures greater than 11° C or if an interaction occurred between large mesh gill nets and marine mammals or sea turtles. Masters of vessels that fish for monkfish in the specified area are required to possess a current year monkfish large mesh gill net permit issued by North Carolina Division of Marine Fisheries (NCDMF) to valid commercial license holders. The permit requires holders to report weekly trip information to NCDMF and mandated participation in the NOAA Fisheries observer program, in order to monitor interactions with protected species.

The original FMP was modified and amended to include an annual measure of the status of the stocks and adjustment to management measures as needed to maintain a 10-year rebuilding schedule. In April 1999, the councils adopted Amendment 1 to the monkfish FMP, which described and identified the essential fish habitat (EFH) for the monkfish fishery, compliant with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Framework Adjustment 1 to the FMP, effective June 1999, implemented management measures for FY 2002, provided for a one-year delay in default measures for Year 4, and adjusted trip limits to account for court decision on differential gear-based limits.

Framework Adjustment 2 to the FMP, effective May 2004, established a process to determine an annual total allowable catch (TAC) and appropriate fishing measures for each management area. This method is based upon the relationship between the 3-year running average of National Marine Fisheries Service's (NOAA FISHERIES) fall trawl survey biomass index and established biomass index targets. The data indicated that the biomass indices were less than the current targets for both management areas. Due to concern about the ability of the stocks to rebuild to target levels by the end of the 10 year rebuilding period under this process, the Councils modified the management measures in the NMFA and changed the annual adjustment process.

Amendment 2 to the FMP, effective May 2005, included measures to address Essential Fish Habitat (EFH) and bycatch issues, as well as other issues raised during the public scoping process. Amendment 2 did not modify the stock-rebuilding program established in Framework Adjustment 2. Amendment 2 implemented the following measures: a new limited access permit for qualified vessels fishing south of 38°20'00.00 N latitude (south of Ocean City, MD); an offshore monkfish fishery in the Southern Fishery Management Area (SFMA); a maximum roller-gear disc diameter of 6 inches in the SFMA; closure of two deep-sea canyon areas to all gears when fishing under monkfish days at sea (DAS); establishment of a research DAS set-aside program and a DAS exemption program; a North Atlantic Fisheries Organization Regulated Area Exemptions Program; adjustments to the monkfish incidental catch limits (from 50 lb/trip to 50 lb/day not to exceed 150 lb/trip or, for qualified vessels, no more than 5 percent of the total weight of fish on board, not to exceed 450 lb tail weight); a decrease in the monkfish minimum size in the SFMA (from 14 inches to 11 inches tail length or 21 inches to 17 inches total length) to correspond to the size limits in the Northern Fishery Management Area (NFMA); removal of the 20-day block requirement; and new additions to the list of actions that can be taken under the framework adjustment process contained in the FMP.

A stock assessment (40th Northeast Regional Stock Assessment Workshop (SAW 40)) from November of 2004 showed that monkfish were not overfished in either the NFMA or the SFMA

based on existing reference points. Overfishing could not be determined as fishing mortality rates estimated from NEFSC and Cooperative survey data were not reliable.

Despite several years of increase in biomass in both stocks, by the fall of 2006 both stocks were considered to be in decline with approximately 50% of the biomass being below the annual biomass index targets. Framework Adjustment 3 to the FMP, effective November 2006, prohibited targeting monkfish on Multispecies permit B-regular days-at-sea (DAS). In 2007, Framework Adjustment 4 to the FMP was proposed by the Council to revise the monkfish management program so that the goals of the rebuilding plan could be met. Framework Adjustment 4 included, among other measures, a backstop provision that would adjust and potentially close, the directed monkfish fishery in 2009 if the landings in the 2007 fishing year exceeded the target total allowable catch by more than 30 percent.

Amendment 3 to the FMP, effective February 2008, included monkfish in part of the standardized bycatch reporting methodology omnibus amendment. The omnibus amendment was applied to FMPs of the MAFMC and NEFMC and was developed to address the requirements of the Magnuson-Stevens Act to include, in all FMPs, a standardized bycatch reporting methodology.

In July 2007, the Northeast Data Poor Stocks Working Group (DPWG) completed a new stock assessment which indicated that the monkfish stocks were not overfished and overfishing was no longer occurring. The council adopted new revised reference points recommended by the DPWG in May 2008, as Framework Adjustment 5 to the FMP. Framework Adjustment 6 to the FMP was also implemented in 2008, eliminating the backstop provision adopted in Framework Adjustment 4. The backstop provision would have adjusted and possibly closed the monkfish fishery in FY 2009 if landings exceeded the target total allowable catch (TAC) by more than 30 percent. Given that both stocks were rebuilt, the backstop provision was no longer deemed necessary.

Amendment 5 to the FMP, effective May 2011, was issued to bring the Monkfish FMP into compliance with the 2007 re-authorization of the Magnuson-Stevens Act. The Magnuson-Stevens Act was reauthorized and revised; it included the requirement that all FMPs establish Annual Catch Limits (ACLs) and measures to ensure accountability (AMs). For stocks not subject to overfishing, such as monkfish, the Act set a deadline of 2011 for the implementation of ACLs and AMs. Amendment 5 established the mechanism for specifying ACLs, AMs, annual catch target (ACT) and associated measures for DAS. Amendment 5 also brought the biological and management reference points in the FMP into compliance with the revised 2009 National Standard 1 (NS1) Guidelines.

In June 2010, another stock assessment, Stock Assessment Review Committee (SARC) 50, concluded that both stocks were above their respective biomass thresholds, and also above newly established biomass thresholds recommended during the assessment, indicating that both stocks are not overfished. The estimated fishing mortality rate for each stock was below its respective fishing mortality threshold, therefore overfishing was not occurring on either stock. The SARC 50 Report did however emphasize the continuing high degree of uncertainty in the assessment.

As a result of SARC 50, the NEFMC's Scientific and Statistical Committee (SSC) revised the estimate of ACLs for both stocks. The revised ACL for the NFMA is below the proactive AM annual catch target (ACT) for that area proposed in Amendment 5. Framework Adjustment 7, effective October 2011, adjusted the ACT for the NFMA to be consistent with the most recent

scientific advice regarding the acceptable biological catch (ABC) for monkfish. Framework Adjustment 7 also specifies a new DAS allocation and trip limits for the NFMA consistent with the new ACT. As well as, established revised biomass reference points for the NFMA and SFMA. A benchmark stock assessment for monkfish is scheduled to begin in 2016 under SARC 61.

Management Unit

In North Carolina, monkfish are included in the Interjurisdictional Fisheries Management Plan, which defers to the New England Fishery Management Council (NEFMC)/ Mid-Atlantic Fishery Management Council (MAFMC) FMP compliance requirements in federal waters (3–200 miles). Figure 1 illustrates the northern and southern fishery management areas and the boundary between the NEFMC and MAFMC.

Goal and Objectives

The FMP is intended to manage the monkfish fishery pursuant to the Magnuson-Stevens Fishery Conservation Management Act (MSFCMA) of 1976, as amended by the Sustainable Fisheries Act (SFA). The purpose of the amendment is to bring this FMP into compliance with the new and revised National Standards and other required provisions of the SFA by implementing the following:

- Reduce fishing mortality in the monkfish fishery to assure that overfishing does not occur;
- Improve the yield from this fishery;
- Promote compatible management regulations between state and federal jurisdictions;
- Promote uniform and effective enforcement of regulations; and
- Minimize regulations to achieve the management objectives stated above.

STATUS OF THE STOCK

Stock Status

Both the North and South monkfish stocks are not overfished and overfishing is not occurring. Monkfish was removed from the N.C. Stock Status Report due to the limited fishery in North Carolina. In 2014, commercial landings of monkfish were low and there were no reported recreational landings.

Stock Assessment

The NEFSC conducted a monkfish operational stock assessment in 2013. The purpose of the operational stock assessment was to update the 2010 assessment with additional data from 2010 and 2011. The model configuration has not changed substantively since the last peer-review by the SARC 50 in 2010. The model was updated with two years of data and revisions of discard estimates for 1980-2011 based on new methodology (SBRM approach). Changes in the discard estimates resulted in a minor reduction in the number of selectivity blocks in the southern stock model. Model results from the operational stock assessment indicate that the North and South monkfish stocks are not over-fished and overfishing is not occurring. The review panel summary, included in the NEFSC 2013 operational stock assessment, recommended a new benchmark assessment not proceed until new information on age, growth,

longevity and natural mortality is obtained. The review panel noted that a number of key uncertainties in landings, discards, commercial length frequencies, aging methods, life history, growth and natural mortality remain unresolved since the 2010 stock assessment. Despite these uncertainties, the work of the 2013 operational stock assessment is accepted as the best available scientific information by the review panel for assessing the status of monkfish. Projections for initial conditions of population sizes illustrated a negligible probability of the stocks becoming overfished in the short term. Based on the assessment results, the Monkfish PDT updated the OFL and ABC calculations using the default ABC control rule recommended by the SSC in 2010. The NEFSC submitted these findings in an assessment update reference document to the Council in May 2013.

This latest assessment (SARC 50) 1980-2009 placed new reference points to the existing data based on revised yield-per-recruit analysis and results of a length-tuned model that incorporates multiple survey indices and catch data. This new assessment indicates that monkfish stocks in both the Northern and Southern Management areas are not overfished and that overfishing is not taking place. To support current harvest levels and the FMP rebuilding plan for the stock, the Bthreshold is 37,245 mt for the SFMA and 26,465 mt for the NFMA. The Btarget is 74,490 mt for the SFMA and 52,930 mt for the NFMA. The 2010 estimates of total biomass are 131,218 mt for the SFMA and 66,062 mt for the NFMA. The Total Allowable Catch (TAC) remains at 15,279 mt in the SFMA and 10,745 mt in the NFMA. The assessment results continue to be uncertain due to cumulative effects of under-reported landings, unknown discards during the 1980's, uncertainty in survey indices, and incomplete understanding of key biological parameters such as age and growth, longevity, natural morality and stock structure.

Estimates (2010-2011) and projected biomass (2012-2016) were updated using the SCALE models in the 2013 assessment update. In the SFMA 2012-2016 the projected biomass ranges from 108,100 mt in 2012 to 106,600 mt in 2016, with a low of 104,200 mt in 2015. For the NFMA the projected biomass ranges from 66,600 mt in 2012 to 82,600 mt in 2016, with a low of 72,400 mt in 2013. Updated estimates of Bthreshold are 35,834 mt in the SFMA and 23,037 mt in the NFMA. Updated estimates of Btarget are 71,667 mt in the SFMA and 46,074 in the NFMA. Total updated estimates of catch are 14,328 mt SFMA and 9,383 NFMA.

STATUS OF THE FISHERY

Current Regulations

In North Carolina, a directed monkfish commercial fishery occurs from March 16 through April 14 in the Atlantic Ocean. During this time, fishermen harvesting monkfish in the Atlantic Ocean using gill nets greater than seven inches stretched mesh, must hold a valid N.C. Monkfish Large Mesh Gill Net Permit and limit fishing activity to a one mile wide area extending from two miles seaward of the coastline to three miles seaward of the coastline from the North Carolina/Virginia state line southward to Wimble Shoals (Latitude 35°30'N). The minimum size length for monkfish is 17 inches total length or 11 inches tail length for both commercial and recreational anglers. North Carolina does not set trip or possession limits for monkfish.

Commercial Landings

Annual landings of monkfish were up in 2014 compared to 2012 and 2013. Monkfish landings in North Carolina predominately occur as marketable by-catch from the summer flounder trawl fishery. In 2012 and 2013, shoaling of Oregon Inlet prevented flounder trawlers from landing in

Wanchese, NC, the closest NC port to the monkfish fishing grounds. During these years, North Carolina transferred summer flounder quota to Virginia to allow vessels to land summer flounder at Virginia fish houses when Oregon Inlet was impassible for larger vessels. In 2014, the transfer of quota between North Carolina and Virginia was not allowed; boats landed further south accessing ports through Beaufort Inlet or attempted entering Oregon Inlet when inlet conditions allowed. Tables 1 and 2 illustrate the magnitude of landings in pounds by year from each gear in both estuarine and ocean waters. For 2013 and 2014 the Atlantic Ocean large mesh gill net fishery had no reported trips and participation in the fishery has been declining. Landings from large mesh and small mesh gill nets are assumed to be as marketable by-catch and not from the targeted fishery. Prior to 2013, the landings from large mesh gill nets were significant. In recent years, weather conditions, water temperature, fish availability and activity in other fisheries have kept participation and landings low.

Recreational Landings

Not available due to low recreational activity.

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

North Carolina does not have a fishery dependent monitoring program for monkfish.

Fishery-Independent Monitoring

North Carolina does not have a fishery independent monitoring program for monkfish.

MANAGEMENT STRATEGY

The monkfish fishery is managed in federal waters primarily with a days-at-sea (DAS) management system with corresponding trip limits per DAS. Every three years the biological objectives and reference points are reviewed to evaluate threshold and target biological reference points. The MAFMC or NEFMC may initiate a framework adjustment, at any time, if they find it necessary to meet or be consistent with the goals and objectives of the Monkfish FMP. The management adjustments or amendments for monkfish will require majority approval of both the MAFMC and the NEFMC. The Monkfish Monitoring Committee (MC) meets six months prior to the beginning of the next fishing year to review available data pertaining to: discards and landings; days-at-sea and other measures of fishing effort; stock status and fishing mortality rates; enforcement of and compliance with management measures; and any other relevant information. The data is provided to the MC by NMFS, but the MC may also consider data provided by the states, ASMFC, the U.S. Coast Guard and other sources. The MC reviews the data and develops target Total Allowable Catch (TAC) recommendations and management options necessary to achieve the FMP goals and objectives.

The FMP defines overfishing as when F exceeds Fmax. Overfished is defined as when the total stock biomass or Bthreshold is less than half of the Bmax Projected. The 2013 Monkfish Operational Assessment conducted by the Northeast Fisheries Science Center (NEFSC) updated the biological reference points from the 2010 stock assessment needed to evaluate stock status for both the northern and southern stock and based on the long term projections

determined that neither stock was overfished or experiencing overfishing. All of the biological reference points are based on results of the SCALE model used in the 2010 stock assessment and are subject to a high level of uncertainty due to the poor quality of data used.

Northern Stock

- Fmax = 0.44
- Bthreshold = 0.5*Bmax Projected = 23,037 mt
- Btarget = Bmax Projected = 46,074 mt
- Bmsy = Fmax Projected = 9,383 mt

Southern Stock:

- Fmax = 0.37
- Bthreshold = 0.5*Bmax Projected = 35,834 mt
- Btarget = Bmax Projected = 71,667 mt
- Bmsy = Fmax Projected = 14,328

MANAGEMENT AND RESEARCH NEEDS

From the Northeast Fisheries Science Center 2013 monkfish operational stock assessment the panel recommended further research into (NEFSC 2013):

- Resolution of age, growth, and natural mortality issues.
- Determination of movement patterns in relation to stock areas.
- Development of a one stock model given evidence of movement between the two areas and existing genetic information (on-going genetics work may resolve the two stock-area issue).
- Development of a two-sex model depending on the results of aging work (would require estimation of sex ratios in catch and survey data)

Note: The information for this Fishery Management Plan (FMP) update can be found on the Mid-Atlantic and New England Fishery Management Councils' Website (http://www.mafmc.org or http://www.nefmc.org). Information is also available on NOAA Fisheries website for the Greater Atlantic Region (http://www.greateratlantic.fisheries.noaa.gov/sustainable/species/monkfish/). Please refer to these websites for additional information.

LITERATURE CITED

NEFSC (Northeast Fisheries Science Center). 2013. 2013 Monkfish Operational Assessment. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-23; 116 p.

TABLES

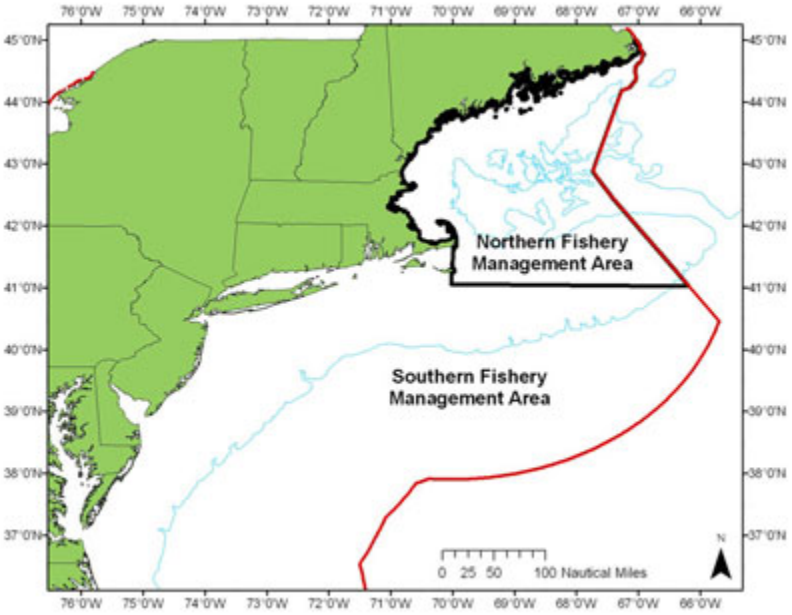
Table 1. Estuarine landings (lb) of monkfish by gear 2005-2014 (NC Trip Ticket Program).

Gear	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Crab Trawl			11		5					
Shrimp Trawl			50							
Pound Net				5				4		
Crab Pot			7							
Gill Net, < 5 inches	60	46	405		202	62	48	61	122	2
Gill Net, >=5 inches	159	74	86	180	138	30		10	27	49
Oyster Dredge								18		
Total	219	120	559	185	345	92	48	93	149	51

Table 2. Ocean landings (lb) of monkfish by gear 2005-2014 (NC Trip Ticket Program).

Gear	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Crab Trawl			11		5					
Flounder Trawl	56,423	64,424	40,026	49,961	26,967	23,960	29,371	11,626	8,009	70,988
Scallop Trawl	40	166	304	1,138				36		
Shrimp Trawl			104							
Ocean Flynet	258	1,726	2,896	2,226	1,368	7,265	162	166		1,032
Pound Net				5				4		
Crab Pot			7							
Gill Net, < 5 inches	7,550	3,456	16,238	138	18,542	460	4,072	2,673	792	834
Gill Net, >=5 inches	24,767	94,445	88,951	54,403	52,084	14,857	4,855	6,637	1,629	1,169
Gill Net, Runaround	83									
Rod-n-reel	9	45		6						22
Longline								6	11	
Oyster Dredge								18		
Scallop Dredge		156	964	180	80	28	74	150		
Total	89,130	164,418	149,501	108,057	99,046	46,570	38,534	21,316	10,441	74,045

Figure 1. 2014 Monkfish fishery management areas (NOAA Fisheries).



FISHERY MANAGEMENT PLAN UPDATE
SCUP NORTH OF CAPE HATTERAS
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	Incorporated into Summer Flounder FMP through Amendment 8 in 1996
Amendments:	Amendment 8 in 1996 Amendment 10 in 1997 Amendment 11 in 1998 Amendment 12 in 1999 Amendment 13 in 2003 Amendment 14 in 2007 Amendment 15 in 2011 Amendment 16 in 2007
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	A benchmark stock assessment is underway in 2015.

Because of their presence in, and movement between, state waters (0-3 miles) and federal waters (3-200 miles), the Mid Atlantic Fisheries Management Council manages scup north of Cape Hatteras cooperatively with the Atlantic States Marine Fisheries Commission (ASMFC). The two management entities work in conjunction with the National Marine Fisheries Service (NMFS) as the federal implementation and enforcement entity. The Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP) and amendments use output controls (catch and landings limits) as the primary management tool, with landings divided between the commercial and recreational fisheries. The FMP also includes minimum fish sizes, bag limits, seasons, gear restrictions, permit requirements, and other provisions to prevent overfishing and ensure sustainability of the fisheries. Recreational bag/size limits and seasons are determined on a state-by-state basis using conservation equivalency. The commercial quota is divided into state-by-state quotas based on historical landings. Specific details for each Amendment include:

Amendments 1-7 to the FMP were completed prior to black sea bass being incorporated in the Summer Flounder, Black Sea Bass and Scup FMP

Amendment 8 - Incorporated Scup FMP into Summer Flounder FMP; established scup management measures, including commercial quotas, recreational harvest limits, size limits, gear restrictions, permits, and reporting requirements.

Amendment 10 - Modified commercial minimum mesh requirements; continued commercial vessel moratorium; prohibited transfer of summer flounder at sea; established special permit for party/charter sector for summer flounder.

Amendment 11 - Modified certain provisions related to vessel replacement and upgrading, permit history transfer, splitting, and permit renewal regulations.

Amendment 12 - Revised FMP to comply with the Sustainable Fisheries Act and established framework adjustment process; established quota set-aside for research for summer flounder, scup, and black sea bass; established state-specific conservation equivalency measures; allowed the rollover of winter scup quota; revised the start date for summer quota period for scup fishery; established a system to transfer scup at sea.

Amendment 13 - Revised black sea bass commercial quota system; addressed other black sea bass mgmt. measures; Established multi-year specification setting of quota for all three species; Established region-specific conservation equivalency measures for summer flounder; built flexibility into process to define and update status determination criteria for each plan species.

Amendment 14 - Established a rebuilding schedule for scup; scup Gear Restricted Areas made modifiable through framework adjustment process.

Amendment 15 - Established Annual Catch Limits (ACLs) and Accountability Measures

Amendment 16 - Standardized bycatch reporting methodology.

Management Unit

U.S. waters in the western Atlantic Ocean from Cape Hatteras northward to the U.S.-Canadian border.

Goal and Objectives

The objectives of the Summer Flounder, Black Sea Bass and Scup FMP are to:

1. Reduce fishing mortality in the summer flounder, scup and black sea bass fisheries to assure that overfishing does not occur;

2. Reduce fishing mortality on immature summer flounder, scup and black sea bass to increase spawning stock biomass (SSB);

3. Improve the yield from these fisheries;

4. Promote compatible management regulations between state and federal jurisdictions;

5. Promote uniform and effective enforcement of regulations;

6. Minimize regulations to achieve the management objectives stated above.

The 2011 Omnibus Amendment contains Amendment 15 to the Summer Flounder, Black Sea Bass and Scup FMP (the most recent Amendment that impacts the scup fishery). The amendment is intended to formalize the process of addressing scientific and management

uncertainty when setting catch limits for the upcoming fishing year(s) and to establish a comprehensive system of accountability for catch (including both landings and discards) relative to those limits, for each of the managed resources subject to this requirement. Specifically: (1) Establish Allowable Biological Catch (ABC) control rules, (2) Establish a Council risk policy, which is one variable needed for the ABC control rules, (3) Establish ACL(s), (4) Establish a system of comprehensive accountability, which addresses all components of the catch, (5) Describe the process by which the performance of the annual catch limit and comprehensive accountability system will be reviewed, (6) Describe the process to modify the measures above in 1-5 in the future.

STATUS OF THE STOCK

Stock Status

The stock is considered to be viable. The 2015 Benchmark Stock Assessment for U.S. waters north of Cape Hatteras indicates the stock is not overfished nor is overfishing occurring relative to biological reference points.

Stock Assessment

The 2015 Benchmark Stock Assessment used a statistical catch at age model calculated using the Age Structured Assessment Program (ASAP). In 2014 the fishing mortality rate was below the threshold reference point (F40%) and the spawning stock biomass (SSB) was above the target reference point (SSB40%).

STATUS OF THE FISHERY

Current Regulations

Commercial: 9 inches total length (TL) minimum size limit. Landings windows are set by proclamation with variable harvest limits by time-period (see most recent NCDMF proclamation).

Recreational: Season is year-round. 8 inches TL minimum size, 50 fish bag limit/day in state waters; 9 inches TL minimum size, 50 fish bag limit in federal waters

Commercial Landings

Most scup landings from north of Cape Hatteras were from flounder trawls although flynets also caught scup. Landings are constrained by the coastwide quota. Annual landings were variable in 2005 to 2014 with very low landings in 2012-2013 but an increase in 2014 (Figure 1). The low landings in 2012-2013 were partly due to the closure of Oregon Inlet to large vessels (such as trawlers) and the consequent transfer of most of North Carolina's quota allocation to Virginia and other states. In 2014, more winter trawl vessels returned to North Carolina to land catches rather than transferring quota to Virginia and other states. Trends in commercial trips have generally followed landings trends (Figure 1). Trips include the number of trip ticket records with landings reported. Trips typically represent more than one day of fishing.

Recreational Landings

Recreational harvest and trips for scup from north of Cape Hatteras only occurred in 2011 and 2012 (Table 1).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Two NCDMF sampling programs collect biological data on commercial and recreational fisheries that catch scup north of Cape Hatteras. Program 433 (Winter Trawl Fishery) is the primary program that collects harvest length data. Other commercial sampling programs focusing on fisheries that do not target scup collect biological data rarely. NCDMF sampling of the recreational fishery through the Marine Recreational Information Program (MRIP) collects harvest length data. Age data have not been collected by NCDMF for scup north of Cape Hatteras.

There were no clear trends in commercial length data in 2005-2014 (Table 2). Annual mean lengths were fairly consistent for the time-series and 2014 was typical. There is a slight increase in the annual maximum length in recent years compared to early in the time-series and 2014 had the highest maximum length. The number of fish measured in 2014 was the second highest in the time-series.

Recreational harvest length data were only collected in 2011 and 2012 for scup north of Cape Hatteras (Table 3). Only one fish was measured each year. Very few scup are encountered in this fishery.

Fishery-Independent Monitoring

NCDMF independent sampling programs did not encounter scup north of Cape Hatteras in 2005-2014. NCDMF currently does not have independent sampling programs in ocean waters north of Cape Hatteras.

MANAGEMENT STRATEGY

Management of scup has been based on results from stock assessments. Results from the 2015 Benchmark Stock Assessment will be used to guide management. Projections based on stock assessments are used to set the coastwide quota level each year. Amendments to the FMP are undertaken as issues arise that require action.

MANAGEMENT AND RESEARCH NEEDS

- Implementation of new standardized research surveys that focus on accurately indexing the abundance of older scup (ages 3 and older);
- Continuation of at least the current levels of at-sea and port sampling of the commercial and recreational fisheries in which scup are landed and discarded;
- Quantification of the biases in the catch and discards, including non-compliance;

- Experimental work to better characterize the discard mortality rate of scup captured by different commercial gear types should be conducted to more accurately quantify the magnitude of scup discard mortality.

LITERATURE CITED

NMFS NEFSC. 2015. Stock assessment of scup (*Stenotomus chrysops*). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center.

TABLES

Table 1. Recreational hook and line harvest of scup in numbers of fish north of Cape Hatteras from MRIP data 2005-2014.

Year	Harvest (numbers)	Trips
2005	0	0
2006	0	0
2007	0	0
2008	0	0
2009	0	0
2010	0	0
2011	27	48
2012	148	150
2013	0	0
2014	0	0

Table 2. Summary of scup length (TL, mm) and age data from NCDMF commercial fishery sampling programs north of Cape Hatteras.

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	272	105	372	1,817	ND	ND	ND	ND
2006	286	160	393	1,568	ND	ND	ND	ND
2007	281	190	404	1,659	ND	ND	ND	ND
2008	281	183	415	3,493	ND	ND	ND	ND
2009	281	153	403	1,740	ND	ND	ND	ND
2010	276	200	386	1,450	ND	ND	ND	ND
2011	267	198	407	1,076	ND	ND	ND	ND
2012	327	287	401	7	ND	ND	ND	ND
2013	253	192	389	261	ND	ND	ND	ND
2014	281	193	441	2,725	ND	ND	ND	ND

Table 3. Summary of scup length (TL, mm) and age data from NCDMF recreational fishery sampling programs north of Cape Hatteras.

Year	Mean Length	Minimum Length	Maximum Length	Total Measured	Modal age	Minimum age	Maximum age	Total aged
2005	0	0	0	0	ND	ND	ND	ND
2006	0	0	0	0	ND	ND	ND	ND
2007	0	0	0	0	ND	ND	ND	ND
2008	0	0	0	0	ND	ND	ND	ND
2009	0	0	0	0	ND	ND	ND	ND
2010	0	0	0	0	ND	ND	ND	ND
2011	181	181	181	1	ND	ND	ND	ND
2012	290	290	290	1	ND	ND	ND	ND
2013	0	0	0	0	ND	ND	ND	ND
2014	0	0	0	0	ND	ND	ND	ND

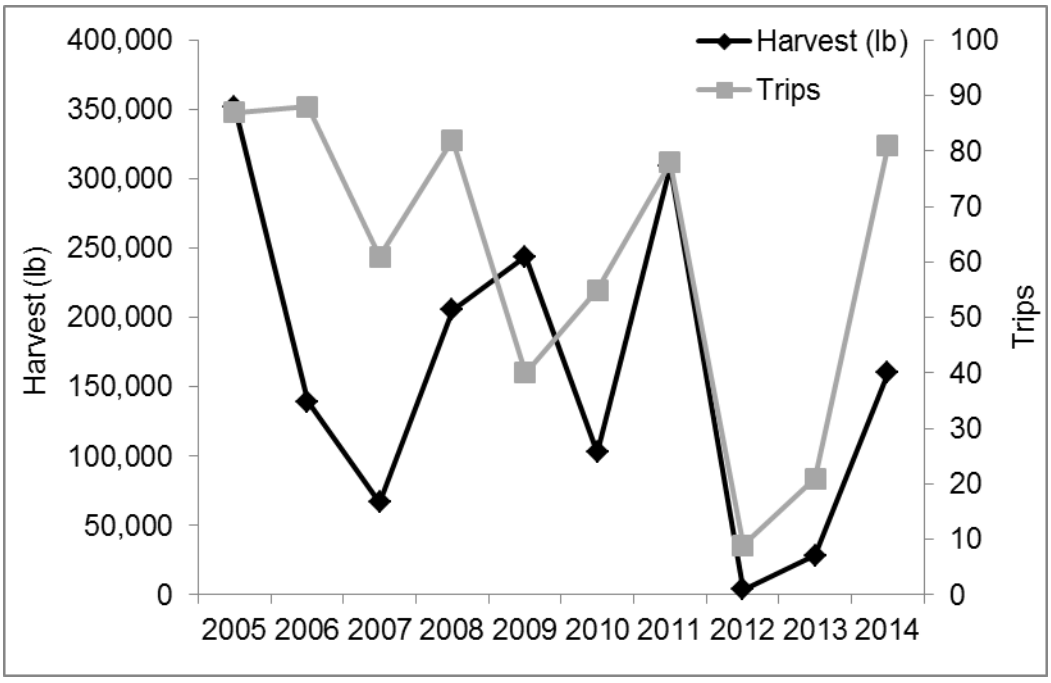


Figure 1. North Carolina commercial landings (lb) and trips for scup north of Cape Hatteras 2005-2014.

FISHERY MANAGEMENT PLAN UPDATE
SHARKS
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	August 2008
Amendments:	None
Revisions:	Addendum I (September 2009) Addendum II (May 2013) Addendum III (October 2013)
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	None

The Atlantic States Marine Fisheries Commission (ASMFC) adopted its first fishery management plan (FMP) for coastal sharks in 2008. Coastal sharks are managed under this plan as six different complexes: prohibited, research, small coastal, non-sandbar large coastal, pelagic and smooth dogfish (Table 1). The ASMFC does not actively set quotas for any shark species. The ASMFC follows National Marine Fisheries Service (NOAA Fisheries) openings and closures for small coastal sharks, non-sandbar large coastal shark and pelagic sharks. Species in the prohibited category may not be possessed or taken. Sandbar sharks (*Carcharhinus plumbeus*) may only be taken with a shark fishery research permit. All species must be landed with their fin attached to the carcass by natural means. Addendum I (2009) modified the FMP to allow limited smooth dogfish (smoothhound shark (*Mustelus canis*)) processing at sea (removal of fins from the carcass), removed smooth dogfish recreational possession limits, and removed gillnet check requirements for smooth dogfish fishermen. The goal of Addendum I was to remove restrictive management intended for large coastal sharks from the smooth dogfish (smoothhound shark) fishery, to allow fishermen to continue their operations while upholding the conservation measures of the FMP. Addendum II (2013) modified the FMP to allow year round smooth dogfish (smoothhound shark) processing at sea and allocated state-shares of the smooth dogfish (smoothhound shark) federal quota. The goal of Addendum II was to implement an accurate fin-to-carcass ratio and prevent the quota of smooth dogfish (smoothhound shark) from being harvested in one state. Addendum III (2013) modified the species groups to ensure consistency with NOAA Fisheries. The addendum also increased the recreational size limit for all hammerhead sharks species to 78 inches fork length.

Management Unit

The management unit includes the entire coast-wide distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ. The management unit is split between

the Atlantic and Gulf of Mexico regions for aggregated large coastal, hammerhead, non-blacknose small coastal and blacknose sharks. No regional quotas are in place for pelagic shark species.

Goal and Objectives

The Interstate Fishery Management Plan for Coastal Sharks (FMP) established the following goal and objectives.

The goal of the Interstate Fishery Management Plan for Coastal Sharks is "to promote stock rebuilding and management of the coastal shark fishery in a manner that is biologically, economically, socially, and ecologically sound."

In support of this goal, the following objectives are in place for the Interstate Shark FMP:

- Reduce fishing mortality to rebuild stock biomass, prevent stock collapse, and support a sustainable fishery.
- Protect essential habitat areas such as nurseries and pupping grounds to protect sharks during particularly vulnerable stages in their life cycle.
- Coordinate management activities between state and federal waters to promote complementary regulations throughout the species' range.
- Obtain biological and improved fishery related data to increase understanding of state water shark fisheries.
- Minimize endangered species bycatch in shark fisheries.

STATUS OF THE STOCK

Stock Status

Stock status is assessed by species complex for most coastal shark species and by species group for species with enough data for an individual assessment (Table 1).

Stock Assessment

The Southeast Data, Assessment and Review (SEDAR) completed a benchmark stock assessment on the smoothhound (smooth dogfish) shark complex (*Mustelus spp*.) in both the Gulf of Mexico and the Atlantic. The assessment found that neither stock was overfished or experiencing overfishing. A 2011 benchmark assessment of dusky (*Carcharhinus obscures*), sandbar, and blacknose (*Carcharhinus acrontus*) sharks indicates that both sandbar and dusky sharks continue to be overfished with overfishing occurring for dusky sharks. Blacknose sharks, part of the SCS 3 complex, are overfished with overfishing occurring. The Board approved the assessment for management use in February 2012, and NOAA Fisheries' Highly Migratory Species Division (HMS) is incorporated the results of the assessment as part of Amendment 5a to its FMP. Porbeagle sharks (*Lamna nasus*) were assessed by the ICCAT Standing Committee on Research and Statistics in 2009. The assessment found that while the Northwest Atlantic

stock is increasing in biomass, the stock is considered to be overfished with overfishing not occurring. The 2007 SEDAR 13 assessed the SCS complex, finetooth (*Carcharhinus isodon*), Atlantic sharpnose (*Rhizoprionodon terraenovae*), and bonnethead (*Sphyrna tiburo*) sharks. The SEDAR 13 peer reviewers considered the data to be the 'best available at the time' and determined the status of the SCS complex to be 'adequate.' Finetooth, Atlantic sharpnose and bonnethead were all considered to be not overfished and not experiencing overfishing. Atlantic sharpnose and bonnethead were more recently assessed by SEDAR 34, and are still considered not overfished or undergoing overfishing. SEDAR 11 (2006) assessed the LCS complex and blacktip sharks (*Carcharhinus limbatus*). The LCS assessment suggested that it is inappropriate to assess the LCS complex as a whole due to the variation in life history parameters, different intrinsic rates of increase, and different catch and abundance data for all species included in the LCS complex. Based on these results, NMFS changed the status of the LCS complex from overfished to unknown. As part of SEDAR 11, blacktip sharks were assessed for the first time as two separate populations: Gulf of Mexico and Atlantic. The results indicated that the Gulf of Mexico stock is not overfished and overfishing is not occurring, while the current status of blacktip sharks in the Atlantic region is unknown.

STATUS OF THE FISHERY

Current Regulations

Commercial

All non-prohibited coastal shark complexes opened on January 1, 2014, with the exception of large coastal sharks that opened on June 1, 2014. These openings followed NOAA Fisheries openings of the species complexes. NOAA Fisheries closes the shark complexes when 80% of their quota is reached. When the fishery closes in federal waters, the Interstate FMP dictates that the fishery also closes in state waters. No harvest of size restrictions are in place with the exception of large coastal sharks, it is unlawful to possess more than 36 large coastal sharks per trip. It is unlawful to possess any shark [with the exception of smooth dogfish (smoothhound shark)] without tail and fins naturally attached to the carcass through the point of landing. Commercial fishermen may completely remove the fins of smooth dogfish (smoothhound shark). If fins are removed, the total wet weight of the shark fins may not exceed twelve (12) percent of the total dressed weight of smooth dogfish (smoothhound shark) carcasses landed or found onboard a vessel. It is unlawful for a vessel to retain, transship, land, store or sell scalloped hammerhead, great hammerhead or smooth hammerhead sharks with pelagic longline gear onboard. It is unlawful for a vessel to retain sandbar sharks unless the vessel is selected to participate in the shark research fishery, subject to retention limits established by NOAA Fisheries and only when a NOAA Fisheries-approved observer is onboard. It is unlawful to use gears other than rod and reel, handlines, large and small mesh gill nets, shortlines (maximum of 500 yards each with 50 hooks or less), and meeting the criteria in C.2. below, pound nets/fish traps, and trawl nets. It is unlawful to use a large mesh (stretched mesh size greater than or equal to 5 inches) gill net more than 2,734 yards in length to capture sharks. It is unlawful to sell sharks to anyone who is not a federally permitted shark dealer.

NOAA Fisheries sets quotas for coastal sharks through their 2006 Consolidated Highly Migratory Species Fishery Management Plan (HMS FMP). As indicated above, the states follow NOAA Fisheries openings and closings, which are based on those quotas (Table 2).

Recreational

All non-prohibited coastal shark complexes opened on January 1, 2014. These openings followed NOAA Fisheries openings of the species complexes. It is unlawful for a recreational angler to possess more than one Atlantic sharpnose, and one bonnethead and one smooth dogfish (smoothhound shark) and one additional shark from the recreationally permitted species list (Table 3) per person per calendar day. Additionally, if fishing from a vessel, it is unlawful to have more than one additional shark from the recreationally permitted species list aboard a vessel, per calendar day, regardless of the number of people on board the vessel. It is unlawful to possess silky sharks (*Carcharhinus falciformis*) and sandbar for recreational purposes. It is unlawful to possess great hammerhead, smooth hammerhead and scalloped hammerhead sharks less than 78 inches [(fork length) Table 4]. It is unlawful to possess the rest of the Large Coastal Shark and Pelagic Shark species less than 54 inches long [(fork length) Table 4]. Smooth dogfish and small coastal sharks have no minimum size. Spiny dogfish are exempt from harvest and size restrictions. It is unlawful for recreational fishermen to possess any shark without head, tail, and fins intact with the carcass through the point of landing. Anglers may still gut and bleed the carcass as long as the tail is not removed. Filleting sharks at sea is prohibited. It is unlawful to fail to return all sharks not meeting harvest requirements (including prohibited species) to the water in a manner that ensures the highest likelihood of survival. It is unlawful for recreational fishermen to catch sharks by any gear other than rod and reel or handlines. Handlines are defined as a mainline with no more than two gangions or hooks attached that are retrieved by hand only. It is unlawful to possess a great hammerhead, scalloped hammerhead, smooth hammerhead or oceanic whitetip shark while in possession of tunas, billfish or swordfish.

Commercial Landings

Coast-wide commercial landings of Atlantic large coastal shark species in 2014 were 348,733 lb dressed weight (dw). Commercial landings of hammerhead sharks were 27,586 lb dw. Both large coastal and hammerhead landings were slightly higher compared to 2013 by a total of 5,196 lb dw. Commercial landings of small coastal shark species in 2014 were 228,045 lb dw. This is a decrease of approximately 11,000 lb dw from 2013 due to the premature closure of the fishery. The non-blacknose small coastal shark quota in the Atlantic is linked to the Atlantic blacknose shark quota. This quota linkage closes the Atlantic small coastal shark fishery prematurely, if the smaller blacknose quota is harvested before the larger non-blacknose quota. Landings of Atlantic pelagic species of sharks were 339,319 lb dw 2014, higher than 2013 due to the opening of porbeagle sharks and increased landings in the “pelagic sharks other than porbeagle and blue” management group (Table 2).

Recreational Landings

Recreational harvest for small coastal sharks has fluctuated from a peak harvest number of 1,095 to 6,299 and averaged 3,238 from 2005 to 2014. Recreational landings in pounds ranged from 6,598 to 36,544 and averaged 20,049 from 2005 to 2014 (Table 5).

Recreational harvest for large coastal sharks has been on a much smaller magnitude compared to small coastal sharks. Harvest numbers have ranged from 0 to 1,105 and averaged 356 sharks from 2005 to 2014. Recreational landings in pounds ranged from 0 to 38,052 and average 11,404 from 2005 to 2014 (Table 6).

Recreational harvest of pelagic sharks is similar to large coastal sharks. Harvest numbers for pelagic sharks ranged from 28 to 1,509 and averaged 240 sharks from 2005 to 2014. Recreational landings in pounds ranged from 1,219 to 112,556 and averaged 19,109 pounds from 2005 to 2014 (Table 7).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

North Carolina does not have a fishery-dependent monitoring program for sharks.

Fishery-Independent Monitoring

NCDMF has an independent red drum longline project established in 2007, which allows for capture and tagging of Atlantic coastal sharks. The independent red drum longline project in the Pamlico Sound resulted in a catch of 18 coastal sharks in 2014 (Table 8). Four species of sharks were captured; ten blacktip, six sandbar, one Atlantic sharpnose, and one finetooth shark. Of the ten blacktip sharks nine were females and their total lengths ranged from 1129 to 1638 mm. One blacktip shark was not measured. Of the six sandbar sharks one was a male with a total length of 800 mm the other 5 were females with total lengths ranging from 890 to 937 mm. The Atlantic sharpnose shark was a female with a total length of 431 mm. The finetooth shark was a male with a total length of 1,435 mm. A total of six sandbar and five blacktip sharks were also tagged with Northeast Fisheries Science Center's (NEFSC) Apex Predators Program tags.

A fisheries independent gill net survey was initiated in North Carolina in 2001. The objective of this project is to provide annual independent relative indices of abundance for key estuarine species in sounds and rivers that can be incorporated into stock assessments and used to improve bycatch estimates, evaluate management measures, and evaluate habitat usage. Results from this project are used by the NCDMF and other Atlantic coast fishery management agencies to evaluate the effectiveness of current management measures and to identify additional measures that may be necessary to conserve marine and estuarine stocks. Developing fishery independent indices of abundance for target species allows the NCDMF to assess the status of these stocks without relying solely on commercial and recreational fishery dependent data. Sampling is a stratified random sampling design in Pamlico Sound, utilizing multiple mesh gill nets (3.0-6.5 inch, ½ inch increments). In 2014, a total of 34 individual coastal sharks were captured in the Pamlico Sound independent gill net survey (Table 9). Coastal sharks from the 2014 Pamlico Sound independent gill net survey catch included: 25 Smooth dogfish total length range 459-1,082 mm (mean= 584 mm), five bull (*Carcharhinus leucas*) total length range 598-944 mm (mean=733 mm), two bonnethead total length range 748-974 mm (mean=861 mm), and two Atlantic sharpnose sharks total length range 736-877 mm (mean=807 mm). It should be noted that one bull shark was caught in the Neuse River portion of this survey. The sex of the shark was not recorded and the total length was 671 mm.

The Fisheries Independent Assessment Program Ocean Gillnet began in February, 2008, funded by the Coastal Recreational Fishing License receipts. The program utilizes the same sampling framework as the fisheries independent gill net survey. This program is designed to gather data on fishes utilizing the nearshore ocean (<3 miles) from New River Inlet south to the SC/NC state line and the Cape Fear and New Rivers. The goals of the program are to provide CPUE data for coastal fishes, to supplement age, growth, and reproduction studies,

to evaluate catch rates and species distribution for use in management plans, and to characterize habitat use. In 2014, 565 sharks were captured in the near shore ocean waters from New River Inlet south to the SC/NC state line and the Cape Fear and New Rivers (Table 10). Coastal sharks from the 2014 ocean gillnet survey catch included: 364 Atlantic sharpnose total length range 306-1002 mm (mean=649 mm), 42 blacknose total length range 901-1,281 mm (mean=1,085 mm), 36 blacktip total length range 625-1,593 mm (mean=1,231 mm), 91 bonnethead total length range 724-1,161 mm (mean=974 mm), one bull total length range 950 mm, six sand tiger (Carcharias Taurus) total length range 1,510-3,048 mm (mean=2,279 mm), six sandbar total length range 686-1,182 mm (mean=883 mm), ten scalloped hammerhead (Sphyrna lewini) total length range 593-1,183 mm (mean=855 mm), and 13 smooth dogfish total length range 442-721 mm (mean=595 mm).

MANAGEMENT STRATEGY

These species cross domestic and international boundaries; NOAA Fisheries' HMS Management Division is responsible for managing them under the Magnuson-Stevens Fishery Conservation and Management Act. In cooperation with an advisory panel, the division develops and implements fishery management plans for these species taking into account various domestic and international requirements. The ASMFC adopts NOAA Fisheries regulations in state waters.

MANAGEMENT AND RESEARCH NEEDS

The 2013 review of the ASMFC FMP for coastal sharks lists the following research needs:

Species-Specific Priorities

- Investigate the appropriateness of using vertebrae for ageing adult sandbar sharks. If appropriate, implement a systematic sampling program that gathers vertebral samples from entire size range for annual ageing to allow tracking the age distribution of the catch as well as updating of age-length keys.
- Re-evaluate finetooth shark life history in the Atlantic Ocean in order to validate fecundity and reproductive periodicity.
- Develop and conduct tagging studies on dusky and blacknose stock structure with increased international collaboration (e.g., Mexico) to ensure wider distribution and returns of tags.
- Expand research efforts directed towards tagging of individuals in south Florida and Texas/Mexico border to get better data discerning potential stock mixing.

General Priorities

- Generally update age and growth and reproductive studies for all species currently assessed.
- Examine female sharks during the pupping periods to determine the proportion of reproductive females.
- Expand or develop monitoring programs to collect appropriate length and age samples from the catches in the commercial sector by gear type, from catches in the recreational sector, and from catches taken in research surveys to provide reliable length and age compositions for stock assessments.
- Evaluate to what extent the different CPUE indices track population abundance (e.g., through power analysis).

- Explore modeling approaches that do not require an assumption that the population is at virgin level at some point in time.

LITERATURE CITED

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TABLES

Table 1. Stock status of Atlantic coastal shark species and species groups (ASMFC 2014).

Species or Complex Name	Stock Status		References/Comments
	Overfished	Overfishing is Occurring	
Porbeagle	Approaching	N	Porbeagle Stock Assessment, ICCAT Standing Committee on Research and Statistics Report (2009)
Dusky	Y	Y	SEDAR 21 (2011); designated to prohibited species
Large Coastal Sharks	Unknown	Unknown	SEDAR 11 (2006); difficult to assess as a species complex due to various life history characteristics/lack of available data
Blacktip	Unknown	Unknown	SEDAR 11 (2006)
Sandbar	Y	N	SEDAR 21 (2011)
Atlantic Sharpnose	N	N	SEDAR 34 (2013)
Blacknose	Y	Y	SEDAR 21 (2011)
Bonnethead	N	N	SEDAR 34 (2013)
Finetooth	N	N	SEDAR 13 (2007)
Smooth Dogfish	N	N	SEDAR 39 (2015)

Table 2. Summary of the 2014 coastwide and North Carolina 2014 Atlantic coastal shark commercial fishery (NOAA Fisheries and NCTTP).

Management Group	Region	2014 Annual Adjusted Quota (lb dw)	Season Opening Date	Season Closing Date	2014 Estimated Coastwide Landings (lb dw)	2014 NC Commercial Landings (lb dw)
Aggregated Large Coastal Sharks	Atlantic	372,552	6/1/2014	11/30/2014	348,733	134,194
Hammerhead Sharks		59,736			27,586	14,132
Non-Blacknose Small Coastal Sharks		582,333	1/1/2014	7/28/2014	228,045	100,444
Blacknose Sharks		38,638			33,382	1,842
Blue Sharks	No Regional Quotas	601,856		12/31/2014	17,806*	18,266
Porbeagle Sharks		2,820		12/17/2014	6,414	0
Pelagic Sharks Other Than Porbeagle or Blue		1,075,856		12/31/2014	315,099	194,000

*NCTTP program landings higher than estimated coast-wide due to the error in estimation

Table 3. Recreationally permitted species list.

SPECIES AUTHORIZED FOR RECREATIONAL HARVEST			
Large Coastal Sharks (LCS) (non-ridgeback* LCS & tiger)	Small Coastal Sharks (SCS)	Pelagic Sharks	Other
Blacktip Bull Hammerhead, great** Hammerhead, scalloped** Hammerhead, smooth** Lemon Nurse Spinner Tiger	Atlantic Sharpnose Blacknose Bonnethead Finetooth	Blue Oceanic whitetip** Porbeagle Shortfinmako Thresher	Smooth dogfish (smoothhound shark) Spiny dogfish

Table 4. Recreational size and bag limits.

RECREATIONALSIZE / BAG LIMITS and SEASONS			
Species	Minimum Size (Fork Length) in Inches (“)	Trip Bag Limit/Calendar Day	Season
Atlantic sharpnose	None	1 per person of each species	Jan. 1 – Dec. 31
Bonnethead	None		
Hammerheads (Great, Smooth and Scalloped)	78”	1 per vessel OR 1 per person for shore-anglers	
Large Coastal Sharks (LCS), Tiger and Pelagic Sharks	54”		
Small Coastal Sharks (SCS)	None		

Table 5. MRIP small coastal shark recreational harvest and discards 2005-2014 (NMFS 2015).

Year	Harvest Number (A+B1)	PSE (Num)	Weight (lb), (A+B1)	PSE (lb)	Number Released	PSE
2005	1,095	91.6	6,598	92.0	2,291	73.4
2006	4,605	69.2	27,690	69.6	24,791	54.1
2007	6,299	60.7	33,127	52.2	2,782	70.8
2008	3,268	66.4	18,610	66.4	.	.
2009	3,402	38.7	29,148	44.6	1,260	65.3
2010	5,989	31.9	36,544	34.1	12,358	59.6
2011	2,127	42.8	15,414	44.0	11,049	29.9
2012	1,449	51.6	9,839	51.6	3,319	46.5
2013	1,325	37.6	8,038	39.4	5,736	43.6
2014	2,821	31.8	15,479	30.5	1,540	45.6
10 Yr Average	**3,238**		**20,049**			

Table 6. MRIP large coastal shark recreational harvest and discards 2005-2014 (NMFS 2015).

Year	Harvest Number (A+B1)	PSE (Num)	Weight (lb), (A+B1)	PSE (lb)	Number Released	PSE
2005	664	95.9	38,052	95.9	5,803	59.4
2006	118	101.3	6,789	101.3	4,179	57.3
2007	1,105	70.0	17,344	46.0	8,731	46.9
2008	61	104.8	798	104.8	.	.
2009	.	.	.	.	582	89.1
2010	388	94.0	685	94.0	10,589	57.2
2011	305	99.9	471	99.9	3,342	77.9
2012	243	76.7	22,634	64.1	3,898	59.7
2013	59	113.4	11,128	113.4	2,776	35.1
2014	258	74.1	4,735	75.7	7,902	55.2
10 Yr Average	**356**		**11,404**			

Table 7. MRIP pelagic shark recreational harvest and discards 2005-2014 (NMFS 2015).

Year	Harvest Number (A+B1, MRIP)	PSE (Num)	Weight (lb), (A+B1, MRIP)	PSE (lb)	Number Released (MRIP)	PSE
2005	1,509	84.4	112,556	85.1	569	65.9
2006	254	68.6	24,001	66.5	428	95.2
2007	80	74.3	7,439	74.9	11	112.3
2008	30	79.8	2,693	79.8	.	.
2009	102	55.6	9,009	55.1	.	.
2010	87	78.2	13,559	84.4	116	98.9
2011	88	77.0	5,356	68.6	25	63.8
2012	172	63.2	11,697	61.1	13	98.0
2013	28	100.8	1,219	100.8	374	96.4
2014	45	63.8	3,558	60.5	62	110.8
10 Yr Average	**240**		**19,109**			

Table 8. Shark species captured in the NCDMF 2014 independent red drum longline project in the Pamlico Sound.

Species	Sex	Number Measured	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)
Atlantic Sharpnose Shark	Female	1	431	431	431
Atlantic Sharpnose Shark Total		**1**	**431**	**431**	**431**
Blacktip Shark	Female	9	1,437	1,125	1,638
	Sex Not Identified	1	0	0	0
Blacktip Shark Total		**10**	**1,294**	**0**	**1,638**
Finetooth Shark	Male	1	1,435	1,435	1,435
Finetooth Shark Total		**1**	**1,435**	**1,435**	**1,435**
Sandbar Shark	Male	1	800	800	800
	Female	5	910	890	937
Sandbar Shark Total		**6**	**892**	**800**	**937**
Total		**18**			

Table 9. Shark species captured in the NCDMF 2014 Pamlico Sound independent gill net survey.

Species	Sex	Number Measured	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)
Atlantic Sharpnose Shark	Male	2	736	877	807
Atlantic Sharpnose Shark Total		**2**	**736**	**877**	**807**
Bonnethead Shark	Female	2	748	974	861
Bonnethead Shark Total		**2**	**748**	**974**	**861**
Bull Shark	Sex Not Identified	5	598	944	733
Bull Shark Total		**5**	**598**	**944**	**733**
Smooth Dogfish	Male	17	490	1,082	587
	Female	8	459	690	577
Smooth Dogfish Total		**25**	**459**	**1,082**	**584**
Total		**34**			

Table 10. Shark species captured in the NCDMF 2014 Atlantic Ocean independent gillnet survey.

Species	Sex	Number Measured	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)
Atlantic Sharpnose Shark	Male	197	677	306	966
	Female	159	624	330	1,002
	Undetermined	2	910	899	921
	Sex Not Identified	6	368	335	409
Atlantic Sharpnose Shark Total		**364**	**649**	**306**	**1,002**
Blacknose Shark	Male	24	1,107	901	1,281
	Female	18	1,057	929	1,229
Blacknose Shark Total		**42**	**1,085**	**901**	**1,281**
Blacktip Shark	Male	13	1,229	1,029	1,576
	Female	23	1,231	625	1,593
Blacktip Shark Total		**36**	**1,231**	**625**	**1,593**
Bonnethead Shark	Male	27	850	771	938
	Female	64	1,002	724	1,161
Bonnethead Shark Total		**91**	**974**	**724**	**1,161**
Bull Shark	Male	1	950	950	950
Bull Shark Total		**1**	**950**	**950**	**950**
Sand Tiger Shark	Undetermined	2	2,279	1,510	3,048
Sand Tiger Shark Total		**2**	**2,279**	**1,510**	**3,048**
Sandbar Shark	Male	3	743	686	799
	Female	3	1,024	769	1,182
Sandbar Shark Total		**6**	**883**	**686**	**1,182**
Scalloped Hammerhead	Male	2	842	822	862
	Female	7	811	593	940
	Sex Not Identified	1	1,183	1,183	1,183
Scalloped Hammerhead Total		**10**	**855**	**593**	**1,183**
Smooth Dogfish	Male	7	594	442	721
	Female	6	597	521	663
Smooth Dogfish Total		**13**	**595**	**442**	**721**
Total		**565**			

FISHERY MANAGEMENT PLAN UPDATE
SNAPPER GROUPER COMPLEX
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption: August 1983 (SAFMC 1983; 48 FR 39463)

Amendments:

Amendment	Amendment approved	All Actions Effective By:
Regulatory Amendment 1	1987	March 1987
Regulatory Amendment 2	1988	March 1989
Amendment 1	1988	January 1989
Regulatory Amendment 3	1989	November 1990
Amendment 2	1990	October 1990
Amendment 3	1990	January 1991
Amendment 4	1991	January 1992
Amendment 5	1992	April 1992
Regulatory Amendment 4	1992	July1993
Regulatory Amendment 5	1992	July 1993
Amendment 6	1993	July 1994
Amendment 7	1994	January 1995
Regulatory Amendment 6	1994	May 1995
Amendment 8	1997	December 1998
Regulatory Amendment 7	1998	January1999
Amendment 9	1998	February 1999/ October 2000
Amendment 10	1998	July 2000
Amendment 11	1998	December 1999
Regulatory Amendment 8	2000	November 2000
Amendment 12	2000	September 2000
Amendment 13a	2003	April 2004
Amendment 13c	2006	October 2006
Amendment 14	2007	February 2009
Amendment 15a	2008	March 2008
Amendment 15b	2008	February 2010
Amendment 16	2009	July 2009
Amendment 19	2010	July 2010
Amendment 17a	2010	March 2011

Amendment 17b	2010	January 2011
Regulatory Amendment 10	2010	May 2011
Regulatory Amendment 9	2011	July 2011
Regulatory Amendment 11	2012	May 2012
Amendment 25	2012	April 2012
Amendment 24	2012	July 2012
Amendment 23	2011	January 2012
Amendment 18a	2012	July 2012
Amendment 20a	2012	October 2012
Regulatory Amendment 12	2012	October 2012
Amendment 18b	2012	May 2013
Regulatory Amendment 13	2013	July 2013
Regulatory Amendment 14	2013	December 2014
Regulatory Amendment 15	2013	September 2013
Amendment 27	2013	January 2014
Amendment 28	2013	August 2013
Regulatory Amendment 18	2013	September 2013
Regulatory Amendment 19	2013	October 2013
Regulatory Amendment 21	2014	November 2014
Amendment 32	2014	March 2015
Amendment 29	2014	July 2015

Revisions: N/A

Supplements: N/A

Information Updates: N/A

Schedule Changes: N/A

Next Benchmark Review: N/A

Of the 75 species managed by the South Atlantic Fishery Management Council (SAFMC), 59 of these are included in the Snapper Grouper management complex. Because of its mixed species nature, this fishery offers the greatest challenge for SAFMC to manage successfully. Initially, FMP regulations consisted of minimum sizes, gear restrictions and a provision for the designation of special management zones (SMZs). Early attempts to develop more effective management measures were thwarted by lack of data on both the resource and the fishery. The condition of many of the species within the snapper grouper complex was, and still is, unknown. Improved data collection (in terms of quantity and quality) during the 1980's and 90's has provided more management information on some of the more commercially and recreationally valuable species, but lack of basic management data on many of the species still remains the major obstacle to successful management.

Snapper grouper management is also difficult because many of these species are slow growing, late maturing, hermaphroditic, and long lived, so rebuilding efforts for some species will take

years to produce full recovery. Strict management measures, including prohibition of harvest in some cases, have been implemented to rebuild overfished species in the snapper grouper complex. Such harvesting restrictions are beneficial not only in rebuilding species, but also in helping to alleviate the need for these species to be listed in the future.

Regulatory Amendment 1 (48 FR 9864) prohibited fishing in SMZs except with hand-held hook-and-line and spearfishing gear; prohibited harvest of goliath grouper in SMZs; and implemented Special Management Zones (SMZ) off SC and GA.

Regulatory Amendment 2 (54 FR 8342) established two artificial reefs off Ft. Pierce, FL as SMZs.

Amendment 1 (SAFMC 1988; 54 FR 1720) prohibited use of trawl gear to harvest fish in the snapper grouper fishery south of Cape Hatteras, NC and north of Cape Canaveral, FL; defined directed snapper grouper fishery as a vessel with trawl gear and greater than or equal to 200-pounds of snapper grouper species onboard; and established the assumption that vessels with snapper grouper species onboard harvested these fish in the EEZ.

Regulatory Amendment 3 (55 FR 40394) established an artificial reef at Key Biscayne, FL as an SMZ in Dade County, FL; prohibited fish trapping, bottom longlining, spearfishing and harvesting of Goliath grouper in SMZs.

Amendment 2 (SAFMC 1990a; 55 FR 46213) prohibited harvest or possession of Goliath grouper in or from the EEZ in the South Atlantic, and defined overfishing for snapper grouper species according to NMFS 602 guidelines.

Amendment 3 (SAFMC 1990b; 56 FR 2443) established a management program for the wreckfish fishery which: added wreckfish to the snapper grouper management unit; defined OY and overfishing; required an annual permit to fish for, land or sell wreckfish; established a control date of March 28, 1990 for the area bounded by 33° and 30° N. latitude; established a fishing year beginning April 16; established a process whereby annual quotas would be specified; implemented a 10,000 pound trip limit and a January 15 – April 15 spawning season closure.

Amendment 4 (SAFMC 1991a; 56 FR 56016) prohibited the use of various gear, including fish traps, the use of bottom longlines for wreckfish, and powerheads in Special Management Zones off SC; established bag limits and minimum size limits for several species; established income requirements to qualify for permits; and required that all snapper grouper species possessed in South Atlantic federal waters must have heads and fins intact through landing.

Amendment 5 (SAFMC 1991b; 57 FR 7886) established an Individual Transferable Quota (ITQ) management program for the wreckfish fishery.

Regulatory Amendment 4 (SAFMC 1992a; 58 FR 36155) modified the definition of black sea bass pots; allowed for multi-gear trips and the retention of incidentally caught fish.

Regulatory Amendment 5 (SAFMC 1992b; 58 FR 35895) established eight additional Special Management Zones (SMZs) off the coast of SC.

Amendment 6 (SAFMC 1993; 59 FR 27242) established commercial quotas for snowy grouper, golden tilefish; established commercial trip limits for snowy grouper, golden tilefish, speckled

hind, and warsaw grouper; included golden tilefish in grouper recreational aggregate bag limits; prohibited sale of warsaw grouper and speckled hind; created the Oculina Experimental Closed Area; and specified data collection needs for evaluation of possible future IFQ system.

Amendment 7 (SAFMC 1994a; 59 FR 66270) established size limits and bag limits for hogfish and mutton snapper; specified allowable gear; prohibited the use of explosive charges, including powerheads, off SC; and required dealer, charter and headboat federal permits.

Regulatory Amendment 6 (SAFMC 1994b; 60 FR 19683) includes provisions to rebuild and protect hogfish by implementing a recreational bag limit of 5 fish per person off FL; protect cubera snapper by implementing a recreational bag limit of 2 per person for fish 30" total length or larger off Florida; and protect gray triggerfish by implementing a minimum size limit of 12 inches total length off Florida.

Amendment 8 (SAFMC 1997; 63 FR 38298) established a limited entry system for the snapper grouper fishery.

Regulatory Amendment 7 (63 FR 71793) established 10 SMZs at artificial reefs off SC.

Amendment 9 (SAFMC 1998a; 64 FR 3624; 65 FR 55203) increased the minimum size limits on red porgy, black sea bass, vermillion snapper (recreational only), gag, and black grouper; changed bag limits for red porgy, black sea bass, greater amberjack, gag, and black grouper; established an aggregate recreational bag limit of 20 fish per person per day inclusive of all snapper grouper species currently not under a bag limit, excluding tomtate and blue runners; and specified that vessels with bottom longline gear aboard may only possess snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish.

Amendment 10 (SAFMC 1998b; 65 FR 37292) identified Essential Fish Habitat (EFH) and EFH - Habitat Areas of Particular Concern for species in the snapper grouper management unit.

Amendment 11 (SAFMC 1998c; 64 FR 59126) amended the Fishery Management Plan (FMP) as required to make definitions of MSY, OY, overfishing and overfished consistent with "National Standard Guidelines"; identified and defined fishing communities; and addressed bycatch management measures.

Regulatory Amendment 8 (65 FR 61114) established 12 SMZs at artificial reefs off GA; revised boundaries of seven existing SMZs off GA to meet Coast Guard permit specs; restricted fishing in new and revised SMZs.

Amendment 12 (SAFMC 2000; 65 FR 51248) set regulatory limits for red porgy including a recreational bag limit, a commercial incidental catch limit, and a recreational and commercial size limit. It also permitted the transfer of the 225-pound trip limited commercial permit to another vessel (not another person) regardless of vessel size.

Amendment 13A (SAFMC 2003; 69 FR 15731) extended regulations within the Oculina Experimental Closed Area off the east coast of Florida that prohibit fishing for and retention of snapper grouper species for an indefinite period with a 10 year re-evaluation by the Council. The Council will review the configuration and size of the area within 3 years of publication of the Final Rule (March 26, 2004).

Amendment 13C (SAFMC 2006; 71 FR 55096) addressed overfishing for snowy grouper, golden tilefish, black sea bass and vermilion snapper. The amendment also allowed for a moderate increase in the harvest of red porgy as stock continues to rebuild.

Amendment 14 (SAFMC 2007a; 74 FR 1621) established a series of deepwater marine protected areas in the South Atlantic Exclusive Economic Zone.

Amendment 15A (SAFMC 2008a; 73 FR 14942) updated management reference points for snowy grouper, black sea bass, and red porgy; modified rebuilding schedules for snowy grouper and black sea bass; defined rebuilding strategies for snowy grouper, black sea bass, and red porgy; and redefined the minimum stock size threshold for the snowy grouper stock.

Amendment 15B (SAFMC 2008b; 74 FR 58902) prohibited sale the sale of bag-limit caught snapper grouper species; reduced the effects of incidental hooking on sea turtles and smalltooth sawfish; changed the commercial permit renewal period and transferability requirements; implemented a plan to monitor and address bycatch; and established management reference points for golden tilefish. Amendment 15B also established allocations between recreational and commercial fishermen for snowy grouper and red porgy.

Amendment 16 (SAFMC 2009a; 74 FR 30964) included measures to end overfishing for gag grouper and vermilion snapper; established commercial and recreational allocations for both species; established a January through April spawning season closure for gag, black grouper, red grouper, scamp, red hind, rock hind, yellowmouth grouper, tiger grouper, yellowfin grouper, graysby, and coney; reduced the aggregate grouper bag limit from 5 fish to 3 fish, and within that, reduced the gag bag limit from 2 fish to 1 gag or black grouper, combined; reduced the vermilion snapper bag limit from 10 fish to 5 fish; established a recreational closed season for vermilion snapper of November through March; excluded captain and crew on for-hire vessels from retaining a bag limit of groupers; and required the use of dehooking tools to reduce bycatch mortality.

Amendment 19 (SAFMC 2009b; 75 FR 35330) was included under the Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1) and included measures to provide presentation of spatial information for Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concern (EFH-HAPC) designations under the Snapper Grouper FMP; and designation of deepwater coral HAPCs.

Amendment 17A (SAFMC 2010a; 75 FR 76874) addressed management measures to end overfishing of red snapper and rebuild the stock, including Annual Catch Limits and Accountability Measures. It extended the prohibition of red snapper in federal waters throughout the South Atlantic EEZ effective immediately. Amendment 17A also included a regulation requiring the use of non-stainless circle hooks north of 28 degrees N. latitude effective March 3, 2011.

Amendment 17B (SAFMC 2010b; 75 FR 82280) established Annual Catch Limits (ACLs) and Accountability Measures (AMs) and addressed overfishing for nine species in the snapper grouper management complex: golden tilefish, snowy grouper, speckled hind, warsaw grouper, black grouper, black sea bass, gag, red grouper, and vermilion snapper. Measures in Amendment 17B included a deepwater closure (240 ft. seaward) for deepwater species to help protect warsaw grouper and speckled hind. Additional measures in the amendment included a reduction in the snowy grouper bag limit; establishment of a combined ACL for gag, black grouper, and red grouper; an allocation of 97% commercial and 3% recreational for the golden

tilefish fishery based on landings history; and establishment of accountability measures as necessary.

Regulatory Amendment 10 (SAFMC 2010c; 76 FR 23728) eliminated the large area closure in Amendment 17A for all snapper grouper species off the coasts of southern GA and north/central FL. The regulatory amendment modified measures implemented in Amendment 17A to end overfishing for red snapper.

Regulatory Amendment 9 (SAFMC 2011a; 76 FR 34892) reduced the bag limit for black sea bass from 15 fish per person to 5 fish per person, established trip limits on vermilion snapper and gag, and increased the trip limit for greater amberjack.

Regulatory Amendment 11 (SAFMC 2011b; 77 FR 27374) eliminated a restriction on the possession or harvest of some deepwater snapper grouper species in waters greater than 240 feet deep.

Amendment 25 (Comprehensive Annual Catch Limit Amendment) (SAFMC 2011c; 77 FR 15916) met the 2011 deadline mandated by the Magnuson-Stevens Act to establish Annual Catch Limits (ACLs) and Accountability Measures (AMs) for species managed by the Council that are not undergoing overfishing.

Amendment 24 (SAFMC 2011d; 77 FR 34254) proposed measures to end overfishing and establish a rebuilding plan for red grouper. The amendment also implemented or revised parameters such as Maximum Sustainable Yield (MSY), Minimum Stock Size Threshold (MSST), Annual Catch Limits (ACLs) and Accountability Measures (AMs) and specified allocations for the commercial and recreational sectors.

Amendment 23 (Comprehensive Ecosystem-Based Amendment 2) (SAFMC 2011e; 76 FR 82183) included measures to designate the Deepwater MPAs as EFH-HAPCs; limited harvest of snapper grouper species in SC Special Management Zones to the bag limit; and modified sea turtle release gear.

Amendment 18A (SAFMC 2012a; 77 FR 32408) established management actions to limit participation and effort in the black sea bass fishery. Measures included establishment of an endorsement program and other modifications to the commercial black sea bass pot fishery; establishment of a commercial trip limit (all gear-types) for black sea bass; and increased minimum size limits for both commercial and recreational black sea bass fisheries.

Amendment 20A (SAFMC 2012b; 77 FR 59129) defined and reverted inactive shares within the wreckfish ITQ program; redistributed reverted shares to active shareholders; established a share cap; and implemented an appeals process.

Regulatory Amendment 12 (77 FR 61295) adjusted the Annual Catch Limit (ACL) and Optimum Yield (OY) for golden tilefish; specified a commercial Annual Catch Target (ACT); and revised recreational Accountability Measures (AMs) for golden tilefish.

Amendment 18B (SAFMC 2013a; 78 FR 23858) addressed management of golden tilefish. Actions included in the amendment are: An endorsement program for the longline sector of the golden tilefish component of the snapper-grouper fishery; establishment of landings criteria to determine who will receive endorsements; an appeals process for the golden tilefish

endorsement program; establishment of a procedure to allow transferability of golden tilefish endorsements; allocation of 75% of the commercial annual catch limit to the longline sector and 25% to the hook-and-line sector; and modification of the golden tilefish trip limit.

Regulatory Amendment 13 (78 FR 36113) revised the acceptable biological catch estimates, annual catch limits (including sector annual catch limits), and recreational annual catch targets for 37 un-assessed snapper-grouper species. The revisions incorporated updates to the recreational data for these species, as per the new Marine Recreational Information Program, as well as revisions to commercial and for-hire landings. Regulatory Amendment 13 was necessary to avoid triggering accountability measures for these snapper-grouper species based on annual catch limits that were established by the Comprehensive Annual Catch Limit Amendment in April 2012, using recreational data under the Marine Recreational Fisheries Statistics Survey system.

Regulatory Amendment 14 (SAFMC 2013b; 79 FR 66316) modified the fishing year for greater amberjack; revised the minimum size limit measurement for gray triggerfish; increased the minimum size limit for hogfish; modified the commercial and recreational fishing year for black sea bass; adjusted the commercial fishing season for vermilion snapper; modified the aggregate grouper bag limit; and revised the Accountability Measures for gag and vermilion snapper.

Regulatory Amendment 15 (SAFMC 2013c; 78 FR 49183) modified the existing specification of optimum yield and annual catch limit for yellowtail snapper in the South Atlantic; modified existing regulations for yellowtail snapper in the South Atlantic; and modified the existing gag commercial annual catch limit and accountability measure for gag that requires a closure of all other shallow water groupers (black grouper, red grouper, scamp, red hind, rock hind, graysby, coney, yellowmouth grouper, and yellowfin grouper) in the South Atlantic when the gag commercial annual catch limit is met or projected to be met.

Amendment 27 (SAFMC 2013d; 78 FR 78770) assumed management of Nassau grouper in the Gulf of Mexico; modified the crew size restriction for dual-permitted vessels (those with a Snapper Grouper Unlimited or 225-Pound Permit and a Charter/Headboat Permit for Snapper Grouper); modified the bag limit retention restriction for captain and crew of for-hire vessels; changed the existing snapper grouper framework procedure to allow for more timely adjustments to annual catch limits; and removed blue runner from the fishery management unit.

Amendment 28 (SAFMC 2013e; 78 FR 44461) established a process to determine if a red snapper fishing season will occur each year, including specification of the allowable harvest for both sectors and season length for the recreational sector; an equation to determine the annual catch limit amount for red snapper for each sector; and management measures if fishing for red snapper is allowed.

Regulatory Amendment 18 (SAFMC 2013f; 78 FR 47574) adjusted the annual catch limit (and sector annual catch limits) for vermilion snapper and red porgy based on the stock assessment updates for those two species and removed the annual recreational closure for vermilion snapper.

Regulatory Amendment 19 (SAFMC 2013g; 78 FR 58249) adjusted the black sea bass annual catch limits based on the results of the 2013 assessment. Because the increase to the annual catch limit was substantial, there was concern that this could extend fishing with pots into the calving season for right whales and create a risk of entanglement for large migratory whales

during the fall months. To minimize this risk, the amendment also established a closure to black sea bass pot gear from November 1 to April 30.

Regulatory Amendment 21 (SAFMC 2014a; 79 FR 60379) prevents snapper-grouper species with low natural mortality rates (red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack) from being unnecessarily classified as overfished. For these species, even small fluctuations in biomass due to natural conditions rather than fishing mortality may cause a stock to be classified as overfished. Modifying the minimum stock size threshold definition (used in determining whether a species is overfished) prevents these species from being classified as overfished unnecessarily.

Amendment 32 (SAFMC 2014b; 80 FR 16583) addressed the determination that blueline tilefish are overfished and undergoing overfishing. The amendment removed blueline tilefish from the deep-water complex; established blueline tilefish commercial and recreational sector annual catch limits (ACLs) and accountability measures (AMs); revised the deep-water complex ACLs and AMs; established a blueline tilefish commercial trip limit; and revised the blueline tilefish recreational bag limit and harvest season.

Amendment 29 (SAFMC 2014c; 80 FR 30947) becomes effective July 1, 2015. The amendment revises annual catch limits (ACLs) and recreational annual catch targets (ACTs) for four unassessed snapper grouper species and three snapper grouper species complexes based on an update to the acceptable biological catch (ABC) control rule and revised ABCs for 14 snapper-grouper stocks. Additionally, this final rule revises management measures for gray triggerfish in Federal waters in the South Atlantic region, including modifying minimum size limits, establishing a split commercial season, and establishing a commercial trip limit.
There are several amendments either in development or under secretarial review (Table 1).

Management Unit

The original SAFMC plan stated the management unit of the snapper-grouper fishery is the stocks within the EEZ from North Carolina/ Virginia border through the east coast of Florida. In the case of black sea bass, the unit is limited to south of Cape Hatteras.
Since the inception of the FMP, there has been the addition of four species: wreckfish (1990), spadefish, banded rudderfish, and lesser amberjack. In recent years, 14 species have been removed; 13 in 2012 (tiger grouper, sheepshead, Queen triggerfish, puddingwife, black margate, yellow jack, Crevalle jack, porkfish, grass porgy, small mouth grunt, French grunt, Spanish grunt, and blue striped grunt) and one in 2014 (blue runner).

Objectives

The following are the fishery management plan objectives for the snapper grouper fishery as specified by the Council. These were last updated in Snapper Grouper FMP Amendment 8 in July 1997 (SAFMC 1997).

1. Prevent overfishing.

2. Collect necessary data.

3. Promote orderly utilization of the resource.

4. Provide for a flexible management system.
5. Minimize habitat damage.
6. Promote public compliance and enforcement.
7. Mechanism to vest participants.
8. Promote stability and facilitate long-run planning.
9. Create market-driven harvest pace and increase product continuity.
10. Minimize gear and area conflicts among fishermen.
11. Decrease incentives for overcapitalization.
12. Prevent continual dissipation of returns from fishing through open access.
13. Evaluate and minimize localized depletion.

STATUS OF THE STOCK

Stock Status

Concern – Of the 59 species in the South Atlantic Fishery Management Council (SAFMC) management unit, several species are either overfished or experiencing some degree of overfishing.

Stock Assessment

The status of a number of the species within the snapper grouper complex is unknown. However, for some of the species assessments are available through various federal entities; the snapper grouper complex is regionally (North Carolina south to eastern Florida) managed, and none of the assessments have been conducted by NCDMF (Table 2).

Since 2002, stock assessments have been conducted through the Southeast Data, Assessment, and Review (SEDAR) which is the cooperative process by which stock assessment projects are conducted in NOAA Fisheries' Southeast Region. Currently stock assessments are available for 10 of the complex species. There is an upcoming assessment (SEDAR 41) for gray triggerfish and red snapper that will be final in April 2016. There are also assessments scheduled for Goliath grouper (SEDAR 47) and Black grouper (SEDAR 48) to be final in August 2016; scamp and gray snapper have assessments to be scheduled after 2017. Blueline tilefish, tilefish, red grouper, vermillion snapper, and greater amberjack have updates to their assessments scheduled in the next few years.

Some of the other species have status updates provided by National Marine Fisheries Service (NFMS). These updates are based on landings data to determine whether or not the stock is overfished or undergoing overfishing. This information is updated quarterly by NMFS and available on their website (http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/).

STATUS OF THE FISHERY

Current Regulations

The following species have state and federal regulations for minimum lengths:

- Greater Amberjack: 28” Fork Length (FL) (recreational); 36” FL (commercial)
- Lesser Amberjack: 16” Total Length (TL)
- Black and Gag groupers: 24” TL
- Red, Scamp, Yellowfin, and Yellowmouth groupers: 20” TL
- Red Porgy : 14” TL
- Vermilion, Dog, Gray, Cubera, Mahogany, Queen, Silk, Yellowtail, Black, and Blackfin snappers : 12” TL
- Hogfish (not pigfish): 12” FL
- Mutton snapper: 16” TL
- Gray Triggerfish: 12” FL

All species have ACLs and recreational bag limits, see the SAFMC or NCDMF websites for the most current information.

The fisheries are open year round, with the exception of:

- Goliath grouper, Nassau grouper, Warsaw grouper, and speckled hind, unlawful to possess/harvest (commercial and recreational)
- Red snapper, unlawful to possess/harvest (commercial and recreational); limited season may occur based on previous year’s data
- January-April shallow water grouper spawning closure (commercial and recreational); Commercial also has same closure for red porgy
- Wreckfish have commercial spawning closure January 15-April 15; recreational fishery open July 1-August 31 annually
- April commercial closure for greater amberjack

Temporary closures may result for species if their ACL is met. See the SAFMC or NCDMF websites for more details and the most current information.

Commercial Landings

Commercial gear used in the snapper grouper fishery includes bandit reels, electromate reels, manual hook-and-line, long lines, fish pots, spear, and trolling. Bandit reels, followed by electromate rods and reels are the two most prevalent gear types used, especially south of Cape Hatteras (NCDMF 2015a). Spear fishing seems to be limited to south of Hatteras, while longlines are primarily fished north of Hatteras (NCDMF 2015a); their use is limited to six deepwater species and depths greater than 50 fathoms. Fish pots are used primarily to target black sea bass. Trip lengths vary dependent on the area fished and the gear used, but tended to average between 2-3d in length over the past 5 years; trips ranged from 1 day to 12 days for the entire commercial snapper grouper fleet (NCDMF 2015a).

The average landings for commercially caught snapper grouper from 2005-2014 was 2,328,834 pounds with a dockside value of $5,118,394.[1] The highest landings from the past 10 years were in 2008 and 2009, after which landings dropped; landings have been under 2 million pounds for the last 3 years (Figure 1). The decline in landings over the past 5 years is most likely due to the removal of species from the complex, as well as the changes to annual catch limits by the SAFMC (i.e., gag grouper).

Over the last 5 years landings have been dominated by five main aggregates, sea bass, grouper, snapper, triggerfish, and tilefish though the dominant group varies by year (Table 3). The top ten dominant species over the last 5 years are: black sea bass, vermillion snapper, blueline tilefish, gag, triggerfish, red grouper, red porgy, amberjack, scamp, and grunts (NCDMF 2015a).

Recreational Landings

Recreational fishing uses many of the same gear types as the commercial fishery, with the exception of fish pots and longlines. The average recreational catch of snapper grouper species was 1,246,252 pounds for 2005-2014. Since 2008, the total amount of fish landed has declined steadily; the highest amount landed was in 2007/2008 and the lowest in 2014 (Figure 2; Table 4). Recreational landings have dropped by approximately 75% from 2007 to 2014. As with the commercial fishery this is most likely due to the removal of species from the complex, as well as the changes to annual catch limits by SAFMC. For the last four years, the number of releases has been above 80% of the total fish caught (Table 4).

For 2014, the dominant species (by harvest number) landed were black sea bass, white grunt, gray triggerfish, vermillion snapper, blueline tilefish, Atlantic spadefish, and red porgies. This pattern mainly holds true for the last 5 years, though occasionally some of the jack species are dominant (Table 5).

MONITORING PROGRAM DATA

Most of the data (dependent and independent) collected by NCDMF is provided to National Marine Fisheries Service (NMFS). The Division received a grant, which ended in 2014, to look the age structure and release mortality of the commercial snapper grouper fishery in general and at the south of Hatteras black sea bass stock age structure specifically. Data collected for this grant is summarized in the final MARFIN reports (NCDMF 2015a, b).

Fishery-Dependent Monitoring

Commercial fisheries are monitored by port agents (state and federal) who collect information on trips, as well as biological information. Information is collected through the Trip Information Program (TIP), seafood dealer reporting, and logbooks (SAMFC 2015a). Recreational fisheries are monitored through the Southeast Region Headboat Survey program and the Marine Recreation Information Program (MRIP) (SAFMC 2015b). North Carolina contributes to this data through the collection of trip and biological information for both fisheries.

[1] These averages do not include sheepshead, as well as a number of other species, as they were removed from the complex in 2012. See Amendment 25 for list of species removed from complex.

Fishery-Independent Monitoring

The Southeast Reef Fish Survey (SERFS) maintains the fisheries independent data for the snapper grouper complex. SERFS is a collective program for gathering fisheries independent data within the South Atlantic federal waters. There are three primary programs that contribute to the data:

- Marine Resources Monitoring, Assessment, and Prediction (MARMAP) survey
- Southeast Fisheries-Independent Survey (SEFIS), and
- Southeast Area Monitoring and Assessment Program (SEAMAP)- South Atlantic. (SAFMC 2015).

North Carolina contributes to the data collected through programs such as the gag ingress work.

MANAGEMENT STRATEGY

The snapper grouper complex is managed under the various amendments of the SAFMC fisheries management plan. The fishery is a regional fishery, and the Council has authority within the federal 200-mile limit of the Atlantic Ocean off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West with the exception of black sea bass north of Cape Hatteras, North Carolina. In state waters, North Carolina defers to the Council and the same regulations are followed. Thresholds and targets for the species are determined by the SAFMC and are species dependent.

MANAGEMENT AND RESEARCH NEEDS

The reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act in 2006 directed that all regional management councils develop a prioritized research plan for annual submission to the Secretary of Commerce. The following are research and management needs as determined by the council in 2007 (SAFMC 2007b). All needs are ongoing; however the emphasis changes annually based on the SAFMC Science and Statistical Committee review of these needs. The reviewed list and priorities for the year are then approved for submission to the NMFS Southeast Fisheries Science Center. The council has developed a series of research and monitoring needs for the period of 2015-2019 (SAFMC 2015c).

- Continue monitoring of catches
- Collect otoliths and spines for ageing
- Estimate mortality rates
- Determine if stock structure exists for many of the species
- Note seasonal and spawning migrations
- Map essential fish habitat
- Determine spawning locations and seasons
- Continue life history studies
- Estimate reproductive parameters including fecundity, age and size of maturity, age and size of sexual transition, and sex ratio
- Determine reliability of historical landings
- Expand diet studies
- Develop juvenile and adult indexes

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TABLES

Table 1. Amendments under consideration/review by the SAFMC. Summaries of the issues the amendment addresses are included.

Amendment	Issue addressed	Where in process	Documentation
Regulatory 16	Black sea bass pots (remove seasonal prohibition)	Under development by council (SAFMC)	1. SG Regulatory 16 website (SAFMC) 2. Summary document (SAFMC 2015d)
Regulatory 17	Marine Protected Areas	Development of amendment stopped in June 2014 to focus on SG Amendment 36	SG Regulatory 17 website (SAFMC)
22	Recreational harvest tag program for species with low ACL	Development of amendment postponed in March 2015 to instead work with NMFS MRIP staff to address alternate means of tracking "low-intercept" species	SG Amendment 22 website (SAFMC)
36	Spawning Special Management Zones	Under development by council (SAFMC	SG Amendment 36 website (SAFMC)
35	Removal of species from the snapper grouper fishery management unit: black snapper, dog snapper, mahogany snapper, and schoolmaster.	Under development by council (SAFMC)	SG Amendment 35 website (SAFMC)
Comprehensive Ecosystem-Based Amendment (CE-BA) 3	Improvements in bycatch/discard data collection methods	Under development by council (SAFMC)	CE-BA 3 website (SAFMC)
34	Accountability measures for snapper grouper species	Under secretarial review	SG Amendment 34 website (SAFMC)
33	Transport of snapper grouper fillets from the Bahamas	Under secretarial review	SG Amendment 33 website (SAFMC)
Regulatory 22	Measures for gag grouper and wreckfish	Under secretarial review	SG Regulatory 22 website (SAFMC)
Regulatory 20	Management measures for snowy grouper	Under secretarial review	SG Regulatory 20 website (SAFMC)

Table 2. Stock status of the 59 species within the snapper grouper complex. Documentation is provided for the assessment associated with each species. No assessments have been conducted by NCDMF due to the nature of the fishery.

Family (species aggregate)	Species	Overfishing?	Overfished?	Approaching overfished condition?	Documentation
Serranidae (Sea basses and Groupers)	Gag (*Mycteroperca microlepis*)	No** (**based on NMFS assessment)	No	No	SEDAR 10 Update (SEDAR 2014); NMFS 2014
	Red grouper (*Epinephelus morio*)	No	No	No	SEDAR 19 (SEDAR 2010a)
	Scamp (*Mycteroperca phenax*)	No	Unknown	Unknown	NMFS 2014
	Black grouper (*Mycteroperca bonaci*)	No	No	No	SEDAR 19 (SEDAR 2010b)
	Rock hind (*Epinephelus adcensionis*)	Unknown	Unknown	Unknown	NMFS 2014
	Red hind (*Epinephelus guttatus*)	Unknown	Unknown	Unknown	NMFS 2014
	Graysby (*Cephalopholis cruentata*)	Unknown	Unknown	Unknown	NMFS 2014
	Yellowfin grouper (*Mycteroperca venenosa*)	Unknown	Unknown	Unknown	NMFS 2014
	Coney (*Cephalopholis fulva*)	Unknown	Unknown	Unknown	NMFS 2014
	Yellowmouth grouper (*Mycteroperca interstitialis*)	Unknown	Unknown	Unknown	NMFS 2014
	Goliath grouper (*Epinephelus itajara*)	No (Permanent closure)	Unknown	Unknown	SEDAR 23 (SEDAR 2011a); NMFS 2014
	Nassau grouper (*Epinephelus striatus*)	No (Permanent closure)	Unknown	Unknown	NMFS 2014
	Snowy grouper (*Epinephelus niveatus*)	No	Yes	No	SEDAR 36 (SEDAR 2013a); NMFS 2014
	Yellowedge grouper (*Epinephelus flavolimbatus*)	Unknown	Unknown	Unknown	NMFS 2014

* indicates ecosystem component species which do not have management measures in place and are not assessed.

Table 2 (continued).

Family (species aggregate)	Species	Overfishing?	Overfished?	Approaching overfished condition?	Documentation
Serranidae (Sea basses and Groupers)	Warsaw grouper (*Epinephelus nigritus*)	Yes	Unknown	Unknown	SG Amendment 17b (SAFMC 2010b); NMFS 2014
	Speckled hind (*Epinephelus drummondhayi*)	Yes	Unknown	Unknown	SG Amendment 17b (SAFMC 2010b); NMFS 2014
	Misty grouper (*Epinephelus mystacinus*)	Unknown	Unknown	Unknown	NMFS 2014
	Black sea bass (*Centropristis striata*)	No	No	No	SEDAR 25 (SEDAR 2013b); NMFS 2014
	*Bank sea bass (*Centropristis ocyurus*)	N/A	N/A	N/A	
	*Rock sea bass (*Centropristis philadelphica*)	N/A	N/A	N/A	
Polyprionidae (Wreckfish)	Wreckfish (*Polyprion americanus*)	No	No	No	NMFS 2014
Lutjanidae (Snappers)	Queen snapper (*Etelis oculatus*)	Unknown	Unknown	Unknown	NMFS 2014
	Yellowtail snapper (*Ocyusus chrysurus*)	No	No	No	SEDAR 27A (SEDAR 2012c); NMFS 2014
	Gray snapper (*Lutjanus griseus*)	Unknown	Unknown	Unknown	NMFS 2014
	Mutton snapper (*Lutjanus analis*)	No	No	No	SEDAR 15A Update (SEDAR 2015); NMFS 2014
	Lane snapper (*Lutjanus synagris*)	Unknown	Unknown	Unknown	NMFS 2014
	Cubera snapper (*Lutjanus cyanopterus*)	Unknown	Unknown	Unknown	NMFS 2014
	Dog snapper (*Lutjanus jocu*)	Unknown	Unknown	Unknown	NMFS 2014
	Schoolmaster (*Lutjanus apodus*)	Unknown	Unknown	Unknown	NMFS 2014

* indicates ecosystem component species which do not have management measures in place and are not assessed.

Table 2 (continued).

Family (species aggregate)	Species	Overfishing?	Overfished?	Approaching overfished condition?	Documentation
Lutjanidae (Snappers)	Mahogany snapper (*Lutjanus mahogoni*)	Unknown	Unknown	Unknown	NMFS 2014
	Vermilion snapper (*Rhomboplites aurorubens*)	No	No	No	SEDAR 17 Update (SEDAR 2012a); NMFS 2014
	Red snapper (*Lutjanus campechanus*)	Yes	Yes	N/A	SEDAR Assessment 24 (SEDAR 2010c); NMFS 2014
	Silk snapper (*Lutjanus vivanus*)	Unknown	Unknown	Unknown	NMFS 2014
	Blackfin snapper (*Lutjanus buccanella*)	Unknown	Unknown	Unknown	NMFS 2014
	Black snapper (*Apsilus dentatus*)	Unknown	Unknown	Unknown	NMFS 2014
Sparidae (Porgies)	Red Porgy (*Pagrus pagrus*)	No	Yes	No	SEDAR 1 Update (SEDAR 2012b); NMFS 2014
	Knobbed porgy (*Calamus nodosus*)	Unknown	Unknown	Unknown	NMFS 2014
	Jolthead porgy (*Calamus bajonado*)	Unknown	Unknown	Unknown	NMFS 2014
	Scup (*Stenotomus chrysops*)	Unknown	Unknown	Unknown	NMFS 2014
	Whitebone porgy (*Calamus leucosteus*)	Unknown	Unknown	Unknown	NMFS 2014
	Saucereye porgy (*Calamus calamus*)	Unknown	Unknown	Unknown	NMFS 2014
	*Longspine porgy (*Stenotomus caprinus*)	N/A	N/A	N/A	
Haemulidae (Grunts)	White grunt (*Haemulon plumieri*)	Unknown	Unknown	Unknown	NMFS 2014
	Margate (*Haemulon album*)	Unknown	Unknown	Unknown	NMFS 2014
	Tomtate (*Haemulon aurolineatum*)	Unknown	Unknown	Unknown	NMFS 2014

* indicates ecosystem component species which do not have management measures in place and are not assessed.

Table 2 (continued).

Family (species aggregate)	**Species**	**Overfishing?**	**Overfished?**	**Approaching overfished condition?**	**Documentation**
Haemulidae (Grunts)	Sailor's choice (*Haemulon parra*)	Unknown	Unknown	Unknown	NMFS 2014
	*Cottonwick (*Haemulon melanurum*)	N/A	N/A	N/A	
Carangidae (Jacks)	Greater Amberjack (*Seriola dumerili*)	No	No	No	SEDAR 15 (SEDAR 2008); NMFS 2014
	Almaco jack (*Seriola rivoliana*)	Unknown	Unknown	Unknown	NMFS 2014
	Banded rudderfish (*Seriola zonanta*)	Unknown	Unknown	Unknown	NMFS 2014
	Bar jack (*Caranx ruber*)	Unknown	Unknown	Unknown	NMFS 2015
	Lesser Amberjack (*Seriola fasciata*)	Unknown	Unknown	Unknown	NMFS 2014
Malacanthidae (Tilefishes)	Golden tilefish (*Lopholatilus chamaeleonticeps*)	No	No	No	SEDAR Assessment 25 (SEDAR 2011b); NMFS 2014
	Blueline (or gray) tilefish (*Caulolatilus microps*)	Yes	No** (**based on NMFS assessment)	N/A	SEDAR Assessment 32 (SEDAR 2013c); NMFS 2015
	Sand tilefish (*Malacanthus plumier*)	Unknown	Unknown	Unknown	NMFS 2014
Balistidae (Triggerfishes)	Gray triggerfish (*Balistes capriscus*)	No	Unknown	Unknown	NMFS 2014
	*Ocean triggerfish (*Canthidermis sufflamen*)	N/A	N/A	N/A	
Labridae (Wrasses)	Hogfish (*Lachnolaimus maximus*)	Unknown (Carolinas); Yes (FL)	Unknown (Carolinas); Yes (FL)	Unknown	NFMS 2015; SEDAR 37 (SEDAR 2013d)
Eppiphidae (Spadefishes)	Atlantic spadefish (*Chaetodipterus faber*)	Unknown	Unknown	Unknown	NMFS 2014

* indicates ecosystem component species which do not have management measures in place and are not assessed.

Table 3. Landings (in pounds) of snapper grouper, by aggregate groups, for the commercial fishery from 2010-2014. Aggregate groups are those used by the SAFMC and are done by family (as in Table 2). Sheepshead were removed from the fishery in 2012 and therefore not included past 2011; these are included in the porgy aggregate. Only black sea bass and scup from south of Cape Hatteras are included, as the northern populations are managed by the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fisheries Management Council (MAFMC); scup are included in the porgies for 2013 and 2014, 2010-2012 scup landings are confidential.

	Year				
Species	2010	2011	2012	2013	2014
Sea basses	292,879	173,681	194,778	241,403	312,078
Grouper	561,926	408,491	382,085	309,116	299,539
Wreckfish	--	23	--	--	--
Snapper	320,256	326,371	279,367	276,533	251,062
Porgies	242,412	211,699	83,918	72,666	82,655
Grunts	7,219	33,443	49,733	44,698	39,043
Jacks	131,050	73,810	140,525	104,673	202,152
Tilefish	430,394	133,824	361,074	217,079	91,074
Triggerfish	225,671	220,202	143,085	160,573	109,764
Hogfish	13,046	10,793	8,256	7,847	9,767
Spadefish	18,827	21,535	24,238	20,369	22,761
Unclassifed	17,763	7,681	12,038	14,928	21,962

Table 4. Landings of all snapper grouper species for the recreational fishery for 2005-2014. Sheepshead were removed from the fishery in 2012 and therefore not included past 2011.

Year	Number Harvested	Weight of harvested fish (pounds)	Number Released	Percent Released
2005	796,893	1,722,649	1,580,733	66%
2006	578,306	2,179,721	1,977,019	77%
2007	805,106	2,698,359	2,024,885	72%
2008	742,366	3,012,206	1,611,634	68%
2009	623,418	2,367,512	1,300,583	68%
2010	566,613	1,787,832	1,405,122	71%
2011	291,867	762,491	1,265,506	81%
2012	317,072	848,327	2,323,541	88%
2013	198,372	524,504	1,556,568	89%
2014	186,338	478,650	1,482,627	89%

Table 5. Recreational landings (in pounds), by aggregate groups, for 2010-2014. Aggregate groups are those used by the SAFMC and are done by family (as in Table 2). Sheepshead were removed from the fishery in 2012 and therefore not included past 2011; these are included in the porgy aggregate. Only black sea bass from south of Cape Hatteras are included, as the northern population is managed by ASMFC.

Species aggregate	Year				
	2010	**2011**	**2012**	**2013**	**2014**
Black sea bass	186,803	143,234	127,621	68,225	134,662
Groupers	275,085	107,852	126,567	54,417	20,363
Snappers	35,041	25,167	60,164	14,013	15,739
Porgies	460,919	191,262	26,249	16,720	17,453
Grunts	56,802	44,213	95,724	26,769	41,392
Jacks	440,846	138,703	175,197	197,482	94,917
Tilefish	43,333	27,163	43,681	33,951	41,970
Triggerfish	160,737	77,371	149,895	96,262	77,176
Hogfish	1,398	1,539	14,961	3,619	0
Atlantic Spadefish	125,088	2,711	25,905	12,459	34,789

FIGURES

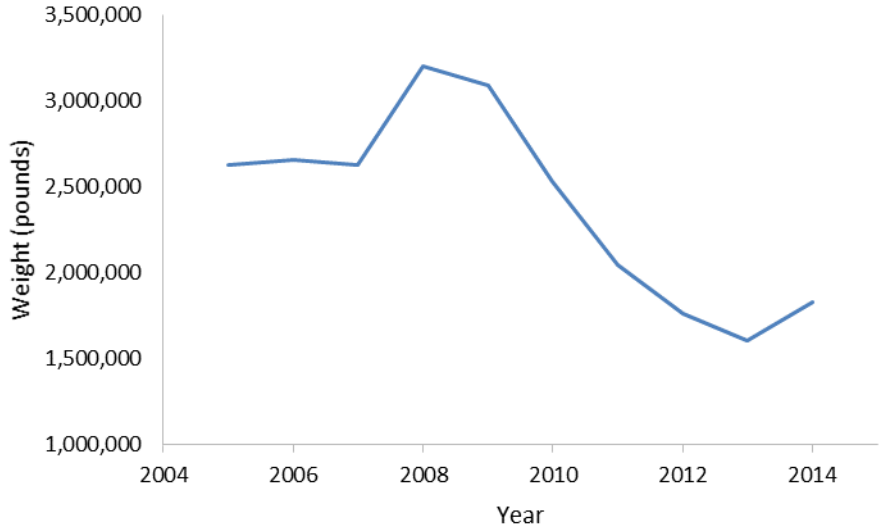


Figure 1. Commercial landings for all species within the snapper grouper complex from 2005-2014.

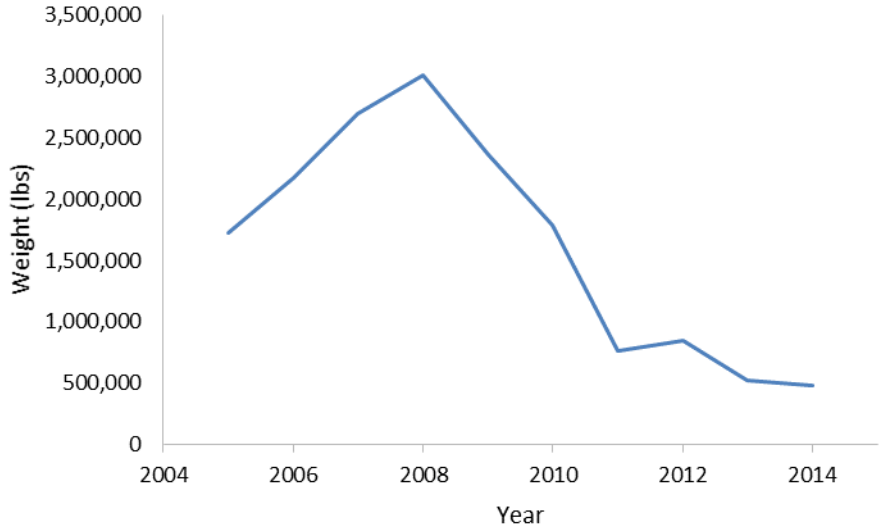


Figure 2. Recreational landings for all species within the snapper grouper complex from 2005-2014.

FISHERY MANAGEMENT PLAN UPDATE
SPANISH MACKEREL
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	February 1983
Amendments:	Amendment 2 – July 1987 Amendment 3 – August 1989 Amendment 4 – October 1989 Amendment 5 – August 1990 Amendment 6 – November 1992 Amendment 8 – March 1998 Amendment 9 – April 2000 Amendment 10 – June 1999 Amendment 11 – December 1999 Amendment 12 – October 2000 Amendment 13 – August 1992 Amendment 14 – July 2002 Amendment 15 – February 2004 Amendment 18 – December 2011 Amendment 20a – July 2014 Amendment 20b – March 2015 Omnibus Amendment – August 2011 Addendum I to Omnibus Amendment – August 2011
Revisions:	None
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	A benchmark stock assessment was completed for Spanish mackerel in the South Atlantic in 2012. The next assessment has not been scheduled.

Spanish mackerel are currently included in the Interjurisdictional Fishery Management Plan which defers to the Atlantic States Marine Fisheries Commission's (ASMFC) Fishery Management Plan for Spanish mackerel and South Atlantic Fishery Management Council's Coastal Migratory Pelagics Fishery Management Plan. The original Gulf and South Atlantic Fisheries Management Councils (GSAFMCs) fishery management plan (FMP) for Coastal Migratory Pelagic Resources (mackerels) was approved in 1983. This plan treated king and Spanish mackerel each as one U.S. stock. Allocations were established for recreational and commercial fisheries, and the commercial allocation was divided between net and hook–and–line fishermen; Established procedures for the Secretary to take action by regulatory

amendment to resolve possible future conflicts in the fishery, such as establish fishing zones and local quotas to each gear or user group. Numerous amendments have been implemented since the first FMP and those relevant to Spanish mackerel are described below:

Amendment 2, established in 1987 revised Spanish mackerel maximum sustainable yield (MSY) downward, recognized two migratory groups, and set commercial quotas and bag limits. Charter boat permits were required, and it was clarified that Total allowable catch (TAC) for overfished stocks must be set below the upper range of acceptable biological catch (ABC). The use of purse seines on overfished stocks was prohibited.

Amendment 3 (1989) prohibited drift gill nets for coastal pelagics and purse seines and run-around gillnets for the overfished groups of mackerels. The habitat section of the FMP was updated and vessel safety considerations were included in the plan. A new objective to minimize waste and bycatch in the fishery was added to the plan.

Amendment 4 (1989) reallocated Spanish mackerel equally between recreational and commercial fishermen on the Atlantic group with an increase in TAC.

Amendment 5 established in 1990 Extended the management area for the Atlantic groups of mackerels through Mid-Atlantic Fishery Management Council (MAFMC) jurisdiction. It revised problems in the fishery and plan objectives, revised the definition of "overfishing", added cobia to the annual stock assessment procedure, provided that the SAFMC will be responsible for pre–season adjustments of TACs and bag limits for the Atlantic migratory groups of mackerels, redefined recreational bag limits as daily limits; created a provision specifying that the bag limit catch of mackerel may be sold, provided guidelines for corporate commercial vessel permits, imposed a bag limit of two cobia per person per day for all fishermen, established a minimum size of 12–inch (30.5 cm.) fork length or 14–inch total length for king mackerel and included a definition of "conflict" to provide guidance to the Secretary.

Amendment 6 (1992) Identified additional problems and an objective in the fishery, provided for rebuilding overfished stocks of mackerels within specific periods, provided for biennial assessments and adjustments, provided for more seasonal adjustment actions, including size limits, vessel trip limits, closed seasons or areas, and gear restrictions, provided for commercial Atlantic Spanish mackerel possession limits, changed commercial permit requirements to allow qualification in one of three preceding years, discontinued the reversion of the bag limit to zero when the recreational quota is filled, modified the recreational fishing year to the calendar year; and changed minimum size limit for king mackerel to 20 inches fork length, and changed all size limit measures to fork length only.

Amendment 8 (1996) Identified additional problems in the fishery, specified allowable gear, established a moratorium on new commercial Spanish and king mackerel permits and provided for transferability of permits during the moratorium, revised qualifications for a commercial permit, extended the management area of cobia through New York, allowed retention of up to 5 damaged king mackerel on vessels with commercial trip limits, revised the seasonal framework procedures to a). delete a procedure for subdividing the Gulf migratory group of king mackerel, b). request that the stock assessment panel provide additional information on spawning potential ratios and mixing of king mackerel migratory groups, c). provide for consideration of public comment, d). redefine overfishing and allow for adjustment by framework procedure, e). allow changes in allocation ratio of Atlantic Spanish mackerel, f). allow setting zero bag limits, g). allow gear regulation including prohibition.

Amendment 9 (2000) changed the percentage of the commercial allocation of TAC for the Florida east coast (North Area) and Florida west coast (South/West Area) of the Eastern Zone to 46.15 percent North and 53.85 percent South/West (previously, this allocation was 50%/50%); and allowed possession of cut-off (damaged) king or Spanish mackerel that comply with the minimum size limits and the trip limits in the Gulf, Mid-Atlantic, or South Atlantic EEZ (sale of such cut-off fish is allowed and is in addition to the existing allowance for possession and retention of a maximum of 5 cut-off (damaged) king mackerel that are not subject to the size limits or trip limits, but that cannot be sold or purchased, nor counted against the trip limit). (Note: Several other changes were made involving allocation and gear restrictions that affected the Florida west coast and Gulf fisheries).

Amendment 10 (1998) designated Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concerns for coastal migratory pelagics.

Amendment 11 (1998) amended Fishery Management Plan (FMP) as required to make definitions of MSY, optimal yield (OY), overfishing and overfished consistent with "National Standard Guidelines"; identified and defined fishing communities and addressed bycatch management measures.

Amendment 13 (2002) established two marine reserves in the exclusive economic zone (EEZ) of the Gulf of Mexico in the vicinity of the Dry Tortugas, Florida known as Tortugas North and Tortugas South, in which fishing for coastal migratory pelagic species is prohibited. This action complements previous actions taken under the National Marine Sanctuaries Act.

Amendment 18 establishes Annual Catch Limits and Accountability Measures for king and Spanish mackerel, as well as cobia.

Amendment 20a prohibits the sale of king mackerel caught under the bag limit unless the fish are caught as part of a state-permitted tournament and the proceeds from the sale are donated to charity. In addition, the rule removes the income qualification requirement for king mackerel commercial vessel permits.

Amendment 20b eliminates the 500-pound trip limit that is effective when 75 percent of the respective quotas are landed for king mackerel in the Florida west coast Northern and Southern Subzones, allows transit of commercial vessels with king mackerel through areas closed to king mackerel fishing, if gear is appropriately stowed, creates Northern and Southern Zones for Atlantic migratory group king and Spanish mackerel, each with separate quotas. NOAA Fisheries will close each zone when the respective quota is met or expected to be met. The dividing line between the zones is at the North Carolina/South Carolina state line.

The ASMFC approved the Omnibus Amendment in 2011. The management goal for the Omnibus Amendment is to bring the Fishery Management Plan for Spanish mackerel under authority of the Atlantic Coastal Fisheries Cooperative Management Act, providing for more efficient and effective management and changes to management in the future. Addendum I to the Omnibus Amendment (August 2013) establishes a pilot program that would allow states to reduce the Spanish mackerel minimum size limit for the commercial pound net fishery to 11 ½ inches during the summer months of July through September for the 2013 and 2014 fishing years only.

Management Unit

The management unit is defined as Spanish mackerel within US waters of the Atlantic.

Goals and Objectives

Omnibus amendment 1 objectives include:

1. Manage the Spanish mackerel fishery by restricting fishing mortality to rates below the threshold fishing mortality rates to provide adequate spawning potential to sustain long-term abundance of the Spanish mackerel populations.

2. Manage the Spanish mackerel stock to maintain the spawning stock biomass above the target biomass levels.

3. Minimize endangered species bycatch in the Spanish mackerel fishery.

4. Provide a flexible management system that coordinates management activities between state and federal waters to promote complementary regulations throughout Spanish mackerel's range which minimizes regulatory delay while retaining substantial ASMFC, Council, and public input into management decisions; and which can adapt to changes in resource abundance, new scientific information and changes in fishing patterns among user groups or by area.

5. Develop research priorities that will further refine the Spanish mackerel management program to maximize the biological, social, and economic benefits derived from the Spanish mackerel population.

STATUS OF THE STOCK

Stock Status

A statistical catch-age model was used to assess the population of Atlantic Spanish mackerel. The age-structured assessment indicated that the stock was not overfished and that overfishing was not occurring.

Stock Assessment

There is a lack of available fishery independent indices of abundance for this species. Many of the indices of abundance that were made available were rejected due to concerns about the way the fishers targeted Spanish mackerel. The schooling behavior of Spanish mackerel makes a random survey of their population particularly difficult. The one fishery independent index used (SEAMAP young of the year) was highly variable, as would be expected for a recruitment index. The base run of the age-structured assessment model indicated that the stock is not over shed ($SSB_{2009\text{-}2011}=SSB_{MSY}$ = 1.49) and that overfishing is not occurring ($F_{2011}=F_{MSY}$ = 0.57). The sensitivity analyses yielded similar results and there was no retrospective pattern of concern. Conclusions about stock status during the MCB analysis were most sensitive to different combinations of input data and variance around fixed parameters (steepness, recreational discard mortality, historical recreational landings and natural mortality).

STATUS OF THE FISHERY

Current Regulations

Commercial: 3,500 lb trip limit

Recreational: 12 inches FL minimum size; 15 fish/day

Commercial Landings

From 2005 - 2014, landings of Spanish mackerel stayed below 500,000 lbs until 2009 in which time landings almost doubled to over 900,000 lbs (Figure 1.)

Recreational Landings

During the time series (2005 – 2014), estimated MRIP landings of Spanish mackerel peaked in 2008 at 744,139 lbs and declined and stabilized over the next 6 years to < 500,000 lbs in for the remainder of the series (Figure 2.)

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Length-frequency information for the commercial Spanish mackerel fishery in North Carolina is collected by port agents through the trip ticket program and fish house samplers, specifically programs 431, 434, 4371 and 461. Maximum sizes of king mackerel sampled over the last 10 years have fluctuated from < 700 mm to over 1000 mm but, average lengths of harvested fish have remained steady at about 400 mm (Table 1.).

Fishery-Independent Monitoring

Spanish mackerel are frequently caught in the division's statewide independent gill net survey (Prg. 915) and Pamlico Sound trawl survey (Prg. 195) from which ageing structures are collected. Ageing structures are collected from both independent and dependent sampling programs and sent to the Southeast Fisheries Science Center in Panama City, Florida for processing and aging (Table 2.) The average size of Spanish mackerel caught in the independent surveys (~ 330 mm) is smaller than the fish sampled from the fishery (~ 400 mm; Table 1. and Table 3.)

MANAGEMENT STRATEGY

In North Carolina, Spanish mackerel are currently included in the Interjurisdictional Fishery Management Plan (FMP), which defers to the South Atlantic Fishery Management Council management measures and is currently managed under recent Amendments 20A (2014) and Framework Amendment 1 (2014) to the Coastal Migratory Pelagics Fishery Management Plan. Amendment 20A prohibits the sale of all bag-limit-caught Spanish mackerel, except those harvested during a state-permitted tournament. Framework Amendment 1 modifies the annual catch limits for Atlantic Spanish mackerel and modifies the recreational annual catch target, based on the results of the most recent stock assessments for these stocks. Current

management strategies for Spanish mackerel in South Atlantic waters are summarized in Table 4.

MANAGEMENT AND RESEARCH NEEDS

From Omnibus Amendment:

- Increase collection of fishery-dependent length, sex, age, and CPUE data to improve stock assessment accuracy. Simulations on CPUE trends should be explored and impacts on assessment results determined. Data collection is needed for all states, particularly those north of North Carolina.
- Develop fishery-independent methods to monitor stock size.
- Develop methodology for predicting year class strength and determination of the relationship between juvenile abundance and subsequent year class strength.
- To ensure more accurate estimates of t0, increase efforts to collect age 0 specimens for use in estimating von Bertalanffy growth parameters.
- Provide better estimates of recruitment, natural mortality rates, fishing mortality rates, and standing stock. Specific information should include an estimate of total amount caught and distribution of catch by area, season, and type of gear.
- Commission and member states should support and provide the identified data and input needed to improve the SEDAR process.
- Conduct yield per recruit analyses relative to alternative selective fishing patterns.
- Investigate the discard mortality of Spanish mackerel in the commercial and recreational trolling fisheries and commercial gill net fishery.
- Need observer coverage for Spanish mackerel fisheries: gill nets, cast nets, handlines, pound nets, and shrimp trawl bycatch.
- Evaluate potential bias of the lack of appropriate stratification of the data used to generate age-length keys.
- Evaluate CPUE indices related to standardization methods and management history, with emphasis on greater temporal and spatial resolution in estimates of CPUE.
- Expand TIP sampling to better cover all statistical areas.
- Complete research on the application of assessment and management models relative to dynamic species such as Spanish mackerel.
- Establish a monitoring program to characterize the bycatch and discards of Spanish mackerel in the directed shrimp fishery in Atlantic Coastal waters.
- Obtain adequate data to determine gutted to whole weight relationships.
- Conduct inter-lab comparisons of age readings from test sets of otoliths in preparation for any future stock assessment.
- Address issue of fish retained for bait (undersized) or used for food by crew (how to capture these as landings).
- Investigate whether catchability varies as a function of fish density and/or environmental conditions.
- Investigate how temporal changes in migratory patterns may influence indices of abundance.
- Investigate the possibility of using models that allow catchability to follow a random walk, which can be useful in tracking longer-term trends in time-varying catchability and thus detect changes over time in CPUE (from SEDAR 2009)

LITERATURE CITED

ASMFC Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout. 161 pp.

SEDAR 28 Stock Assessment report South Atlantic Spanish mackerel. SEDAR Charleston, SC. 444 pp.

TABLES

Table 1. Mean, minimum and maximum fork lengths (mm) and total number sampled of Spanish mackerel from fishery dependent sampling programs.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	412.8	237	695	1844
2006	430.4	178	704	2238
2007	372.3	64	810	2445
2008	376.7	75	668	2489
2009	395.3	54	971	3606
2010	411.6	172	677	4785
2011	420.9	256	1080	5523
2012	413.4	30	704	5576
2013	417.9	31	723	4009
2014	411.0	77	766	4558

Table 2. Mean, minimum and maximum fork lengths (mm) and total number sampled of Spanish mackerel aged through Prg. 930.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	373.1	38	646	304
2006	378.6	254	683	291
2007	379.3	265	805	297
2008	362.6	196	684	328
2009	387.9	235	638	317
2010	377.5	174	645	411
2011	383.3	155	712	430
2012	367.5	159	670	557
2013	385.1	188	699	370
2014	373.7	192	656	515

Table 3. Mean, minimum and maximum fork lengths (mm) and total number sampled of Spanish mackerel from fishery independent sampling programs.

Year	Mean Length	Minimum Length	Maximum Length	Total Number Measured
2005	356.5	47	612	67
2006	357.1	176	542	47
2007	291.2	55	553	164
2008	328.7	80	680	371
2009	356.6	110	568	547
2010	344.6	75	550	378
2011	356.5	52	520	132
2012	340.9	38	580	122
2013	301.1	117	608	80
2014	266.0	42	483	45

Table 4. Summary of management strategies by North Carolina for Spanish Mackerel

Management Strategy	Outcome
12” minimum size limit	Rule 3M.0301(a)(1)
15 fish creel limit	Rule 3M.0301(a)(2)
15 fish creel limit outside 3 miles only with a NMFS Commercial Vessel Permit	Rule 3M.0301(a)(3)
Charter vessels or head boats with NMFS Commercial Vessel Permit must comply with possession limits when fishing with more than 3 persons	Rules 3M.0301(c)
Commercial trip limit of 3,500 lbs of Spanish, King or aggregate	Rule 3M.0301(d)
Prohibits Purse Gill Nets when taking king or Spanish mackerel	Rule 3M.0302

FIGURES

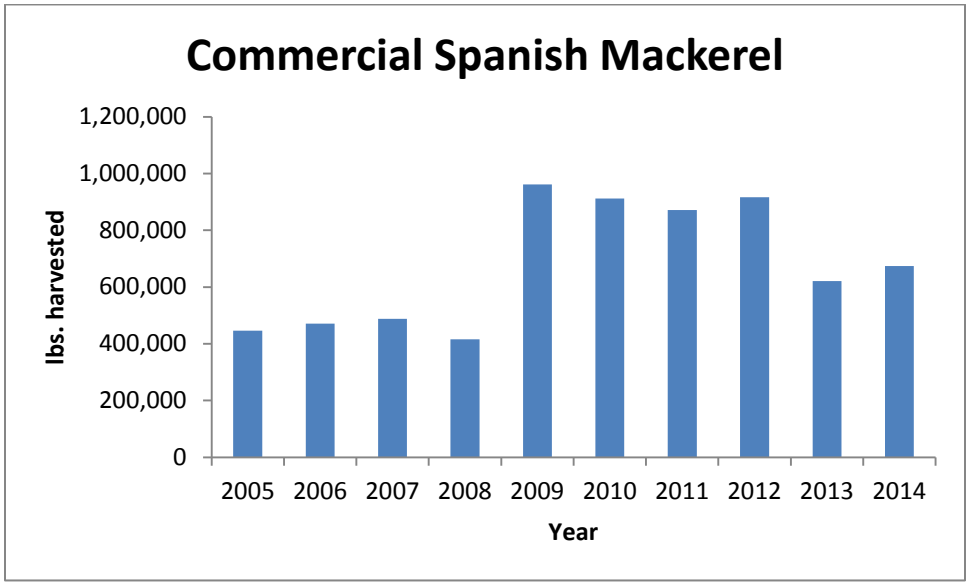


Figure 1. Commercial landings of Spanish mackerel in North Carolina from 2005 - 2014.

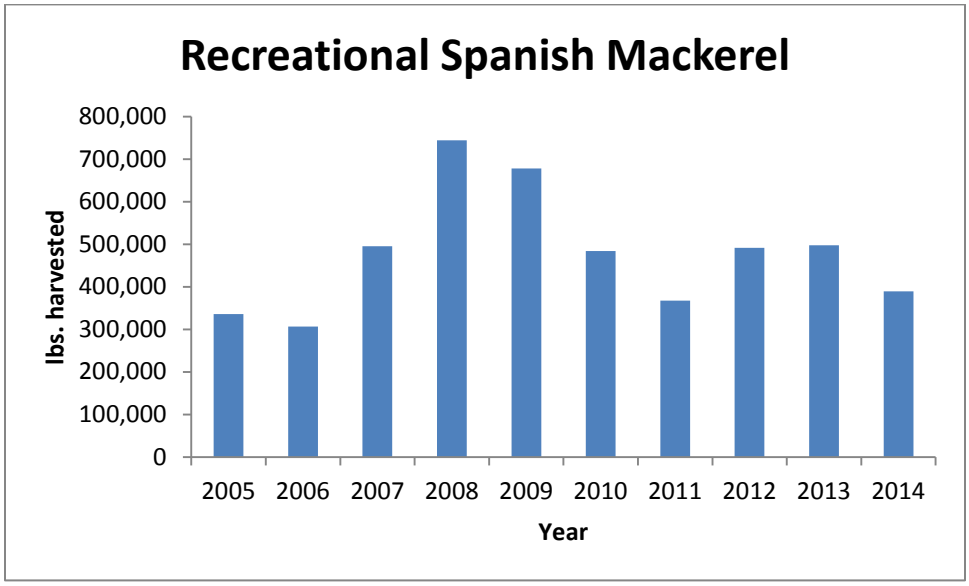


Figure 2. Estimated recreational harvest of Spanish Mackerel in North Carolina from 2005 – 2014.

FISHERY MANAGEMENT PLAN UPDATE
SPINY DOGFISH
AUGUST 2015

STATUS OF THE FISHERY MANAGEMENT PLAN

Fishery Management Plan History

Original FMP Adoption:	November 2002
Amendments:	None
Revisions:	Addendum I November 2005 Addendum II October 2008 Addendum III April 2011 Addendum IV August 2012 Addendum V October 2014
Supplements:	None
Information Updates:	None
Schedule Changes:	None
Next Benchmark Review:	None

The Interstate Fishery Management Plan for Spiny Dogfish (FMP) was approved by the Atlantic States Marine Fishery Commission (ASMFC) in November 2002 with implementation for the 2003/2004 fishing year. The 2002 FMP established the annual quota and possession limit system. The Spiny Dogfish and Coastal Shark Management Board (Board), Advisory Panel, Technical Committee, and Plan Review Team oversee the management of spiny dogfish in state waters. The management unit includes the entire coast-wide (Maine-Florida) distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ.

There are no amendments to the interstate FMP but there are four addenda. Addendum I approved in November 2005 allowed the Board to set multi-year specifications. Addendum II approved October 2008 established regional allocation of the annual quota with 58% to states from Maine to Connecticut. Addendum III established state shares for New York to North Carolina. For these southern region states, Addendum III also allowed for quota transfer between states, rollovers of up to five percent, state-specified possession limits, and included a three-year reevaluation of the measures. North Carolina is allocated 14.036% of the southern quota. Addendum IV approved in August 2012 addressed the differences in the definitions of overfishing between the New England Fishery Management Council (NEFMC), Mid-Atlantic Fishery Management Council (MAFMC) and the ASMFC. The Board adopted the fishing mortality threshold to be consistent with the federal plan. Addendum V, approved in 2014, ensured consistency in spiny dogfish management with the Shark Conservation Act of 2010 by prohibiting processing at-sea, including the removal of fins.

Management Unit

The entire coastwide distribution of the resource in the Atlantic from the estuaries eastward to the inshore boundary of the Exclusive Economic Zone (EEZ), is managed by the ASMFC, NEFMC and MAFMC. North Carolina is allotted a state specific share of the coastwide quota and allowed to specify possession limits in state waters.

Goal and Objectives

The goal of the ASMFC FMP for spiny dogfish is to promote stock rebuilding and management of the spiny dogfish fishery in a manner that is biologically, economically, socially, and ecologically sound. In support of this goal, the following objectives are recommended:

1. Reduce fishing mortality and rebuild the female portion of the spawning stock biomass to prevent recruitment failure and support a more sustainable fishery.

2. Coordinate management activities between state, federal and Canadian waters to ensure complementary regulations throughout the species range.

3. Minimize the regulatory discards and bycatch of spiny dogfish within state waters.

4. Allocate the available resource in biologically sustainable manner that is equitable to all the fishers.

5. Obtain biological and fishery related data from state waters to improve the spiny dogfish stock assessment that currently depends upon data from the federal bottom trawl survey.

STATUS OF THE STOCK

Stock Status

N.C. Division of Marine Fisheries 2014 Stock Status Report classifies the spiny dogfish stock as viable because they are not overfished and overfishing is not occurring.

Stock Assessment

The 2014 stock assessment update, conducted by the Northeast Fisheries Science Center (NEFSC), estimates spiny dogfish are not overfished and not experiencing overfishing. Female spawning stock biomass estimates from 2009 to 2013 exceeded the biomass reference point (Figure 1). Therefore, the stock was not overfished and remained rebuilt in 2013.

The NEFSC report also provides the most recent estimate of F (fishing mortality). F was 0.15 in 2012 and has been consistently below the fishing mortality target in recent years. As such, spiny dogfish are not overfished and overfishing is not occurring. Unfortunately, record low pup production from 1997 to 2003 has left a recruitment deficit that will cause SSB to drop soon. The amplitude of this drop increases as fishing mortality increases and still occurs when fishing mortality is hypothetically zero.

Spiny dogfish was declared 'rebuilt' in 2008 when SSB exceeded the target for the first time since the ASMFC began managing spiny dogfish in 2002. Prior to the 'rebuilt' status, quotas were based on the short term target Frebuild = 0.11. The FMP allows for quotas based on Ftarget (as opposed to the more conservative Frebuild) "once the mature female portion of the spawning stock has reached the target".

STATUS OF THE FISHERY

Current Regulations

Spiny dogfish are primarily harvested commercially with no recreational regulations in effect. Commercial harvest of spiny dogfish is quota managed with harvest periods and trip limits in federal waters and through regional and state quota allocations in state waters. The ASMFC Spiny Dogfish Board approved a 49.37 million pound quota for the 2014/2015 fishing season (May 1 – April 30). The quota is subdivided into a northern region share of 58% and state-specific shares for the southern region from New York to North Carolina. North Carolina receives 14.0036 % of the annual quota. For the 2014/2015 fishing season North Carolina was allocated 6,929,573 pounds of the southern regions quota. The NCDMF set the trip limit at 10,000 pounds per day and increased it to 20,000 pounds effective February 19, 2015.

Commercial Landings

Prior to the Fishery Conservation and Management Act of 1976 (now known as the Magnuson-Stevens Reauthorization Act), foreign fleets caught the majority of dogfish in U.S. waters but U.S. fishermen have had uncontested access ever since the Act's passage. The National Marine Fisheries Service (NMFS) encouraged commercial fishermen to target the bountiful stocks of spiny dogfish in the 1980s and 1990s when stocks of other commercially valuable fish in the Northeast declined. Then in 1998, NMFS determined that spiny dogfish were overfished and implemented stringent harvest restrictions in federal waters to allow the stock to rebound. The states followed shortly after with complementary regulations for state waters.

Coastwide landings were approximately 37.2 million pounds in 1992, gradually increasing to a peak of about 60 million pounds in 1996. In the late 1990s, landings declined to an average of around 40 million. After federal and state regulations were implemented in the early 2000s, landings declined to less than five million pounds in 2001 and 2002. They then ranged between two and eight million pounds between 2003 and 2009. As the stock began to improve, landings were increased to 21 million pounds in 2011. Commercial landings continue to be mostly female dogfish, with female landings comprising about 98% of the total commercial catch. Commercial landings totaled 16 million pounds in 2014, a decrease in recent years due to poor market conditions. Discards have remained fairly stable, around 11 million pounds over the past decade and are expected to remain near that level in the future.

The coastwide commercial quota was set at 49,037,000 pounds for fishing year 2014. The fishing year runs from May 1, 2014 to April 30, 2015. The quota is subdivided into a northern region (Maine - Connecticut) share of 58% and state-specific shares for the southern region, allocated as follows New York (2.707%); New Jersey (7.644%); Delaware (0.896%); Maryland (5.92%); Virginia (10.795%; and North Carolina (14.036%). Any overages from the previous fishing seasons will be paid back by the region or state in the following season, as has been done in the past. Landings in North Carolina have been increasing correlating to the increase in quota (Figure 2). Primarily, landings occur from ocean gill nets (Table 1 and Figure 3). While

estuarine gill nets do not target spiny dogfish, landings increased for the gear in 2013 and 2014 possibly due to the season opening earlier and the marketability of the incidental catch of spiny dogfish when targeting flounder or American shad.

Recreational Landings

Recreational landings are insignificant for 2005 through 2014 (Table 2) and were obtained from the Marine Recreational Information Program (MRIP). As a source of total mortality, recreational catch can be considered negligible (Rago and Sosebee 2014).

MONITORING PROGRAM DATA

Fishery-Dependent Monitoring

Fishery-dependent monitoring programs for beach seine, estuarine gill net, ocean gill net and ocean trawl sampled spiny dogfish from 2005 to 2014. Samples were taken at fish packing houses while the catches were being offloaded. Captain or crew members were interviewed to obtain information including area fished, gear specifications and water depth. Samples were collected and recorded in metric units (kilograms and millimeters). Each sample was weighed to the nearest 0.1 kg, individual spiny dogfish were measured to the nearest millimeter for both total and fork length, and sex determined. The total catch weight was obtained from the fish house dealer's records. Table 3 summarizes all the length data collected from fishery-dependent sampling from 2005 to 2014. Tables 4 through 7 summarize the fishery-dependent length data by gear from 2005 to 2014. The majority of spiny dogfish are sampled from the ocean gill net fishery, the primary gear used to target spiny dogfish in North Carolina. The number of trips sampled and spiny dogfish measured has been increasing since 2012 while the mean total length has stayed between 850 to 899 millimeters. Total length has ranged from 470 to 1,080 millimeters in the ocean gill net fishery. Mean length of spiny dogfish harvested from this gear has remained constant, only dropping below 850 millimeters in 2007 to an average of 847 millimeters.

Numbers of spiny dogfish measured have ranged from 0 in 2005 to 2,461 in 2012. Female spiny dogfish contribute to the majority of the harvest and samples collected. Female fish are larger and more abundant in the nearshore areas where most fishing occurs. Tables 8 and 9 summarize the length data for male and female spiny dogfish collected from fishery-dependent sampling from 2005 to 2014. Figure 3 illustrates the female to male sampling composition.

Fishery-Independent Monitoring

The NCDMF initiated a fisheries independent gill net survey in 2001 and expanded its coverage in 2008 to include the Cape Fear River and the near shore (0-3 miles) Atlantic Ocean from New River Inlet south to the South Carolina state line. The objective of this project is to provide annual, independent, relative-abundance indices for key estuarine species in the near shore Atlantic Ocean, Pamlico Sound, Pamlico, Pungo, Neuse, and Cape Fear rivers. These indices can also be incorporated into stock assessments and used to improve bycatch estimates, evaluate management measures, and evaluate habitat usage. Results from this project will be used by the NCDMF and other Atlantic coast fishery management agencies to evaluate the effectiveness of current management measures and to identify additional measures that may be necessary to conserve marine and estuarine stocks. Developing fishery independent indices of abundance for target species allows the NCDMF to assess the status of these stocks without

relying solely on commercial and recreational fishery dependent data. The survey employs a stratified random sampling design and utilizes multiple mesh gill nets (3.0 inch to 6.5 inch stretched mesh, by ½ inch increments). A total of 775 spiny dogfish were caught in the Pamlico Sound portion of the independent gill net study from 2001 to present. Total length ranged from 511 to 1,010 millimeters and averaged 842 millimeters. The nearshore, ocean gill net component of the survey caught 1,237 spiny dogfish from 2008 to present. Total length ranged from 569 to 1,024 and averaged 864 millimeters (Table 10).

MANAGEMENT STRATEGY

The spiny dogfish fishery is managed complementarily by the MAFMC and NEFMC in federal waters, and ASMFC in state waters. In order to set the annual quota a joint meeting between the ASMFC Technical Committee (TC) and MAFMC Monitoring Committee (MC) occurs each fall. The TC and MC review the best available science and make quota recommendations to the Spiny dogfish and Coastal Shark Management Board (Board) and MAFMC for the following fishing year's quota. The first step to making a quota recommendation is to calculate a harvest level that coincides with the appropriate F rate. In 2002, ASMFC adopted the MAFMC's target, and threshold, fishing mortality rates in the original FMP. In 2009, the MAFMC revised status determinations criteria to define Fthreshold as "Fmsy (or a reasonable proxy thereof) as a function of productive capacity, and based upon the best scientific information consistent with National Standards 1 and 2" and did not include and Ftarget value. In 2012, the ASMFC adopted the MAFMC's Fthreshold definition to be consistent with the federal plan through Addendum IV to the FMP. Overfishing is defined as an F rate that exceeds the Fthreshold. The Board retains the authority to set an Ftarget based on the TC's recommendations. While the federal plan does not specify an Ftarget and quotas are calculated based on Fmsy. The Board is not required to specify an Ftarget and if specified, an Ftarget would apply to one fishing season.

- Fmsy = 0.244; allows for the production of 1.5 female pups per female that will recruit to the spawning stock biomass (SSB).
- Fthreshold = 0.325; allows for the production of one female pup per female that will recruit to the SSB.
- SSBtarget = 159,288 mt (351 million pounds); level of biomass that would maximize recruitment to the population (100% SSBmax).
- SSBthreshold = 79,644 mt (175 million pounds); 50% of SSBmax

The NEFSC conducts a spring bottom trawl survey to gather data used to update population abundance estimates. Due to mechanical problems in 2014 critical strata in the Mid-Atlantic region were unable to be sampled. For this reason, it was not possible to update population abundance estimates in 2014 nor was it possible to provide updated estimates of fishing mortality rates, or conduct projections of stock size under varying fishing mortality rates. Instead the total estimated catch of spiny dogfish in 2013 was summarized and compared to catch projections from previous years.

U.S. landings decreased about 31% from 10,660 mt in 2012 to 7,312 mt in 2013. Recreational landings and distant water fleet landings are negligible. Canadian landings have averaged about 77 mt since 2009. Total discards increased slightly from 11,626 mt in 2012 to 12,820 mt in 2013. The 2013 estimate is approximately equal to the average of the previous 5 years. Similar patterns were observed for dead discards. Total dead discards have been relatively stable since 2000. The ratio of dead discards to landings in 2013 increased slightly to 0.68. The 3 year average of female SSB swept area biomass in 2013 of 235,900 mt was about the same as the 241,000 mt in 2012. Pup production was the highest observed in the time series since 1968. Female SSB estimates from 2009 to 2013 exceeded the biomass reference point. Fishing mortality was estimated to be 0.15 in 2012, well below the plan's threshold (0.244).

MANAGEMENT AND RESEARCH NEEDS

Continuing research priorities from the ASMFC FMP include:

- Determine area, season, and gear specific discard mortality estimates coast wide in the recreational, commercial, and non-directed (bycatch) fisheries.
- Monitor the level of effort and harvest in other fisheries as a result of no directed fishery for spiny dogfish.
- Characterize and quantify bycatch of spiny dogfish in other fisheries.
- Increase observer trips to document the level of incidental capture of spiny dogfish during the spawning stock rebuilding period.
- Conduct a coast wide tagging study to explore stock structure, migration, and mixing rates.
- Standardize age determination along the entire East Coast. Conduct an ageing workshop for spiny dogfish, encouraging participation by NEFSC, NCDMF, Canada DFO, other interested agencies, academia, and other international investigators with an interest in dogfish ageing.

LITERATURE CITED

NMFS 2015. Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division June 3, 2015.

Rago P.J. and K.A. Sosebee. 2014. Update of Landings and Discards. Report to MAFMC SSC September 15, 2014. 19 p.

TABLES

Table 1. Commercial spiny dogfish landings (lb) by gear 2005-2014 (NCDMF Trip Ticket. Program)

Year	Ocean Gill Net	Estuarine Gill Net	Beach Seine	Ocean Trawl	Ocean Hook N-Line	Annual Total
2005	16,979	1,021		850	15	18,865
2006	11,547	27				11,574
2007	148,147	434	800		162	149,543
2008	158,562	165				158,727
2009	1,405,549	327	10,486			1,416,362
2010	1,695,878	116	11,170	1,273		1,708,437
2011	2,553,293	130		4,500		2,557,923
2012	2,663,008	229	65,645			2,728,882
2013	3,000,602	10,356				3,010,958
2014	5,643,146	5,339		1,800		5,650,285

Table 2. Recreational spiny dogfish harvest and discards from MRIP survey for 2005-2014 (NMFS 2015).

Year	Harvest Number (A+B1)	PSE (Num)	Weight (lb), (A+B1)	PSE (lb)	Number Released	PSE
2005					802	94.2
2006	430	100.0	1,752	100.0	20,934	38.5
2007					12,573	50.8
2008					10,139	58.4
2009					8,854	73.2
2010	1,070	64.7	5,399	69.7	31,644	37.7
2011	1,247	73.3	8,294	75.9	39,908	41.1
2012	140	71.2	712	71.2	25,515	36.9
2013	3,404	75.4	6,134	67.4	135,333	47.5
2014	1,044	63.1	4,947	71.4	80,970	36.7
10 Yr Average	**1,223**		**4,540**		**36,667**	

Table 3. Summary table of spiny dogfish trips sampled, sample weight (kg) and length data collected from dependent sampling 2005-2014.

Year	Number of Trips Sampled	Total Number Measured	Sample Weight (kg)	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)
2005	0					
2006	2	82	231.7	886	765	1,045
2007	27	1,201	3,273.7	855	675	1,020
2008	10	545	1,369.2	859	724	995
2009	28	1,048	2,650.1	864	704	1,080
2010	23	843	2,227.1	861	712	1,015
2011	24	686	1,893.2	847	661	1,005
2012	67	2,461	7,030.7	876	681	1,074
2013	66	2,373	6,765.1	877	668	1,035
2014	63	2,168	6,025.4	878	470	1,065

Table 4. Spiny dogfish length data collected from the commercial beach seine fishery 2005-2014.

Year	Number of Trips Sampled	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Number Male	Number Female	Total Number Measured
2005							
2006							
2007							
2008							
2009	1	873	805	1,010		14	14
2010	2	856	713	997	7	90	97
2011							
2012	1	869	771	982	8	78	43
2013	4	850	735	959	22	238	130
2014							

Table 5. Spiny dogfish length data collected from the commercial estuarine gill net fishery 2005-2014.

Year	Number of Trips Sampled	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Number Male	Number Female	Total Number Measured
2005							
2006	1	864	825	888		6	6
2007							
2008							
2009							
2010							
2011							
2012							
2013							
2014	2	864	800	907		18	9

Table 6. Spiny dogfish length data collected from the commercial ocean gill net fishery 2005-2014.

Year	Number of Trips Sampled	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Number Male	Number Female	Total Number Measured
2005							
2006	1	888	765	1,045	1	75	76
2007	27	855	675	1,020	184	1,017	1,201
2008	10	859	724	995	18	527	545
2009	27	864	704	1,080	54	980	1,034
2010	21	861	712	1,015	42	704	746
2011	24	847	661	1,005	34	647	698
2012	65	877	681	1,074	166	4,592	2,380
2013	62	879	668	1,035	154	4,332	2,243
2014	61	878	470	1,065	148	4,170	2,159

Table 7. Spiny dogfish length data collected from the commercial ocean trawl fishery 2005-2014.

Year	Number of Trips Sampled	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Number Male	Number Female	Total Number Measured
2005							
2006							
2007							
2008							
2009							
2010							
2011							
2012	1	881	797	970		76	38
2013							
2014							

Table 8. Length data collected from male spiny dogfish sampled from all gears 2005-2014.

Year	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Total Number Measured
2005	.	.	.	.
2006	765	765	765	1
2007	764	675	930	184
2008	792	741	937	18
2009	786	721	940	54
2010	785	712	895	49
2011	765	700	829	34
2012	769	702	882	87
2013	779	670	896	88
2014	776	641	844	74

Table 9. Length data collected from female spiny dogfish sampled from all gears 2005-2014.

Year	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Total Number Measured
2005	0	0	0	0
2006	888	786	1,045	81
2007	871	740	1,020	1,017
2008	862	724	995	527
2009	868	704	1,080	994
2010	865	715	1,015	794
2011	852	661	1,005	647
2012	880	681	1,074	2,373
2013	881	668	1,035	2,285
2014	882	470	1,065	2,094

Table 10. Fisheries independent assessment programs length data for spiny dogfish.

Program	Time Series	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Total Number Measured
Pamlico Sound Independent Gill Net Survey-915	2001-present	842	511	1,010	775
Ocean Gill Net Independent Survey-916	2008-present	864	569	1,024	1,237

FIGURES

Figure 1. NEFSC Spiny Dogfish Spawning Stock Biomass 1991-2013.

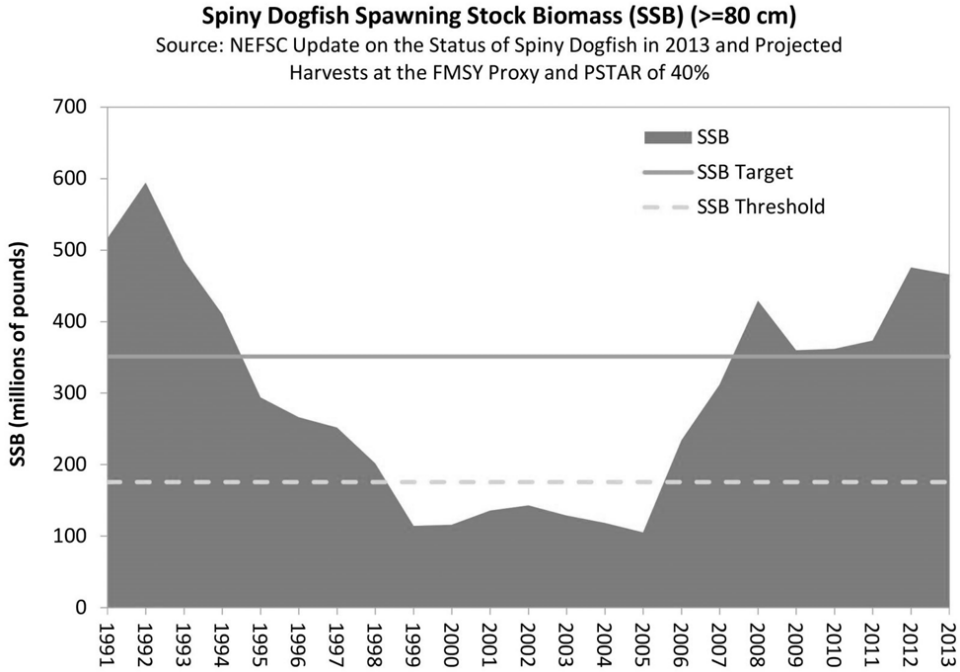


Figure 2. Annual commercial spiny dogfish landings (lb) 2005-2014 (NCDMF Trip Ticket Program).

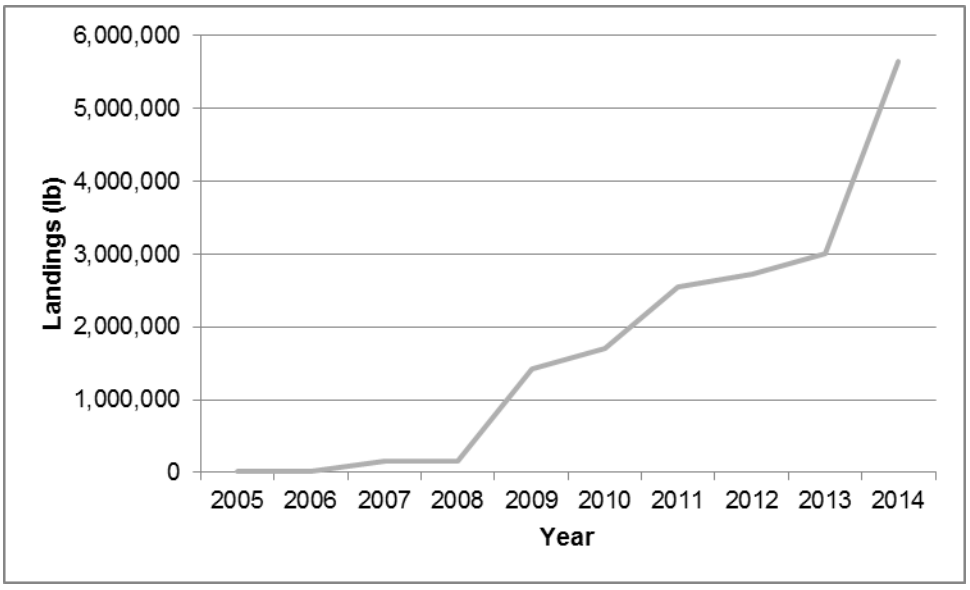


Figure 3. Annual commercial spiny dogfish landings (lb) by gear 2005-2014 (NCDMF Trip Ticket Program).

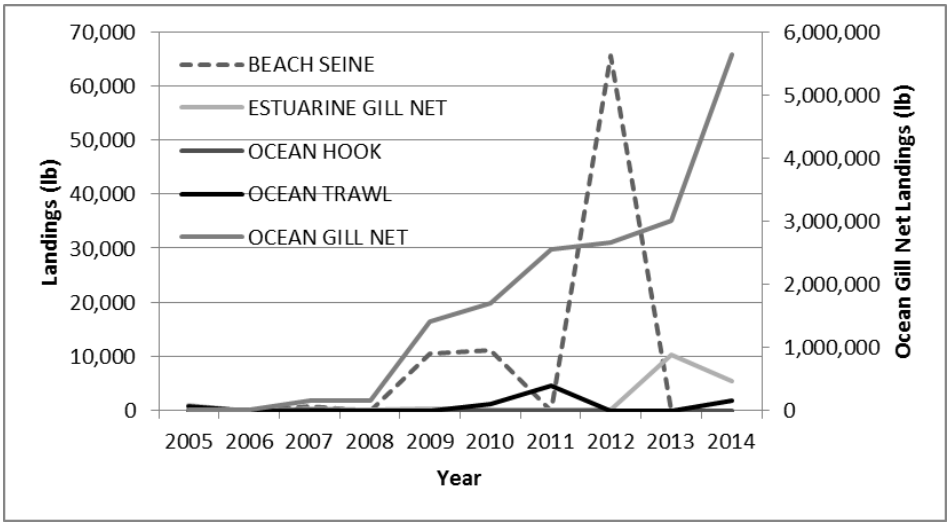
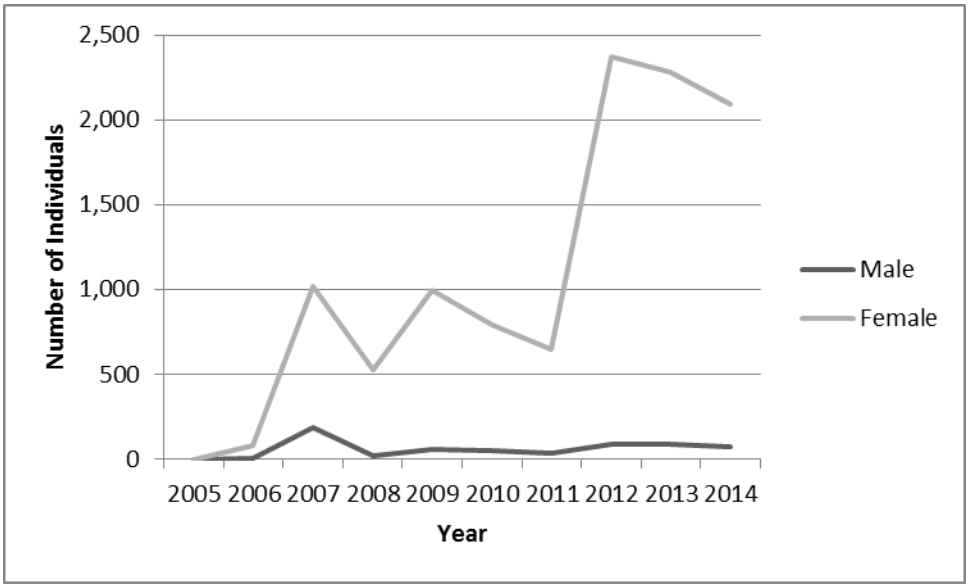


Figure 4. Number of individuals measured by year and sex 2005-2014.



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

July 30, 2015

Memorandum

To: Marine Fisheries Commission

Through: Louis B. Daniel III, Director

From: Don Hesselman, License & Statistics Section Chief

Subject: Commercial License Sales FY15 and FY16 Pre-sales

The purpose of this memo is to provide a summary and trend analysis of commercial fishing license sales and revenue to assess and estimate revenue changes as a result of recent fee increases. In general, reduction in sales as a result of the 25-percent rate increase for the 2014/2015 license year was minimal and not significantly different from other years, although the general trend continues to show a decrease.

We are limited in the ability to estimate revenues for the 2015/2016 license year with the 100 percent fee increases. We can only provide estimates based on the April 15 – June 30 pre-sales period. Comparing prior pre-sale license years, we found an attrition rate close to 5 percent; therefore, we estimated another 5-percent decrease for license year 2015-2016.

A 5 percent attrition rate for license year 2015/2016 would result in total estimated revenues of $3,293,126 for all license sales. Of that, $1,436,270 would come from the increased fee and be applied directly to the At Sea Observer Program. This will more than cover the $1.3 million annual funding need for the At Sea Observer Program. However, it will be May 2016 before the division can determine if the 5 percent attrition rate is accurate. Additionally, the division cannot determine how much of the At Sea Observer Program budget will remain unspent until the end of the fiscal year on June 30, 2016.

North Carolina Division of Marine Fisheries
Quota Monitoring
Landings Report

North Carolina Quota Monitored Species Reporting

Species currently under a quota monitoring requirement by the North Carolina Division of Marine Fisheries (NCDMF) include summer flounder, striped bass, black sea bass North of Cape Hatteras, spiny dogfish, and river herring. Seasons are opened and closed by proclamation as shown in the table below. Landings reports are updated weekly during the proclamation season.

2015 North Carolina Quota Monitored Landings

Updated 07/28/2015

Species	2015 Total Quota (LBS)	80% of Quota for Winter Fishery	2015 Transfer	2015 Harvest	Quota Remaining	Proclamation	Trip Limit (pounds)	Comments
2015 Summer Flounder	3,038,093	2,430,474	61,850	2,299,705	68,919	FF-22-2015	7,500	**Closes** 09/30/2015 at 6:00pm
2015 Black Sea Bass N of Cape Hatteras	243,422		509	237,257	5,656	FF-27-2015	100 trawl, hook & line, fish pot /week	**Closed**
2014/2015 Spiny Dogfish	7,276,052			5,198,409	2,077,640	FF-05-2015	per day: 20,000	**Closed** 04/30/2015 at 6:00pm
A.O. Striped Bass	360,360							
TRAWL	120,120			0	120,120	FF-1-2015	100 fish/day	Closed 3/31/15
SEINE	120,120			0	120,120	FF-77-2014	150 fish/day	Closed 3/31/15
GILL NET	120,120			0	120,120	FF-91-14	50 fish/day	Closed 02/14/2015
ASMA Striped Bass	137,500			80,843	56,657	FF-15-15	20 fish/day	Closed 04/30/2015
CSMA Striped Bass	25,000			25,573	-573	FF-14-15	10 fish/day	Closed 03/18/2015

*** All figures are in pounds unless otherwise noted**

For questions about quota monitoring or to report landings:

Permitted Species	FAX	E-mail Address	Telephone #
Striped Bass, River Herring	**252-264-3723**	LANDINGS@ncdenr.gov	800-338-7805
Summer Flounder, Black Sea Bass North of Cape Hatteras, Spiny Dogfish	**252-726-3903**	FLOUNDER@ncdenr.gov	800-682-2632

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: Louis Daniel
Sammy Corbett

FROM: Chris Batsavage, Protected Resources Section Chief/Special Assistant for Councils
Division of Marine Fisheries, NCDENR

DATE: July 31, 2015

SUBJECT: Protected Resources Section Update

OBSERVER PROGRAM

Tables summarizing observer coverage and protected species interactions from January through June 2015 are found in the briefing book. Observer coverage for the large mesh gill net fishery was 7.4% and coverage for the small mesh gill net fishery was 2.9%. Observer coverage estimates are based on the number of gill net trips from prior years because 2015 trip numbers are preliminary.

Also included in the briefing book are tables summarizing the observer coverage for the winter and spring seasons, by management unit. Large mesh gill net observer coverage by management unit in the winter ranged from 0% to 18% and from 0% to 7% for small mesh gill nets. The windy weather combined with very cold temperatures this past winter impacted the number of gill net and observer trips. Large mesh gill net observer coverage by management unit in the spring ranged from 0% to 24% and from 2% to 10% for small mesh gill nets.

A total of 14 sea turtle interactions were observed in large mesh gill nets and 2 in small mesh gill nets from January through June 2015. These interactions occurred in every management unit except for D1 and D2 with most of the interactions taking place in Management Unit B (10). No self-reported sea turtle interactions by gill net fishermen occurred.

A total of 19 Atlantic sturgeon interactions were observed in large mesh gill nets and 9 in small mesh gill nets. These interactions occurred in every management unit with most of the interactions taking place in Management Unit A (19). No self-reported Atlantic sturgeon interactions by gill net fishermen occurred.

MANAGEMENT UNIT CLOSURES

Management Unit B closed for large mesh gill nets on June 8, 2015 due to the allowed number of live and dead green sea turtle interactions being approached. Management Unit A closed for all anchored gill nets

on June 12, 2015 due to the total number of allowed interactions (4) being exceeded. Management Unit C closed on July 23, 2015 due to sea turtle interactions (please see Incidental Take Permit Status for 2014-2015 Fishing Year below for more information). The closures will remain in place until at least September 1, 2015, which is the beginning of the next fishing year for the incidental take permits. However, the reopening could occur later, depending on the abundance of sea turtles in those areas at that time.

SEA TURTLE INCIDENTAL TAKE PERMIT UPDATE

Spring Seasonal Progress Report

Included in the briefing book is the spring seasonal progress report for the Sea Turtle Incidental Take Permit, which covers the period from March through May 2015. Based on the number of gill net trips from prior years for large mesh gill nets, the minimum observer coverage was reached or exceeded in all of the management units except Management Unit D1. Coverage was not met in Management Unit D1 due to the minimal amount of fishing effort that occurred and the annual closure beginning on May 7 in the management unit. Based on the number of gill net trips from prior years for small mesh gill nets, the minimum observer coverage was exceeded in all of the management units.

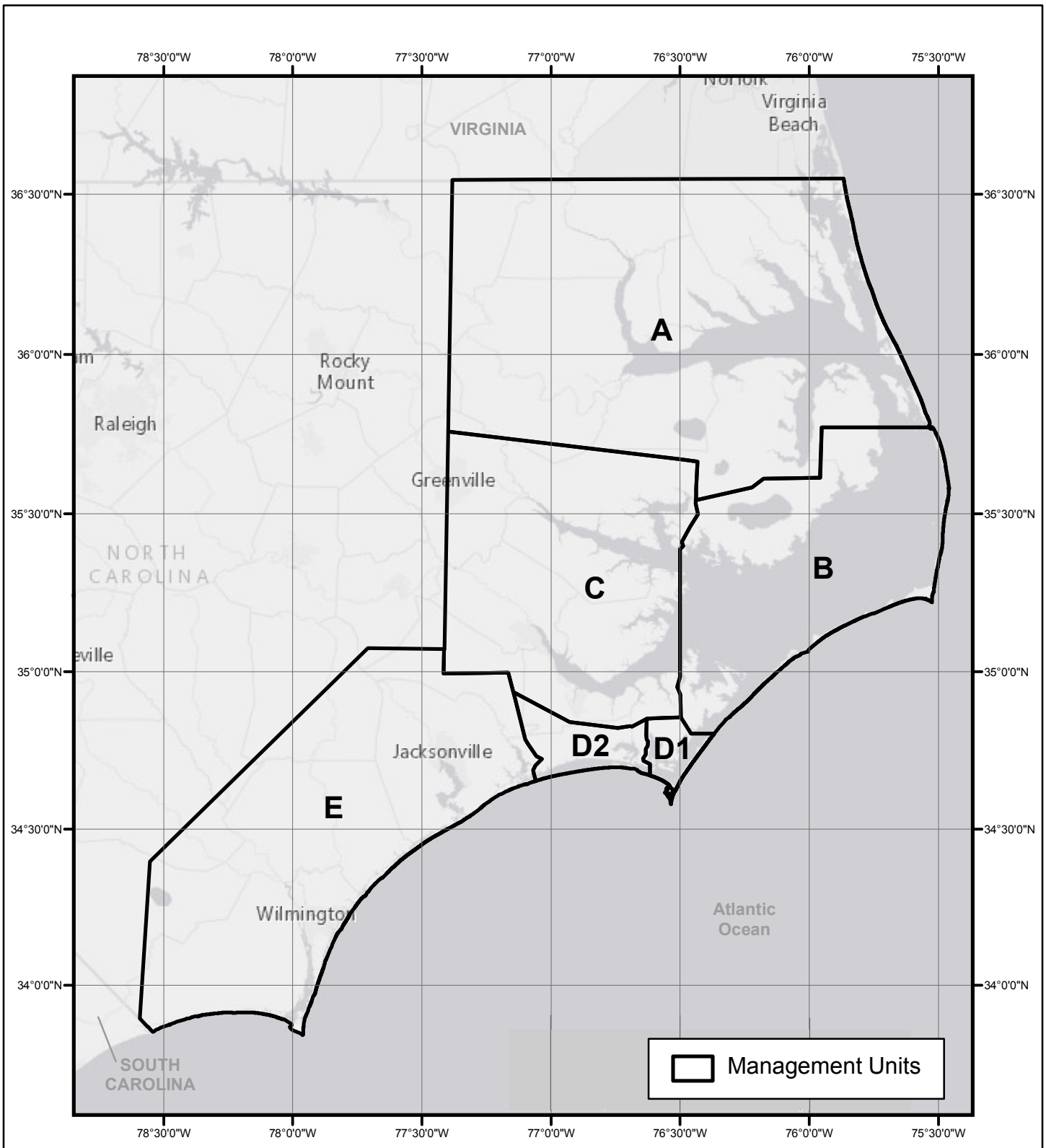
Annual Review of Incidental Take Permit for 2013-2014 Fishing Year

The National Marine Fisheries Service recently reviewed the Sea Turtle Incidental Take Permit for the 2013-2014 fishing year, and they concluded that the division met all of the requirements under the incidental take permit for that fishing year. In their review, the National Marine Fisheries Service acknowledged that the Estuarine Gill Net Permit played a major role in this accomplishment by improving compliance with the incidental take permit. In addition, the implementation of the Estuarine Gill Net Permit met the requirement of a fishermen registry and did so well in advance of the deadline set by National Marine Fisheries Service (September 1, 2015).

Incidental Take Permit Status for 2014-2015 Fishing Year

The sea turtle takes in Management Unit A this fishing year (6) exceeded the allowed annual takes for that management unit (4). According to the Endangered Species Act regulations, a violation of any of the terms and conditions of the incidental take permit will subject the division, and any individual who is operating under the authority of this permit, to the penalties as provided in the Endangered Species Act. In order to return to compliance this fishing year and to provide more flexibility in managing the fishery to ensure that authorized take levels are not exceeded in the future, the division requested a minor modification to the incidental take permit that combines the authorized takes for Management units A and C. Each management unit was originally allowed 4 sea turtle takes of any species or disposition (dead/alive) for both small and large mesh gill nets. This minor modification was implemented on July 21, 2015. A total of two sea turtle interactions already occurred in Management Unit C this fishing year, so the combined number of allowed takes for both management units was reached. Consequently, the division closed Management Unit C for all anchored gill nets on July 23, 2015 to prevent the combined takes from being exceeded. As with Management units A and B, the closure will remain in place until at least September 1, 2015.

The division is also developing an issue paper for potential amendments to the sea turtle and Atlantic sturgeon incidental take permits. An amendment is required for changes that are beyond the scope of a minor modification as determined by the National Marine Fisheries Service. The issue paper will be presented to the Sea Turtle Advisory Committee and the regional advisory committees in September. Based on feedback from the committees and the public that attend the meetings, the division will present the amendment items to the National Marine Fisheries Service for their consideration. The amendment will be available for public comment on the Federal Register, and the approval of the amendment by National Marine Fisheries Service will not be made until public comment and the analysis of impacts are considered. As such, the amendment process generally takes about one year, but the time period depends on the number of requested amendment items and their complexity.



NCDMF ESTUARINE GILLNET PERMIT MAP

April 2015

0 12.5 25 50 Miles

Table 1. Preliminary data collected by month through the NCDMF Observer Program through June 2015.

	Trips		Observer Large Mesh				Observed Takes By Species								
							Kemp's		Green		Loggerhead		Unknown	A. Sturgeon	
Month	Estimated [1]	Actual [2]	AP Attempts [3]	Trips	Yards	Coverage [4]	Live	Dead	Live	Dead	Live	Dead	Live	Live	Dead
January	245	355	85	16	12,600	6.5	0	0	0	0	0	0	0	**2**	0
February	811	385	125	43	24,375	5.3	0	0	0	0	0	0	0	0	0
March	1,871	2,154	135	157	110,740	8.4	0	0	0	0	0	0	0	**9**	0
April	1,227	1,308	140	84	55,058	6.8	0	0	**1**	0	0	0	0	**2**	0
May	952	673	123	101	80,890	10.6	**1**	0	**3**	**3**	0	0	0	**5**	0
June	1,429	405	67	84	54,330	5.9	0	0	**4**	**2**	0	0	0	**1**	0
Total	6,536	5,280	675	485	337,993	7.4	1	0	8	5	0	0	0	19	0

[1] Finalized trip ticket data averaged from 2011-2014

[2] Preliminary trip ticket data for 2015

[3] Alternative Platform trips where no fishing activity was found

[4] Based on estimated trips and observer large mesh trips

Table 2. Preliminary data collected by month through the NCDMF Observer Program through June 2015.

	Trips		Observer Small Mesh			Observed Takes By Species								
						Kemp's		Green		Loggerhead		Unknown	A. Sturgeon	
Month	Estimated [1]	Actual [2]	Trips	Yards	Coverage [3]	Live	Dead	Live	Dead	Live	Dead	Live	Live	Dead
January	712	495	15	9,440	2.1	0	0	0	0	0	0	0	0	0
February	819	290	30	16,205	3.7	0	0	0	0	0	0	0	0	0
March	953	642	43	24,290	4.5	0	0	0	0	0	0	0	0	0
April	1,407	1,018	41	27,242	2.9	0	0	0	**1**	0	0	0	**7**	**2**
May	988	523	24	8,725	2.4	0	0	0	0	0	0	0	0	0
June	817	356	11	6,000	1.3	0	0	**1**	0	0	0	0	0	0
Total	5,694	3,324	164	91,902	2.9	0	0	1	1	0	0	0	7	2

[1] Finalized trip ticket data averaged from 2013-2014

[2] Preliminary trip ticket data for 2015

[3] Based on estimated trips and observer small mesh trips

Table 3. Preliminary data collected by month and management unit through the NCDMF Observer Program through June 2015.

								Observed Takes By Species								
		Trips		Observer Large Mesh				Kemp's		Green		Loggerhead		Unknown	A.Sturgeon	
Season	Unit	Estimated [1]	Actual [2]	AP Attempts [3]	Trips	Yards	Coverage [4]	Live	Dead	Live	Dead	Live	Dead	Live	Live	Dead
Winter	A	765	619	56	38	27,800	5.0	0	0	0	0	0	0	0	**2**	0
	B	94	57	37	0	0	0.0	0	0	0	0	0	0	0	0	0
	C	159	47	49	13	7,800	8.2	0	0	0	0	0	0	0	0	0
	D1	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0
	D2	1	0	17	1	200	0.0	0	0	0	0	0	0	0	0	0
	E	38	17	51	7	1,175	18.3	0	0	0	0	0	0	0	0	0
Spring	A	2,254	2,348	110	158	153,925	7.0	0	0	0	0	0	0	0	**14**	0
	B	614	338	79	44	31,700	7.2	**1**	0	**4**	**3**	0	0	0	0	0
	C	839	1,040	57	72	36,318	8.6	0	0	0	0	0	0	0	0	0
	D1	30	9	5	0	0	0.0	0	0	0	0	0	0	0	0	0
	D2	61	80	26	7	5,900	11.4	0	0	0	0	0	0	0	0	0
	E	251	320	121	61	18,845	24.3	0	0	0	0	0	0	0	**2**	0
Total		5,106	4,875	608	401	283,663	7.9	1	0	4	3	0	0	0	18	0

[1] Finalized trip ticket data averaged from 2011-2014

[2] Preliminary trip ticket data for 2015

[3] Alternative Platform trips where no fishing activity was found

[4] Based on estimated trips and observer large mesh trips

Table 4. Preliminary data collected by month and management unit through the NCDMF Observer Program through June 2015.

		Trips		Observer Small Mesh			Observed Takes By Species								
							Kemp's		Green		Loggerhead		Unknown	A.Sturgeon	
Season	Unit	Estimated [1]	Actual [2]	Trips	Yards	Coverage [3]	Live	Dead	Live	Dead	Live	Dead	Live	Live	Dead
Winter	A	1,327	384	27	17,945	2.0	0	0	0	0	0	0	0	0	0
	B	483	160	4	4,050	0.8	0	0	0	0	0	0	0	0	0
	C	152	163	10	2,350	6.6	0	0	0	0	0	0	0	0	0
	D1	7	1	0	0	0.0	0	0	0	0	0	0	0	0	0
	D2	64	55	0	0	0.0	0	0	0	0	0	0	0	0	0
	E	76	22	4	1,300	5.3	0	0	0	0	0	0	0	0	0
Spring	A	1,436	722	52	24,425	3.6	0	0	0	0	0	0	0	**2**	0
	B	1,337	1,056	23	20,880	1.7	0	0	0	**1**	0	0	0	0	**1**
	C	276	195	12	5,900	4.4	0	0	0	0	0	0	0	0	0
	D1	49	15	5	4,650	10.3	0	0	0	0	0	0	0	**5**	**1**
	D2	42	40	2	600	4.8	0	0	0	0	0	0	0	0	0
	E	209	155	14	3,802	6.7	0	0	0	0	0	0	0	0	0
Total		5,453	2,968	153	85,902	2.8	0	0	0	1	0	0	0	7	2

[1] Finalized trip ticket data averaged from 2013-2014

[2] Preliminary trip ticket data for 2015

[3] Based on estimated trips and observer large mesh trips

Spring 2015 Seasonal Progress Report
Incidental Take Permit No. 16230
March 1 – May 31, 2015

Jacob Boyd
Protected Species Biologist
North Carolina Division of Marine Fisheries

June 25, 2015

Summary

The spring season for large and small mesh gill nets in North Carolina is March through May for Incidental Take Permit (ITP) Year 2015 (September 1, 2014 – August 31, 2015) as defined in ITP No. 16230. The Division closed anchored large mesh gill nets via proclamation M-6-2015 on May 8, 2015 in management unit D1 through October 14, 2015 as part of the annual closure. All other management units remained open for the duration of the spring season.

Observer coverage was calculated for the spring 2015 season in each management unit by estimating fishing trips using an average of the previous four year's trip ticket data (2011-2014) for large mesh gill nets and the average of the previous two year's (2013-2014) trip ticket data for small mesh gill nets compared to the observer trips completed throughout the spring season. The average was used when estimating fishing trips to account for the fluctuation of fishing effort over the previous four years due to closures and other regulations put in place throughout the time series. The Observer Program achieved an estimated 8.5% overall large mesh gill-net coverage for the spring 2015 season meeting the minimum requirement (n = 7.0%) in all management units except D1 (Table 1). Coverage was not met in management unit D1 due to the minimal amount of fishing effort that occurred and the closure of 25 days in the management unit. Once trip ticket data are finalized in May of 2016, the final observer coverage will be recalculated. This information will be provided annually to finalize all estimates of observer coverage. The Observer Program achieved an estimated 3.2% small mesh gill-net coverage for the spring 2015 season meeting the minimum requirement (n = 1.0%) in each management unit (Table 2).

There were 8 observed sea turtle interactions from large mesh gill nets and 1 observed from small mesh gill nets in the spring 2015 season (Table 3). The species composition was made up of primarily green sea turtles (n = 4 alive; n = 4 dead), with 1 alive Kemp's ridley sea turtle (Table 3). There were no reported sea turtle interactions during this time period. The cumulative estimated and/or observed takes for large and small mesh gill nets through the spring 2015 season for ITP Year 2015 are in Tables 4 and 5.

Marine Patrol made 394 gill net checks for the spring 2015 season. Due to a staffing shortage in the Marine Patrol section, the number of gill net checks made in April and May by Marine Patrol in the southern portion of the state (management unit E) are not included. Of these 394 gill net checks, there were 14 citations written (Table 6).

As per the ITP, the Division established a permit in September 2014 to register all fishermen participating in the anchored large and small mesh gill-net fisheries (Estuarine Gill Net Permit – EGNP). This multifaceted permit allows the Division to closely monitor for compliance with the permit system the Division already has in place. As of June 17, 2015 there have been 2,650 EGNPs issued for Fiscal Year 15. Permits are renewed on an annual basis, based on Fiscal Year (July 1 – June 30) for licenses. During the spring 2015 season there were 14 Notice of Violations (NOV) issued for the EGNP (Table 7).

The Observer Program has various ways to contact fishermen to set up trips. Due to limited resources and fishermen leaving from their residence or private ramps, the most efficient and common way to contact fishermen is by phone. One of the many checks the Program has is a contact log which is filled out for every contact that is made when attempting to obtain a trip. Each contact is put into a specific category and other information is gathered (Table 8). The contact log was analyzed by month and category to determine what percentage of contacts (n = 4,080) resulted in positive observer trips (Table 9). Of the 4,080 contacts that were made, 57.2% were categorized as 1, 8, 11, 12, 13, and 14 which inclusively represent not being able to get in touch with fishermen or fishermen refusing trips. Fishermen compliance decreased by 11.0% from the fall 2014 season with observers making 2,007 more contacts in the spring 2015 season. This decrease may be partly due to the increase in the number of contacts made.

Tables

Table 1. Estimated observer coverage calculated from previous year's trip ticket data (average 2011-2014) and observer data from the spring 2015 season (March - May) by management unit for large mesh gill nets for ITP Year 2015.

	Trips		
Management Unit [1]	Estimated (2011-2014) [2]	Observed	Coverage (%)
A	2,254	158	7.0
B	614	44	7.2
C	839	72	8.6
D1	22	0	0.0
D2	61	7	11.5
E	251	63	25.1
Total	4,041	344	8.5

[1] Management unit D1 was closed during portions of the spring 2015 season.

[2] Finalized trip ticket data averaged from 2011-2014

Table 2. Estimated observer coverage calculated from previous year's trip ticket data (average 2013-2014) and observer data from the spring 2015 season (March - May) by management unit for small mesh gill nets for ITP Year 2015.

	Trips		
Management Unit	Estimated (2013-2014) [1]	Observed	Coverage (%)
A	1,435	52	3.6
B	1,337	23	1.7
C	275	12	4.4
D1	48	5	10.4
D2	41	2	4.9
E	208	13	6.3
Total	3,344	107	3.2

[1] Finalized trip ticket data averaged from 2013-2014

Table 3. Summary of observed sea turtle interactions in large and small mesh gill nets from the spring 2015 season (March - May) for ITP Year 2015.

Date	Management Unit	Latitude	Longitude	Species	Disposition	Tag		Curved Carapace (mm)	
						PIT	Inconel	Length	Width
4/10/2015	B	3510.924	7549.519	green [1]	dead	n/a	n/a	238	206
4/17/2015	B	3507.242	7557.741	green	alive	989.001001952762	n/a	236	200
5/14/2015	B	3449.196	7622.597	green	alive	n/a	n/a	n/a	n/a
5/14/2015	B	3448.986	7622.668	green	dead	n/a	n/a	289	241
5/14/2015	B	3449.582	7622.140	Kemp's	alive	989.001001951753	n/a	257	264
5/27/2015	B	3458.360	7622.268	green	dead	n/a	n/a	240	216
5/28/2015	B	3448.900	7622.949	green	alive	989.001001952770	n/a	320	290
5/29/2015	B	3459.148	7614.202	green	alive	989.001001951712	n/a	239	217
5/29/2015	B	3504.129	7625.871	green	dead	n/a	n/a	240	216

[1] Indicates small mesh gear

Table 4. Summary of estimated and/or observed cumulative sea turtle interactions through the spring 2015 season (March - May) by management unit for large mesh gill nets for ITP Year 2015.

Management Unit	Green		Kemp's ridley		Loggerhead		Unknown	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
A	*1	0	*1	0	0	0	*1	0
B	201.7	93.2	27.1	7.1	*1	0	*1	0
C	0	0	0	0	0	0	0	0
D1	2.0	0	0	0	0	0	0	0
D2	0	0	0	0	0	0	0	0
E	0	0	7.5	0	*1	0	0	0
Total	204.7	93.2	35.6	7.1	2	0	2	0

*Indicates observed takes

Table 5. Summary of observed cumulative sea turtle interactions through the spring 2015 season (March - May) by management unit for small mesh gill nets for ITP Year 2015.

	Green	
Management Unit	Alive	Dead
B	0	*1
E	*1	0
Total	*1	0

*Indicates observed takes

Table 6. Citations written by Marine Patrol for large and small mesh gill nets by violation code during the spring 2015 season (March - May) for ITP Year 2015.

	Violation	
Date	Code	Description
3/4/2015	NETG09	Gill net set too close to bridge
3/9/2015	NETG09	Gill net set too close to bridge
3/21/2015	NETG22	Improperly set gill net
3/21/2015	NETG53	Use large mesh gill net with corks or floats on top line
3/21/2015	NETG38	Use large mesh gill net in Pamlico Sound later than 1 hour after sunrise
4/2/2015	NETG08	Gill net within 200 yards of pound net
4/2/2015	NETG12	Net in middle third of marked navigational channel
4/2/2015	NETG08	Gill net within 200 yards of pound net
4/2/2015	NETG12	Net in middle third of marked navigational channel
4/5/2015	NETG10	Gill net with illegal mesh size
4/10/2015	NETG29	RCGL gear without proper buoys
5/4/2015	NETG04	Leave gill net in waters when could not be legally fished
5/5/2015	NETG03	Using gill net with improper buoys or identification
5/20/2015	NETG01	Leave gill net in coastal waters unattended

Table 7. Notice of Violations issued by date and violation code for the Estuarine Gill Net Permit during the spring 2015 season for ITP Year 2015.

Date	Code	Description
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
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3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/12/2015	EGNP08	Failure to notify DMF of a change in phone number within 14 days
3/13/2015	EGNP25	Refuse to allow fisheries observers onboard or collect data
3/17/2015	EGNP25	Refuse to allow fisheries observers onboard or collect data
3/17/2015	EGNP25	Refuse to allow fisheries observers onboard or collect data
3/25/2015	EGNP09	Failure to set or retrieve nets in accordance with time restrictions
4/6/2015	EGNP25	Refuse to allow fisheries observers onboard or collect data

Table 8. Categories and descriptions for the Observer Program's contact logs used for analysis.

Categories	Category description
1	Left message with someone else
2	Not fishing general
3	Fishing other gear
4	Not fishing because of weather
5	Not fishing because of boat issues
6	Not fishing because of medical issues
7	Booked trip
8	Hung up, got angry, trip refused
9	Call back later time/date
10	Saw in person
11	Disconnected
12	Wrong number
13	No answer
14	No answer, left voicemail

Table 9. The percent of contacts (n = 4,080) made by the observers trying to set up trips by month categorized by contact type (0-14) and defined in table 8 for the spring 2015 season (March - May) for ITP Year 2015.

	Categories (%)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
March	1.3	9.5	2.1	0.6	0.5	0.6	2.5	0.0	2.0	1.3	2.2	0.7	5.7	15.2	44.2
April	1.3	5.7	2.0	0.2	0.4	0.3	1.4	0.1	2.3	0.3	1.8	0.5	3.5	9.5	29.2
May	1.0	5.4	2.7	0.1	0.3	0.3	0.8	0.0	1.2	0.4	1.0	0.2	3.0	10.1	26.6
Total	3.6	20.6	6.8	1.0	1.2	1.2	4.6	0.1	5.4	2.1	5.0	1.4	12.2	34.8	100.0

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: Louis Daniel
Sammy Corbett

FROM: Chris Batsavage, Protected Resources Section Chief/Special Assistant for Councils
Division of Marine Fisheries, NCDENR

DATE: July 6, 2015

SUBJECT: Mid-Atlantic Fishery Management Council Meeting— June 8-11, 2015

The Mid-Atlantic Fishery Management Council (Council) met on June 8-11, 2015 in Virginia Beach, VA. Management actions taken by the Council are discussed below.

DEEP SEA CORALS AMENDMENT

The Council selected preferred alternatives for the Deep Sea Corals Amendment and approved the amendment for submission to the Secretary of Commerce. The amendment's management measures are designed to protect deep sea corals in the mid-Atlantic region from bottom tending fishing gear through 15 discrete zones around the offshore canyons and a broad zone designation between the 400 meter and 500 meter depth contour, targeting the 450 meter depth contour. These zones protect an area of over 38,000 square miles, or nearly the size of Virginia. The amendment exempts the deep sea red crab fishery from the bottom tending fishing gear restrictions for at least two years in the discrete zones and indefinitely in the broad zones. The American lobster fishery is also exempt from the bottom tending fishing gear restrictions because the Council does not have management authority for this fishery (managed by the Atlantic States Marine Fisheries Commission). The amendment also requires vessel monitoring systems (VMS) for all *Illex* squid moratorium vessels, and allows for vessel transit through or across all deep sea coral zones with a requirement that the vessel's fishing gear be stowed during transit.

ATLANTIC MACKEREL, SQUID, AND BUTTERFISH SPECIFICATIONS

The Council recommended a 9,177-metric ton annual quota for Atlantic mackerel in 2016-2018, a 56 percent reduction from 2015. The annual quota has drastically decreased over the last several years as Atlantic mackerel have become conspicuously absent from commercial, recreational, and fishery-independent survey catches. Although the stock status of mackerel is currently classified as unknown, the Council's Scientific and Statistical Committee (SSC) recently concluded that the stock is in a depleted state relative to historical levels of abundance.

The Council recommended no changes to the specifications previously recommended for 2016 for longfin squid, *Illex* squid, and butterfish.

RIVER HERRING AND SHAD CATCH CAP

The Council recommended lowering the shad and river herring catch cap from 89 metric tons in 2015 to 82 metric tons in 2016 for the Atlantic mackerel trawl fishery. This was based on the expected quota reduction for Atlantic mackerel in 2016 and the minimal shad and river herring catch in the Atlantic mackerel trawl fishery in recent years.

UPCOMING MEETING

The next regularly scheduled meeting of the Mid-Atlantic Fishery Management Council will be August 10-13, 2015 at the Holiday Inn Midtown in New York City, NY.

June 2015 Council Meeting Report

June 8 – 11, 2015

Virginia Beach, Virginia

The following summary highlights Council actions and issues considered at the Mid-Atlantic Fishery Management Council's June 2015 meeting in Virginia Beach, VA. Presentations, briefing materials, and audio recordings are available at www.mafmc.org/briefing/june-2015.

Deep Sea Corals Amendment

The Council selected preferred alternatives for the Deep Sea Corals Amendment and approved the amendment for submission to the Secretary of Commerce. Below is a summary of the Council's preferred alternatives.

Deep Sea Coral Zone Designations: The Council approved the designation of fifteen discrete coral zones with the boundaries developed during the April 2015 Corals Workshop. The Council also voted to establish a broad coral zone with a landward boundary drawn between the 400 meter and 500 meter depth contour, targeting the 450 meter depth contour. The broad zone would originate at this landward boundary and extend seaward to the boundaries of the Council's management region.

Gear Restrictions: In both types of coral zones, the Council voted to prohibit the use of all bottom-tending gear, including both mobile and stationary/passive gear types.

Exemptions: The Council approved an exemption from gear restrictions for the red crab fishery. This exemption would apply indefinitely in the broad zones and for a period of *at least* two years in the discrete zones.

Framework Adjustments: The Council voted to allow the use of framework adjustments to (1) modify coral zone boundaries and management measures, (2) add additional discrete coral zones, or (3) implement a special access program, provided that such adjustments are in keeping with the purpose of the amendment. Modification of management measures through framework actions could be directed at gear and species not currently addressed in the FMP if the purpose of such measures is to further the objectives of the amendment.

VMS: The amendment would also require the use of Vessel Monitoring Systems (VMS) for all *Illex* squid moratorium vessels regardless of whether fishing activity is occurring within or outside of any proposed deep sea coral zones.

Transit Provision: The Council also approved a provision that would allow for vessel transit through or across all deep sea coral zones with a requirement that the vessel's fishing gear be stowed during transit.

Mackerel, Squid, Butterfish Specifications

All to be implemented for 2016

Atlantic Mackerel Quotas (2016-2018): The Council adopted three-year Atlantic mackerel specifications for 2016, 2017, and 2018. Although the stock status of mackerel is currently classified as unknown, the Council's Scientific and Statistical Committee (SSC) recently concluded that the stock is in a depleted state relative to historical levels of abundance. The SSC also determined that the foundation used previously to establish the Acceptable Biological Catch (ABC) for the stock was no longer valid. In light of these findings and consideration of a mackerel management strategy evaluation (MSE) conducted under contract for the Council, the SSC

recommended setting the ABC at 19,898 metric tons (mt) for 2016-2018, a 50% reduction from the 40,165 mt ABC in 2015.

The Council adopted the ABC recommended by the SSC, resulting in a U.S. Annual Catch Limit (ACL) of 11,009 mt. After accounting for discards and management uncertainty, the Council recommended a commercial domestic annual harvest (DAH) of 9,177 mt and a recreational annual catch target (ACT) of 614 mt.

Summary of Atlantic Mackerel Specifications 2016-2018	
Acceptable Biological Catch (ABC)	19,898 mt
Annual Catch Limit (ACL)	11,009 mt
Recreational Annual Catch Target	614 mt
Commercial Annual Catch Target	9,294 mt
Domestic Annual Harvest (DAH)	9,177 mt

The Council also voted to lower the RH/S cap for the Atlantic mackerel fishery from 89 metric tons (mt) to 82 mt. This will continue to provide a strong incentive for the fishery to avoid RH/S in order to preserve their ability to harvest the mackerel quota.

Squid and Butterfish Quotas (2016): In 2016 the *Illex* squid, longfin squid, and butterfish fisheries will be in year 2 of multi-year specifications for 2015-2017. The Council recommended no changes to the specifications previously recommended for 2016. These specifications are described in detail in the final rule published March 20, 2015: http://www.greateratlantic.fisheries.noaa.gov/regs/2015/March/15smbspecs20152017fr.pdf.

Butterfish Gear Issues: The Council voted to increase the threshold for requiring a minimum 3-inch mesh size from 2,500 lbs to 5,000 lbs of butterfish. Industry participants have reported that this will increase opportunistic butterfish landings during squid trips and recent data suggest directed butterfish fishing will predominantly occur on larger trips that will still need to use 3-inch mesh. The Council also voted to allow the use of 5" strengtheners (square or diamond mesh). Industry participants have indicated they would like the regulations clarify that, as in the longfin squid fishery, strengtheners of at least 5 inches may be used. This is the current practice by some fishery participants (often with 5-inch diamond mesh scup nets), where a piece of netting outside of the primary net/liner keeps it from bursting from large catches.

Longfin Squid Pre-Trip Notification*:* Because of the limited conservation use of the 48-hour longfin squid pre-trip notification requirement and the burden it places on industry, the Council voted to suspend this requirement until further notice.

Squid Capacity Amendment

Staff presented a summary of scoping comments on a potential amendment to address latent capacity in the squid fisheries. After considering 17 written comments and summaries of 6 public hearings, the Council voted to continue amendment development and added three additional issues: (1) new allocations/permits for Maine/northern states; (2) longfin trimester issues; and (3) longfin squid buffer zones (e.g. 10 miles) beyond state waters in the area south of Martha's Vineyard/Nantucket to allow squid to enter/spawn in Nantucket Sound. Based on the public comment received, catch share programs will not be further considered in this action.

Surfclams and Ocean Quahogs

2016 Specification Review

Next year the surfclam and ocean quahog fisheries will be in the third year of multi-year specifications set for 2014-2016. The Council reviewed updated catch and landings information for both stocks, as well as recommendations from staff, the surfclam and ocean quahog AP, and the SSC, and determined that no changes are warranted. The Council also voted to recommend suspending the minimum shell length for surfclams in 2016. These specifications are described in detail in the final rule published December 20, 2013: http://www.greateratlantic.fisheries.noaa.gov/regs/2013/December/13clam20142016specsfr.pdf

Unmanaged Forage Fish Action

Staff presented an update on development of an action to prohibit the development of new, or expansion of existing, directed fisheries for unmanaged forage species. The Council reviewed and provided comments on a draft scoping document, voting to add the following item to the *Issues for Consideration* section of the scoping document: "The ability of current scientific data and models to fully inform prospective Council action to manage the suite of forage fish species in the region." The Council recommended that staff delay scoping until after August in order to enable more people to attend scoping hearings.

Jim Gilmore also provided an update on an effort by ASMFC staff to poll member states regarding (1) whether they have management measures in place for forage fisheries not currently managed by the ASMFC or the Mid-Atlantic Council, and (2) if they have any regulations in place for emerging fisheries. He noted that many states do not have the resources to collect baseline data on small bait fisheries and recommended that the Council keep this in mind when considering future actions on forage species.

Monkfish

Framework 9

The Council indicated a general preference for the alternatives recommended recently by the Monkfish Committee at a joint Monkfish Committee and Monkfish Advisory Panel meeting. The Council was advised that the New England Groundfish Committee has recommended one option that was different from the New England Monkfish Committee. This option involved the monkfish trip limits in the Northern Management Area while vessels are fishing for New England groundfish. The Council voted for a modified middle-road option that would allow increased monkfish catch in the Northern Management area if vessels use a monkfish day at sea, which should limit unintended effort shifts from the northern management area to the southern management area.

Presentations and Other Business

Species Interactions Workshop

The Council hosted a one-day Species Interactions Workshop on the first day of the meeting. This was the third in a series of workshops that the Council has held to support the development of an Ecosystem Approach to Fisheries Management (EAFM) guidance document. This workshop focused on potential strategies to fully consider species interactions and climate drivers in the stock assessment process, determination of catch limits, and to build capacity within the region to conduct comprehensive management strategy evaluations (MSEs).

Listening Session: Proposed Rule to Revise Listing Status of Humpback Whales

The Council held a listening session on a proposed rule to revise the Endangered Species Act (ESA) listing of the humpback whale. Under the proposal, the humpback whale would be reclassified into fourteen distinct population segments, ten of which would be removed from the endangered species list. Of the remaining population segments, two would be listed as endangered and two would be classified as threatened. During the listening session, a brief presentation was provided by Marta Nammack, from NMFS Office of Protected Resources, followed by an opportunity for Council members and members of the public to ask questions and provide comments for the record.

Cooperative Research Committee

Staff provided a summary of the Cooperative Research Committee Meeting held on June 2, 2015. The Council expressed support for the draft timeline and the proposed approach for development of cooperative research alternatives. The Council also supported the Committee's recommendation that an advisory panel and technical working group be established to provide additional input and expertise.

NROC Commercial Fishery Mapping in Support of Regional Ocean Planning

George Lapointe gave a presentation on a multi-year project with the Northeast Regional Ocean Council (NROC) to map activity of commercial fishing and party/charter boats in New England. The maps produced from this project will be used to coordinate regional ocean use and reduce use conflicts. Additional information about this project is available at http://northeastoceancouncil.org/.

Guidelines for SAW Working Group Formation and Participation

Dr. Jim Weinberg provided an overview of new guidelines for Stock Assessment Workshop (SAW) Working Group formation, participation, and function. The guidelines, which will be phased in for use in 2016, are intended to improve consistency in composition and process across SAW working groups.

Trawl Survey Advisory Panel Formation

Dr. Bill Karp provided an update on the formation of a Northeast Trawl Survey Advisory Panel (NTAP). The purpose of NTAP is to identify concerns with trawl survey performance, identify methods to address these concerns, and promote mutual understanding and acceptance of survey results. The panel will be co-chaired by the Mid-Atlantic and New England Councils and will be composed of commercial fishing, fishery survey, and fishery management professionals.

Departing Council members Jeff Deem of Virginia and Preston Pate of North Carolina received thanks and appreciation from their colleagues during a farewell cookout.

Next Meeting

August 10 - 13, 2015: New York City

Holiday Inn Midtown
440 West 57th Street, New York City, New York 10019
Telephone: 212-581-8100

MID-ATLANTIC
FISHERY MANAGEMENT COUNCIL

PRESS RELEASE

FOR IMMEDIATE RELEASE
June 11, 2015

PRESS CONTACT: Mary Clark
(302) 674-2331 (ext. 261)

Mid-Atlantic Council Approves Deep Sea Corals Amendment

VIRGINIA BEACH, VA – This week the Mid-Atlantic Fishery Management Council approved an amendment to protect deep sea corals from the impacts of bottom-tending fishing gear in the Mid-Atlantic. If approved by the Secretary of Commerce, the amendment will create "deep sea coral zones" in areas where corals have been observed or where they are likely to occur. Within these zones, fishermen will not be allowed to use any type of bottom-tending fishing gear such as trawls, dredges, bottom longlines, and traps. In total, the areas proposed for deep sea coral zone designation encompass more than 38,000 square miles – an area nearly the size of Virginia.

Most deep sea corals are slow-growing and fragile, making them vulnerable to damage from certain types of fishing gear that come in contact with the sea floor. Under the Magnuson-Stevens Act, regional fishery management councils have the authority to designate zones where, and periods when, fishing may be restricted in order to protect deep sea corals. This provision has been in place since 2007, but the Mid-Atlantic Council will be the first of the eight councils to exercise this authority to designate deep sea coral zones.

"This historic action by the Council was made possible by the cooperation of a broad group of fishermen, advisors, coral researchers, conservation groups, Council members, and staff," said Council Chairman Rick Robins. "Many people deserve credit for their collaborative efforts to refine the coral protection areas in a way that protects deep sea corals in our region while accommodating current fishing practices."

The measures approved by the Council on Wednesday include the designation of fifteen "discrete coral zones," which are areas of known or highly likely coral presence. Most of these areas are located around underwater canyons or slope areas along the continental shelf edge. The boundaries for the discrete coral zones were developed cooperatively by members of the Council's advisory panels, deep sea coral experts, industry members, and other stakeholders. In addition, the Council voted to establish a "broad coral zone" encompassing a much larger area beginning around the 450 meter depth contour and extending out to the 200-mile limit of the Exclusive Economic Zone.

The prohibition on all types of bottom-tending gear would apply in both the broad and discrete deep sea coral zones. The amendment includes a provision to allow vessels to transit through coral zones if fishing gear is stowed and not available for immediate use.

Although the amendment will modify the fishery management plan for Atlantic Mackerel, Squid, and Butterfish, the restrictions would apply to any federally regulated fishing activity occurring within the proposed areas in the Mid-Atlantic Council region.

During the meeting the Council considered potential exemptions for federally managed fisheries and voted to exempt the red crab fishery from the proposed gear restrictions. The fishery, which only includes two full-time vessels, would be exempt from gear restrictions in discrete coral zones for at least two years and in broad zones indefinitely.

Secretarial review of the amendment will involve a thorough review of the proposed measures by NOAA Fisheries, including further opportunities for public comment.

Additional information, updates, and background materials related to this amendment are available on the Deep Sea Corals Amendment page at http://www.mafmc.org/actions/msb/am16.

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: Sammy Corbett, Marine Fisheries Commission Chairman
Dr. Louis B. Daniel III, Director, Division of Marine Fisheries

FROM: Michelle Duval

DATE: July 31, 2015

SUBJECT: South Atlantic Fishery Management Council Meeting (June 8-12, 2015)

The South Atlantic Fishery Management Council (Council) met in Key West, Florida. Following is a summary of actions taken by the Council. The next meeting will be held in Hilton Head Island, South Carolina, Sept. 14-18, 2015. The next series of public hearings will be in Jacksonville, NC on August 12 and in Morehead City, NC on August 13. Please see the following link for public information documents as well as locations and times: http://safmc.net/meetings/public-hearing-and-scoping-meeting-schedule.

Snapper Grouper Visioning Workshop

The Council continued its work developing a vision for the future of the snapper grouper fishery. The Council approved the draft Vision Blueprint goals, objectives and strategies for the four major focus areas of Management, Science, Communication and Governance for public input and review. Because stakeholder needs and perceptions can vary widely, the Council has not excluded any input from the draft. There are no prioritized or preferred items in the draft Vision Blueprint as comments received during the summer will inform the Council's decisions regarding items that remain in the Blueprint versus those that are removed.

The Council also reviewed the informational flier being sent to all South Atlantic commercial and for-hire federal permit holders with the schedule of public input opportunities and multiple methods available for stakeholders to provide input:

- Daytime/evening informational webinars on each of the four focus areas (July 6-8)
- Facilitated in-person local comment stations/live webinars in each state (July 28-30 in North Carolina)
- Council website comment form
- Email, mail, phone, fax

The Council will review all input received at its September visioning workshop and begin planning for its two-day visioning council meeting, to be held the second week of October, where it will discuss prioritizing short-term and long-term actions based on public input.

Ecosystem/Habitat Committee

The Council received an update on the February 2015 Ecosystem Modeling Workshop, designed to inform the revision of the Council's Fishery Ecosystem Plan, which is scheduled for completion in 2016. The workshop covered a number of topics, and participants acknowledged the need for ecosystem modeling efforts to inform the Council's decisions regarding managed species. The Council also received an overview of the Oculina Experimental Closed Area 10-year review Evaluation Team Report, which tracks progress toward meeting the objectives of the closed area. Finally, the Council reviewed a request from the rock shrimp industry to determine if additional bottom near the boundary of the Oculina Experimental Closed Area could be re-opened based on Vessel Monitoring System data from 2013 and 2014.

Protected Resources Committee

The Council received an update on the Atlantic sturgeon Section 7 consultation for the Coastal Migratory Pelagics fishery (mackerels, cobia), which has been delayed until September 2015, as well as an update on the *Acropora* coral recovery plan. Council staff reviewed a draft Endangered Species Act/Magnuson-Stevens Act integration agreement, which outlines a tiered approach for the Council's involvement in the formal consultation process. The agreement specifies the responsibilities of Council staff and NOAA Fisheries Southeast Regional Office Protected Resources staff with regard to communications standards, the role of Protected Resources staff in the fishery management plan amendment process, and status updates for the Council's Protected Resources Committee. Suggested changes included adding criteria to determine which informal consultations would be reviewed by the Council and/or Council staff.

Shrimp Committee

The Council received an update from the Shrimp and Deepwater Shrimp Advisory Panel Chair regarding the recent biological opinion on the southeastern shrimp fishery, the results from the 2014 shrimp procedural workshop (that reviewed bycatch estimation methods for managed species), and the industry request to consider a rock shrimp access area within the northern expansion of the Oculina Habitat Area of Particular Concern. The Council discussed changes in the fishery due to environmental and economic factors. Based on the discussions, a motion was made to develop an amendment to change the eastern boundary of the northern extension and develop allowable fishing areas for the rock shrimp fishery.

Southeast Data, Assessment, and Review (SEDAR) Committee

This is the name of the stock assessment process in the southeast, and each Southeast, Data, Assessment and Review, or "SEDAR" is given a number. The Council received updates on the following stock assessment activities:

- The red grouper assessment update, originally due for completion in January 2016, will be delayed until January 2017 due to scheduling difficulties. Blueline tilefish continues to be on the schedule for an update in 2016.
- The Council received an update on the transition from the old Marine Recreational Information Program effort survey (conducted by telephone) to the new mail-based survey. New estimates of recreational catch are expected to be available for assessments occurring in 2017, which will need to be incorporated into the timing of stock assessment updates for recreationally important species.
- The Council discussed modifications to the structure of its annual research plan in order to increase its utility as a resource for federal grant opportunities. Namely, research priorities will be separated from monitoring, and more specific descriptions of research projects will be included.
- A deepwater survey design workshop was conducted at the NOAA Fisheries Beaufort Lab in early April, with the goal of building a framework for a cooperative deepwater snapper grouper monitoring program. The workshop brought together scientists and industry representatives from across the region, including five fishermen from North Carolina. The Council received an update that funding to conduct sampling aboard industry vessels according to the methods discussed at the workshop has been made available, and is expected to occur later this year.

Golden Crab

The Council discussed research from the mid-1980s by the S.C. Department of Natural Resources regarding potential golden crab fishing grounds. Based on a recommendation from the advisory panel, the Council directed staff to begin development of an amendment that would expand the allowable northern golden crab fishing zone.

Snapper Grouper Committee

The committee received updates on the status of the following amendments under review:

- *Amendment 29 (Only Reliable Catch Stocks and gray triggerfish):* The final rule published June 2, 2015 and regulations became effective July 1, 2015. The amendment updates the Council's Allowable Biological Catch control rule to include the use of a data-limited approach, establishes a minimum size limit for gray triggerfish (12 inches fork length), a commercial split season and a commercial trip limit of 1,000 pounds.
- *Regulatory Amendment 20 (snowy grouper):* The final rule for this amendment published July 21, 2015 with regulations effective Aug. 20, 2015. The amendment increases the annual catch limit for snowy grouper, increases the commercial trip limit from 100 to 200 pounds (gutted weight), maintains the existing one fish per vessel per day recreational bag limit and restricts recreational harvest to May through August.

- *Comprehensive Accountability Measures/Dolphin-Wahoo Amendment 8*: This amendment would standardize the Council's accountability measures across its managed species. It also establishes a 10 percent commercial/90 percent recreational allocation of the Annual Catch Limit for dolphin. The proposed rule published July 14 and comments are due by Sept. 14, 2015
- *Regulatory Amendment 22 (gag and wreckfish)*: This amendment updates the annual catch limits for both gag and wreckfish based on recent stock assessment updates.
- *Snapper Grouper Amendment 33/Dolphin-Wahoo Amendment 7*: This amendment extends an exemption currently allowed in the snapper grouper fishery to the dolphin-wahoo fishery that allows fish legally harvested in the Bahamas to be transported aboard a recreational fishing vessel as fillets. It also closes loopholes in the existing snapper grouper exemption and establishes consistent rules across both fisheries. The proposed rule package is under review.

Red snapper 2105 harvest

The Council received an update from NOAA Fisheries staff regarding total removals (harvest and dead discards) of red snapper in 2014. The current approach for determining if a red snapper season will occur for a particular year relies on the previous year's total removals remaining within the allowable biological catch. Because the total removals in 2014 exceeded the 2014 allowable biological catch (by 100,000 fish due mostly to dead discards from the private recreational sector), there will be no red snapper season in 2015.

Marine Recreational Information Program "Rare Event" Sampling Presentation

Dr. David VanVorhees gave a presentation on various approaches that could be used in the South Atlantic to improve recreational catch estimates for "rare event" or "rarely intercepted" species such as snowy grouper, blueline tilefish and golden tilefish. Such approaches included increasing sample size in the intercept survey, adjusting weighting of sample units, stratification (e.g., creation of a deepwater stratum), specialized survey design, and multi-year annual catch limits. The Council requested that some of these approaches be explored further to determine whether they could be implemented in the South Atlantic region.

Regulatory Amendment 16 (black sea bass pot closure): This amendment contains a range of alternatives to modify the existing November through April prohibition on the use of black sea bass pots due to concerns regarding risk to right whales. The Council was required to implement this closure in late 2013 in order to double the annual catch limit based on a stock assessment update. In March, the Council had selected a preferred alternative (Alternative 9, Sub-Alternative 9a) that would maintain a prohibition on the use of black sea bass pot gear inshore of 20 meters depth off the Carolinas, and the area that encompasses the 75th percentile of sightings off Georgia and Florida, annually from Nov. 1 through April 15.

Based on additional concerns on the part of Protected Resources, the Council added two new alternatives: one modifies the closure to apply from Nov. 1 through April 30 inshore of the 27 meter depth contour; the second modifies the closure to apply in depths 25 meters and shallower from Nov. 1-30 and April 1-30, and in depths 30 meters and shallower from Dec. 1-March 30. The Council approved the amendment for public hearings, and removed its selection of a preferred alternative for the seasonal pot closure. The amendment also includes actions to enhance the existing gear-marking, weak link and line breaking-strength requirements of the Atlantic Large Whale Take Reduction Plan.

Amendment 35 (removal of species and golden tilefish endorsements): This amendment contains actions to remove species from the fishery that are primarily caught in south Florida (black snapper, mahogany snapper, dog snapper and schoolmaster snapper), and address a loophole in the golden tilefish longline endorsement that has allowed endorsement holders to fish on the 25 percent of the annual catch limit set aside for hook-and-line fishermen that did not receive endorsements. The Council approved the amendment for secretarial review.

Amendment 36 (spawning Special Management Zones (SMZs)): The Council reviewed the draft amendment and reduced the sizes of several of the candidate spawning special management zones; most candidate sites are one square mile to five square miles in area. The candidate sites being considered in North Carolina are the 780 bottom, an area south of Cape Lookout and the Malchase Wreck. The Council added a transit provision as well as a sunset clause for any spawning special management zones established on natural bottom. The Council approved the amendment for public hearings in August 2015.

Amendment 37 (hogfish): This amendment contains actions related to hogfish in response to the recent stock assessment (2014) that determined there were two hogfish stocks: one from Georgia through North Carolina, and a second along the east coast of Florida through the Florida Keys. The amendment includes actions to establish maximum sustainable yield, annual catch limits and accountability measures for each stock. It also includes actions to modify the minimum size limit and establish a recreational bag limit and commercial trip limit for each stock. It also establishes a rebuilding plan for the Florida east coast/Florida Keys stock. The Council approved the amendment for scoping during August public meetings.

Regulatory Amendment 23 (golden tilefish hook-and-line fishing year; black sea bass bag limit; jacks complex commercial trip limit): This amendment was restructured to include only the following actions: modification of the fishing year start date for the hook-and-line component of the commercial golden tilefish fishery (currently Jan. 1); an increase in the black sea bass recreational bag limit; and a commercial trip limit for the jacks complex (almaco jack, lesser amberjack, banded rudderfish). The Council approved the amendment for August public hearings and is scheduled to consider final action in September 2015.

Blueline tilefish management:
The Council's Scientific and Statistical Committee recommended that the future catch projections for blueline tilefish be recalculated as they are no longer considered best scientific information given the significant increases in harvest both within and outside the Council's jurisdiction since the stock assessment was completed. Projections with varying levels of recruitment were requested, similar to the king mackerel stock assessment. The committee will review the new projections in early September, and the Council will receive the Scientific and Statistical Committee's updated allowable biological catch projections during its September meeting week.

The Mid-Atlantic Fishery Management Council request for emergency action to apply a 300 pound (whole weight) commercial trip limit and seven fish per person per day recreational bag limit was implemented just prior to the June South Atlantic Council meeting. The South Atlantic Council's request for emergency action that would apply the management measures implemented under Snapper Grouper Amendment 32 throughout the Atlantic Coast (100 pound commercial trip limit and 1 fish per vessel per day recreational bag limit) is still under consideration by NOAA Fisheries, pending updated catch projections.

Mackerel Committee
Amendment 26 (king mackerel annual catch limits and stock boundary): This amendment would adjust the king mackerel annual catch limits based on the SEDAR 38 stock assessment. It includes actions to adjust the boundary between Gulf and South Atlantic stocks; allow for sale of king mackerel incidentally caught in the shark gill net fishery; maintain a Florida east coast commercial sub-zone, but adjust the boundaries of sub-zone; and establish a quota and trip limits for the Florida east coast subzone. The Council will review the modified document in September and approve the document for public comment in June.

Amendment 28 (separation of permits/separation of management plan): This amendment considers separation of commercial permits as part of establishing separate fishery management plans. There is a desire on the part of many king mackerel commercial fishermen in the Gulf of Mexico to prevent permit holders on the Florida east coast from fishing in the Gulf, and this amendment is viewed as an opportunity to do so. Currently, the species in the plan are managed jointly with the Gulf of Mexico Fishery Management Council and each council must approve the others actions. This amendment was taken out for scoping, but the Council voted to discontinue work on this amendment based on discussions at the Gulf Council January 2015 meeting. However, the Gulf Council has elected to move forward with development of the amendment, despite the South Atlantic Council's position. This presents a difficult situation in that, at some point, the South Atlantic Council will need to approve any actions for the amendment to move forward.

Data Collection Committee
Commercial Electronic Reporting: The Council received an update on the development of an electronic version of the existing commercial logbook form that fishermen could voluntarily use to submit catch information. The Atlantic Coastal Cooperative Statistics Program is working with the Southeast Fisheries Science Center to implement this product. The form should be operational by late summer 2015. Additionally, the commercial electronic logbook pilot program is underway, with several commercial fishermen in North Carolina participating in the testing of weatherproof tablets and laptops for recording commercial harvest and discard data onboard vessels.

Joint Gulf/South Atlantic Charterboat Electronic Reporting: The Council reviewed the actions and alternatives in the draft amendment in a joint session with the Gulf of Mexico Fishery Management Council. The South Atlantic Council requested that sample data forms with the minimum required elements currently being reported electronically by headboats be included in the draft amendment. The South Atlantic Council is interested in implementing electronic charter vessel reporting on the same schedule as headboats, applying the same standards, reporting mechanism and data elements, while the Gulf Council is interested in having charter vessels reporting electronically prior to arriving at the dock. The South Atlantic Council requested an alternative be added to allow charter vessels to report fishing location manually via a logbook grid, rather than by a geographic positioning system-enabled device. Both Councils will review the modifications to the draft amendment at their next meeting and approve for public hearings.

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

MEMORANDUM

TO: Dr. Louis B. Daniel III, Division of Marine Fisheries Director
Sammy Corbett, Marine Fisheries Commission Chairman

FROM: Randy Gregory
Division of Marine Fisheries, NCDENR

DATE: May 1, 2015

SUBJECT: Highly Migratory Species Update

The Highly Migratory Species Advisory Panel's fall meeting will be held September 9 - 10, 2015 in Silver Spring, Maryland. The National Marine Fisheries Service Highly Migratory Species Fishery Management Division staff will discuss the proposed rule to implement draft Amendment 9 and Amendment 6 to the 2006 Consolidated Highly Migratory Species Fishery Management Plan. Amendment 9 considers management measures in the shark fisheries and could affect fishermen who fish for smoothhound sharks (e.g., smooth dogfish, Florida smoothhound, and Gulf smoothhound) and fishermen who fish for sharks with gillnet gear. Amendment 6 proposes a range of management measures for the commercial shark fisheries.

Sharks

The first stock assessment for Atlantic smooth dogfish (Mustelus canis) was conducted by the Southeast Data, Assessment, and Review (SEDAR) process. Tagging and genetics data support the existence of two distinct stocks of smooth dogfish stocks, one in the Atlantic region and one in the Gulf of Mexico. Since smooth dogfish are the only species of smoothhound sharks occurring in the Atlantic region, the stock assessment was only for this species in the Atlantic region. Based on the results of SEDAR 39, the status of the Atlantic smooth dogfish is not overfished and no overfishing is occurring.

Year	Month	Species	Pounds	Dealers	Trips	Average (2007-2009)
2013	1	SOUTHERN FLOUNDER	2,942	42	276	7,713
2013	2	SOUTHERN FLOUNDER	896	37	254	4,617
2013	3	SOUTHERN FLOUNDER	4,387	57	682	23,512
2013	4	SOUTHERN FLOUNDER	16,697	93	1,177	68,389
2013	5	SOUTHERN FLOUNDER	49,629	123	1,778	122,514
2013	6	SOUTHERN FLOUNDER	79,203	137	2,127	154,090
2013	7	SOUTHERN FLOUNDER	119,720	150	2,839	170,387
2013	8	SOUTHERN FLOUNDER	124,177	147	2,685	201,862
2013	9	SOUTHERN FLOUNDER	416,097	161	3,631	396,301
2013	10	SOUTHERN FLOUNDER	883,476	172	5,512	781,717
2013	11	SOUTHERN FLOUNDER	483,762	121	2,589	392,150
2013	12	SOUTHERN FLOUNDER	5,288	12	27	37,303
2014	1	SOUTHERN FLOUNDER	2,978	29	183	7,713
2014	2	SOUTHERN FLOUNDER	1,823	29	285	4,617
2014	3	SOUTHERN FLOUNDER	3,430	43	677	23,512
2014	4	SOUTHERN FLOUNDER	18,997	71	933	68,389
2014	5	SOUTHERN FLOUNDER	16,001	93	681	122,514
2014	6	SOUTHERN FLOUNDER	80,142	123	1,988	154,090
2014	7	SOUTHERN FLOUNDER	84,702	141	2,148	170,387
2014	8	SOUTHERN FLOUNDER	105,208	137	2,204	201,862
2014	9	SOUTHERN FLOUNDER	404,143	153	3,588	396,301
2014	10	SOUTHERN FLOUNDER	634,514	146	3,436	781,717
2014	11	SOUTHERN FLOUNDER	320,773	121	1,991	392,150
2014	12	SOUTHERN FLOUNDER	800	5	7	37,303
2015	1	SOUTHERN FLOUNDER	1,987	29	235	7,713
2015	2	SOUTHERN FLOUNDER	495	21	93	4,617
2015	3	SOUTHERN FLOUNDER	5,886	61	766	23,512
2015	4	SOUTHERN FLOUNDER	20,754	88	1,067	68,389
2015	5	SOUTHERN FLOUNDER	41,479	113	1,230	122,514
2015	6	SOUTHERN FLOUNDER	32,232	49	937	154,090
2015	7	SOUTHERN FLOUNDER	2,681	6	76	170,387

***2015 data are preliminary and only complete through May.

Conf

Red Drum Landings 2014-2015

Landings are complete through May 31, 2015
2014 Landings are final; 2015 landings are preliminary

Year	Month	Species	Pounds	2009-2011 Average	2012-2014 Average
2014	9	Red Drum	34,775	28,991	35,471
2014	10	Red Drum	36,425	43,644	59,757
2014	11	Red Drum	16,375	14,318	28,619
2014	12	Red Drum	2,995	3,428	3,401
2015	1	Red Drum	1,961	5,885	1,364
2015	2	Red Drum	3,009	3,448	3,176
2015	3	Red Drum	3,913	5,699	2,957
2015	4	Red Drum	12,680	7,848	3,945
2015	5	Red Drum	9,779	13,730	9,222
2015	6	Red Drum	5,629*	12,681	7,432
2015	7	Red Drum	229*	13,777	15,555
Fishing Year (Sept 1, 2014 - Aug 31, 2015) Landings			**127,769**		

*partial trip ticket landings only
***landings are confidential