

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.....	<u>-6,632</u>
Total number of SCFL's available in the pool for 2015-2016.....	<u>2,264</u>
Plus the number of SCFL's not renewed in 2013-2014.....	<u>+ 118</u>
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).....	<u>- 1,142</u>
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... +	<u>4</u>
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 DATE	APPRVLS	DENIALS	TABLED **	TOTALS REVIEWED	INCOMP. ***	NON-TABLED	RESIDENTS APPRV'D	RESIDENTS 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	APPRVLS	DENIALS	TABLED	TOTALS	INCOMP.	NON-	RESIDENTS	
DATE			**	REVIEWED	***	TABLED	APPRV'D	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 Plan

- 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

- Bacher 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.

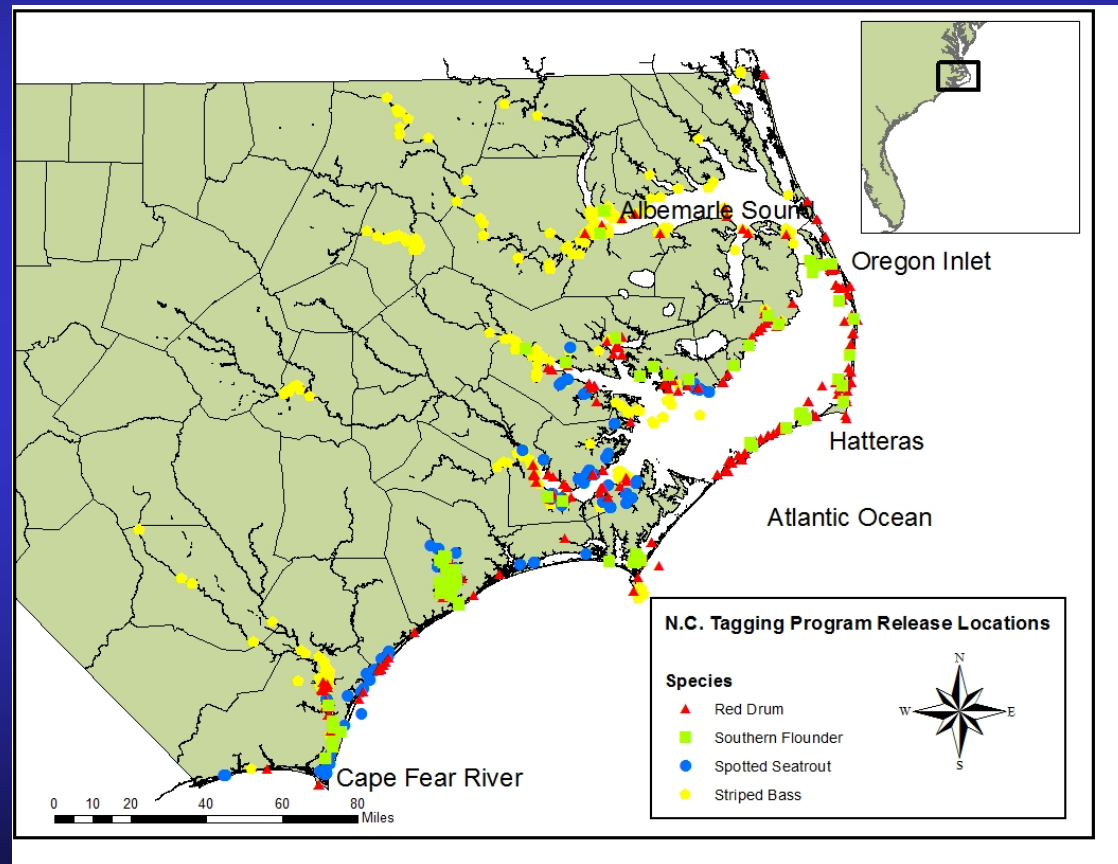


Who will be tagging fish

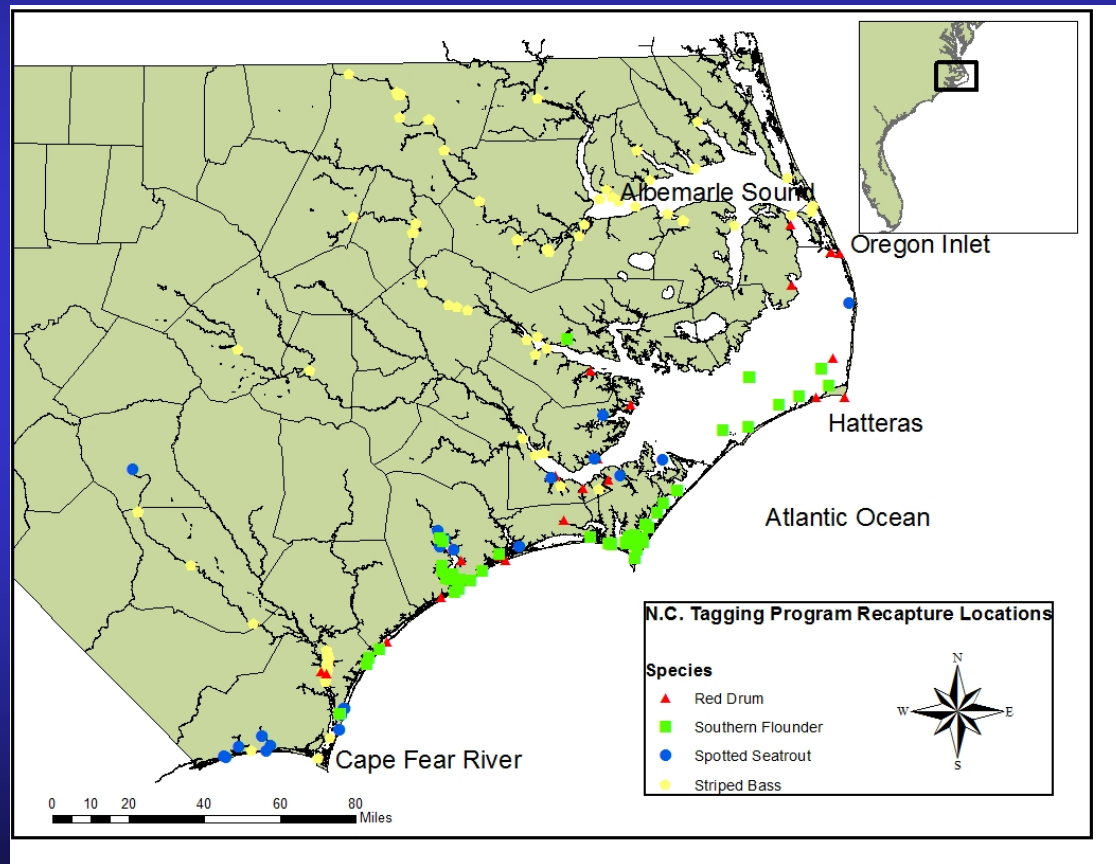
- Red Drum – Division employees
- Striped Bass – State employees
- Southern Flounder – Division employees with the aid of commercial pound net fishermen
- Spotted Seatrout – Division employees and recreational fishing guides



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.”





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)

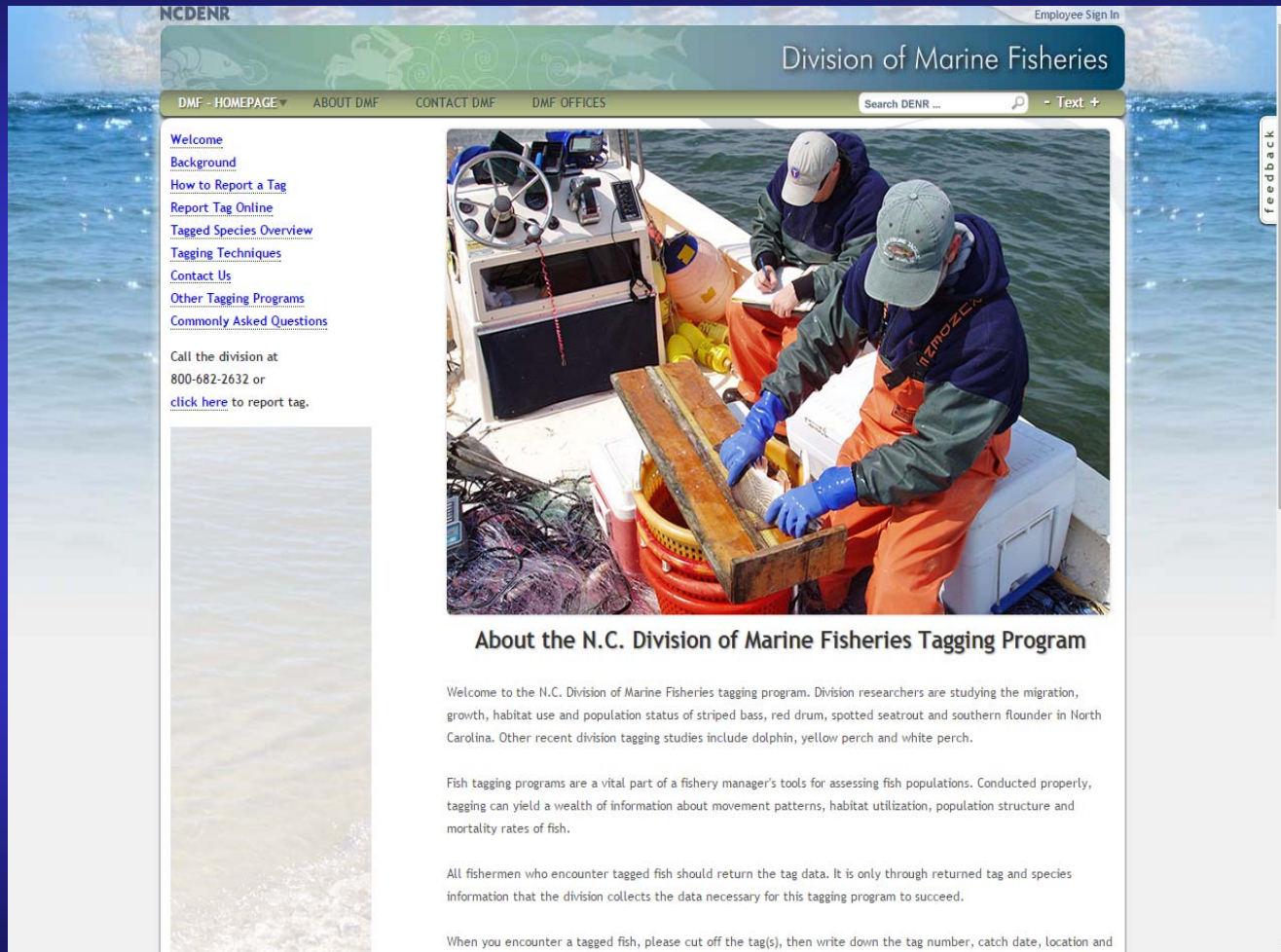


How to report a tag

- 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




The screenshot displays the NCDENR Division of Marine Fisheries website. At the top, the logo 'NCDENR' is on the left and 'Employee Sign In' is on the right. Below this is a green header with 'Division of Marine Fisheries'. A navigation bar contains links for 'DMF - HOMEPAGE', 'ABOUT DMF', 'CONTACT DMF', and 'DMF OFFICES'. A search bar is labeled 'Search DENR ...' and a 'Text +' link is on the right. A vertical 'feedback' link is on the far right edge.

Left Sidebar:

- [Welcome](#)
- [Background](#)
- [How to Report a Tag](#)
- [Report Tag Online](#)
- [Tagged Species Overview](#)
- [Tagging Techniques](#)
- [Contact Us](#)
- [Other Tagging Programs](#)
- [Commonly Asked Questions](#)

Call the division at 800-682-2632 or [click here](#) to report tag.

Main Content Area:



About the N.C. Division of Marine Fisheries Tagging Program

Welcome to the N.C. Division of Marine Fisheries tagging program. Division researchers are studying the migration, growth, habitat use and population status of striped bass, red drum, spotted seatrout and southern flounder in North Carolina. Other recent division tagging studies include dolphin, yellow perch and white perch.

Fish tagging programs are a vital part of a fishery manager's tools for assessing fish populations. Conducted properly, tagging can yield a wealth of information about movement patterns, habitat utilization, population structure and mortality rates of fish.

All fishermen who encounter tagged fish should return the tag data. It is only through returned tag and species information that the division collects the data necessary for this tagging program to succeed.

When you encounter a tagged fish, please cut off the tag(s), then write down the tag number, catch date, location and



Online Reporting Tool

Division of Marine Fisheries

DMF - HOME PAGE | ABOUT DMF | CONTACT DMF | DMF OFFICES

Search DENR ... - Text +

[Welcome](#)
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[Tagged Species Overview](#)
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[Other Tagging Programs](#)
[Commonly Asked Questions](#)

Call the division at 800-682-2632 or [click here](#) to report tag.

Report a Tag Online

Report a tagged fish, apply for reward

Thank you for responding to our tagged fish questionnaire. If you have a red tag, please call 800-682-2632 to report your recapture and discuss your \$100 reward. For online reporting, a representative of the Division of Marine Fisheries may contact you for additional information or to discuss your reward options.

Please complete all required items indicated with *

Color of tag *
 red
 yellow
 blue

Tag number (ex: D12345) : *

Was there a second tag? *
 yes
 no

If so, tag number

Species: *
 dolphin
 red drum
 southern flounder
 spotted seatrout
 striped bass
 yellow perch
 white perch

Date caught (Month/Day/Year): *

Feedback



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



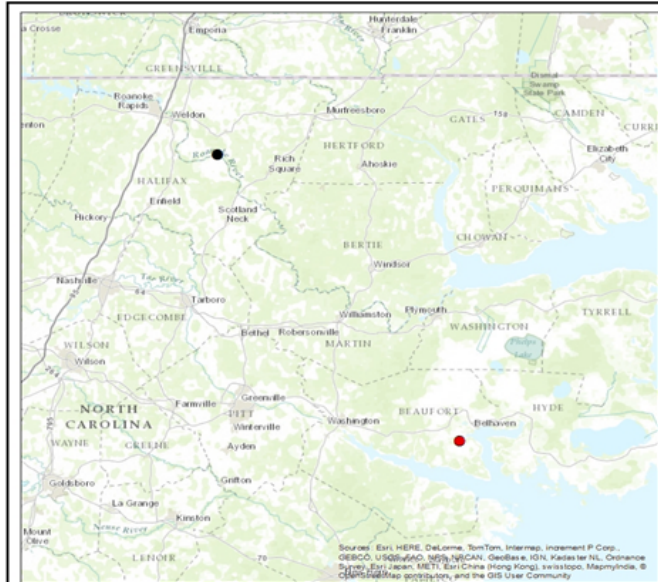
Certificate of Recognition and Appreciation

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	



- Tag and Release Location
- Recapture Location



0 10 20
 Miles

0 15 30
 Kilometers



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



Striped Bass



Spotted Seatrout



Red Drum



Southern Flounder



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

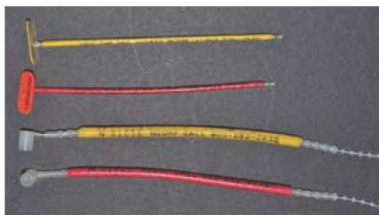
N.C. Division of Marine Fisheries Tagging Program

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.

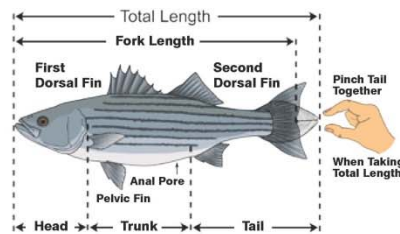


Anchor tags (top) and cinch-up tags (bottom) used in the study

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



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



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					Comments
	Viable	Recovering	Concern	Depleted	Unknown	
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					Comments
	Viable	Recovering	Concern	Depleted	Unknown	
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					Comments
	Viable	Recovering	Concern	Depleted	Unknown	
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 occurring. 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 occurring.
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					Comments
	Viability	Recovering	Concern	Depleted	Unknown	
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 management. 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					Comments
	Viable	Recovering	Concern	Depleted	Unknown	
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					Comments
	Viable	Recovering	Concern	Depleted	Unknown	
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. 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 indicators 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)

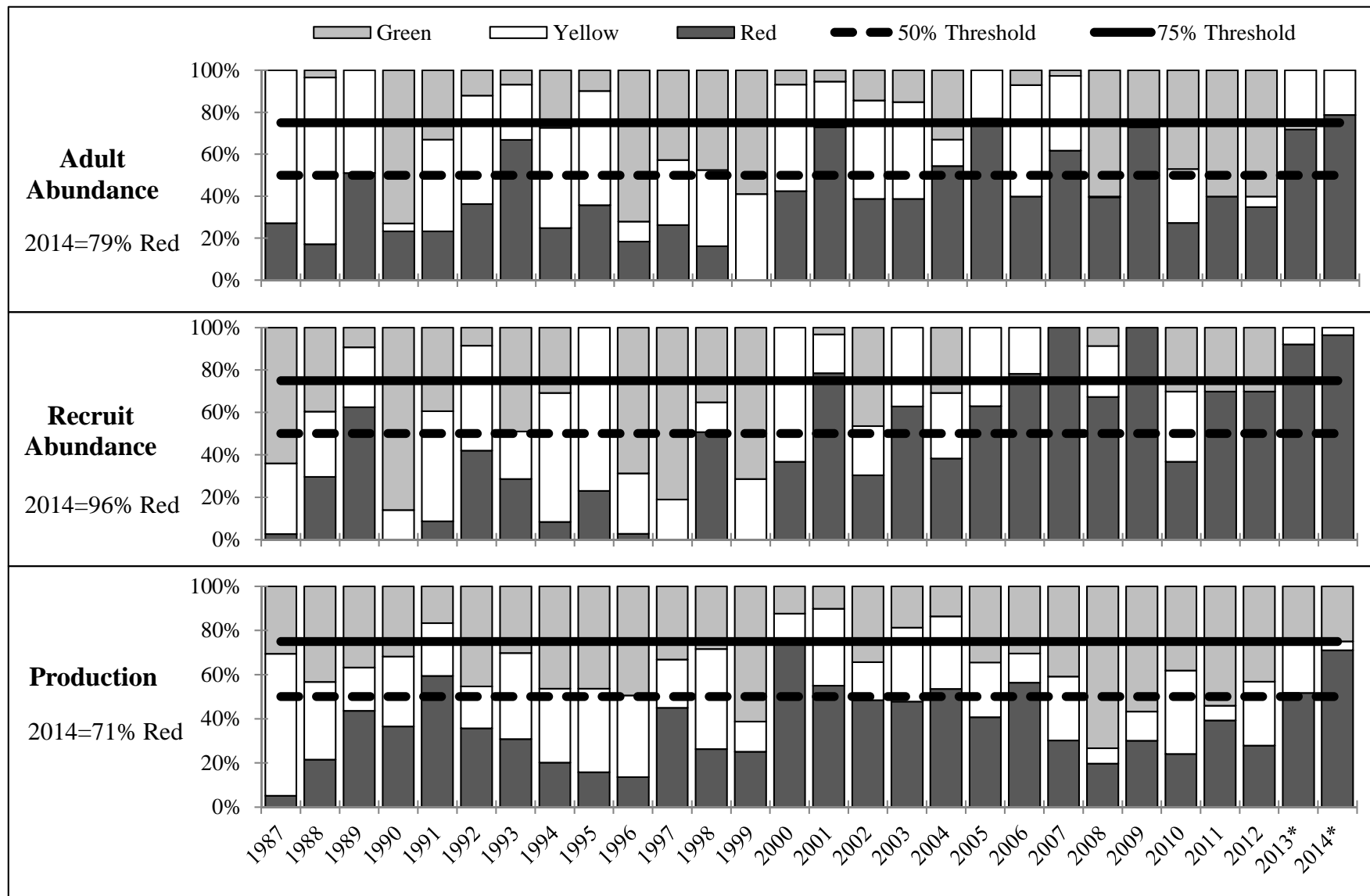


Figure 1. Adult abundance, recruit abundance, and production characteristics for the 2014 Blue Crab Traffic Light update. *2013 and 2014 represent the first and second years that count toward the three consecutive years needed to activate the moderate management trigger. 2013 was the first year of implementation 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
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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

ACKNOWLEDGEMENTS	II
LIST OF ACRONYMS	III
TABLE OF CONTENTS.....	VI
FISHERY MANAGEMENT PLAN, AMENDMENTS AND UPDATES.....	7
EXECUTIVE SUMMARY	8
I. PURPOSE.....	9
II. GOAL AND OBJECTIVES	10
III. BACKGROUND	11
IV. MANAGEMENT AUTHORITY	11
V. MANAGEMENT UNIT: FISH STOCKS MANAGED BY THE COUNCILS AND COMMISSION	12
VI. FISHERY MANAGEMENT PLANS	13
VII. FEDERAL MANAGEMENT.....	14
VIII. COUNCIL AND ASMFC PLAN DEVELOPMENT.....	17
IX. COORDINATION OF FMP DEVELOPMENT WITH THE N.C. MFC	18
X. IMPLEMENTATION OF COUNCIL/COMMISSION PLANS	19
APPENDIX A LEGAL REFERENCES.....	24
APPENDIX B SPECIES SUMMARY	43
APPENDIX C STATE CONTACTS.....	113
APPENDIX D PROPOSED RULE CHANGES FROM 2008.....	117

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.

²Black drum added to IJ FMP management unit subsequent to approval of ASMFC FMP in 2013.

³Tiger 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/>,

TABLE OF CONTENTS

Sec. 2. Findings, purposes, and policy.

Sec. 3. Definitions.

Sec. 4. Authorization of Appropriations.

TITLE I -- UNITED STATES RIGHTS AND AUTHORITY REGARDING FISH AND FISHERY RESOURCES

Sec. 101. United States sovereign rights to fish and fishery management authority.

Sec. 102. Highly migratory species.

TITLE II -- FOREIGN FISHING AND INTERNATIONAL FISHERY AGREEMENTS

Sec. 201. Foreign fishing.

Sec. 202. International fishery agreements.

Sec. 203. Congressional oversight of international fishery agreements.

Sec. 204. Permits for foreign fishing.

Sec. 205. Import prohibitions.

Sec. 206. Large-scale driftnet fishing.

Sec. 206a. Denial of port privileges and sanctions for high seas large-scale driftnet fishing.

TITLE III -- NATIONAL FISHERY MANAGEMENT PROGRAM (16 U. S. C. 1851 et seq).

Sec. 301. National standards for fishery conservation and management.

Sec. 302. Regional fishery management councils.

Sec. 303. Contents of fishery management plans.

Sec. 303A. Limited access privilege programs.

Sec. 304. Action by Secretary.

Sec. 305. Other requirements and authority.

Sec. 306. State jurisdiction.

Sec. 307. Prohibited acts.

Sec. 308. Civil penalties and permit sanctions.

Sec. 309. Criminal offenses.

Sec. 310. Civil forfeitures.

Sec. 311. Enforcement.

Sec. 312. Transition to sustainable fisheries.

Sec. 313. North Pacific fisheries conservation.

Sec. 314. Northwest Atlantic Ocean fisheries reinvestment program.

Sec. 315. Regional coastal disaster assistance, transition, and recovery program.

Sec. 316. Bycatch reduction engineering program.
Sec. 317. Shark feeding.
Sec. 318. Cooperative research and management program.
Sec. 319. Herring study.
Sec. 320. Restoration study.

TITLE IV -- FISHERY MONITORING AND RESEARCH

Sec. 401. Registration and information management.
Sec. 402. Information collection.
Sec. 403. Observers.
Sec. 404. Fisheries research.
Sec. 405. Incidental harvest research.
Sec. 406. Fisheries systems research.
Sec. 407. Gulf of Mexico red snapper research.
Appendix

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

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MEMORANDUM

TO: North Carolina Marine Fisheries Commission

FROM: Francis W. Crawley *fwc*
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

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 = $0.75 \cdot F_{MSY}$; F threshold = F_{MSY}
- SSB target = SSB_{MSY} ; SSB threshold = $0.70 \cdot SSB_{MSY}$ (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.

Atlantic Menhaden:

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.

Atlantic Striped Bass:

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; modified 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 smoothhound 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 it 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.g. 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.

Scup:

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 (F_{max} serving as a proxy for F_{msy}), 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 B_{msy}.

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 F_{max} (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.

Spotted Seatrout:

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 minimis* 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 minimis* 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

Dolphin and Wahoo:

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) 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 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, vermilion 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), and 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 pogy 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 (<i>Morone saxatilis</i>) 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	
				<p>possessed and transported.</p> <p>(c) It is unlawful to possess striped bass imported from other states less than 18 inches long (total length).</p> <p>(d) It is unlawful to import, buy, sell, transport, offer to buy or sell, or possess striped bass except:</p> <p>(1) during the open season in internal coastal waters established in 15A NCAC 03M .0202;</p> <p>(2) during any open season established for the Atlantic Ocean in 15A NCAC 03M .0204; or</p> <p>(3) during any open season of another state without possession of the following:</p> <p>(A) A bill of lading as described in 15A NCAC 03I .0114;</p> <p>(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.</p> <p>(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.</p>		<p>buy, sell, or offer for sale striped bass less than 28 inches total length taken with ocean trawls from the Atlantic Ocean.</p> <p>II. HARVEST RESTRICTIONS</p> <p>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.</p> <p>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.</p> <p>III. GEAR RESTRICTIONS</p> <p>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.</p> <p>B. No gill nets may be possessed on board a vessel used in the taking or landing of striped bass.</p> <p>Plus permits, tags, reporting, etc</p>	
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	<p>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.</p> <p>(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:</p> <p>(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.</p>			
Atlantic striped bass (internal, ASMA, RRMA)	ASMFC	FMP 1981 Amen #6 2003	3M.0202 Season, Size, Etc. Internal	<p>(a) The Fisheries Director may, by proclamation, impose any or all the following restrictions on the taking of striped bass in internal coastal waters:</p> <p>(1) Specify season or seasons: (A) for recreational purposes; (B) for commercial fishing operations from October 1 through April 30, (2) Specify areas,</p>	Several annually FF-35-07 rec.	<p>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:</p> <p>AREA DESCRIPTION:</p> <p>The Albemarle Sound Management Area as defined in</p>	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	
				<p>(3) Specify quantity,</p> <p>(4) Specify means/methods,</p> <p>(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.</p> <p>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.</p> <p>(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:</p> <p>(1) Specify quantity, but shall not exceed possession of more than three fish in any one day, and</p> <p>(2) Specify size, but the minimum size specified shall not be less than 18 inches total length.</p>	FF-33-07	<p>Marine Fisheries Rule 15A NCAC 3R .0201 (a), excluding Inland fishing waters.</p> <p>II. SEASON, MEANS AND METHODS:</p> <p>A. Striped bass may be taken for recreational purposes seven days a week during the open season.</p> <p>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.</p> <p>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.</p> <p>III. SIZE AND CREEL LIMITS:</p> <p>A. No person shall take or possess striped bass less than 18 inches total length taken for recreational</p>	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
					M-5-07	<p>purposes from the Albemarle Sound Management Area.</p> <p>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.</p> <p>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:</p> <p>I. AREA DESCRIPTION</p> <p>Albemarle Sound Management Area as described in Marine Fisheries Rule 15A NCAC 3R .0201 (a), excluding Inland fishing waters.</p> <p>II. SIZE AND HARVEST RESTRICTIONS:</p> <p>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.</p> <p>B. It is unlawful for an individual</p>	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						<p>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.</p> <p>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.</p> <p>Plus permits, tags, etc.</p> <p>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.</p>	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						<p>I. AREA DESCRIPTION: The Albemarle Sound Management Area as described in Marine Fisheries Rule 15A NCAC 3R .0201 (a) excluding Inland Fishing Waters.</p> <p>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:</p> <p>Albemarle Sound, Currituck Sound, Croatan Sound and Roanoke Sound and their Joint Water Tributaries</p> <p>A. Gill nets with a mesh length of 3 ¼ inches shall not exceed 800 yards in length.....</p> <p>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</p>	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						<p>inches.</p> <p>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.</p> <p>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.</p>	
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				<p>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:</p> <ol style="list-style-type: none"> (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. 		<p>15.3°N. Latitude):</p> <p>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.</p> <p>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.</p> <p>B. During any closed season, vessels may land up to 100 pounds of black sea bass per trip taken from the Atlantic Ocean.</p> <p>III. GEAR RESTRICTIONS</p>	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						<p>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).</p> <p>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.</p> <p>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.</p>	

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	
						<p><u>Proclamation FF-19-2007, dated February 23, 2007</u> are replaced with the following provisions in accordance with proclamation authority in the same Rule:</p> <p>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.</p> <p>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.</p> <p>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).</p>	
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	<p>effective at 12:01 A.M., Tuesday, April 1, 2003, the following change will apply to the taking of bluefish for recreational purposes:</p> <p>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.</p> <p>GENERAL INFORMATION</p> <p>C) The recreational</p>	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	
				<p>taken by hook and line for recreational purposes.</p> <p>(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.</p> <p>(c) It is unlawful to possess aboard or land more than 500 pounds of wahoo per trip in a commercial fishing operation</p>			<p>Suspend Rule</p> <p>3M .0512 Conditional Proclamation</p>
Mackerel, king	SAFMC	FMP 1983 Amen 1-13 2004	3M .0301	<p>(b) King mackerel:</p> <p>(1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions for king mackerel:</p> <p>(A) Specify areas.</p> <p>(B) Specify seasons.</p> <p>(C) Specify quantity.</p> <p>(D) Specify means/methods.</p> <p>(E) Specify size.</p> <p>(2) It is unlawful to possess king mackerel less than 24 inches fork length.</p> <p>(3) It is unlawful to possess more than three king mackerel per person per day taken for recreational purposes.</p> <p>(4) It is unlawful to possess more than three king mackerel per person per day in the Atlantic Ocean:</p> <p>(A) by hook and line except for persons holding a valid National Marine Fisheries Service King Mackerel Commercial Vessel Permit; or</p>			<p>3M .0301 Explicit</p>

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
				<p>(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.</p> <p>(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).</p> <p>(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.</p> <p>(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.</p>			
Mackerel, Spanish	SAFMC & ASMFC	FMP 1983 Amen 1-13 2004	3M .0301	<p>(a) Spanish Mackerel:</p> <p>(1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions for Spanish mackerel:</p> <p>(A) Specify areas.</p> <p>(B) Specify seasons.</p> <p>(C) Specify quantity.</p> <p>(D) Specify means/methods.</p> <p>(E) Specify size.</p> <p>(2) It is unlawful to possess</p>			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	
				<p>Spanish mackerel less than 12 inches fork length.</p> <p>(3) It is unlawful to possess more than 15 Spanish mackerel per person per day taken for recreational purposes.</p> <p>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.</p> <p>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.</p> <p>(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.</p>			
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	<p>(a) The Fisheries Director, may by proclamation, impose any or all of the following restrictions on the taking of red drum:</p> <p>(1) Specify areas.</p> <p>(2) Specify seasons.</p> <p>(3) Specify quantity.</p>	FF-47-01	<p>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:</p> <p>I. HARVEST LIMIT</p>	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. <u>See rule for species size and creels</u>		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, April 1, 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	
				<p>herring, alewife, American shad and hickory shad fisheries:</p> <p>(1) Specify size;</p> <p>(2) Specify season;</p> <p>(3) Specify area;</p> <p>(4) Specify quantity;</p> <p>(5) Specify means/methods; and</p> <p>(6) Require submission of statistical and biological data.</p> <p>e) It is unlawful to take American shad and hickory shad by any method except hook-and-line from April 15 through December 31.</p> <p>(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.</p>		<p>shad:</p> <p>I. SEASON</p> <p>The American shad harvest season in the internal Coastal and Joint fishing waters of the state, <u>excluding the Atlantic Ocean</u>, 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.</p> <p>II. RECREATIONAL HARVEST LIMITS</p> <p>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.</p>	
Sharks coastal	ASMFC (pending)& NMFS	FMP 1999 Amen #1 2003	3M .0505	<p>The Fisheries Director may, by proclamation, impose any or all of the following restrictions in the shark fishery:</p> <p>(1) Specify size;</p> <p>(2) Specify seasons;</p> <p>(3) Specify areas;</p> <p>(4) Specify quantity;</p> <p>(5) Specify means/methods; and</p> <p>(6) Require submission of</p>	FF-24-04	<p>Effective at 6:00 A.M. Monday, March 8, 2004, the harvest of sharks taken in state waters is restricted as follows:</p> <p>I. COMMERCIAL HARVEST RESTRICTIONS:</p> <p>A. Seasons:</p> <p>The possession of sharks taken for commercial purposes may only occur during an open portion</p>	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.		<p>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:.....</p> <p>B. Limits</p> <ol style="list-style-type: none"> 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 (<i>Galeocerdo cuvieri</i>), thresher (<i>Alopias vulpinus</i>), bigeye thresher (<i>Alopias superciliosus</i>), shortfin mako (<i>Isurus oxyrinchus</i>), and hammerhead species, genus (<i>Sphyrna</i>), greater than 84 inches fork length is prohibited. 4. The shark species, Atlantic sharpnose (<i>Rhizoprionodon terraenovae</i>) is exempt from these harvest and size restrictions. 5. Smooth dogfish (<i>Mustelis canis</i>) 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	
						<p>the season, harvest and size restrictions listed above.</p> <p>6. Spiny dogfish (<i>Squalus acanthias</i>) seasons and harvest limits are established under the Mid-Atlantic/New England Council Spiny Dogfish Fishery Management Plan or the ASMFC Spiny Dogfish FMP.</p> <p>7. All sharks not retained must be returned to the water in a manner to ensure the highest likelihood of survival.</p> <p>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.</p> <p>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.</p> <p>II. RECREATIONAL PURPOSES AND HOOK-AND-LINE POSSESSION LIMITS:</p> <p>A. The possession of any shark species, excluding smooth dogfish (<i>Mustelus canis</i>), and spiny dogfish (<i>Squalus acanthias</i>), is limited to one (1) shark per vessel per day, for vessels other than charter and head boat vessels for hire.</p>	

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						<p>B. The possession limit for charter and head boat vessels, excluding smooth dogfish (<i>Mustelus canis</i>), and spiny dogfish (<i>Squalus acanthias</i>), 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.</p> <p>C. If no vessel is involved, the possession limit is one (1) shark per person per day.</p> <p>D. All sharks except Atlantic sharpnose (<i>Rhizoprionodon terraenovae</i>), smooth dogfish, and spiny dogfish must be a minimum size of 54 inches fork length.</p> <p>E. The possession of all sharks, except for tiger (<i>Galeocerdo cuvieri</i>), thresher (<i>Alopias vulpinus</i>), bigeye thresher (<i>Alopias superciliosus</i>), shortfin mako (<i>Isurus oxyrinchus</i>) and hammerhead species, genus (<i>Sphyrna</i>), greater than 84 inches fork length is prohibited.</p> <p>F. Any shark retained must have head, tail, and fins intact with the carcass through the point of landing.</p> <p>G. All sharks not retained must be returned to the water in a manner to ensure the highest likelihood of survival.</p> <p>III. PROHIBITED SPECIES:</p> <p>Possession of the following shark species is prohibited in state waters: basking (<i>Cetorhinus</i></p>	

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	
				<p>from the Atlantic Ocean in a commercial fishing operation <u>See Rule for license to land flounder, and gear restrictions</u></p> <p>(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.</p> <p>(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:</p> <p>(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.</p>	<p>FF-10-07 set internal at 14 comm & rec</p> <p>FF-24-07</p>	<p>following restrictions will apply to the taking of flounder for recreational purposes from the Atlantic Ocean:</p> <p>I. A. MINIMUM SIZE LIMIT</p> <p>No person may possess flounder <u>less than 14½ inches</u> total length taken from the Atlantic Ocean for recreational purposes.</p> <p>POSSESSION LIMIT</p> <p>It is unlawful to possess more than 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.</p> <p>effective at 12:01 A.M., Friday, March 2, 2007, the following restrictions shall apply to the commercial flounder fishery:</p> <p>I. HARVEST LIMITS</p> <p>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</p>	<p>G.S 113-221.1 Suspend Rule</p>

Species	Federal	Federal Plan, Amendments or Addendum	State Actions to Implement Compliance Requirements				Comply Venue Authority
			Rule(s)	Measures	Proc(s) Example	Measures	
						<p>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.</p> <p>Plus permits, reporting</p>	
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	<p>(b) Weakfish (gray trout).</p> <p>(1) The Fisheries Director may, by proclamation, impose any or all of the following restrictions on the taking of weakfish by commercial fishing operations:</p> <p>(A) Specify areas.</p> <p>(B) Specify seasons.</p> <p>(C) Specify quantity.</p> <p>(D) Specify means/methods.</p> <p>(E) Specify size, but the minimum size shall not be greater than 12 inches total length.</p> <p>(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</p>	FF-24-06	<p>effective at 12:00 Noon, Friday, March 17, 2006, the following restrictions will apply to the commercial weakfish fishery:</p> <p>I. COMMERCIAL FISHING OPERATIONS, EXCLUDING HOOK-AND-LINE, SIZE LIMITS:</p> <p>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.</p> <p>B. From April 1 through</p>	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	
				<p>following restrictions on the taking of weakfish by hook-and-line or for recreational purposes:</p> <p>(A) Specify quantity.</p> <p>(B) Specify size.</p>		<p>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.</p> <p>GEAR RESTRICTIONS:</p> <p>A. GILL NETS:</p> <p>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.</p> <p>B. FLYNETS:</p> <p>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:.....</p> <p>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</p>	

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^o~~

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 (e) 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 by 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, Reddick 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 Interjurisdictional 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.

DRAFT – NCMFC Review and approval for public comment August 2015
All parts of this document are subject to change until final adoption

North Carolina
Kingfish
Fishery Management Plan

Information Update

By

North Carolina Department of Environment and Natural Resources

Division of Marine Fisheries
3441 Arendell Street
Post Office Box 769
Morehead City, N.C. 28557

August 2015

August 2013
July 2015

Timeline begins
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

1.0	ACKNOWLEDGMENTS.....	ii
2.0	FISHERIES MANAGEMENT PLAN, AMENDMENTS, AND UPDATES.....	iii
3.0	TABLE OF CONTENTS.....	iv
3.1	LIST OF TABLES.....	vii
3.2	LIST OF FIGURES.....	x
3.3	LIST OF ACRONYMS.....	xv
4.0	EXECUTIVE SUMMARY.....	1
5.0	INTRODUCTION.....	3
5.1	RECOMMENDED MANAGEMENT PROGRAM.....	3
5.1.1	Management Authority.....	3
5.1.2	Goal and Objectives.....	4
5.1.3	Definition of Management Unit and Unit Stock.....	5
5.1.4	Sustainable Harvest.....	5
5.1.5	Management Strategy.....	5
5.1.6	Research Needs.....	5
5.2	GENERAL PROBLEM(S) STATEMENT.....	7
5.2.1	Update to Management Framework for North Carolina Kingfish Stock.....	7
5.3	EXISTING PLANS, STATUTES, AND RULES.....	8
5.3.1	Plans.....	8
5.3.2	Statutes.....	8
5.3.3	Marine Fisheries Commission Rules.....	9
5.3.4	Kingfish Rules and Regulations Outside North Carolina.....	9
5.3.5	Federal Regulations.....	9
6.0	STATUS OF THE STOCK.....	10
6.1	GENERAL LIFE HISTORY.....	10
6.1.1	Background.....	10
6.1.2	Physio-chemical Tolerances and Preferences.....	10
6.1.3	Reproductive Biology.....	12
6.1.4	Age, Growth, and Development.....	18
6.1.5	Movements and Migrations.....	23
6.2	PRESENT STOCK STATUS.....	24
7.0	STATUS OF THE FISHERIES.....	26
7.1	COMMERCIAL FISHERY.....	26
7.1.1	Collection of Commercial Statistics.....	26
7.1.2	Annual Landings and Value.....	26
7.1.3	Landings by Season.....	27
7.1.4	Landings by County.....	28
7.1.5	Landings by Waterbody.....	28
7.1.6	Landings by Gear.....	29
7.1.7	Bycatch Associated with Commercial Catches.....	47
7.2	RECREATIONAL FISHERY.....	57
7.2.1	Recreational Fishing Data Collection.....	58
7.2.2	Marine Recreational Information Program.....	59
7.2.3	Recreational Commercial Gear License.....	71
8.0	PROTECTED SPECIES.....	73
8.1	BACKGROUND.....	73
8.2	PROTECTED SPECIES LEGISLATION.....	73

DRAFT – NCMFC Review and approval for public comment August 2015

All parts of this document are subject to change until final adoption

8.2.1	Federal Endangered Species Act.....	73
8.2.2	Marine Mammal Protection Act	74
8.2.3	Migratory Bird Treaty Act.....	74
8.2.4	North Carolina Endangered Species Act.....	75
8.3	SPECIES.....	76
8.3.1	Protected Species Interactions in the Kingfish Fishery	77
8.3.2	Bottlenose Dolphin	77
8.3.3	Shortnose Sturgeon.....	78
8.3.4	Atlantic Sturgeon	78
8.3.5	Sea Turtles	79
8.3.6	Diamondback Terrapins	81
8.3.7	Birds	83
8.4	NORTH CAROLINA DIVISION OF MARINE FISHERIES PROGRAMS	83
9.0	PRIVATE CULTURE, AQUACULTURE, AND STOCK ENHANCEMENT	92
9.1	PRIVATE CULTURE	92
9.2	AQUACULTURE	92
9.2.1	North Carolina Department of Agriculture and Consumer Services and Board of Agriculture Authority	92
9.2.2	North Carolina Wildlife Resources Commission Authority.....	93
9.2.3	Division of Marine Fisheries and the Marine Fisheries Commission Authority.....	93
9.3	STOCK ENHANCEMENT	94
10.0	SOCIOECONOMIC STATUS OF THE KINGFISH FISHERY	95
10.1	ECONOMIC ASPECTS OF THE COMMERCIAL FISHERY	95
10.1.1	Ex-vessel Value and Price.....	95
10.1.2	Gear and Price	98
10.1.3	Waterbodies	100
10.1.4	Participants and Effort	102
10.1.5	Economic Impact of the Commercial Fishery	106
10.2	ECONOMIC ASPECTS OF THE RECREATIONAL FISHERY	107
10.3	SOCIAL ASPECTS OF THE FISHERY	108
10.3.1	Commercial Fishery.....	108
10.3.2	Recreational Fishery.....	111
11.0	ENVIRONMENTAL FACTORS	115
11.1	HABITAT	115
11.1.1	Water Column.....	115
11.1.2	Soft Bottom.....	116
11.1.3	Submerged Aquatic Vegetation.....	122
11.1.4	Hard Bottom	124
11.1.5	Wetlands.....	124
11.2	WATER QUALITY DEGRADATION.....	125
11.2.1	Nutrients	127
11.2.2	Oxygen Depletion	127
11.2.3	Sedimentation and Turbidity	128
11.2.4	Toxic Chemicals	129
11.3	HABITAT AND WATER QUALITY PROTECTION.....	130
11.3.1	North Carolina Marine Fisheries Commission Authority	130
11.3.2	Authority of Other Agencies.....	130
11.3.3	Coastal Habitat Protection Plan.....	131
11.4	STATUS OF 2007 HABITAT RECOMMENDATIONS.....	132
12.0	PRINCIPAL ISSUES AND MANAGEMENT OPTIONS.....	133
12.1	SUMMARY OF MANAGEMENT ACTIONS	133

	12.1.1 Rules	133
	12.1.2 Legislative Action.....	133
13.0	RECOMMENDED MANAGEMENT STRATEGIES AND RESEARCH RECOMMENDATIONS	134
13.1	MANAGEMENT STRATEGIES.....	134
13.2	SUMMARY OF RESEARCH RECOMMENDATIONS.....	134
	13.2.1 Management Related Research Needs	134
	13.2.2 Biological Research Needs	135
	13.2.3 Social and Economic Research Needs	135
13.3	REVIEW CYCLE	135
14.0	LITERATURE CITED	136
15.0	APPENDICES	157
	15.1 APPENDIX 1. EVALUATION OF MANAGEMENT TRIGGERS FOR KINGFISH ..	157
	15.2 APPENDIX 2. SOLICITATION OF PUBLIC COMMENT ON KINGFISH ISSUES .	172

3.1 LIST OF TABLES

Table 2.1	The Marine Fisheries Commission selected management strategies, objectives followed, and required actions in the 2007 Kingfish Fishery Management Plan.	iii
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).	15
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).	21
Table 6.3	Estimated parameter values of the von Bertalanffy age-length model fit to kingfish data, 1997–2013 (Source: NCDMF, unpublished data).	21
Table 6.4	Published length-weight*relationships for the three Atlantic Coast kingfish species.	22
Table 7.1	North Carolina commercial landings of kingfishes (lb) by gear, 1962–2013 (Source: NMFS/NCTTP, unpublished data).	30
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). Top five species rankings are in parentheses.	49
Table 7.3	Comparison of kingfish landings from shrimp trawls with and without shrimp landings, 1994–2013 (Source: NCTTP, unpublished data).	50
Table 7.4	Kingfish data for control nets from gear testing conducted in North Carolina in 1994 (Source: McKenna et al. 1996).	52
Table 7.5	North Carolina southern kingfish recreational harvest, 1989–2013 (Source: MRIP).	63
Table 7.6	Southern kingfish recreational harvest by state, 1989–2013 (Source: MRIP).	64
Table 7.7	North Carolina Gulf kingfish recreational harvest, 1989–2013 (Source: MRIP).	66
Table 7.8	Gulf kingfish recreational harvest by state, 1989–2013 (Source: MRIP).	67
Table 7.9	North Carolina northern kingfish recreational harvest and releases, 1989–2013 (MRIP).	69
Table 7.10	North Carolina recreational northern kingfish harvest, 1989–2013 (Source: MRIP).	70

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).....	72
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).	97
Table 10.2	Landings, nominal ex-vessel value, and average nominal price per pounds for kingfish by gear, 1994–2013 (Source: NCTTP, unpublished data).	99
Table 10.3	Nominal ex-vessel value of commercial kingfish landings by waterbody, 1994–2013 (Source: NCTTP, unpublished data).	101
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).	102
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).	103
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).	105
Table 10.7	Number of seafood dealers reporting kingfish landings by county in North Carolina, 1994–2013 (Source: NCTTP, unpublished data).	106
Table 10.8	Economic impacts associated with commercial landings of kingfish in North Carolina, 2013.	106
Table 10.9	Economic impacts associated with directed recreational fishing trips for kingfish, 2013.	107
Table 10.10	Demographic and fishing characteristics of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).	109
Table 10.11	Communities of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).	109
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).	111
Table 10.13	Demographic and fishing characteristics of survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).	112

DRAFT – NCMFC Review and approval for public comment August 2015
All parts of this document are subject to change until final adoption

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).....	113
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).....	114
Table 11.1	Storm damage reduction projects permitted or in the planning stages.	121

3.2 LIST OF FIGURES

Figure 6.1	The percent of southern kingfish females mature by size, 1997–2013, n = 2,076 (Source: NCDMF, unpublished data).	12
Figure 6.2	The percent of Gulf kingfish females mature by size, 1997–2013, n = 426 (Source: NCDMF, unpublished data).	13
Figure 6.3	The percent of northern kingfish females mature by size, 1997–2013, n = 273 (Source: NCDMF, unpublished data).	13
Figure 6.4	The percent mature at age for female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).	14
Figure 6.5	The percentage of female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).	15
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).	16
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).	17
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).	18
Figure 6.9	Larval and juvenile southern kingfish with a key to morphological characters.	19
Figure 6.10	Adult southern kingfish with a key to morphological characters.	19
Figure 6.11	Adult Gulf kingfish with a key to morphological characters.	20
Figure 6.12	Adult northern kingfish with a key to morphological characters.	20
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.	27
Figure 7.2	Percent of total landings and trips for kingfishes in North Carolina by month, 1994–2013 (Source: NCDMF, unpublished data).	27
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.	28
Figure 7.4	North Carolina landings of kingfishes by waterbody, 1962–2013 (Source: NCDMF, unpublished data).	29

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.	31
Figure 7.6	Percent of North Carolina kingfish landings by gear, 1994–2013 (Source: NCDMF, unpublished data).	31
Figure 7.7	North Carolina commercial landings (lb) and trips for kingfishes from the commercial gill net fishery, 1994–2013 (Source: NCTTP, unpublished data).	32
Figure 7.8	Percent of commercial gill net landings of kingfishes in North Carolina by month, 1994–2013 (Source: NCTTP, unpublished data).	32
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).	33
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.	34
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.	35
Figure 7.12	North Carolina landings (lb) and trips with kingfishes from the commercial shrimp trawl fishery, 1994–2013 (Source: NCTTP, unpublished data).	36
Figure 7.13	Percent of kingfishes in commercial shrimp trawl from North Carolina by month and waterbody, 1994–2013 (Source: NCTTP, unpublished data).	37
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).	38
Figure 7.15	North Carolina commercial shrimp trawl landings of kingfishes by county, 1994–2013 (Source: NCTTP, unpublished data).	38
Figure 7.16	Percent of kingfishes in North Carolina from the three dominant gears, 1972–2013 (Source: NCTTP, unpublished data).	39
Figure 7.17	North Carolina landings (lb) and trips for kingfishes from the fish trawl fishery, 1994–2013 (Source: NCTTP, unpublished data).	40
Figure 7.18	Percent of fish trawl landings of kingfishes in North Carolina by month, 1994–2013 (Source: NCTTP, unpublished data).	40
Figure 7.19	Fish trawl landings of kingfishes in North Carolina by county, 1994–2013 (Source: NCTTP, unpublished data).	41

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).	41
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.	42
Figure 7.22	North Carolina landings (lb) and trips for kingfishes from the seine fishery, 1994–2013 (Source: NCTTP, unpublished data).	43
Figure 7.23	Percent of kingfishes in seines from North Carolina by month and waterbody, 1994–2013 (Source: NCTTP, unpublished data).	44
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).	44
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.	46
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.	47
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).	53
Figure 7.28	Recreational and commercial Landings for North Carolina for all kingfishes in North Carolina, 1989–2013 (Source: MRIP).	59
Figure 7.29	North Carolina recreational kingfish landings, 1989–2013 (Source: MRIP) and citations, 1991–2013 (Source: NC Saltwater Fishing Tournament).	60
Figure 7.30	North Carolina recreational harvest (pounds) of the three kingfish species, 1989–2013 (Source: MRIP).	60
Figure 7.31	Species composition of coastal ocean captured kingfishes, 1989–2013 (Source: MRIP).	61
Figure 7.32	Species composition of kingfishes captured in estuarine waters of North Carolina, 1989–2013 (Source: MRIP).	61
Figure 7.33	North Carolina total length frequency of all kingfishes sampled from the recreational fishery, 1989–2013 (Source: MRIP).	62
Figure 7.34	North Carolina Kingfish catch-per-unit-effort (CPUE), 1989–2013 (Source: MRIP).	62
Figure 7.35	Southern kingfish landings (lb) by area and mode, 1989–2013 (Source: MRIP).	64

Figure 7.36	Unweighted length frequencies of North Carolina ocean and estuarine caught southern kingfish, 1989–2013 (Source: MRIP).....	65
Figure 7.37	North Carolina harvest of southern kingfish (lb) by wave, 1989 – 2013 (Source: MRIP).....	65
Figure 7.38	North Carolina Gulf kingfish landings (lb) by area and by mode, 1989–2013 (Source: MRIP).....	67
Figure 7.39	Unweighted length frequencies of North Carolina ocean and estuarine caught Gulf kingfish, 1989–2013 (Source: MRIP).....	68
Figure 7.40	North Carolina Gulf kingfish catch by wave, 1989–2013 (Source: MRIP).	68
Figure 7.41	North Carolina northern kingfish landings (lb) by area and mode, 1989–2013 (Source: MRIP).....	70
Figure 7.42	Unweighted length frequencies of North Carolina ocean and estuarine caught northern kingfish, 1989–2013 (Source: MRIP).	71
Figure 7.43	North Carolina northern kingfish harvest by wave, 1989–2013 (Source: MRIP).	71
Figure 8.1	Map of Sea Turtle Management Units for North Carolina’s estuarine waters in Incidental Take Permit #16230.....	88
Figure 8.2.	Atlantic Sturgeon Management Units for North Carolina’s estuarine waters in Incidental Take Permit #18102.....	90
Figure 10.1	Ex-vessel value of kingfish landings in North Carolina, 1972–2013 (Source: NCTTP, unpublished data).	95
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).	96
Figure 10.3	Percent of total annual commercial kingfish harvest value by waterbody, 1994–2013 (Source: NCTTP, unpublished data).	100
Figure 10.4	Number of commercial participants and seafood dealers reporting kingfish landings in North Carolina, 1994–2013 (Source: NCTTP, unpublished data).	104
Figure 10.5	Reported conflicts of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).	110
Figure 10.6	Reported conflicts of survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).	113
Figure 11.1	Areas prohibited to dredging or trawling in northern coastal waters of North Carolina.	118

Figure 11.2	Areas prohibited to dredging or trawling in central coastal waters of North Carolina.	119
Figure 11.3	Areas prohibited to dredging or trawling in southern coastal waters of North Carolina.	119

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.

DRAFT – NCMFC Review and approval for public comment August 2015
All parts of this document are subject to change until final adoption

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 Carolina 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).

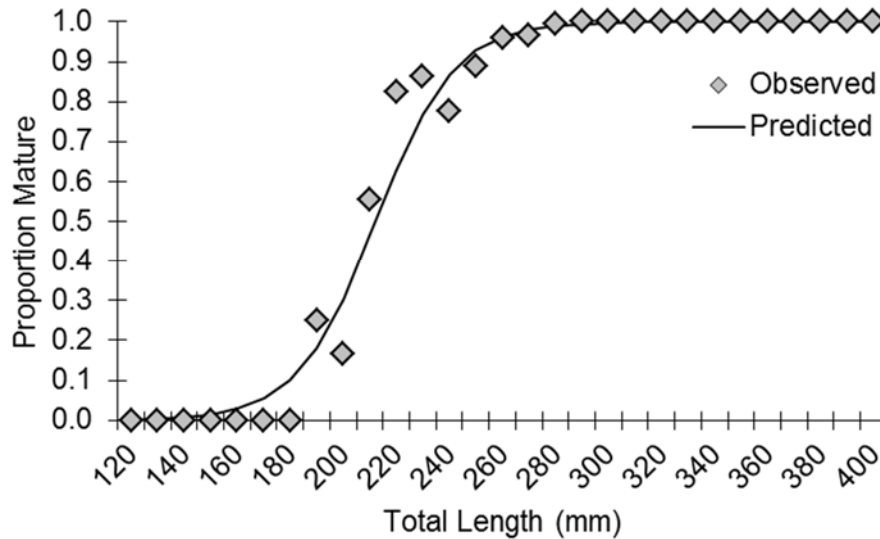


Figure 6.1 The percent of southern kingfish females mature by size, 1997–2013, n = 2,076 (Source: NCDMF, unpublished data).

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).

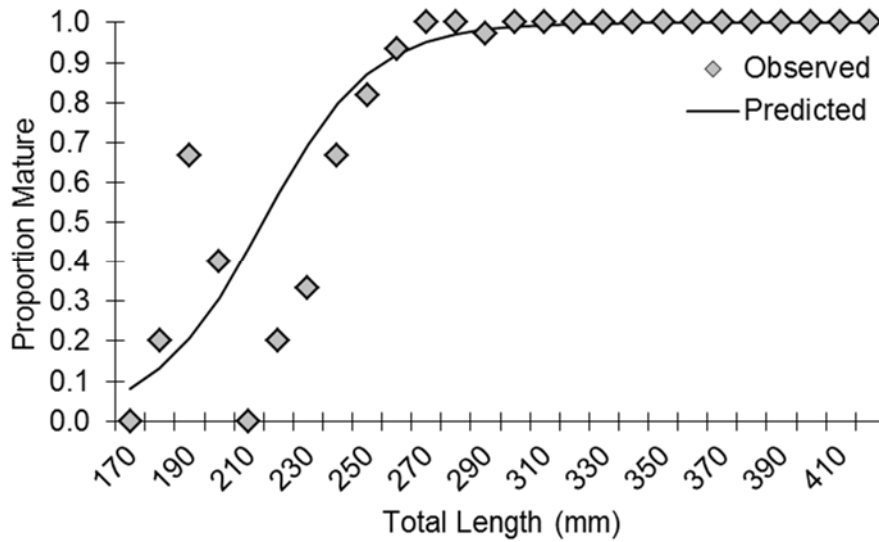


Figure 6.2 The percent of Gulf kingfish females mature by size, 1997–2013, n = 426 (Source: NCDMF, unpublished data).

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).

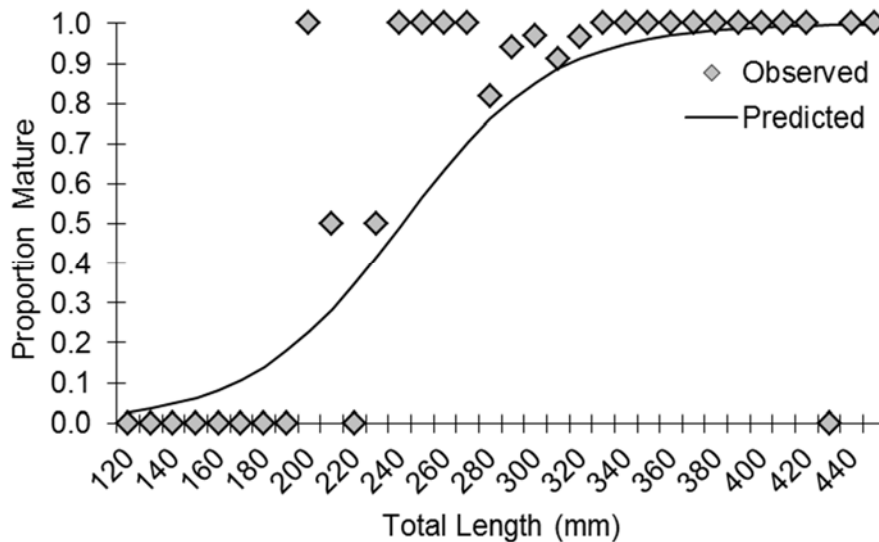


Figure 6.3 The percent of northern kingfish females mature by size, 1997–2013, n = 273 (Source: NCDMF, unpublished data).

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.

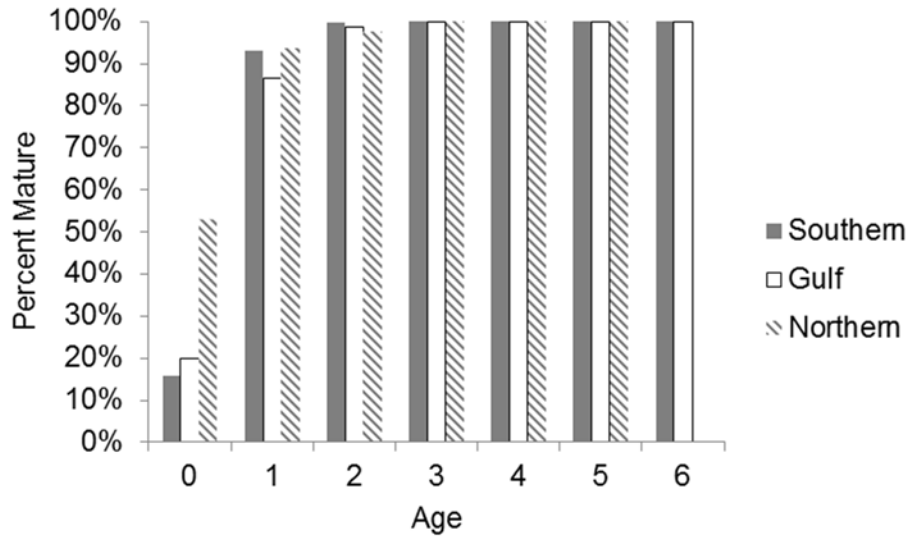


Figure 6.4 The percent mature at age for female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).

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).

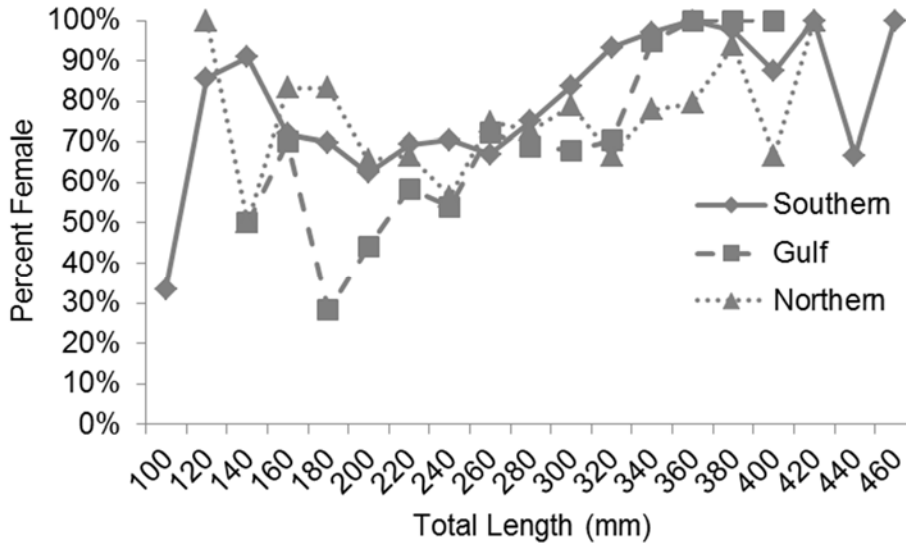


Figure 6.5 The percentage of female southern, Gulf, and northern kingfishes, 1997–2013 (Source: NCDMF, unpublished data).

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).

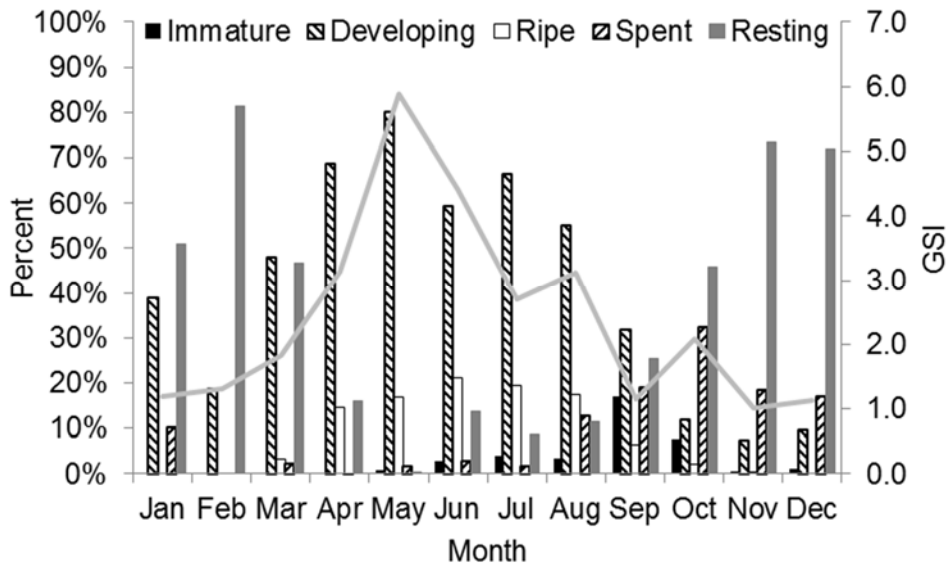


Figure 6.6 The percent of southern kingfish females in the five stages of reproductive development (n = 2,076) and gonadosomatic index (GSI) by month, 1997–2013 (Source: NCDMF, unpublished data).

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 and immature 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.

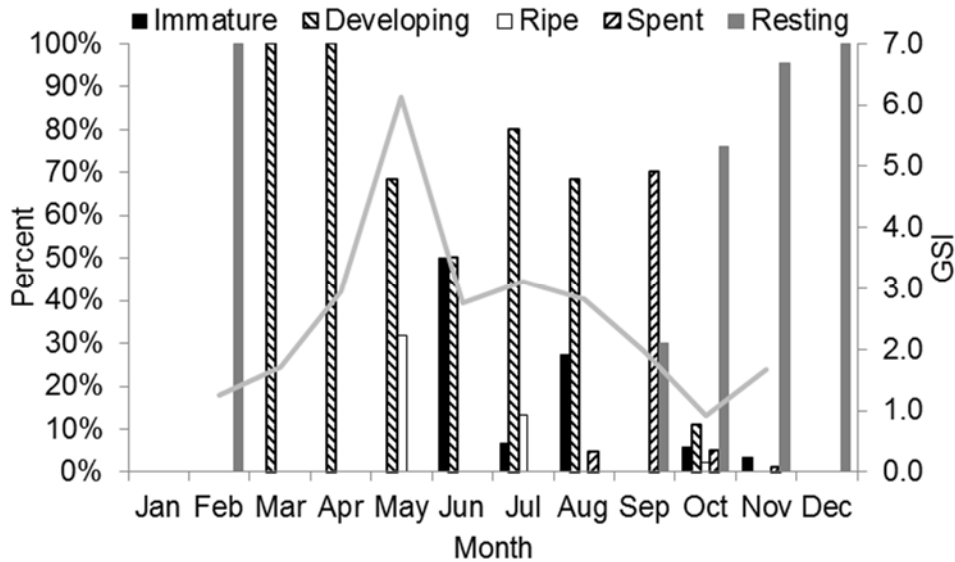


Figure 6.7 The percent of Gulf kingfish females in the five stages of reproductive development (n = 426) and gonadosomatic index (GSI) by month, 1997–2013 (Source: NCDMF, unpublished data).

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).

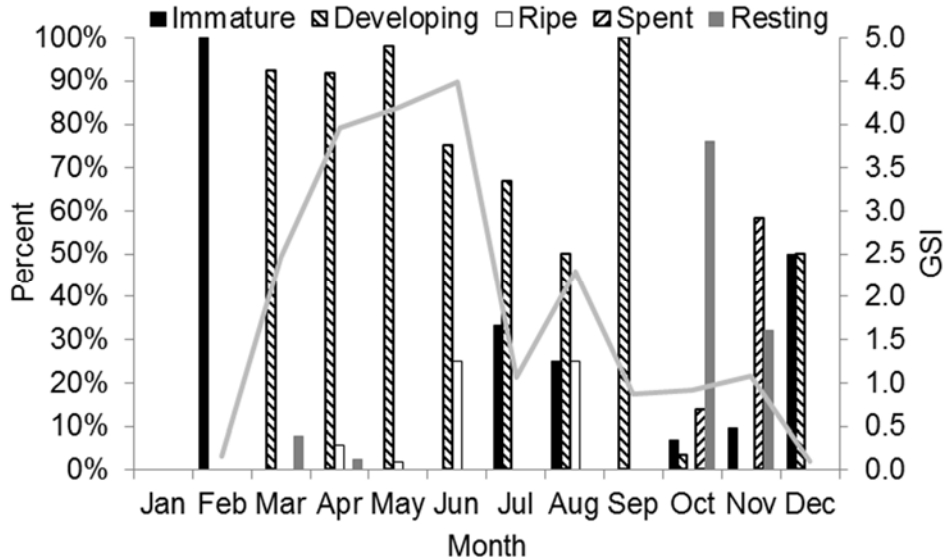


Figure 6.8 The percent of northern kingfish females in the five stages of reproductive development (n = 273) and gonadosomatic index (GSI) by month, 1997–2013 (Source: NCDMF, unpublished data).

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.

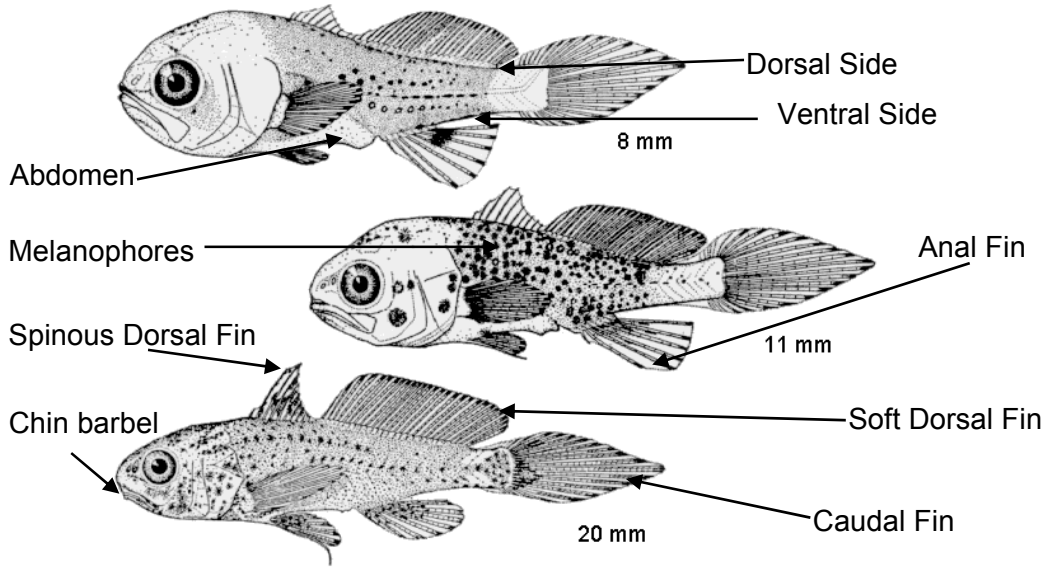


Figure 6.9 Larval and juvenile southern kingfish with a key to morphological characters.

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 to 11 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).

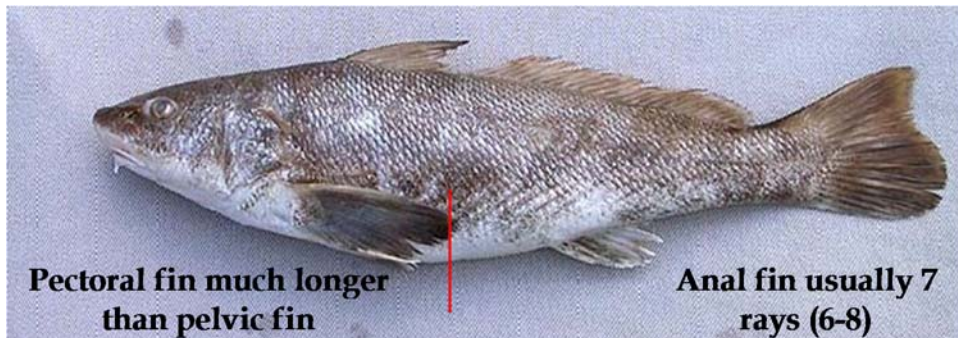


Figure 6.10 Adult southern kingfish with a key to morphological characters.

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.

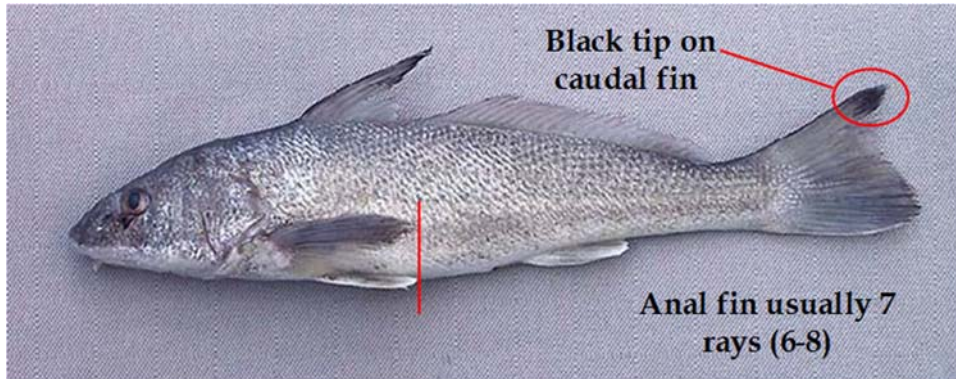


Figure 6.11 Adult Gulf kingfish with a key to morphological characters.

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.

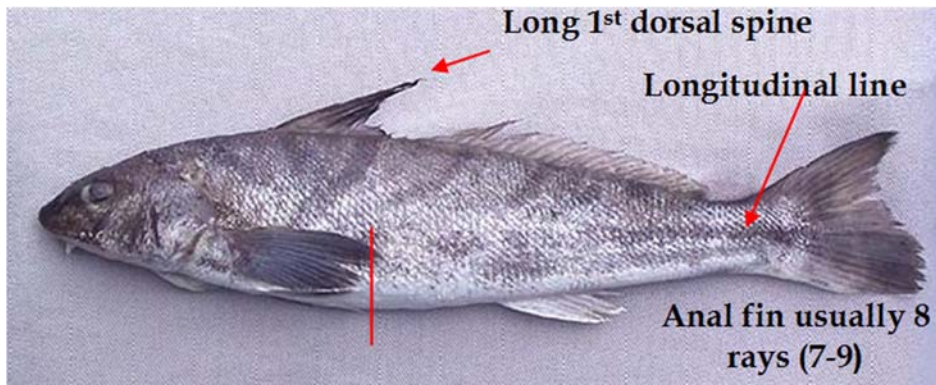


Figure 6.12 Adult northern kingfish with a key to morphological characters.

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).

Age	Southern				Gulf				Northern			
	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.

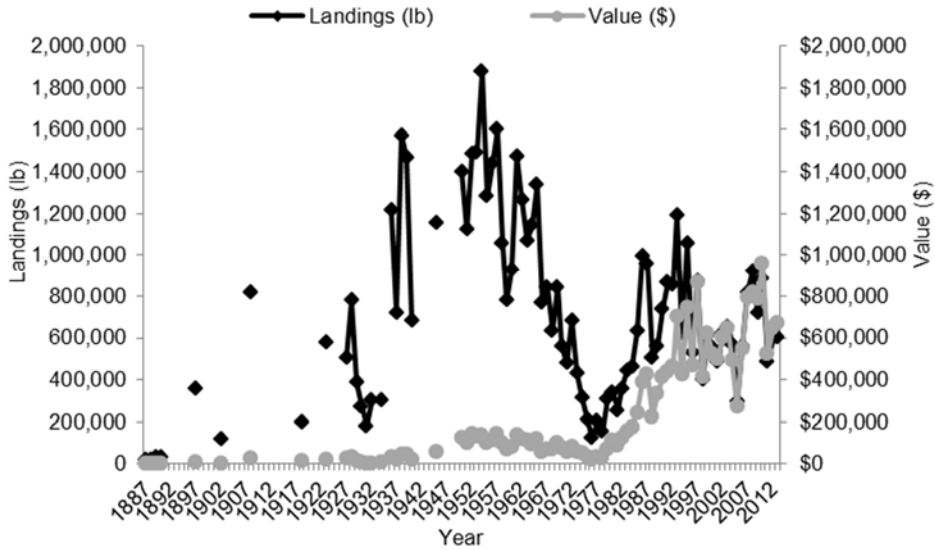


Figure 7.1 North Carolina commercial landings (lb) and dock side value (\$) of kingfishes, 1887–2013 (Source: NMFS/NCDMF, unpublished data). Prior to 1950 data were not reported in every year.

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).

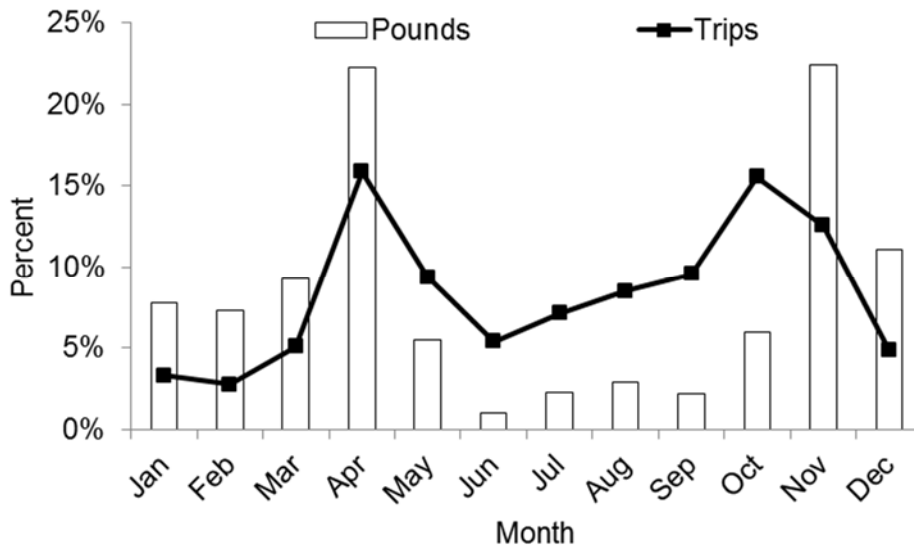


Figure 7.2 Percent of total landings and trips for kingfishes in North Carolina by month, 1994–2013 (Source: NCDMF, unpublished data).

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.

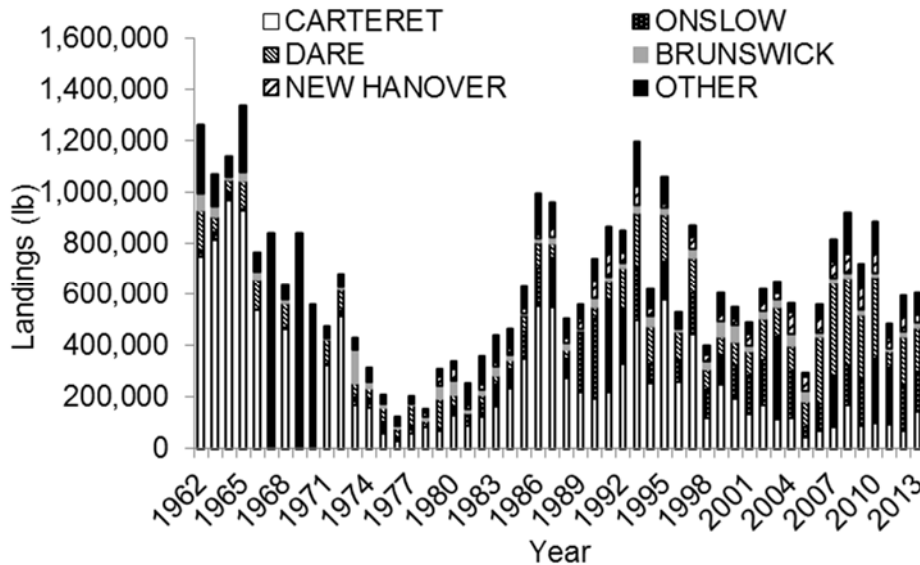


Figure 7.3 North Carolina landings of kingfishes by county of landing, 1962–2013 (Source: NCDMF, unpublished data). Landings by county are not available in 1967, 1969, and 1970.

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.

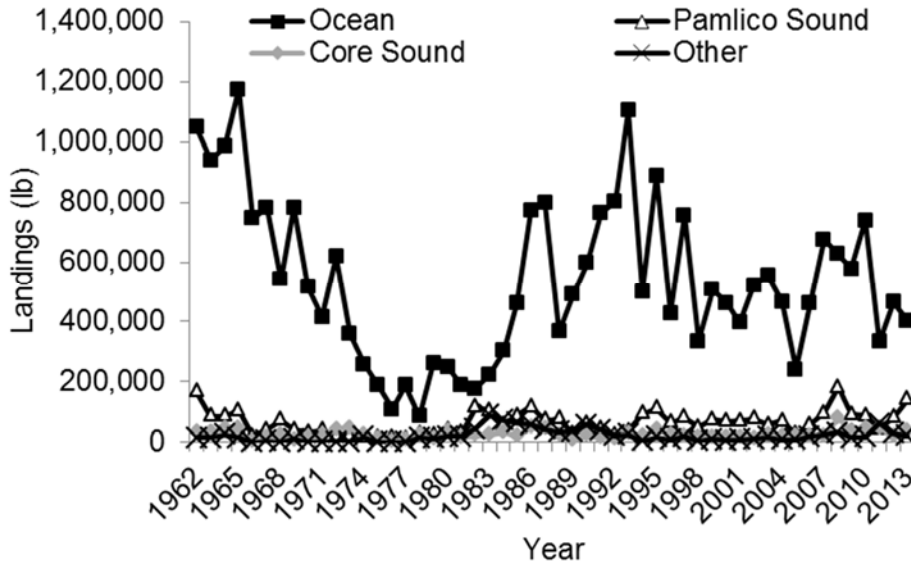


Figure 7.4 North Carolina landings of kingfishes by waterbody, 1962–2013 (Source: NCDMF, unpublished data).

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.

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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.

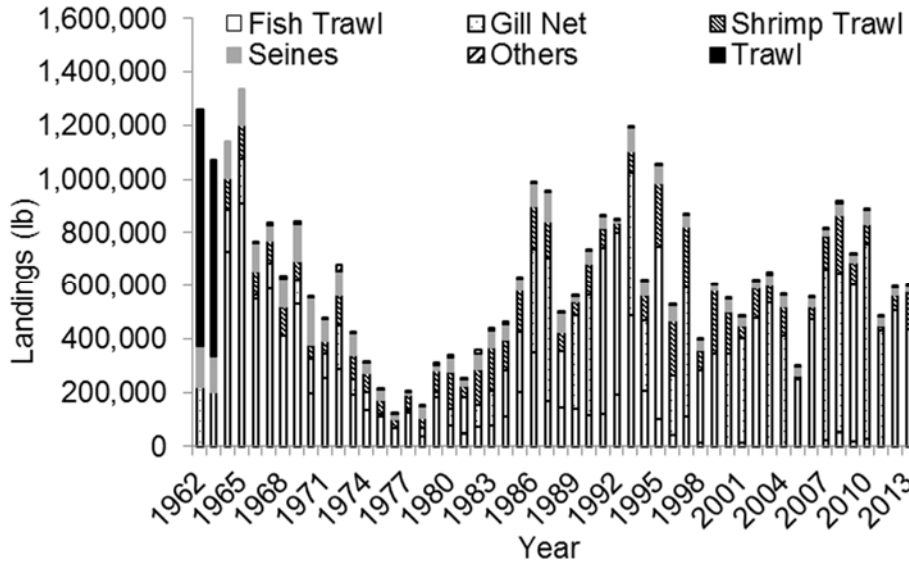


Figure 7.5 North Carolina landings of kingfishes (lb) by gear, 1962–2013 (Source: NCDMF, unpublished data). The trawl fisheries were not distinguished between shrimp and fish trawls in 1962 and 1963.

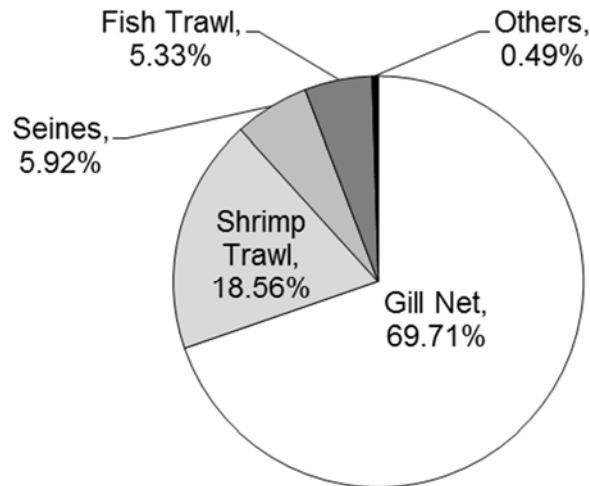


Figure 7.6 Percent of North Carolina kingfish landings by gear, 1994–2013 (Source: NCDMF, unpublished data).

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).

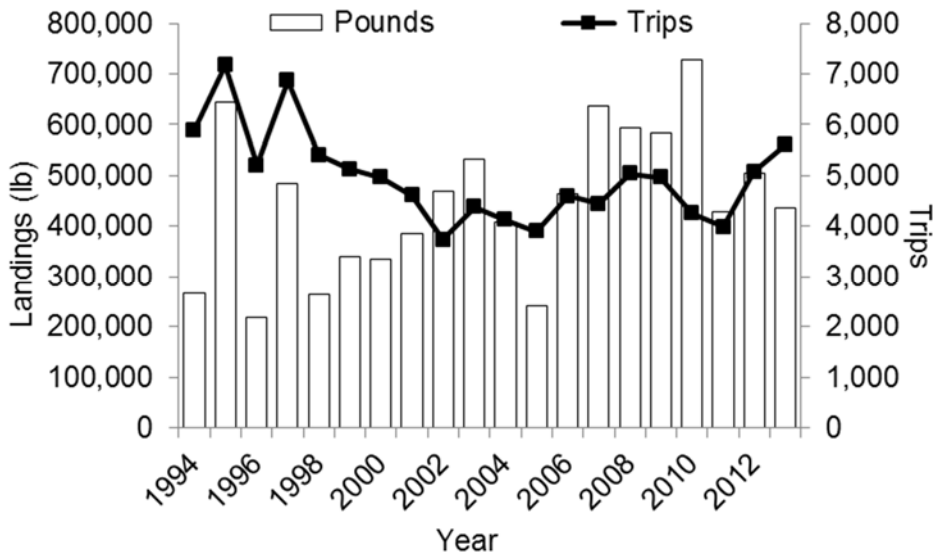


Figure 7.7 North Carolina commercial landings (lb) and trips for kingfishes from the commercial gill net fishery, 1994–2013 (Source: NCTTP, unpublished data).

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.

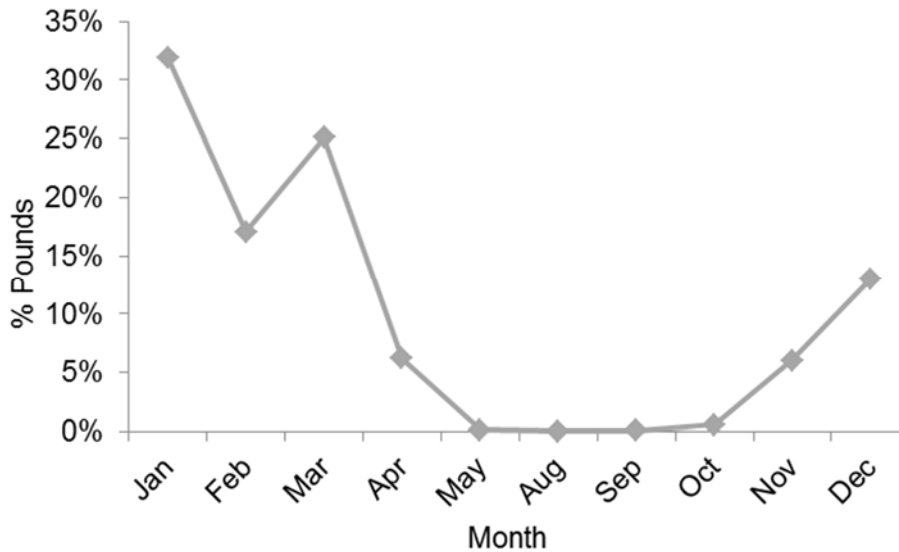


Figure 7.8 Percent of commercial gill net landings of kingfishes in North Carolina by month, 1994–2013 (Source: NCTTP, unpublished data).

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).

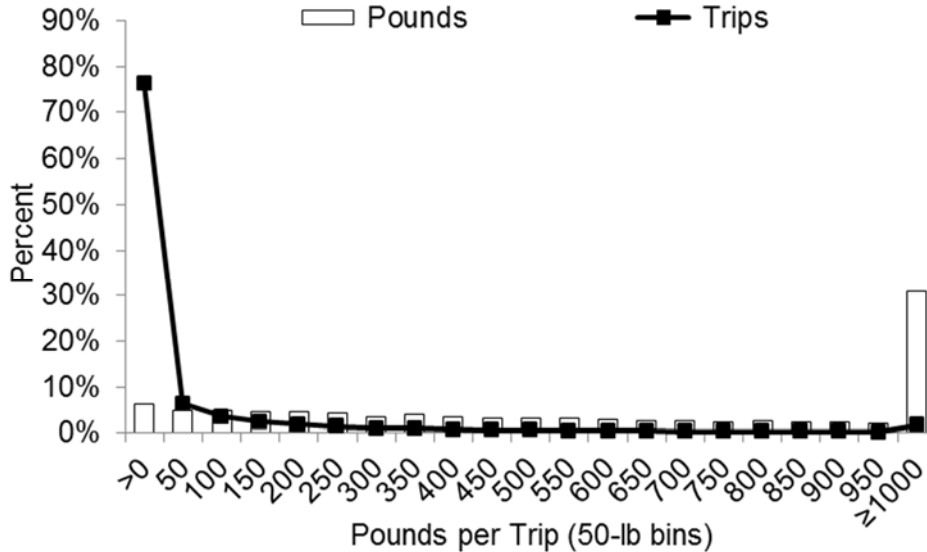


Figure 7.9 North Carolina landings (lb) and trips of kingfishes from the commercial gill net fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

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).

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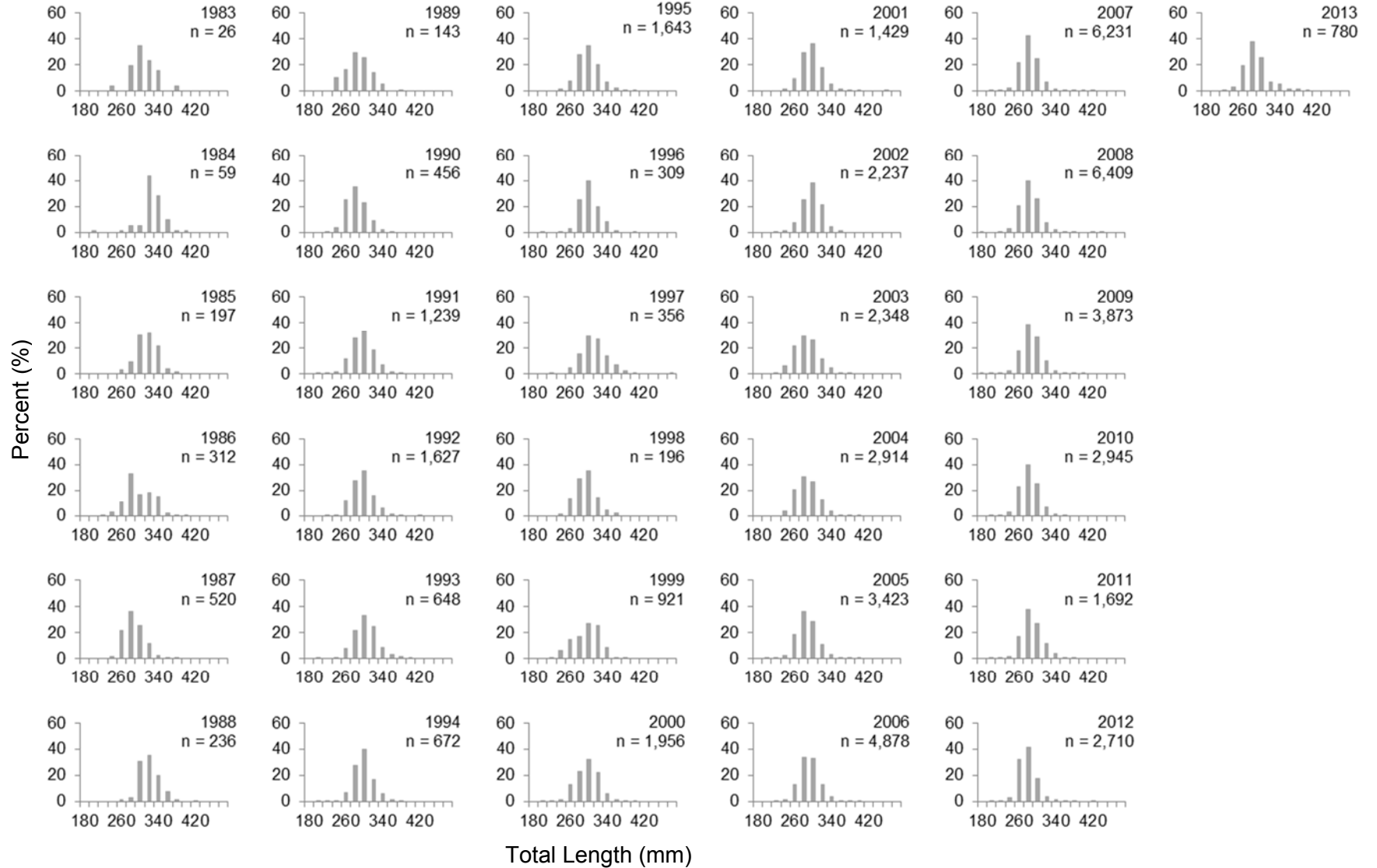


Figure 7.10 Length distributions for kingfish sampled from the commercial ocean gill net fishery, 1983–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

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.

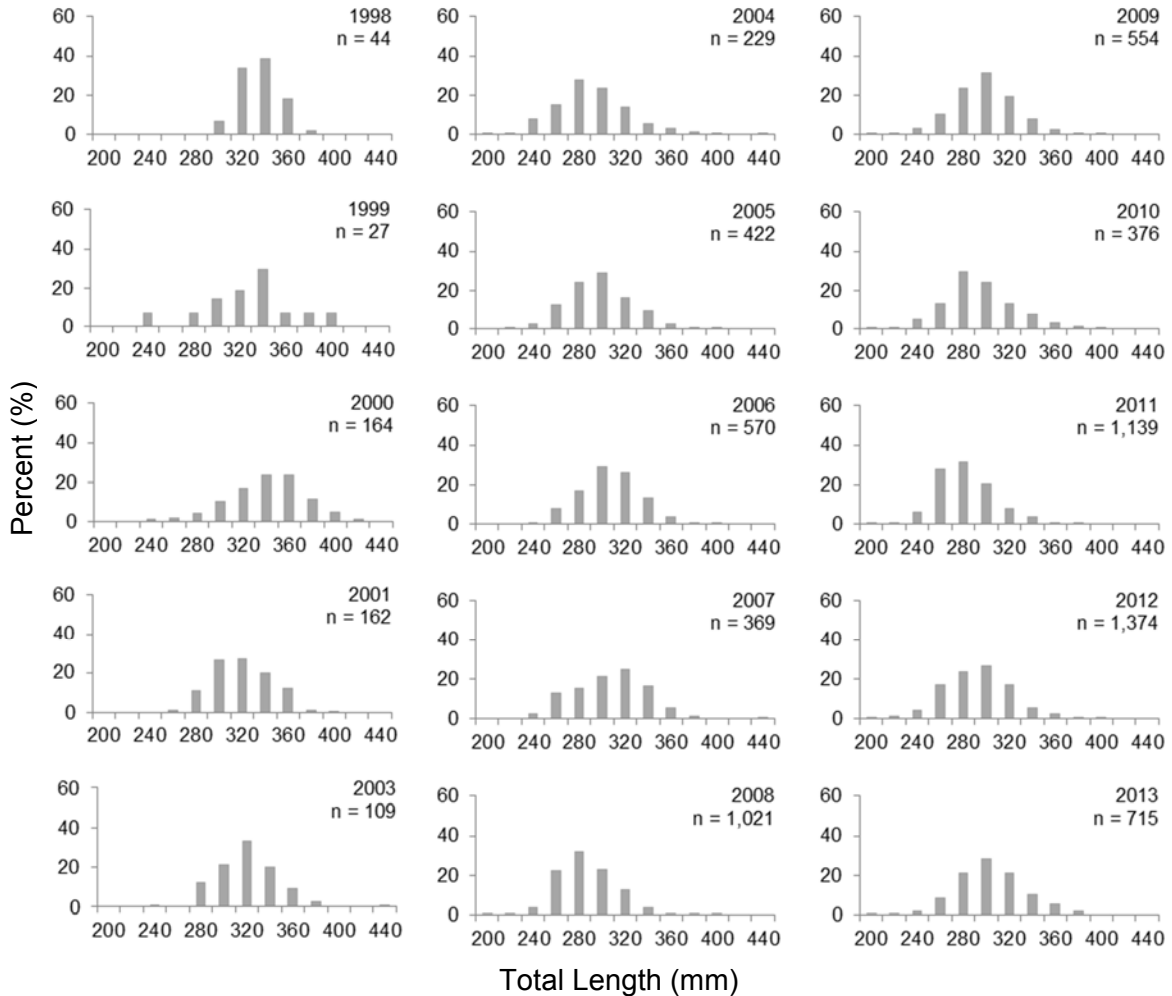


Figure 7.11 Length distributions for kingfish sampled from the commercial estuarine gill net fishery, 1998–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

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.

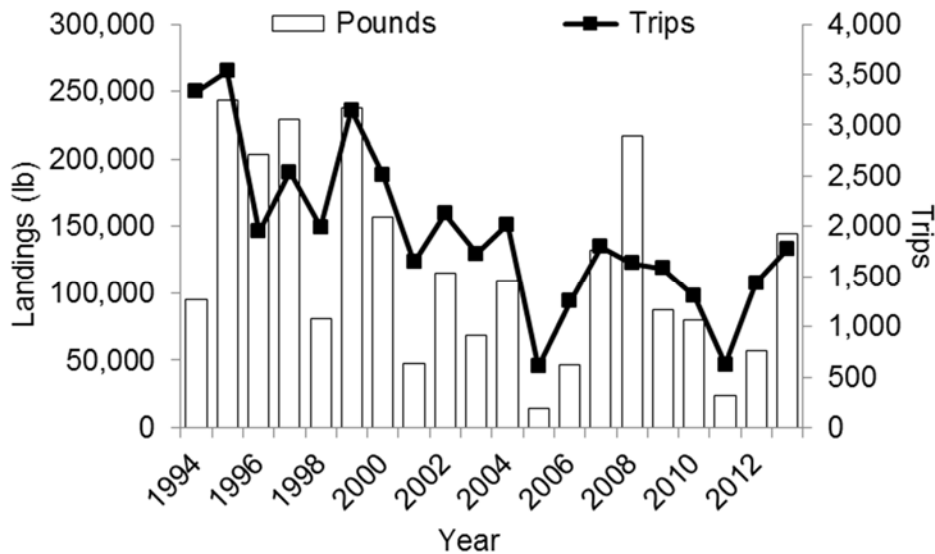


Figure 7.12 North Carolina landings (lb) and trips with kingfishes from the commercial shrimp trawl fishery, 1994–2013 (Source: NCTTP, unpublished data).

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).

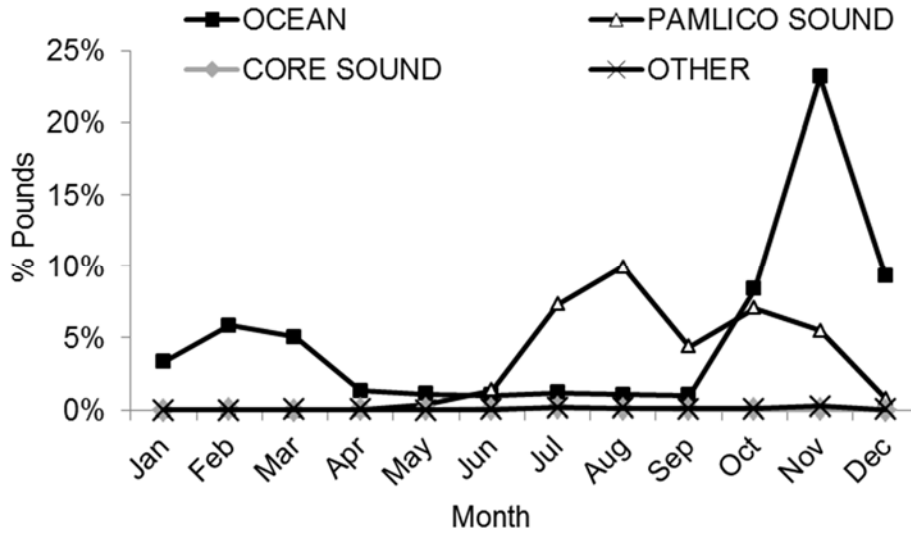


Figure 7.13 Percent of kingfishes in commercial shrimp trawl from North Carolina by month and waterbody, 1994–2013 (Source: NCTTP, unpublished data).

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.

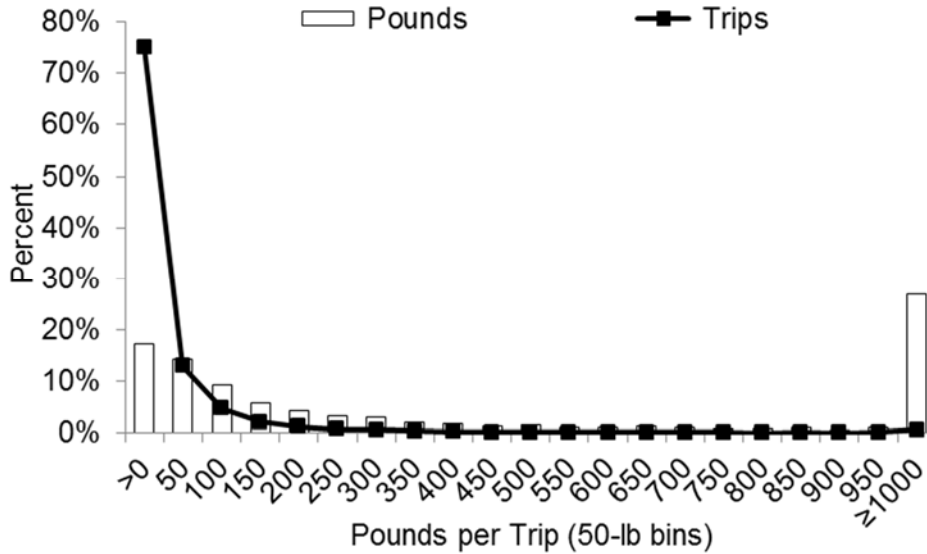


Figure 7.14 North Carolina landings (lb) and trips of kingfishes from the commercial shrimp trawl fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

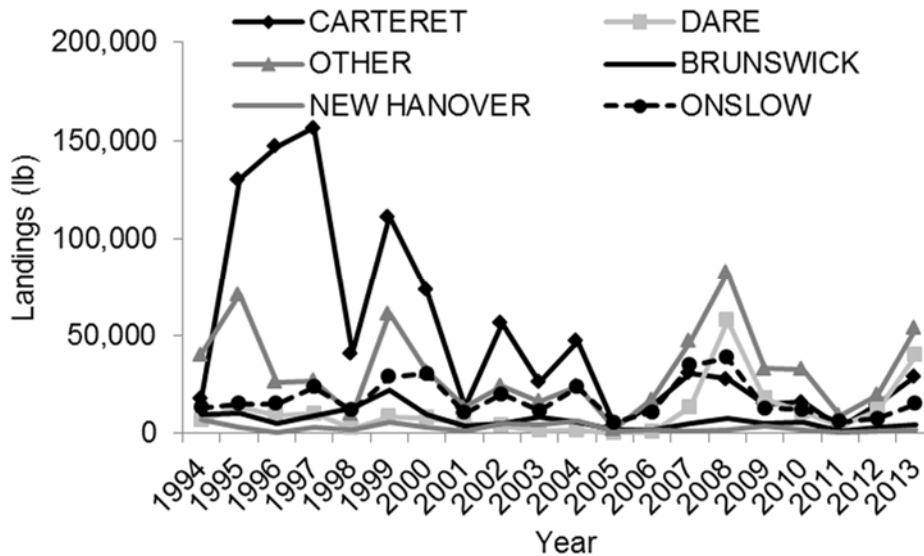


Figure 7.15 North Carolina commercial shrimp trawl landings of kingfishes by county, 1994–2013 (Source: NCTTP, unpublished data).

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)).

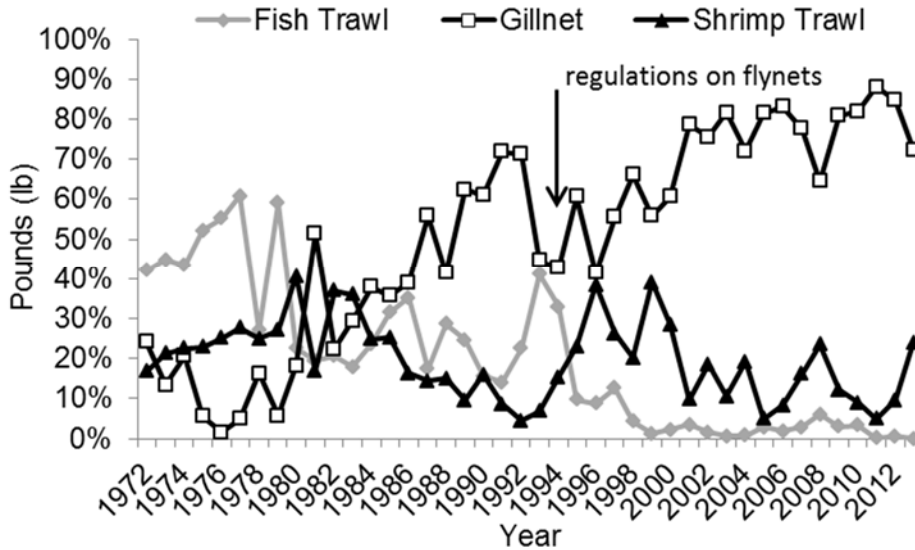


Figure 7.16 Percent of kingfishes in North Carolina from the three dominant gears, 1972–2013 (Source: NCTTP, unpublished data).

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.

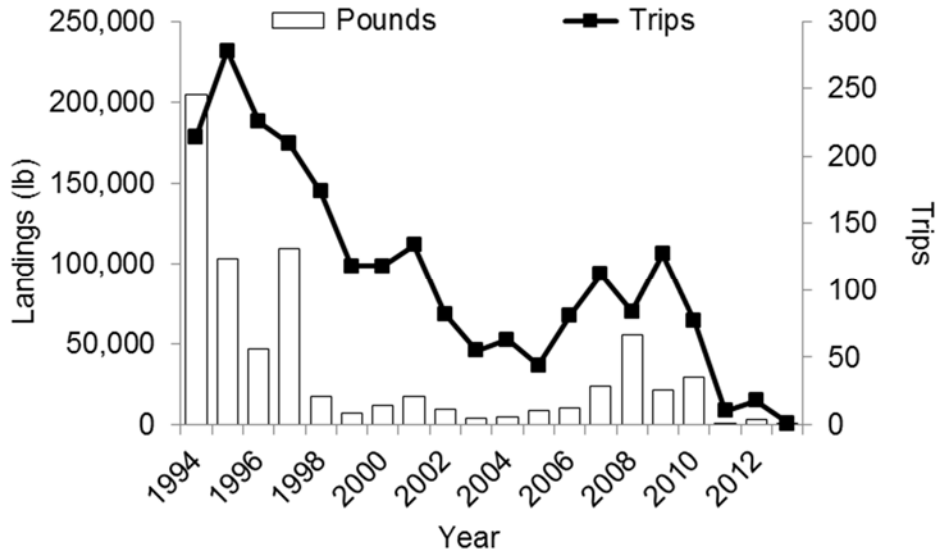


Figure 7.17 North Carolina landings (lb) and trips for kingfishes from the fish trawl fishery, 1994–2013 (Source: NCTTP, unpublished data).

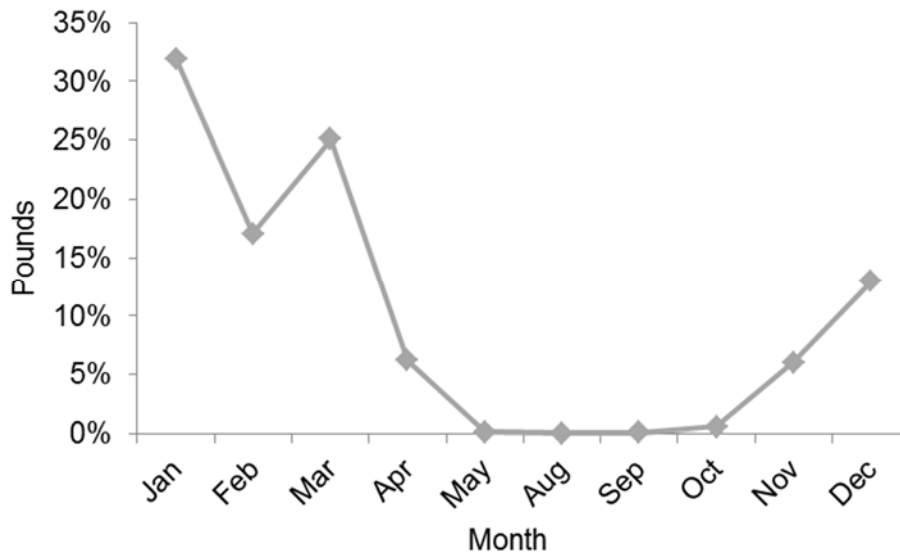


Figure 7.18 Percent of fish trawl landings of kingfishes in North Carolina by month, 1994–2013 (Source: NCTTP, unpublished data).

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.

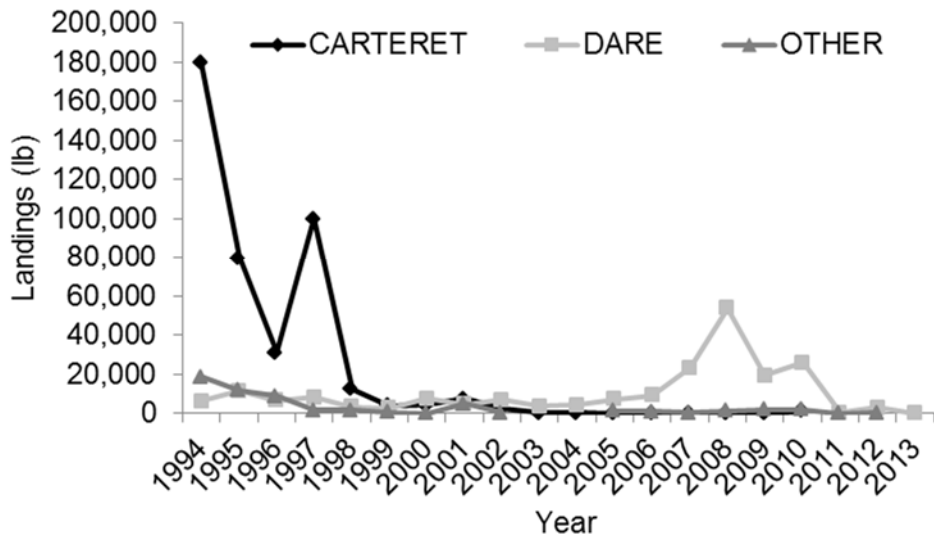


Figure 7.19 Fish trawl landings of kingfishes in North Carolina by county, 1994–2013 (Source: NCTTP, unpublished data).

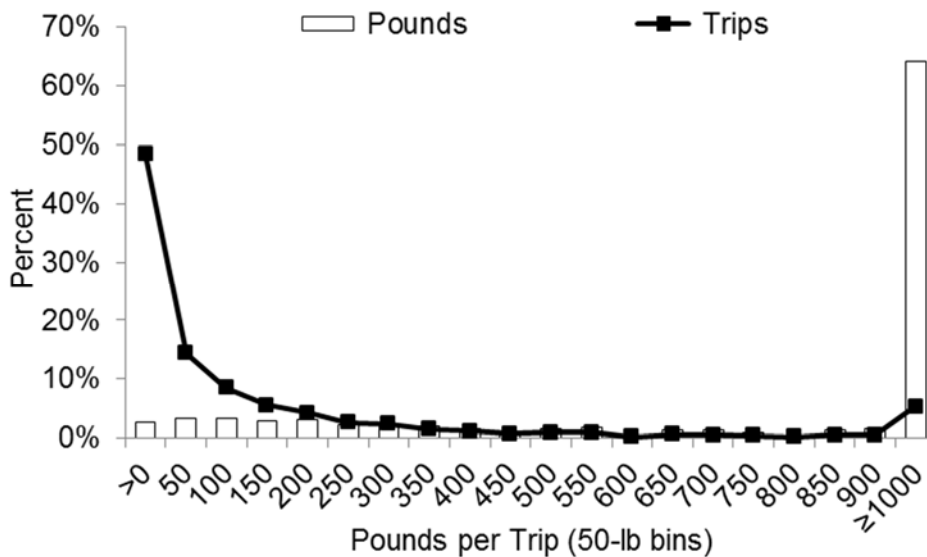


Figure 7.20 North Carolina landings (lb) and trips of kingfishes from the fish trawl fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

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).

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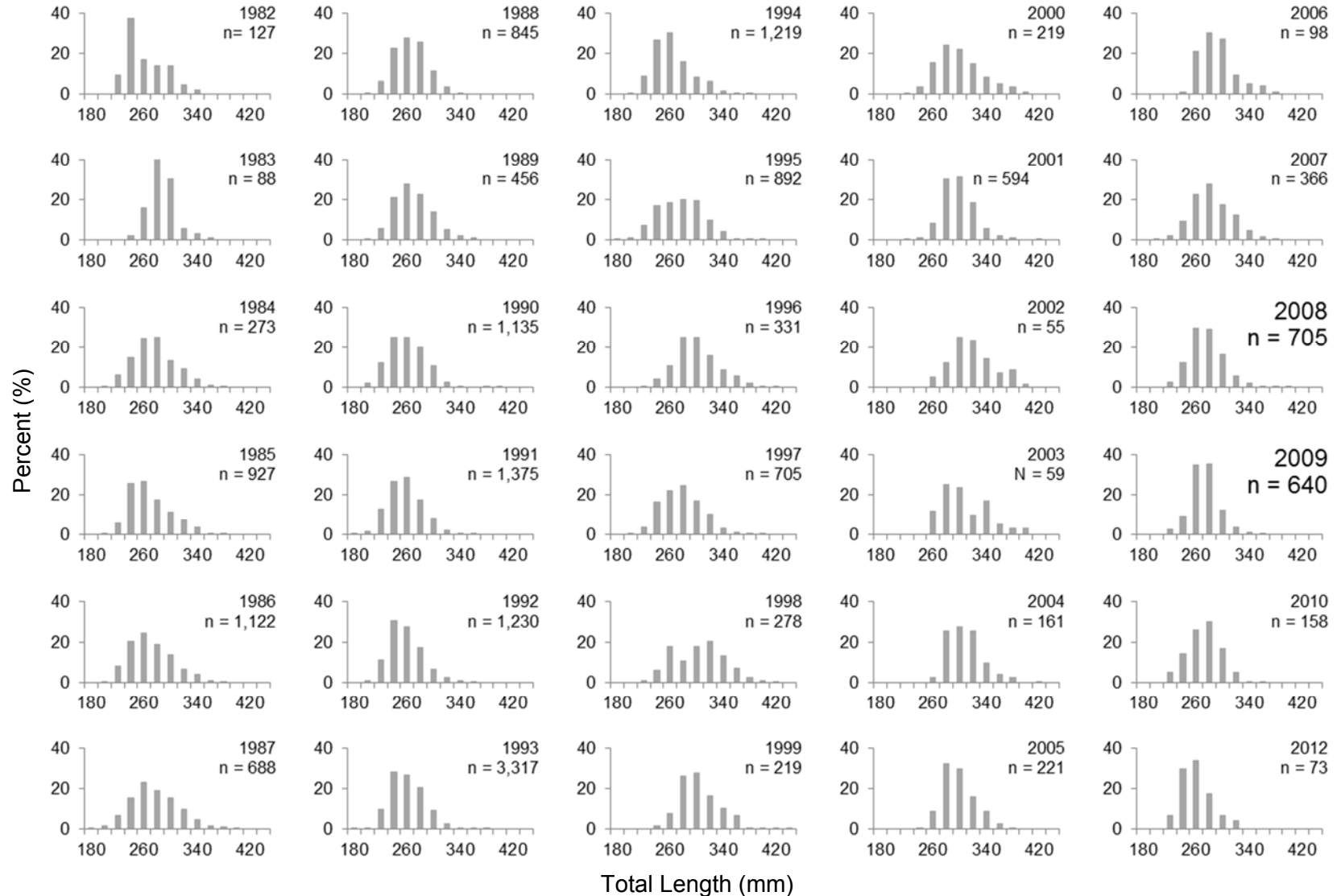


Figure 7.21 Length distributions for kingfish from commercial fish trawl fishery, 1982–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

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).

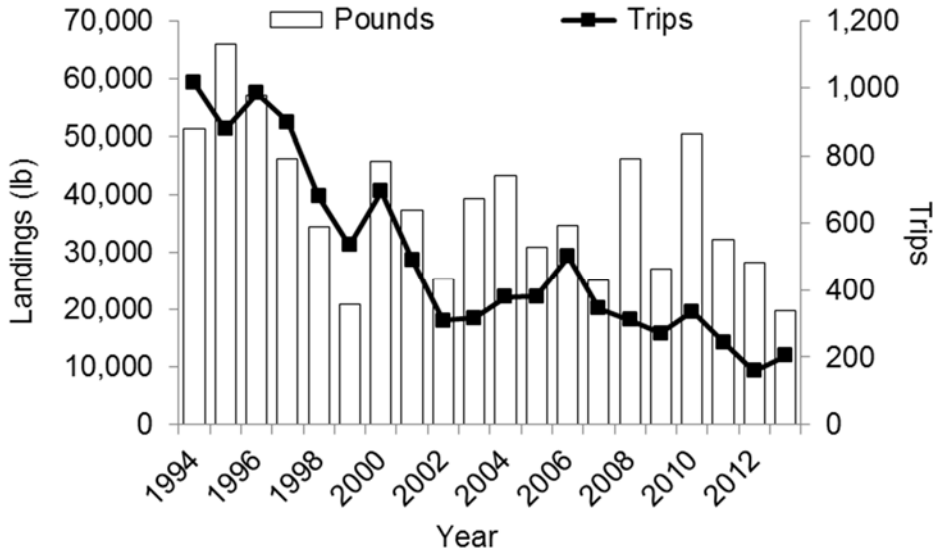


Figure 7.22 North Carolina landings (lb) and trips for kingfishes from the seine fishery, 1994–2013 (Source: NCTTP, unpublished data).

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.

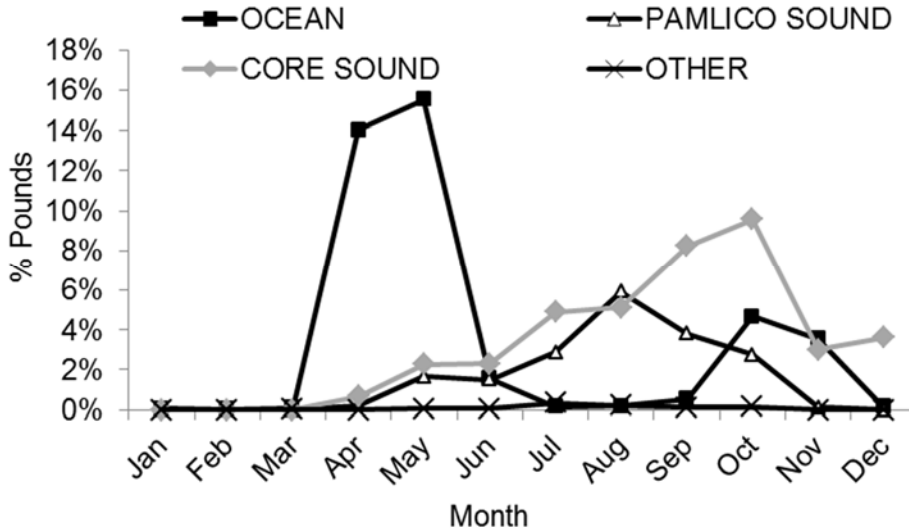


Figure 7.23 Percent of kingfishes in seines from North Carolina by month and waterbody, 1994–2013 (Source: NCTTP, unpublished data).

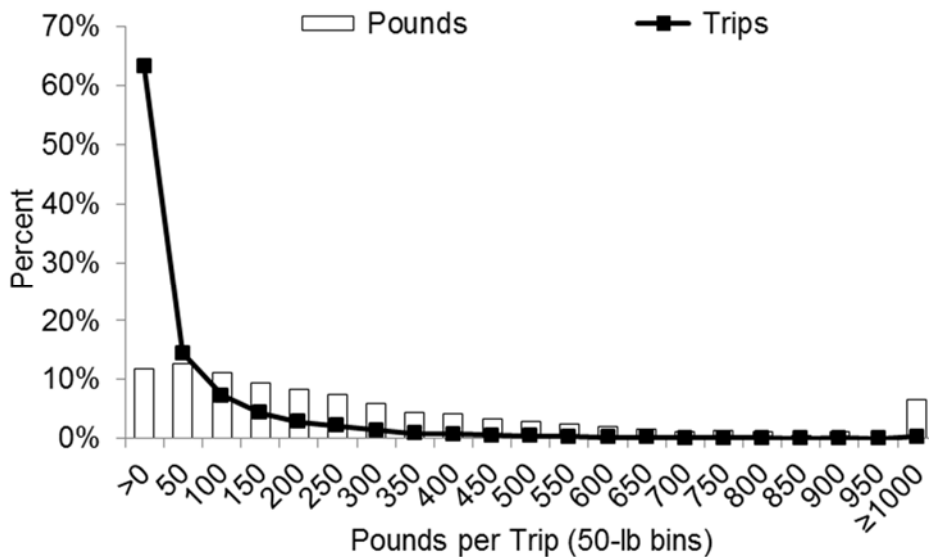


Figure 7.24 North Carolina landings (lb) and trips of kingfishes from the seine fishery in bins showing pounds per trip, 1994–2013 (50-lb increments; Source: NCTTP, unpublished data).

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).

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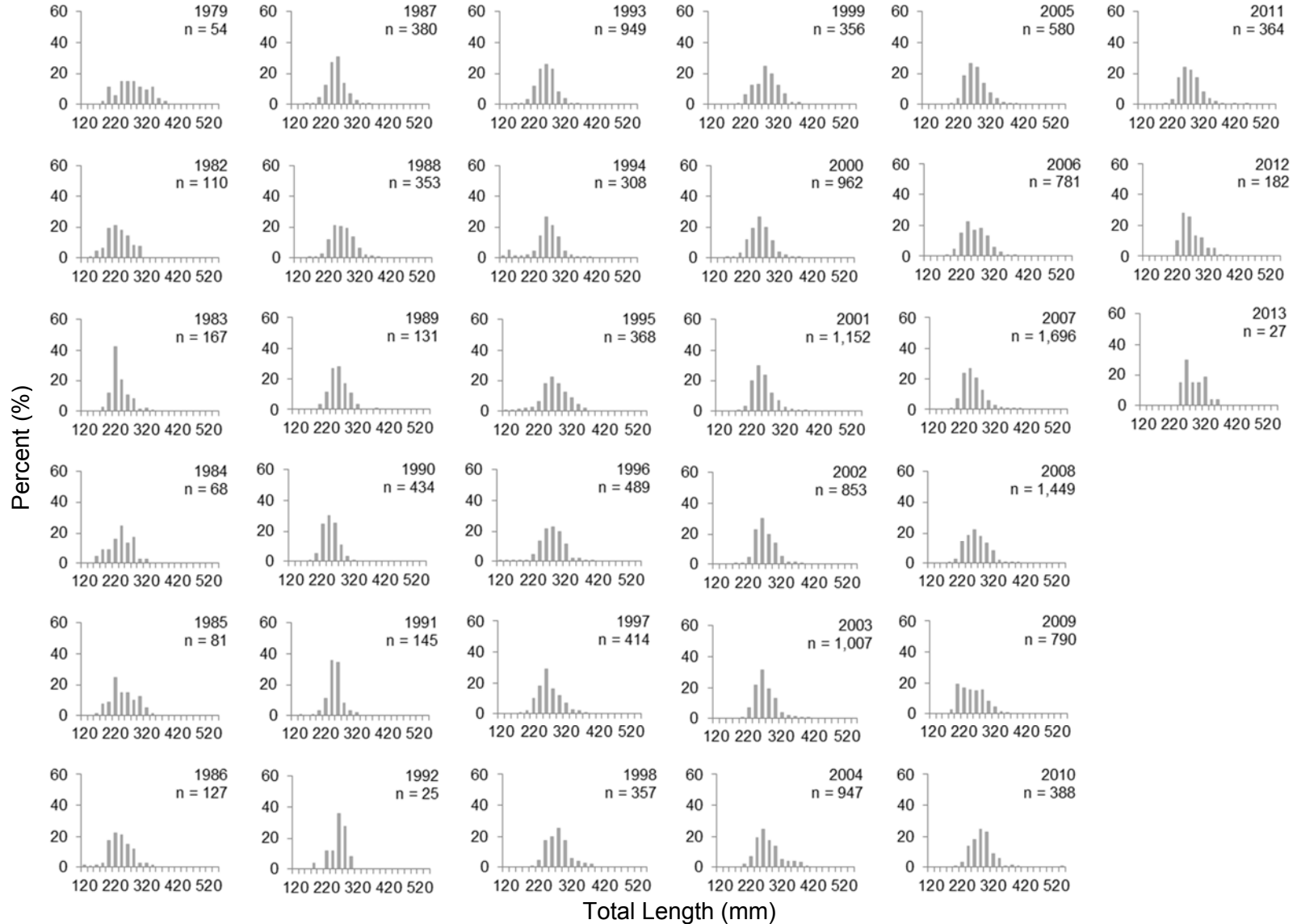


Figure 7.25 Length distributions for kingfish from commercial long haul fishery, 1979–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

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).

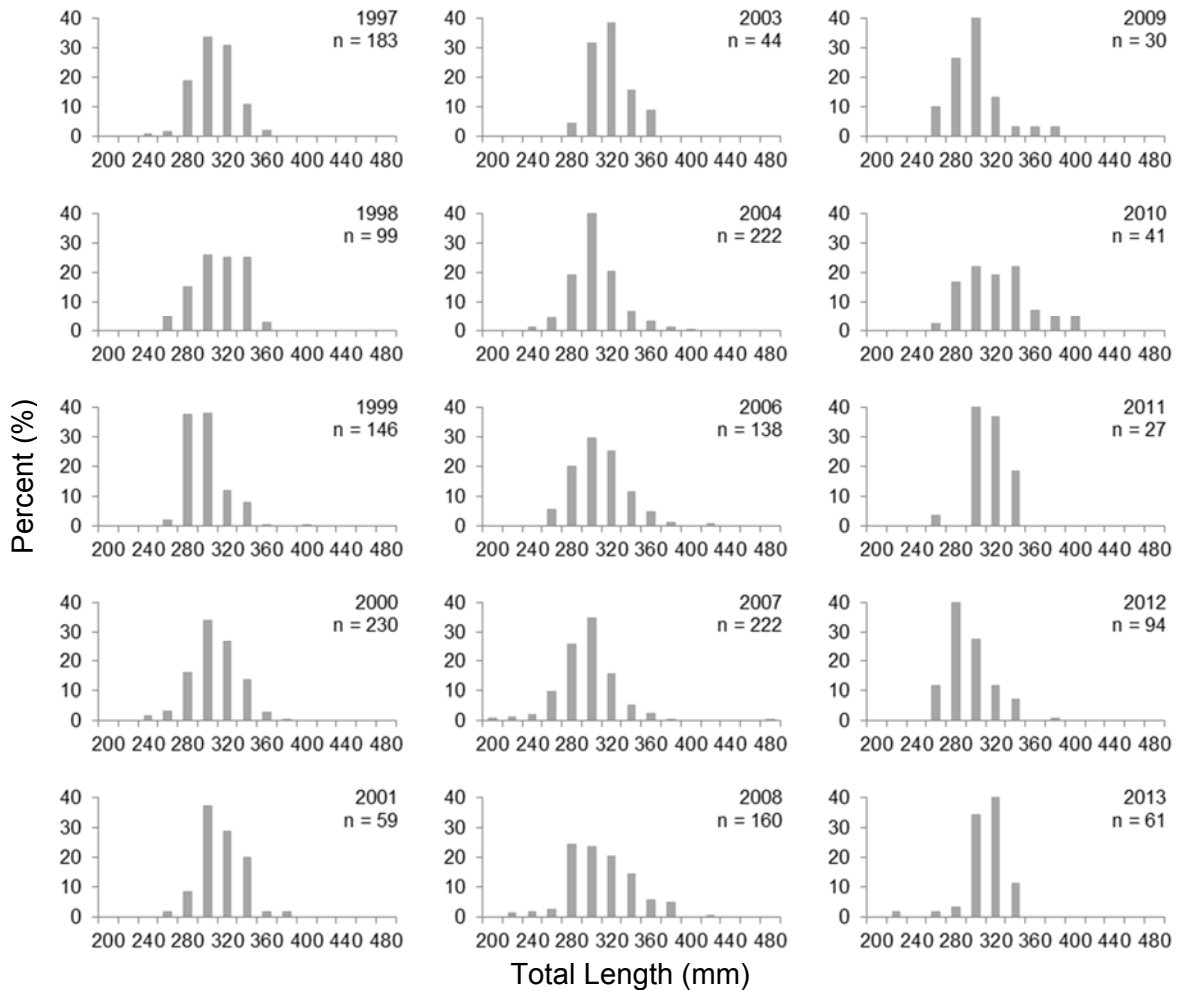


Figure 7.26 Length distributions for kingfish from commercial beach seine fishery, 1997–2013 (Source: NCDMF, unpublished data). Years with sample sizes less than 25 are not included.

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).

Area	Number of tows	lb		Percent kingfish	Kingfish CPUE (lb/tow)	Percentage of tows	
		Finfish	Kingfish			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.

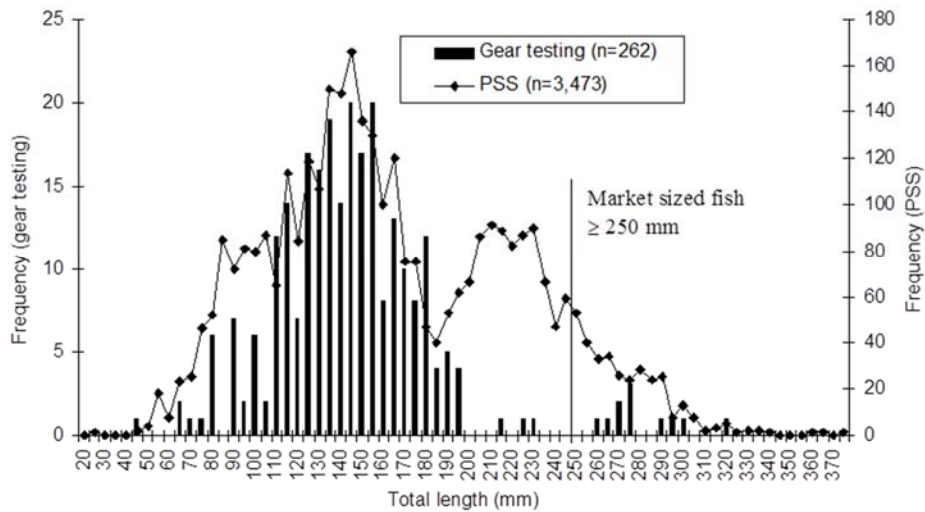


Figure 7.27 Length (mm) frequency distribution of kingfishes captured during gear testing in Pamlico Sound (1994) and the NCDMF Pamlico Sound Survey, 1987–2005 (Source: NCDMF 2007).

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 RCGL 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).

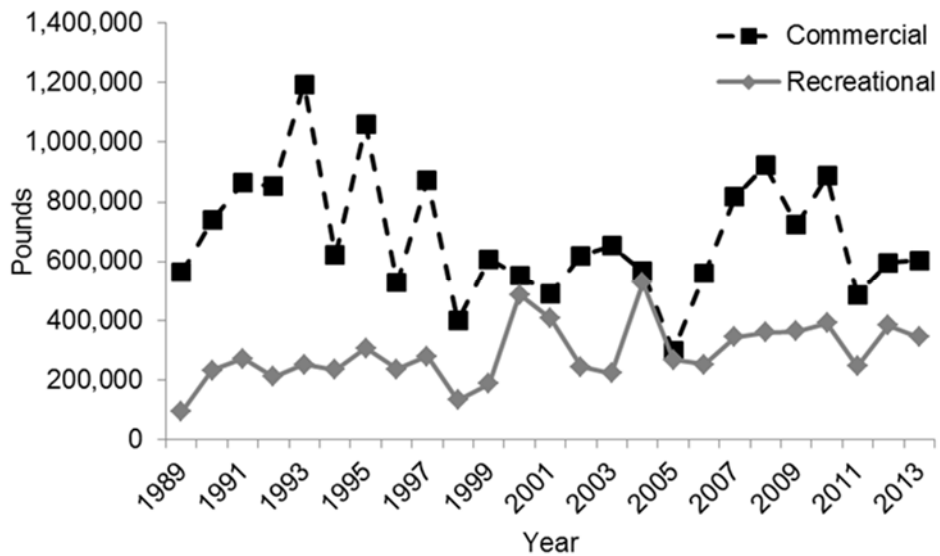


Figure 7.28 Recreational and commercial Landings for North Carolina for all kingfishes in North Carolina, 1989–2013 (Source: MRIP).

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).

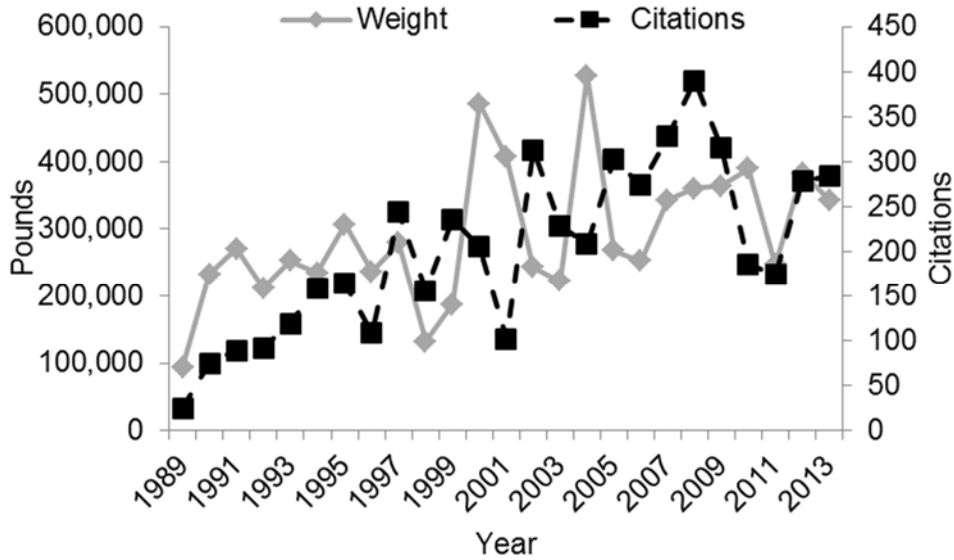


Figure 7.29 North Carolina recreational kingfish landings, 1989–2013 (Source: MRIP) and citations, 1991–2013 (Source: NC Saltwater Fishing Tournament).

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).

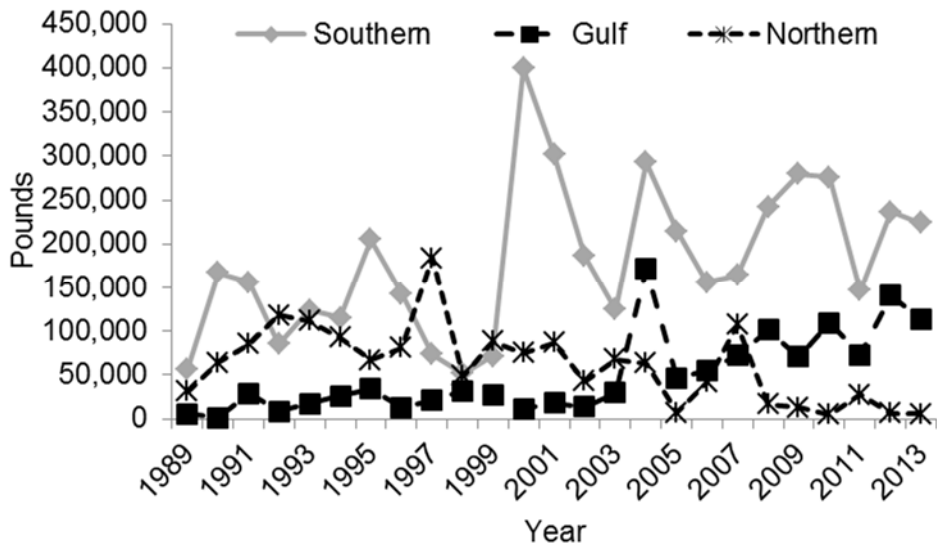


Figure 7.30 North Carolina recreational harvest (pounds) of the three kingfish species, 1989–2013 (Source: MRIP).

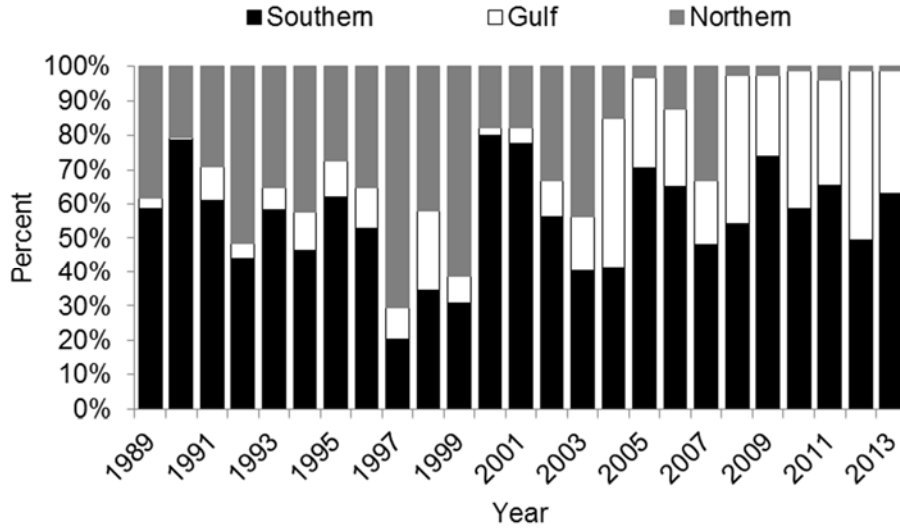


Figure 7.31 Species composition of coastal ocean captured kingfishes, 1989–2013 (Source: MRIP).

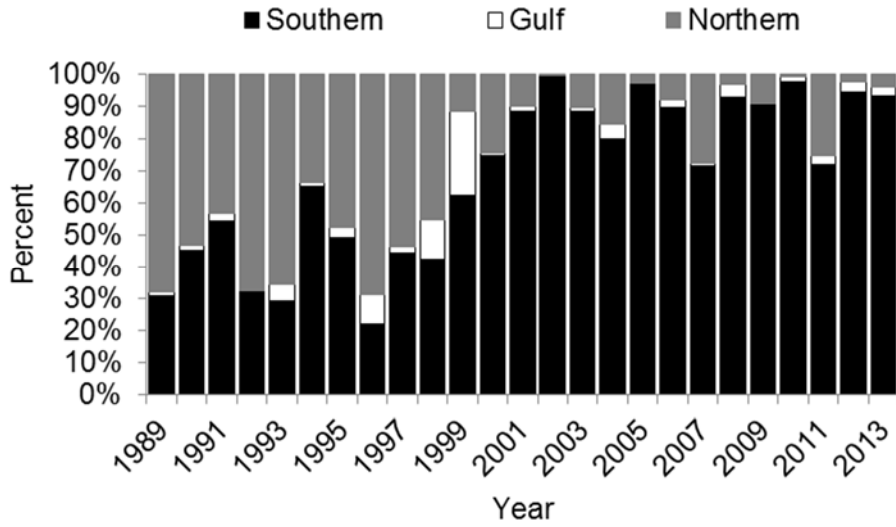


Figure 7.32 Species composition of kingfishes captured in estuarine waters of North Carolina, 1989–2013 (Source: MRIP).

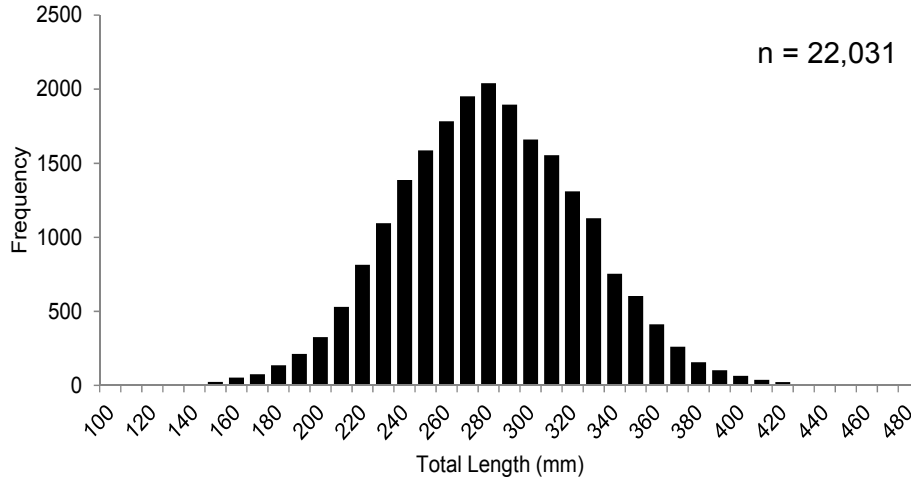


Figure 7.33 North Carolina total length frequency of all kingfishes sampled from the recreational fishery, 1989–2013 (Source: MRIP).

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.

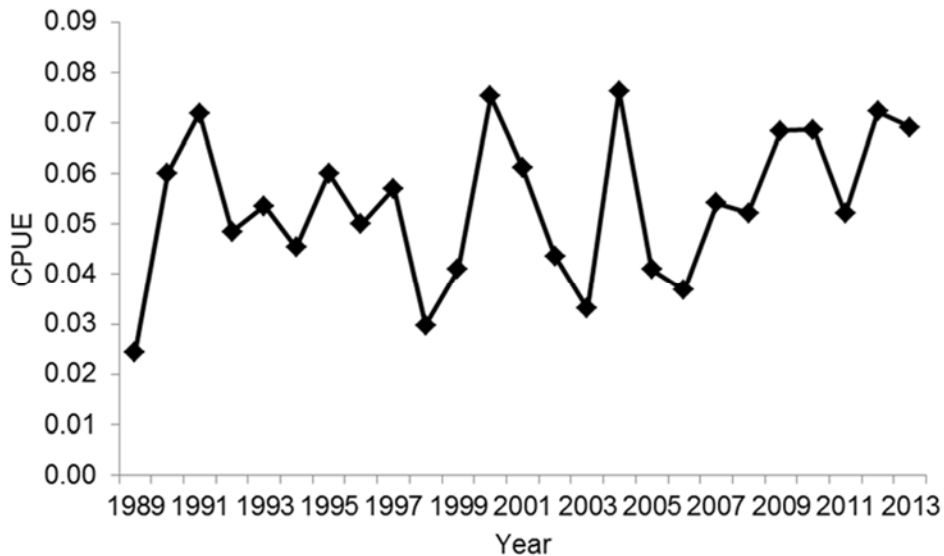


Figure 7.34 North Carolina Kingfish catch-per-unit-effort (CPUE), 1989–2013 (Source: MRIP).

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%).

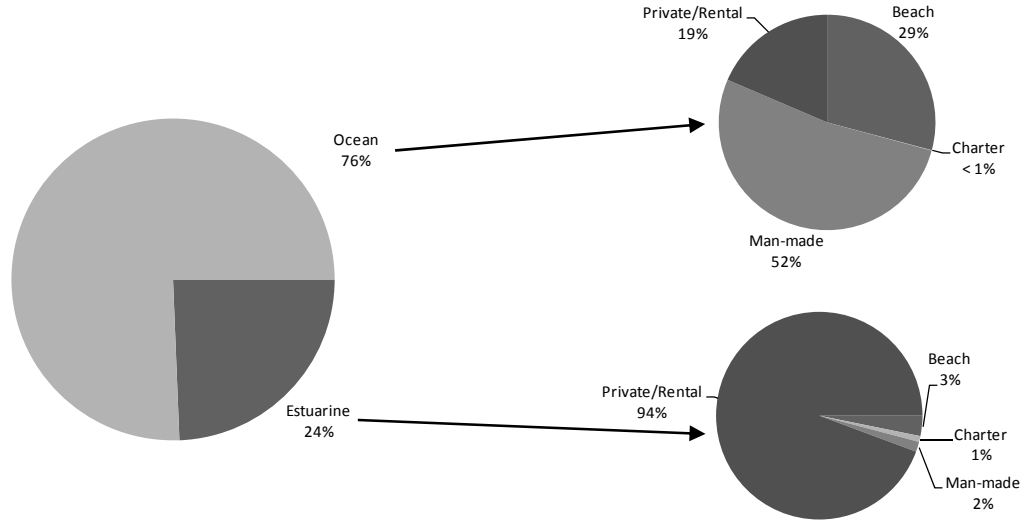


Figure 7.35 Southern kingfish landings (lb) by area and mode, 1989–2013 (Source: MRIP).

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.

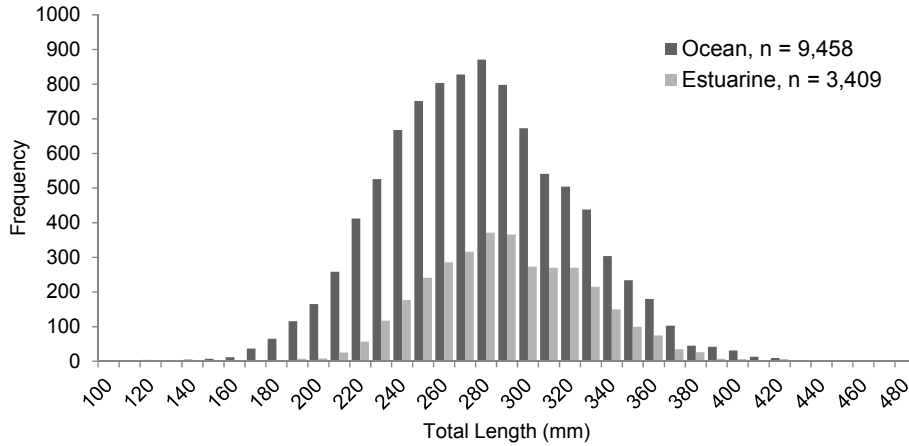


Figure 7.36 Unweighted length frequencies of North Carolina ocean and estuarine caught southern kingfish, 1989–2013 (Source: MRIP).

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).

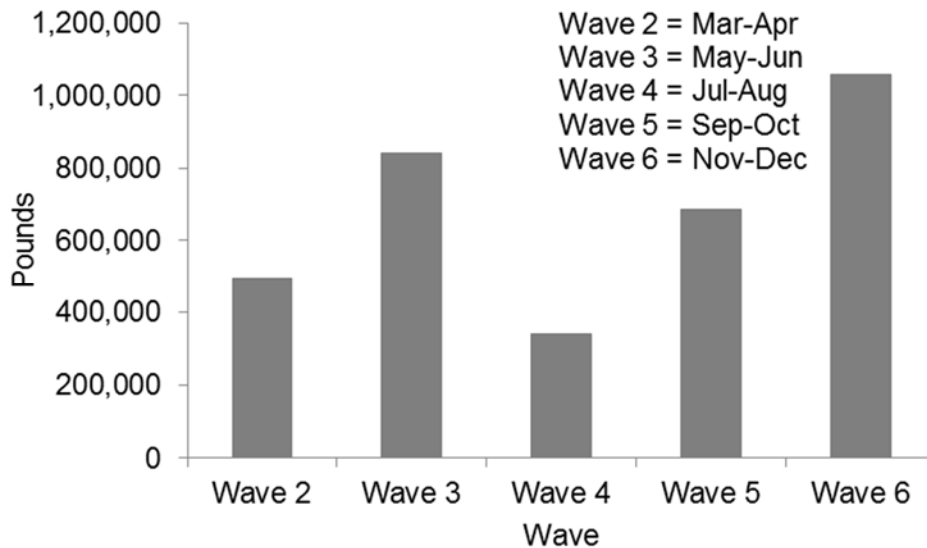


Figure 7.37 North Carolina harvest of southern kingfish (lb) by wave, 1989–2013 (Source: MRIP).

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%).

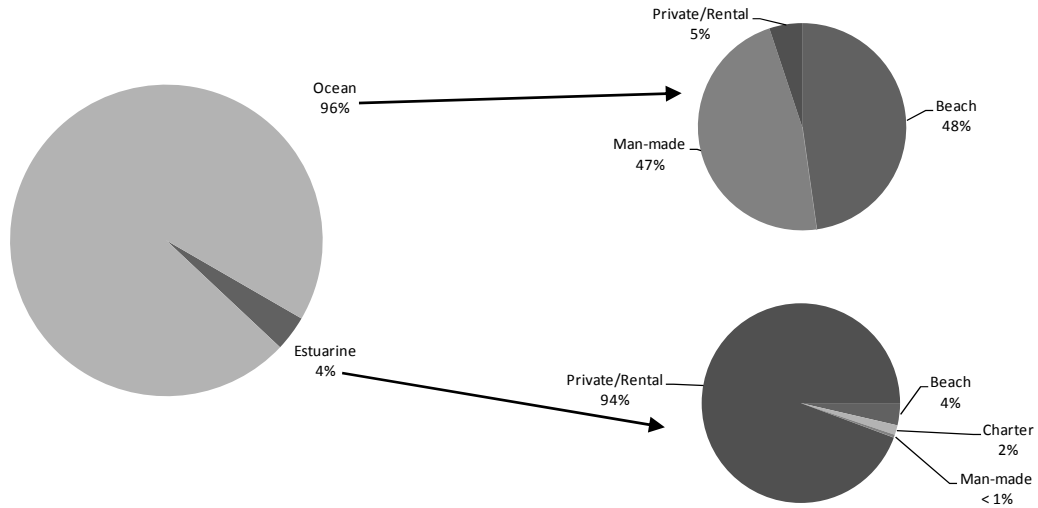


Figure 7.38 North Carolina Gulf kingfish landings (lb) by area and by mode, 1989–2013 (Source: MRIP).

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.

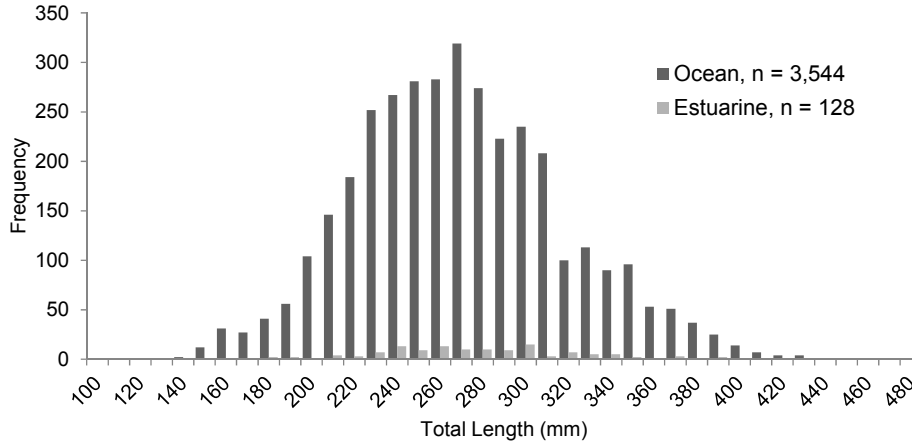


Figure 7.39 Unweighted length frequencies of North Carolina ocean and estuarine caught Gulf kingfish, 1989–2013 (Source: MRIP).

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).

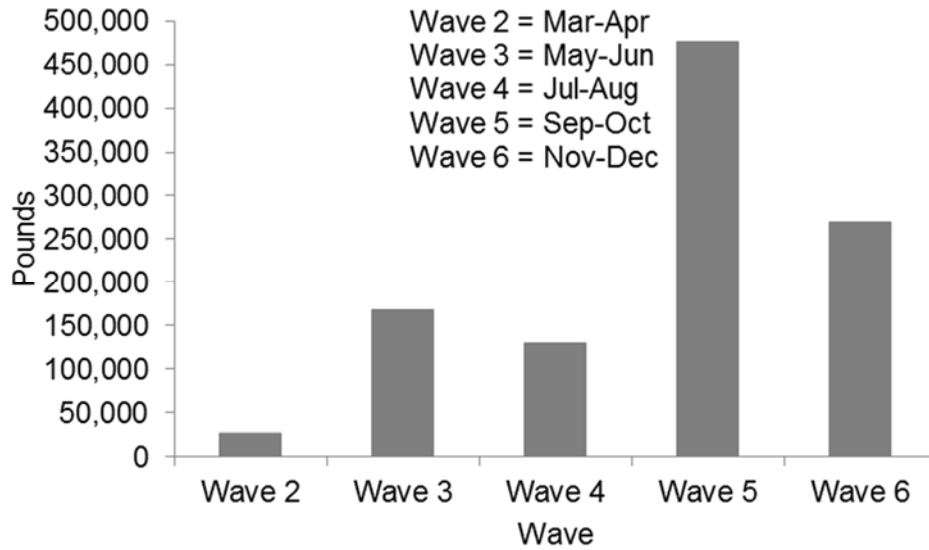


Figure 7.40 North Carolina Gulf kingfish catch by wave, 1989–2013 (Source: MRIP).

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).

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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%).

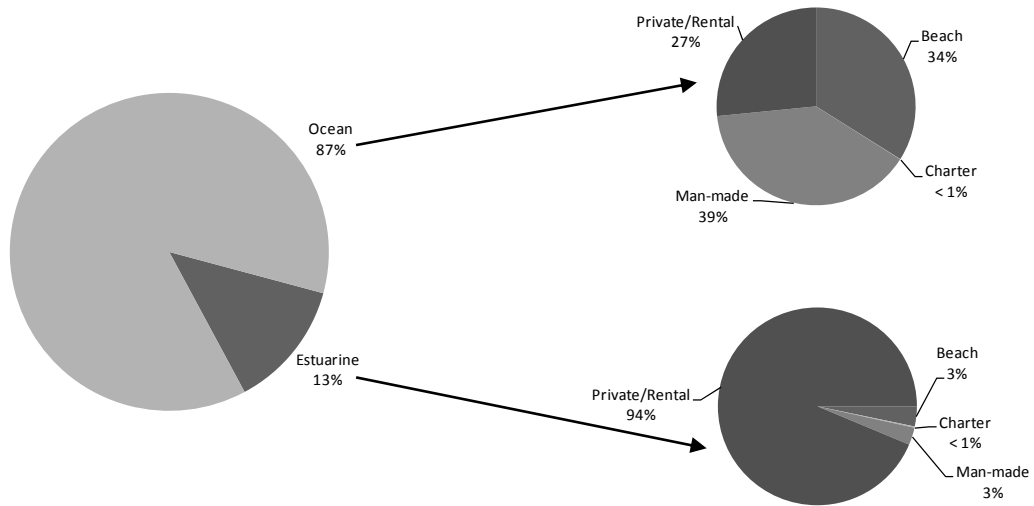


Figure 7.41 North Carolina northern kingfish landings (lb) by area and mode, 1989–2013 (Source: MRIP).

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	Average 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.

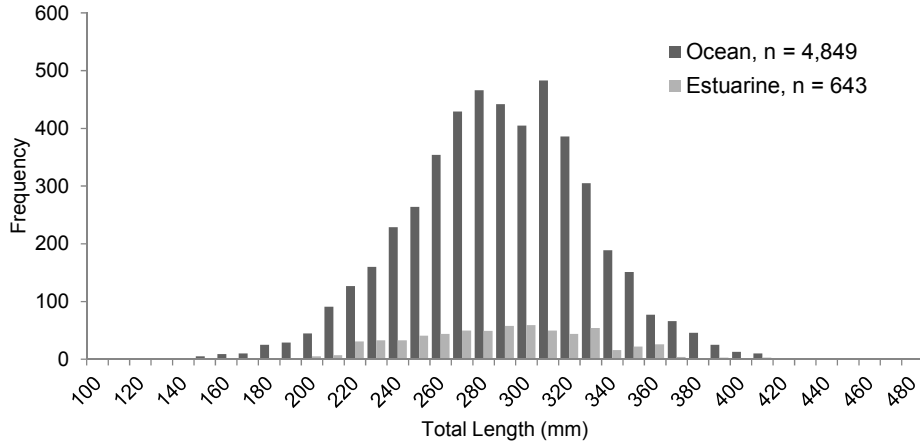


Figure 7.42 Unweighted length frequencies of North Carolina ocean and estuarine caught northern kingfish, 1989–2013 (Source: MRIP).

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).

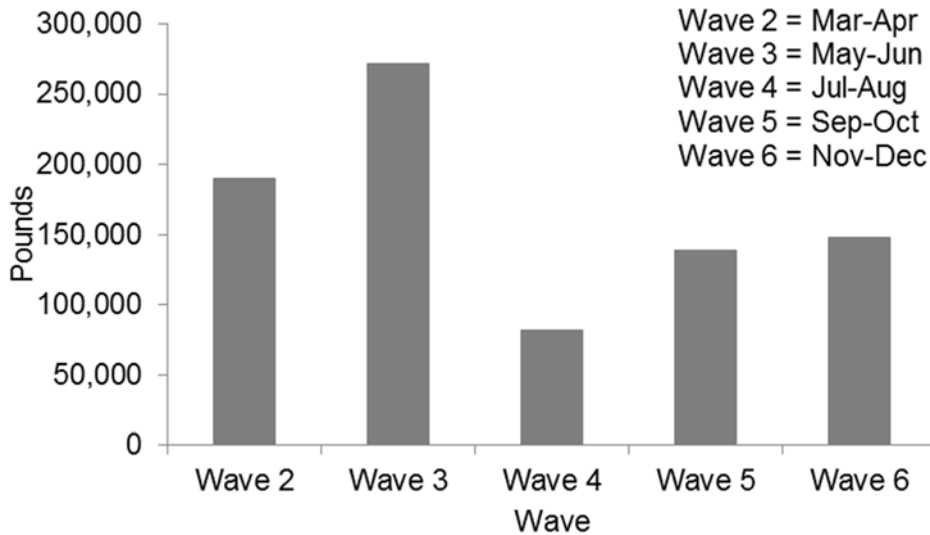


Figure 7.43 North Carolina northern kingfish harvest by wave, 1989–2013 (Source: MRIP).

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 immer*)
- 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°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; 1990–2006). 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 1983 and 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 (\geq 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 - 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.

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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".

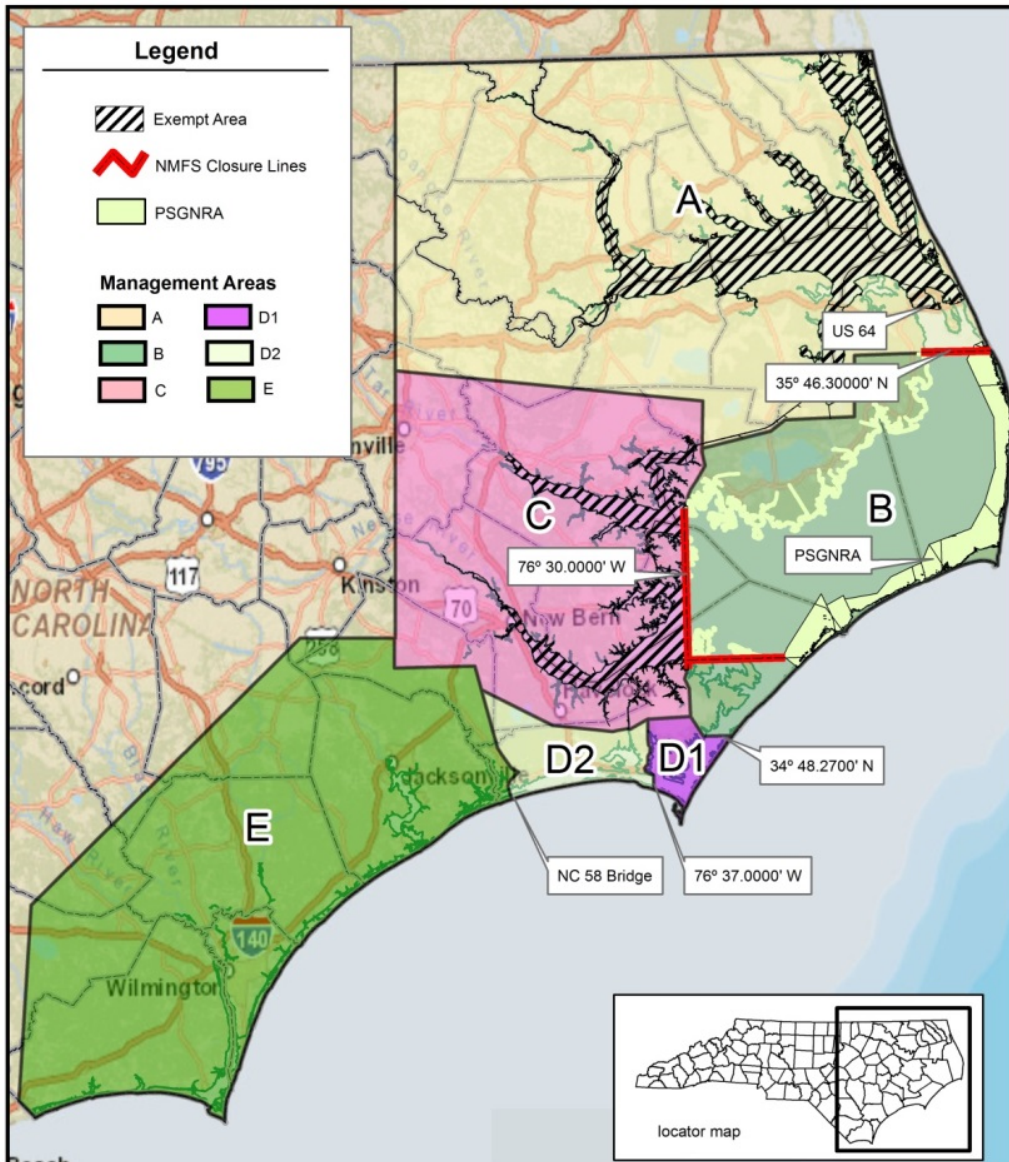
Management Unit C: includes the Pamlico, Pungo, and Neuse river drainages west of 76° 30.00'W.

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.



**NC DMF GILLNET
 MANAGEMENT MEASURES**



Figure 8.1 Map of Sea Turtle Management Units for North Carolina's estuarine waters in Incidental Take Permit #16230.

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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.

DRAFT – NCMFC Review and approval for public comment August 2015
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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° 40.675'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.

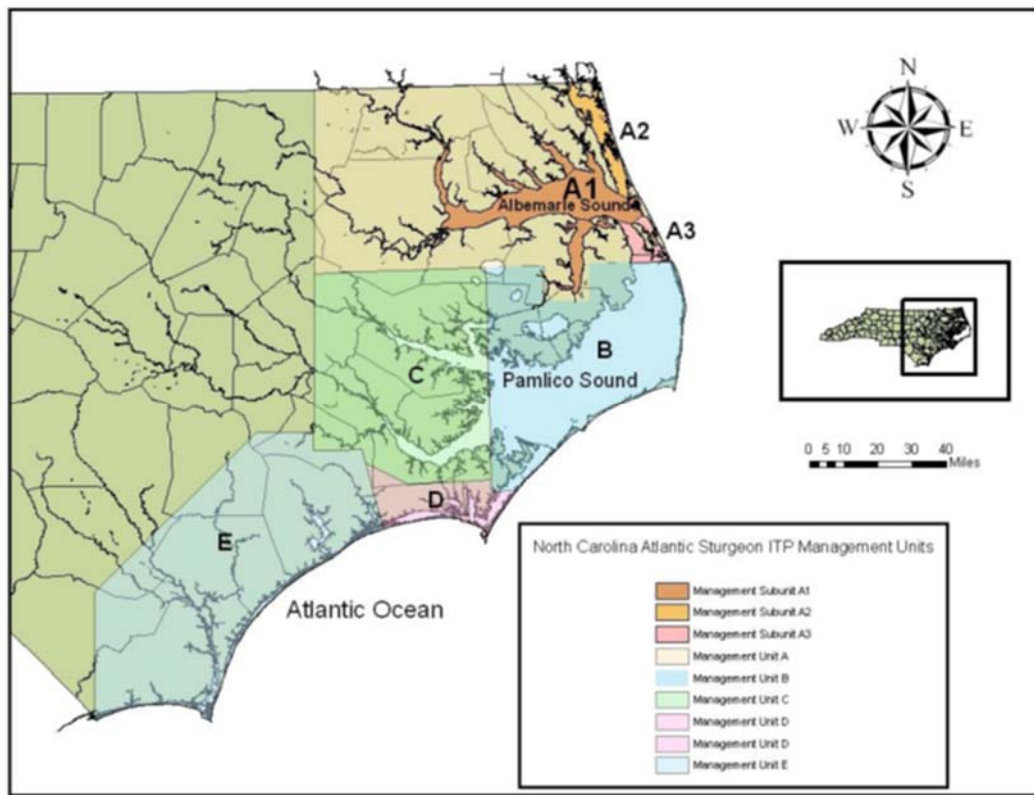


Figure 8.2. Atlantic Sturgeon Management Units for North Carolina's estuarine waters in Incidental Take Permit #18102.

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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 between 1972 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.

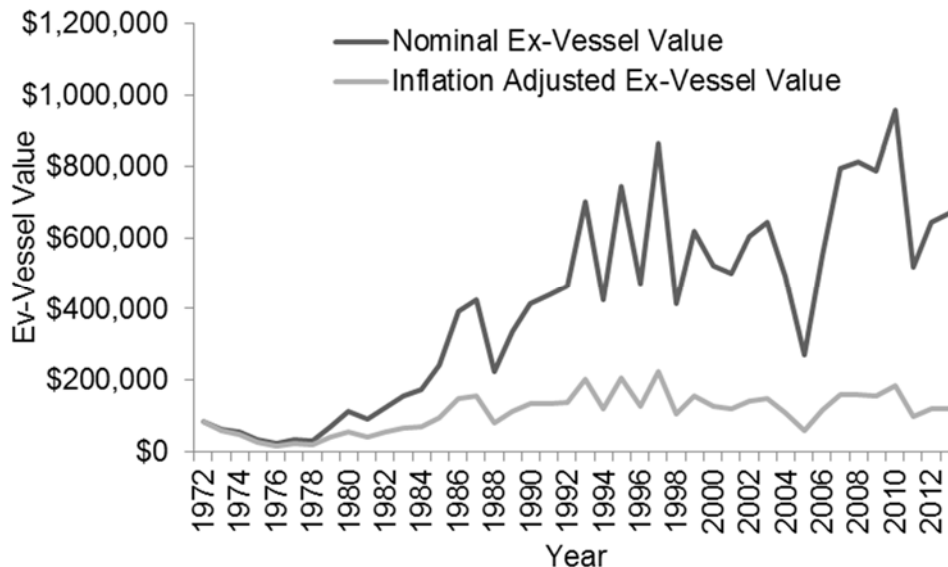


Figure 10.1 Ex-vessel value of kingfish landings in North Carolina, 1972–2013 (Source: NCTTP, unpublished data).

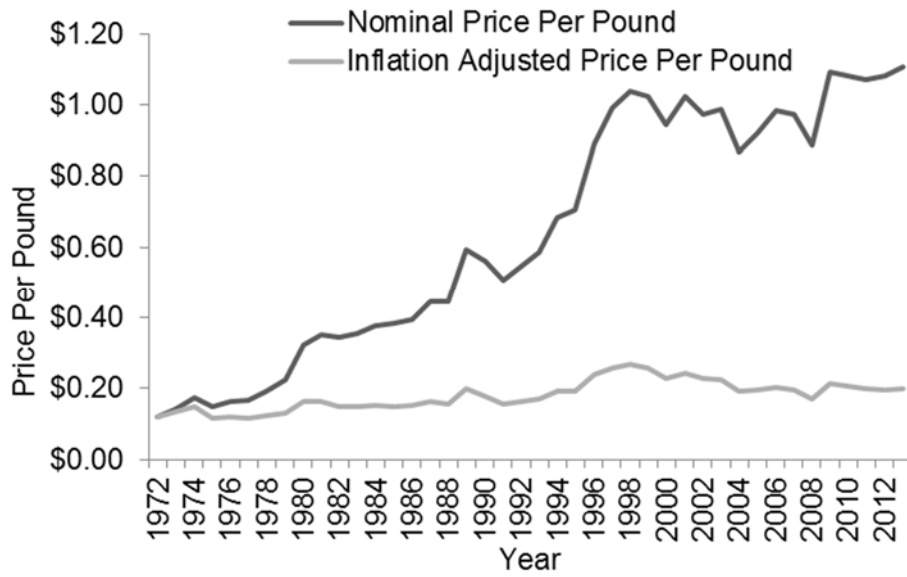


Figure 10.2 Annual average nominal and inflation-adjusted ex-vessel price per pound for kingfish landed in North Carolina, 1972–2013 (Source: NCTTP, unpublished data).

DRAFT – NCMFC Review and approval for public comment August 2015
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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.

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Table 10.2 Landings, nominal ex-vessel value, and average nominal price per pounds for kingfish by gear, 1994–2013 (Source: NCTTP, unpublished data).

Year	Fish Trawl			Gill Net			Seines			Shrimp Trawl			Other		
	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.

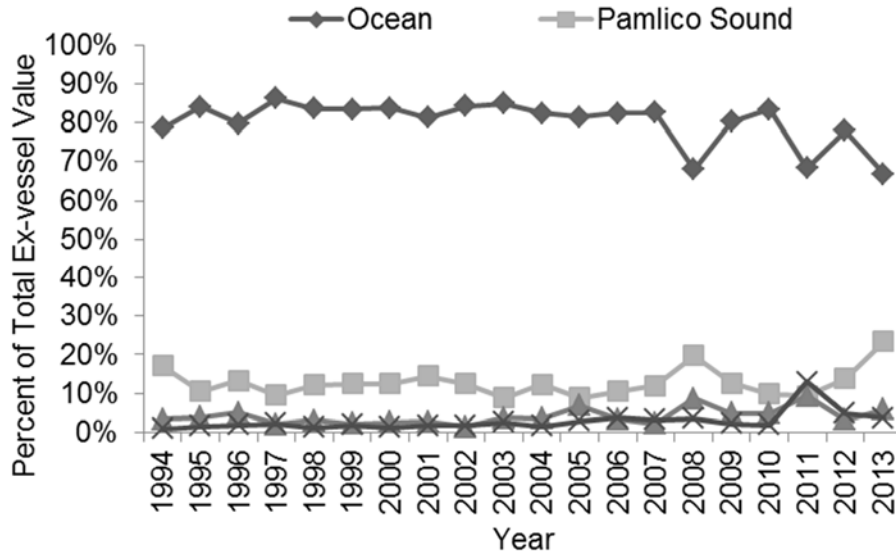


Figure 10.3 Percent of total annual commercial kingfish harvest value by waterbody, 1994–2013 (Source: NCTTP, unpublished data).

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Table 10.3 Nominal ex-vessel value of commercial kingfish landings by waterbody, 1994–2013 (Source: NCTTP, unpublished data).

Year	Ocean		Pamlico Sound		Core Sound		Other		All Water Bodies
	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.

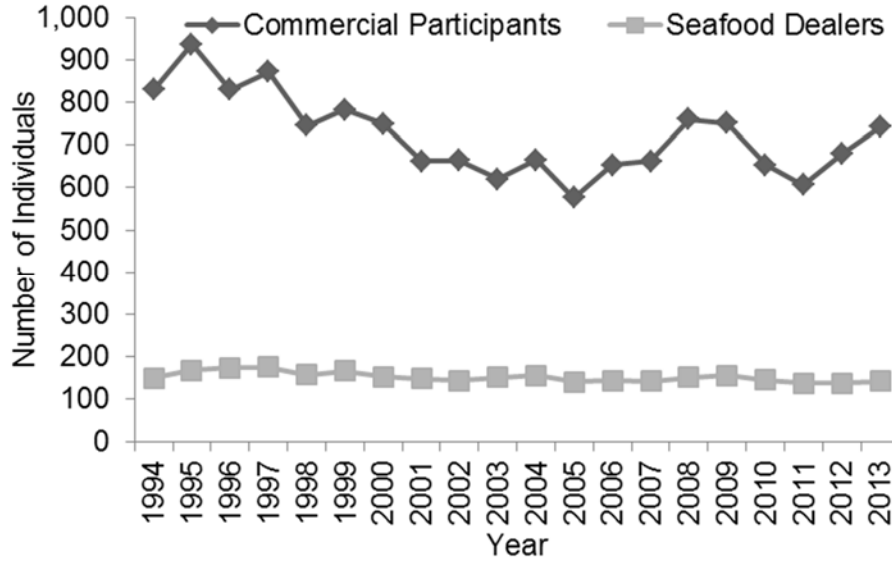


Figure 10.4 Number of commercial participants and seafood dealers reporting kingfish landings in North Carolina, 1994–2013 (Source: NCTTP, unpublished data).

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).

DRAFT – NCMFC Review and approval for public comment August 2015
 All parts of this document are subject to change until final adoption

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).

County	Year										
	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

County	Year									
	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.

Participants ¹	Trips ¹	Estimated Economic Impacts			
		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

¹As reported by the NCTTP

²Represents average monthly number of full-time and part-time jobs over a 12 month period

³Economic 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.

Trips ¹	Estimated Economic Impacts			
	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

¹Trip estimates as reported by the MRIP

²Expenditures estimated using the NCDMF economic impact model for coastal recreational fishing.

³Represents average monthly number of full-time and part-time jobs over a 12-month period

⁴Economic 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		Number	Percent
Gender			Marital Status		
Male	22	100%	Married	18	82%
Race			Divorced	3	14%
Caucasian	21	95%	Separated	1	5%
African American	1	5%	Household Size		
Education			1	2	10%
Less than high school	2	9%	2	9	43%
High school graduate	12	55%	3	4	19%
Some college	7	32%	4	4	19%
College graduate	1	5%	5	1	5%
Age			>5	1	5%
Average	50		Fishing status		
Minimum	34		Full Time	17	77%
Maximum	66		Part Time	5	23%
Years fishing			% of personal income from fishing		
Average	30		Average		80%
Minimum	5		Minimum		15%
Maximum	50		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%.

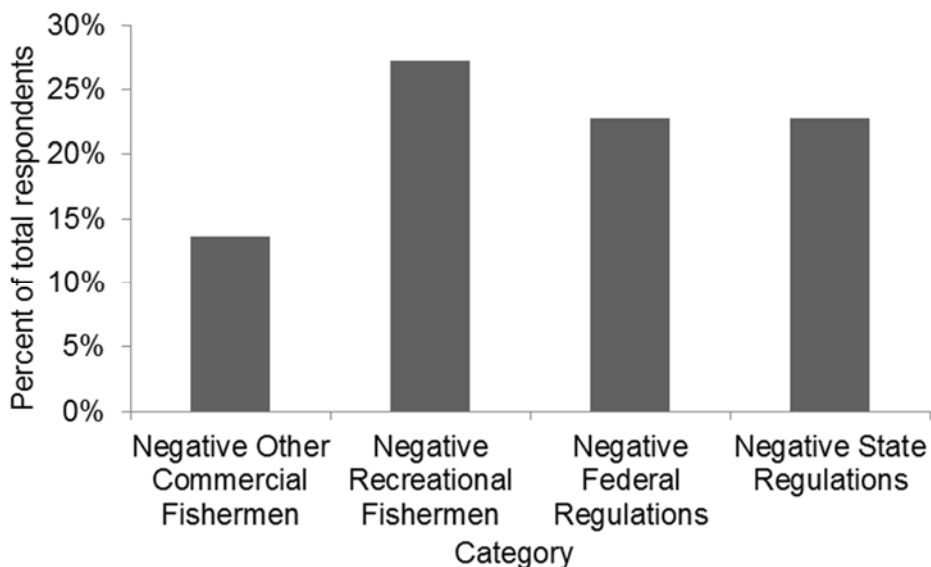


Figure 10.5 Reported conflicts of survey respondents participating in the commercial kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

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		Number	Percent
Gender			Number of people in household		
Male	258	92%	1	24	9%
Female	23	8%	2	137	49%
Marital Status			3	48	17%
Currently married	232	83%	4	54	19%
Never married	30	11%	5	11	4%
Divorced	12	4%	> 5	5	2%
Separated	4	1%	Household income		
Widowed	3	1%	Less than \$15,000	6	2%
Race			\$15,001-\$30,000	21	8%
Caucasian	258	93%	\$30,001-\$50,000	49	18%
African American	11	4%	\$50,001-\$75,000	58	21%
Native American	6	2%	\$75,001-\$100,000	49	18%
Latino	2	1%	More than \$100,000	40	14%
Age			Prefer not to answer	55	20%
Average	49		Education		
Minimum	19		Less than high school	18	6%
Maximum	73		High school graduate	78	28%
Years fishing			Some college	90	32%
Average	30		College graduate	71	25%
Minimum	2		Graduate degree	25	9%
Maximum	60				

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).

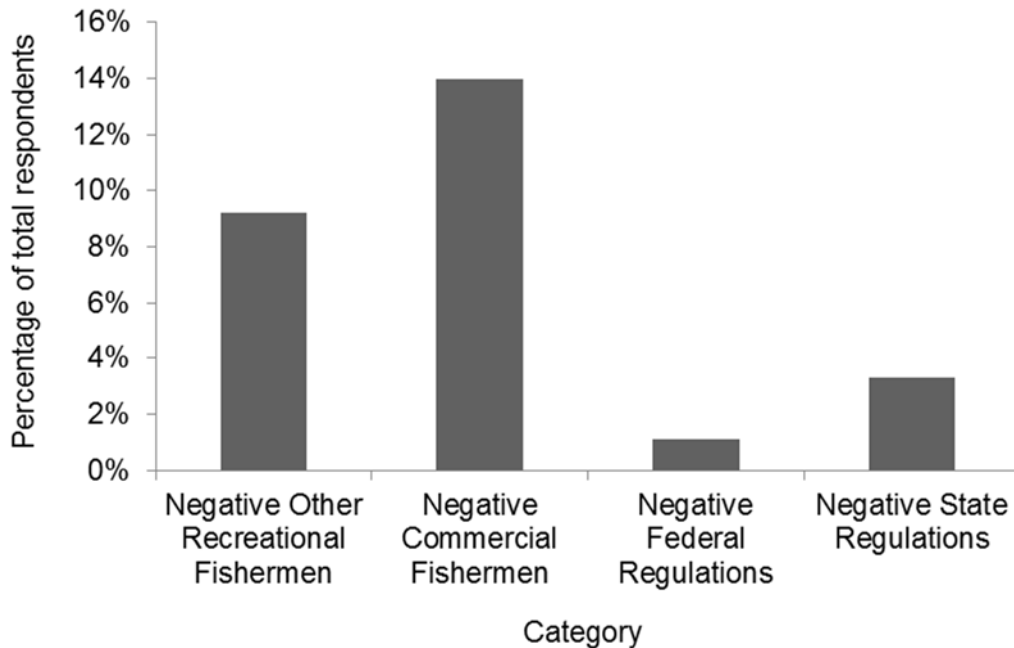


Figure 10.6 Reported conflicts of survey respondents participating in the recreational kingfish fishery (Source: NCDMF Fisheries Economics Program, unpublished data).

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. Coarser 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.

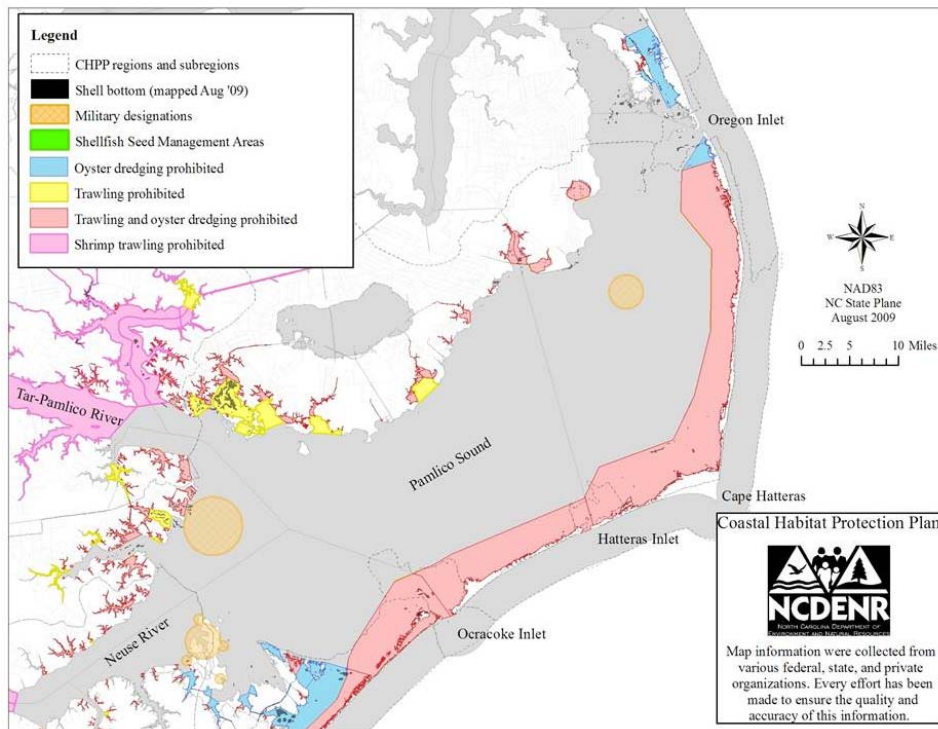


Figure 11.1 Areas prohibited to dredging or trawling in northern coastal waters of North Carolina.

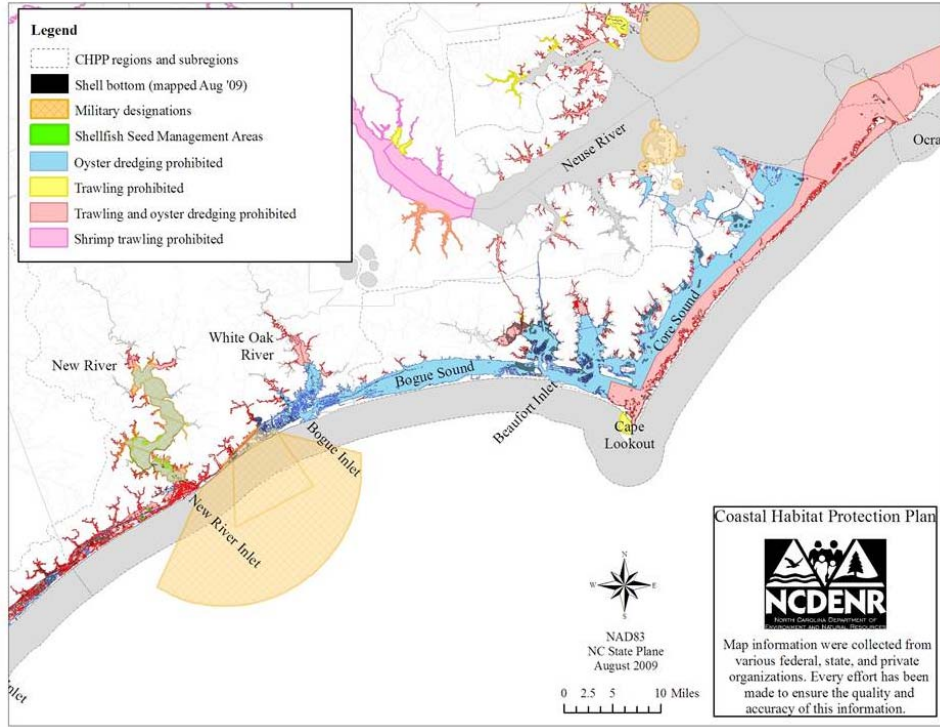


Figure 11.2 Areas prohibited to dredging or trawling in central coastal waters of North Carolina.

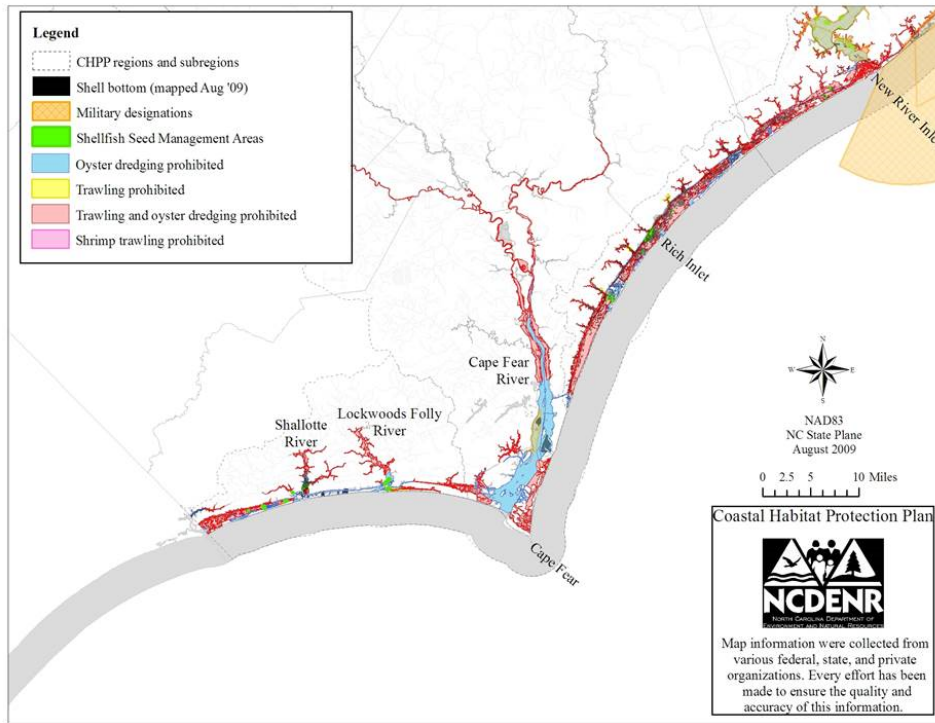


Figure 11.3 Areas prohibited to dredging or trawling in southern coastal waters of North Carolina.

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).

DRAFT – NCMFC Review and approval for public comment August 2015
All parts of this document are subject to change until final adoption

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 programmatic 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 Haurert 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 Haurert 1991; Bulthuis 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 Haurert 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 (Paerl 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), dieldrin, 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, toxicant 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. NCDWM 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 NCDMF 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.

14.0 LITERATURE CITED

- Able, K.W. and M.P. Fahay. 1998. The first year in the life of estuarine fishes in the Middle Atlantic Bight, Rutgers University Press, New Brunswick, New Jersey.
- Alverson, D. L., M. H. Freeberg, S. A. Murawski, and J. G. Pope. 1994. A global assessment of fisheries bycatch and discards. Food and Agriculture Organization of the United Nations, Fisheries Technical Paper Number 339, Rome, Italy.
- Anderson, W.W. 1968. Fishes taken during shrimp trawling along the South Atlantic Coast of the United States, 1931-1935. United States Fish and Wildlife Service, Special Scientific Report Fisheries. No. 570, Washington, D.C.
- Anderson, E. J. and B. H. Comyns. 2013. Distribution, abundance, and feeding Habits of juvenile kingfish (*Menticirrhus*) species found in the North-Central Gulf of Mexico. *Gulf of Mexico Science* 31(1-2): 50–66.
- ASMFC (Atlantic States Marine Fisheries Commission) 1994. Acronymns, Abbreviations and Technical Terms Used in ASMFC Fishery Management Programs. Special Report No. 33. October 1994.
- ASMFC (Atlantic States Marine Fisheries Commission). 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.
- Batsavage, C. 2004a. Sink net fishery assessment *in* Assessment of North Carolina commercial finfisheries. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA06FI0321, Morehead City, North Carolina.
- Batsavage, C. 2004b. Ocean sink net fishery assessment *in* Assessment of North Carolina commercial finfisheries. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA03NMF4070106, Morehead City, North Carolina.
- Batsavage, C. 2007. Winter trawl fishery assessment *in* Assessment of North Carolina commercial finfisheries. November 2007. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA04NMG4070216. Morehead City, North Carolina.
- Batsavage, C., T. Moore, and T. Wadsworth. 2012. Winter trawl fishery assessment *in* Assessment of North Carolina commercial finfisheries. North Carolina Department of Environment, Health, and Natural Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA07NMF4070047, Morehead City, North Carolina.
- Bearden, C.W. 1963. A contribution to the biology of the king whiting, genus *Menticirrhus* of South Carolina. *Contributions of Bears Bluff Laboratory* 38:1.

- Bellido, J. M., M.B. Santos, M.G. Pennio, X. Valerias, and G. J. Pierce. 2011. Fishery discards and bycatch: solutions for an ecosystem approach to fisheries management. *Hydrobiologia* 670: 317–333.
- Beresoff, D. and J.H. Schoolfield. 2002. Movements of kingfishes off North Carolina. North Carolina Sea Grant Fisheries Research Grant, Final Report 99-FEG-03, Morehead City, North Carolina.
- Biber, P.D., C.L. Gallegos, and W.J. Kenworthy. 2008. Calibration of a bio-optical model in the North River, North Carolina (Albemarle-Pamlico Sound): a tool to evaluate water quality impacts on seagrass. *Estuaries and Coasts: Journal of the Coastal and Estuarine Research Federation* 31: 177–191.
- Bishop, J.M. 1983. Incidental capture of diamondback terrapin by crab pots. *Estuaries* 6: 426–430.
- Blanton, J.O., F.E. Werner, A. Kapolnai, B.O. Blanton, D. Knott, and E.L. Wenner. 1999. Wind-generated transport of fictitious passive larvae into shallow tidal estuaries. *Fisheries Oceanography* 8(2): 210–223.
- Boehlert, G.W. and B.C. Mundy. 1988. Roles of behavioral and physical factors in larval and juvenile fish recruitment to estuarine nursery areas. *American Fisheries Symposium* 3: 51-67.
- Bourne, D.W. and J.J. Govoni 1988. Distribution of fish eggs and larvae and patterns of water circulation in Narragansett Bay, 1972-1973. *American Fisheries Symposium* 3: 132 – 148.
- Braun-McNeill, J., and S.P. Epperly. 2004. Spatial and temporal distribution of sea turtles in the western North Atlantic and the U.S. Gulf of Mexico from Marine Recreational Fishery Statistics Survey (MRFSS). *Marine Fisheries Review* 64(4):50–56.
- Breitburg, D.L. 1992. Episodic hypoxia in Chesapeake Bay: interacting effects of recruitment behavior, and physical disturbance. *Ecological Monographs* 62(4):525–546.
- Brown, S.S., G.R. Gaston, C.F. Rakocinski, and R.W. Heard. 2000. Effects of sediment contaminants and environmental gradients on macrobenthic community trophic structure in Gulf of Mexico estuaries. *Estuaries* 23(3):411–424.
- Brown K. 2009. Characterization of the near-shore commercial shrimp trawl fishery from Carteret County to Brunswick County, North Carolina. National Oceanic and Atmospheric Administration, Final Report NA05NMF4741003, Silver Spring, Maryland.
- Brown, K.B. 2010a. Compare catch rates of shrimp and bycatch of other species in standard (control) and modified (experimental) otter trawls in the Neuse River and Pamlico Sound, National Oceanic and Atmospheric Administration, Final Report NA08NMF474076, Silver Spring, Maryland.
- Brown, K.B. 2010b. Characterization of the inshore commercial shrimp trawl fishery in Pamlico Sound and its tributaries, National Oceanic and Atmospheric Administration, Final Report NA08NMF474076, Silver Spring, Maryland.

- Brown, K.B., and B. Price. 2005. Evaluation of low profile flounder gill-net in southeastern Pamlico Sound, North Carolina. National Oceanic and Atmospheric Administration, Final Report NA04NMF4740180 Segment 1, Silver Spring, Maryland.
- Bulthuis, D.A. 1994. Light environment/implications for management. Pages 23-27 *In*: S. Wyllie-Echeverria, A. M. Olson and M. J. Hershman eds. Seagrass science and policy in the Pacific Northwest: Proceedings of a seminar series school of Marine Affairs. University of Washington, Seattle, Washington.
- Burns, B. 2007. Sink net fishery assessment *in* Assessment of North Carolina commercial finfisheries. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Final Performance Report NA04NMF4070216, Morehead City, North Carolina.
- Buzzelli, C.P., R.A. Luettich Jr., S.P. Powers, C.H. Peterson, J.E. McNinch, J.L. Pinckney, and H.W. Paerl. 2002. Estimating the spatial extent of bottom water hypoxia and habitat degradation in a shallow estuary. *Marine Ecology Progress Series* 230:103-112.
- Carpenter, K.E. (ed) 2002. The living marine resources of the Western Central Atlantic. Volume 2: Bony fishes part 1 (Acipenseridae to Grammatidae). Food and Agriculture Organization of the United Nations species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication No. 5. Food and Agriculture Organization of the United Nations, Rome, Italy.
- Chao, L.N. and J.A. Musick. 1977. Life history, feeding habits, and functional morphology of juvenile sciaenid fishes in the York River estuary, Virginia. *Fishery Bulletin* 75:657-702.
- Chestnut A. and H. Davis. 1975. Synopsis of marine fisheries of North Carolina. Part 1: Statistical Information, 1880-1973. North Carolina Sea Grant, Final Report UNC-SG-75-12, Morehead City, North Carolina.
- Chmura, G.L. and N.W. Ross. 1978. Environmental impacts of marinas and their boats. Rhode Island Sea Grant, RIU-T-78-005, Narragansett, Rhode Island.
- Cho, H.J. and M.A. Poirrier. 2005. Vegetation habitat based on studies in Lake Pontchartrain, Louisiana. *Restoration Ecology* 13(4):623-629.
- Churchill, J.H., R.B. Forward, R.A. Luettich, J.J. Hench, W.F. Hettler, L.B. Crowder, and J.O. Blanton. 1999. Circulation and larval fish transport within a tidally dominated estuary. *Fisheries Oceanography* 8 (Suppl. 2):173-189.
- Clardy, S.D., N.J. Brown-Peterson, M.S. Peterson, R. T. Leaf. 2014. Age, growth, and reproduction of Southern Kingfish (*Menticirrhus americanus*): a multivariate comparison with life history patterns in other sciaenids. *Fishery Bulletin* 112:178-197.
- Cochran, W.G. 1997. Sampling techniques. Third Edition. Wiley and Sons. New York, New York.

- Collie, J.S., S.J. Hall, M.J. Kaiser, and I.R. Poiners. 2000. A quantitative analysis of fishing impacts on shelf-sea benthos. *Journal of Animal Ecology* 69:785–798.
- Collier, C. 2012. Kingfish *in* Assessment of North Carolina commercial finfisheries, 2007-2012. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA07NMF4070047, Morehead City, North Carolina
- Cooper, S.R. and G.S. Brush. 1991. A 2,500 year history of anoxia and eutrophication in the Chesapeake Bay. *Science* 254:992–1001.
- Crosson, S. 2007. A social and economic analysis of commercial fisheries in North Carolina: Core Sound, NC. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Crosson, S. 2009. A social and economic analysis of commercial fisheries in North Carolina: Atlantic Ocean. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Crosson, S. 2010a. A social and economic analysis of commercial fisheries in North Carolina: Beaufort Inlet to the South Carolina state line. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Crosson, S. 2010b. A social and economic survey of recreational saltwater anglers in North Carolina. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Crowder, L., K. Hart, and M. Hooper. 2002. Trying to solve a bycatch and mortality problem: Can we exclude diamondback terrapins (*Malaclemys terrapin*) from crab pots without compromising blue crab (*Callinectes sapidus*) catch? North Carolina Sea Grant Fisheries Resource Grant, Final Report 00-FEG-23, Morehead City, North Carolina.
- Crowe, B.J. 1984. Distribution, length-frequency data of southern kingfish, *Menticirrhus americanus*, in Mississippi. *Fishery Bulletin* 82:427–434.
- Cupka, D.M. 1972. A survey of the ichthyofauna of the surf zone in South Carolina. South Carolina Wildlife and Marine Resource Department, Technical Report No. 4, Charleston, South Carolina.
- Currin, C.A., S.Y. Newell, and H.W. Paerl. 1995. The role of standing dead *Spartina alterniflora* and benthic microalgae in salt marsh food webs: considerations based on multiple stable isotope analysis. *Marine Ecology Progress Series* 121:99–116.
- Dahlberg, M.D. 1972. An ecological study of Georgia coastal fishes. *Fishery Bulletin* 70:323-354.
- Daniel III, C. C. 1978. Land use, land cover, and drainage on the Albemarle-Pamlico Peninsula, eastern North Carolina, 1974. U.S. Geological Survey, Report Number 78-134, Washington, DC.

- Darna, P.H. 2000. Reduction of seabird mortality in gill nets. North Carolina Sea Grant Fisheries Resource Grant, Final Report 99-FEG-07, Morehead City, North Carolina.
- Darna, P.H. 2002. Reduction of seabird mortality in gill nets. North Carolina Sea Grant Fisheries Resource Grant, Final Report 01-FEG-17, Morehead City, North Carolina.
- Dauer, D.M., J.A. Ranasinghe, and S.B. Weisberg. 2000. Relationships between benthic community condition, water quality, sediment quality, nutrient loads, and land use patterns in Chesapeake Bay. *Estuaries* 23:80–96.
- Deaton, A. S., W. S. Chappell, K. Hart, J. O’Neal, and B. Boutin. 2010. North Carolina CHPP. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Davis, G.J. and M.M. Brinson. 1990. A survey of submersed aquatic vegetation of the Currituck Sound and the Western Albemarle-Pamlico estuarine system. Department of Natural Resources and Community Development, Albemarle-Pamlico Estuarine Study Project No. 89-10, Raleigh, North Carolina.
- Delancey, L.B. 1984. An ecological study of the surf zone at Folly Beach, South Carolina. Master’s Thesis. The College of Charleston, Charleston, South Carolina.
- DEHNR (North Carolina Department of Environment Health and Natural Resources). 1990. North Carolina coastal marinas: water quality assessment. North Carolina Department of Environment Health and Natural Resources, Raleigh, North Carolina. 90-01:69.
- Dennison, W.C., R.J. Orth, K.A. Moore, J.C. Stevenson, V. Carter, S. Kollar, P.W. Bergstrom, and R. Batiuk. 1993. Assessing water quality with submerged aquatic vegetation. *Bioscience* 43:86–94.
- Dennison, W.C. and R.S. Alberte. 1986. Photoadaptation and growth of *Zostera marina* L. (eelgrass) along a depth gradient. *Journal of Experimental Marine Biology and Ecology* 98:265–282.
- Ditty, J.G., T.W. Farooqi, and R.F. Shaw. 2006. Sciaenidae: Drums or croakers. *In: Early stages of Atlantic fishes: An identification guide for the western central North Atlantic Volume II* (W.J. Richards, ed.), 1669-1724. Taylor and Francis, Boca Raton, Florida.
- Doxey, R. 2000. Industry Dependent Baseline Data Collection on Finfish/Terrapin Bycatch in the Crab Pot Fishery. Fisheries Equipment and Gear grant report 99-FEG-45, NC Sea Grant, NC DENR, DMF.
- Duarte, C.M. 1991. Seagrass depth limits. *Aquatic Botany* 40:363–377.
- Dumas, C., J. Whitehead, C. Landry, and J. Herstine. 2009. Economic impacts and recreational value of the North Carolina for-hire fishing fleet. North Carolina Sea Grant Fisheries Research Grant, Final Report 07-FEG-05, Morehead City, North Carolina.
- Donoghue, C.R. 1999. The influence of swash processes on *Donax variabilis* and *Emerita talpoida*. Doctoral Dissertation, University of Virginia, Charlottesville, Virginia.

- Driscoll, C.H., D. Whitall, J. Aber, E. Boyer, M. Castro, C. Cronan, C.L. Goodale, P. Groffman, C. Hopkinson, K. Lambert, G. Lawrence, and S. Ollinger. 2003. Nitrogen pollution in the Northeastern United States: sources, effects, and management. *Bioscience* 53:357–374.
- Durako, M.J. 1994. Seagrass die-off in Florida Bay (USA): changes in shoot demographic characteristics and population dynamics in *Thalassia testudinum*. *Marine Ecology Progress Series* 110:59–66.
- Dyer, K.R. and R.J. Orth. 1994. Changes in fluxes in estuaries: implications from science to management. Olsen and Olsen, Fredenburg, Denmark.
- Eby, L., L. Crowder, and C. McClellan. 2000. Neuse River estuary modeling and monitoring project Stage 1: effects of water quality on distribution and composition of the fish community. Water Resources Research Institute, Report N. 325-C, Raleigh, North Carolina.
- EPA (United States Environmental Protection Agency). 2012. U.S. Environmental Protection Agency Office of Research and Development/Office of Water, National Coastal Condition Report IV. EPA-842-R-10-003, Washington, DC.
- Epifanio, C.E. 1988. Transport of invertebrate larvae between estuaries and the continental shelf. *American Fisheries Symposium* 3:104–114.
- Epperly, S.P., J. Braun, and A.J. Chester. 1995a. Aerial surveys of sea turtles in North Carolina inshore waters. *Fishery Bulletin* 93:254–261.
- Epperly, S.P., J. Braun, and A. Veishlow. 1995b. Sea turtles in North Carolina waters. *Conservation Biology* 9:384–394.
- Evans, W.G. 2001. Size of flounder trapped in gill-nets of different mesh sizes and marketable and non-marketable bycatch (red drum). North Carolina Sea Grant Fisheries Research Grant, Final Report 98-FEG-50, Morehead City, North Carolina.
- Fahay, M. 1983. *Journal of Northwest Atlantic Fishery Science*. Volume 4. Guide to the early stages of marine fishes occurring in the western North Atlantic Ocean, Cape Hatteras to the southern Scotian Shelf. Northwest Atlantic Fisheries Organization, Dartmouth, Canada.
- Ferguson, R.L. and L.L. Wood. 1994. Rooted vascular aquatic beds in the Albemarle-Pamlico estuarine system. National Oceanic and Atmospheric Administration National Marine Fisheries Service, Project No. 94-02, Beaufort, North Carolina.
- Fischer, W. (ed). 1978. Food and Agriculture Organization of the United Nations species identification sheets for fishery purposes. Western Central Atlantic (fishing area 31). Vol. 4 Food and Agriculture Organization of the United Nations, Rome, Italy.
- FishBase 2015. FishBase. A global information system on fishes. Available (June 2015): www.fishbase.org.
- Fitzpatrick, E. 2007. Long haul seine fishery assessment *in* Assessment of North Carolina commercial finfisheries. North Carolina Department of Environment and Natural

Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA04NMF4070216, Morehead City, North Carolina.

- Fonseca, M. S., W. J. Kenworthy, and G. W. Thayer. 1998. Guidelines for the conservation and restoration of seagrasses in the United States and adjacent waters. National Oceanic and Atmospheric Administration Coastal Ocean Office, National Oceanic and Atmospheric Administration Coastal Ocean Program Decision Analysis Series No. 12, Silver Springs, Maryland.
- Forsell, D.J. 1999. Mortality of migratory waterbirds in Mid-Atlantic coastal anchored gill nets during March and April 1998. United States Fish and Wildlife Service, Administrative Report, Chesapeake Bay Field Office, Virginia.
- FR (United States Office of the Federal Register). 2006a. Taking of marine mammals incidental to commercial fishing operations; Atlantic Large Whale Reduction Plan and Endangered Species Conservation; Restriction of fishing activities. Federal Register 71:32 (16 February 2006):8223–8227.
- FR (United States Office of the Federal Register). 2006b. Right whale protection; Southeast U.S. gillnet closure. Federal Register 71: 220 (15 November 2006):66469–66471.
- FR (United States Office of the Federal Register). 2007. Taking of marine mammals incidental to commercial fishing operations; Atlantic Large Whale Take Reduction Plan. Federal Register 72:121 (25 June 2007):34632–34643.
- French, G.T. and K.A. Moore. 2003. Interactive effects of light and salinity stress on the growth, reproduction, and photosynthetic capabilities of *Vallisneria americana* (wild celery). *Estuaries* 26(5):1255–1268.
- Funderburk, S.L., J.A. Mihursky, S.J. Jordan, and D. Riley. 1991. Habitat requirements for Chesapeake Bay living resources. Habitat Objectives Workgroup, Living Resources Subcommittee and Chesapeake Research Consortium with assistance from Maryland Department of Natural Resources, Solomons, Maryland.
- Gallegos, C. L. 1994. Refining habitat requirements of submerged aquatic vegetation: role of optical models. *Estuaries* 17(18):187–199.
- Gearhart, J. 2001. Sea turtle bycatch monitoring of the 2000 fall flounder gill-net fishery of southeastern Pamlico Sound, North Carolina. National Oceanic and Atmospheric Administration National Marine Fisheries Service, Incidental Take Permit 1259 Final Report, Silver Spring, Maryland.
- Gearhart, J. 2003. Sea turtle bycatch monitoring of the 2002 fall flounder gill-net fishery of southeastern Pamlico Sound, North Carolina. National Oceanic and Atmospheric Administration National Marine Fisheries Service, Incidental Take Permit 1398 Final Report, Silver Spring, Maryland.
- Gearhart, J., and B. Price. 2003. Evaluation of modified flounder gill nets in southeastern Pamlico Sound, NC. National Oceanic and Atmospheric Administration, Final Report NA 16FG1220 Segment 1, Silver Spring, Maryland.

- Gilman, E., J. Gearhart, B. Price, S. Eckert, H. Milliken, J. Wang, Y. Swimmer, D. Shiode, O. Abe, S.H. Peckham, M. Chaloupka, M. Hall, J. Mangel, J. Alfaro-Shigueto, P. Dalzell, and A. Ishizaki. 2010. Mitigating sea turtle by-catch in coastal passive net fisheries. *Fish and Fisheries* 11:57–88.
- Goldsborough, W. J., and W.M. Kemp. 1988. Light responses of submersed macrophytes: implication for survival in turbid waters. *Ecology* 69:1775–1786.
- Grant, G.S. 1997. Impact of crab pot excluder devices on diamondback terrapin mortality and commercial crab catch. University of North Carolina-Wilmington, Wilmington, North Carolina.
- Greene, K. E., J. L. Zimmerman, R. W. Laney, and J. C. Thomas-Blate. 2009. Atlantic coast diadromous fish habitat: A review of utilization, threats, recommendations for conservation, and research needs. Atlantic States Marine Fisheries Commission, Habitat Management Series 9, Washington, D.C.
- Gray, C.A. 2002. Management implications of discarding in an estuarine multi-species gill net fishery. *Fisheries Research* 56(2002):177–192.
- Gray, J.S., R.S. Wu, and Y.Y. Or. 2002. Effects of hypoxia and organic enrichment on the coastal marine environment. *Marine Ecology Progress Series* 238:249–279.
- Hackney, C.T., M.H. Posey, S.W. Ross, and A.R. Norris. 1996. A review and synthesis of data on surf zone fishes and invertebrates in the South Atlantic Bight and the potential impacts from beach renourishment. University of North Carolina-Wilmington, U.S. Army Corps of Engineers Report, Wilmington, North Carolina.
- Hadley, J. 2012. A social and economic profile of ocean fishing piers in North Carolina. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Hadley, J., and S. Crosson. 2010. A business and economic profile of seafood dealers in North Carolina. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Hadley, J., and C. Wiegand. 2014. A social and economic analysis of commercial fisheries in North Carolina: Albemarle and Pamlico Sounds, NC. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Harding, S.M., and M.E. Chittenden, Jr. 1987. Reproduction, movements, and population dynamics of the southern kingfish, *Menticirrhus americanus*, in the Northwestern Gulf of Mexico. National Oceanic and Atmospheric Administration National Marine Fisheries Service, Technical Report 49:1–21, Silver Spring, Maryland.
- Hare, J.O., J.A. Quinlan, F.E. Werner, B.O. Blanton, J.J. Govini, R.B. Forward, L.R. Settle, and D.E. Hoss. 1999. Larval transport during winter in the SABRE study area: results of a coupled vertical larval behavior-three-dimensional circulation model. *Fisheries Oceanography* 8(2):57–76.

- Hassell, J. 2007. Characterization of flounder gill net fishing techniques and bycatch in the Pamlico River. North Carolina Sea Grant Fisheries Research Grant, Final Report 06-FEG-04, Morehead City, North Carolina.
- Havens, K. E. 2003. Submerged aquatic vegetation correlations with depth and light attenuating materials in a shallow subtropical lake. *Hydrobiologia* 493:173–186.
- Heath, R. C. 1975. Hydrology of the Albemarle-Pamlico region, North Carolina: a preliminary report on the impact of agricultural developments. U.S. Geological Survey Water Resources Investigations 80(44):1–85.
- Hildebrand, S.F. 1932. Growth of diamondback terrapin size attained, sex ratio and longevity. *Zoologica* 9:551–563.
- Hildebrand, S.F., and W.C. Schroeder. 1928. The fishes of the Chesapeake Bay. *Bulletin of United States Bureau of Fisheries* 43:1–388.
- Hildebrand, S.F., and L.E. Cable. 1934. Reproduction and development of whiting or kingfishes, drums, spot, croaker, and weakfishes or seatrouts, family Sciaenidae, of the Atlantic coast of the United States. *Bulletin of United States Bureau of Fisheries* 48:41-117.
- Hoese, H.D. 1965. Spawning of marine fishes in the Port Aransas, Texas as determined by the distribution of young and larvae. Doctoral Dissertation, University of Texas, Austin, Texas.
- Huff, J. A. 1975. Life history of Gulf of Mexico sturgeon, *Acipenser oxyrinchus desotoi*, in Suwannee River, Florida. Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Saint Petersburg, Florida.
- Imberger, R. 1983. The influence of water motion on the distribution and transport of materials in a salt marsh estuary. *Limnology and Oceanography* 28:01-214.
- IMPLAN Group, LLC. 2013. IMPLAN System, Version 3.1.1001.2. Huntersville, North Carolina. www.implan.com.
- Irwin, R.J. 1970. Geographical variation, systematics, and general biology of shore fishes of the genus *Menticirrhus*, family Sciaenidae. Doctoral Dissertation. Tulane University, New Orleans, Louisiana.
- Jin, S., I. Yang, P. Danielson, C. Homer, and J. Fry. 2013. A comprehensive change detection method for updating the National Land Cover Database to circa 2011. U.S. Geological Survey Earth Resources Observation and Science (EROS) Center. Sioux Falls, South Dakota.
- Johnson, G.A.. 2003. The Role of Trawl Discards in Sustaining Blue Crab production. North Carolina Sea Grant Fisheries Research Grant, Final Report 99-EP-07, Morehead City, North Carolina.
- Jutte, P.C., R.F. Van Dolah, and M.V. Levison. 1999. An environmental monitoring study of the Myrtle Beach renourishing project: intertidal benthic community assessment. Phase II- Myrtle Beach. South Carolina Department of Natural Resources Marine

Resources Division, U.S. Army Corps of Engineers Final Report, Charleston, South Carolina.

- Kahnle, A. W., K. A. Hattala, K. A. McKown, C. A. Shirey, M. R. Collins, T. S. Squiers, Jr., and T. Savoy. 1998. Stock status of Atlantic sturgeon of Atlantic coast estuaries. Atlantic States Marine Fisheries Commission, Report Draft III, Washington, D.C.
- Kemp, W. M., R. Batiuk, R. Bartleson, P. Bergstrom, V. Carter, C.L. Gallegos, W. hunley, L. Karrh, E.W. Koch, J.M. Landwehr, K.A. Moore, L. Murray, M. Naylor, N.B. Rybicki, J.C. Stevenson, and D.J. Wilcox. 2004. Habitat requirements for submerged aquatic vegetation in Chesapeake Bay: water quality, light regime, and physical-chemical factors. *Estuaries* 27(3):363–377.
- Kenworthy, W.J., and D.E. Haurert. 1991. The light requirements of seagrasses: proceedings of a workshop to examine the capability of water quality criteria, standards and monitoring progress to protect seagrasses. National Oceanic and Atmospheric Administration, Tech. Memo. NMFS-SEFC-287, Beaufort, North Carolina.
- Kimel, J., S. Corbett, and T. Thorpe. 2008. Selectivity of large mesh gillnets in the southeastern flounder (*Paralichthys lethostigma*) fishery. North Carolina Sea Grant Fisheries Research Grant, Final Report 07-FEG-12, Morehead City, North Carolina.
- Kirby, J., W. Maher, and F. Krikowa. 2001. Selenium, cadmium, copper, and zinc concentrations in sediments and mullet (*Mugil cephalus*) from the southern basin of Lake Macquarie, NSW Australia. *Archives of Environmental Contamination and Toxicology* 40(2):246–256.
- Koch, E. W. 2001. Beyond light: Physical, geological, and geochemical parameters as possible submersed aquatic vegetation habitat requirements. *Estuaries* 24(1):1–17.
- Kwon, Y., and C. Lee. 2001. Ecological risk assessment of sediment in wastewater discharging area by means of metal speciation. *Microchemical Journal* 70:255–264.
- Lawler, J.P., M.P. Weinstein, H.Y. Chang, and T.E. Englert. 1988. Modeling of physical and behavioral mechanisms influencing recruitment of spot and Atlantic croaker to the Cape Fear Estuary. *American Fisheries Symposium* 3:115–131.
- Lee, D.S., and M. Socci 1989. Potential impact of oil spills on seabirds and selected other oceanic vertebrates off the North Carolina coast. North Carolina State Museum of Natural Science, Department of Administration, Raleigh, North Carolina.
- Lenihan, H.S., and C.H. Peterson. 1998. How habitat degradation through fishery disturbance enhances impacts of hypoxia on oyster reefs. *Ecological Applications* 8(1):128–140.
- Lindquist, N., and L. Manning. 2001. Impacts of beach nourishment and beach scraping on critical habitat and productivity of surf fishes. North Carolina Sea Grant Fisheries Resource Grant, Final Report 98-EP-05: 41, Morehead City, North Carolina.

- Lippson, A.J., and R.L. Moran. 1974. Manual for identification of early developmental stages of fishes of the Potomac River Estuary. Maryland Department of Natural Resources, Power Plant Siting Program, PPSP-MP-13, Annapolis, Maryland.
- Lipton, I., L. Perillo, R. Dixon, P. Pellerite, and T.E. Lankford. 2010. Fish nursery function of ocean surf-zone habitat: response to a human disturbance gradient. University of North Carolina at Wilmington, Wilmington, North Carolina.
- Livingstone, D.R. 2001. Contaminant-stimulated reactive oxygen species production and oxidative damage in aquatic organisms. *Marine Pollution Bulletin* 42(8):656–666.
- Luettich, R.A., J.E. McNinch, J.L. Pinckney, M.J. Alperin, C.S. Martens, H.W. Paerl, C.H. Peterson, and J.T. Wells. 1999. Neuse River estuary modeling and monitoring project, final report: Monitoring phase. Water Resources Research Institute, Raleigh, North Carolina.
- Lupton, B.Y., and P.S. Phalen. 1996. Designing and implementing a Trip Ticket Program. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- Mansfield, K.L., V.S. Saba, J.A. Keinath, and J.A. Musick. 2009. Satellite tracking reveals a dichotomy in migration strategies among juvenile loggerhead turtles in the Northwest Atlantic. *Marine Biology* 156:2555–2570.
- Marburger, J.E., W.E. Johnson, T.S. Gross, D.R. Douglas, and J. Di. 2002. Residual organochlorine pesticides in soils and fish from wetland restoration areas in central Florida. *Wetlands* 22(4):705–711.
- Marcus, J.M., and T.P. Stokes. 1985. Polynuclear aromatic hydrocarbons in oyster tissue around three coastal marinas. *Bulletin of Environmental Contamination and Toxicology* 35:835–844.
- Matoura, R.F.C., and E.M.C. Woodward. 1983. Conservative behavior of riverine dissolved organic carbon in the Severn estuary: chemical and geochemical implications. *Geochimica et Cosmochimica Acta* 47: 1293–1309.
- McClellan, C.M., and A.J. Read. 2007. Complexity and variation in loggerhead sea turtle life history. *Biology Letters* 3(6):592–594.
- McDowell, D. E., and E. Robillard. 2013. Life history characteristics and age validation of southern kingfish (*Menticirrhus americanus*) in the middle South Atlantic Bight. *Journal of Applied Ichthyology* 29:839–846.
- McKenna, S.A. and J.P. Monaghan, Jr. 1993. Gear development to reduce bycatch in the North Carolina trawl fisheries. North Carolina Department of Environment, Health, and Natural Resources, Division of Marine Fisheries, Completion Report for Cooperative Agreement No. NA90AA-SK052 to Gulf and South Atlantic Fisheries Development Foundation Contract No. 43-01, Morehead City, North Carolina.
- McKenna, S.A., G. Judy, C.P. Lewis and J. Schoolfield. 1996. Evaluation of trawl efficiency device/bycatch reduction device in estuarine and nearshore waters of North Carolian. North Carolina Department of Environment, Health, and Natural

Resources, Division of Marine Fisheries. National Oceanic and Atmospheric Administration Completion Report No. NA 47FF0016, Morehead City, North Carolina.

- McMichael Jr., R.H., and S.T. Ross. 1987. The relative abundance and feeding habits of juvenile kingfish (*Sciaenidae:Menticirrhus*) in a Gulf of Mexico surf zone. *Northeast Gulf Sciences* 9:09–123.
- Micheli, F.M. and C.H. Peterson. 1999. Estuarine vegetated habitats as corridors for predator movement. *Conservation Biology* 13(4):869-881.
- Miller, J.M., L.B. Crowder, and M.L. Moser. 1985. Migration and utilization of estuarine nurseries by juvenile fishes: an evolutionary perspective. p. 338-352 *in* M.A. Rankin (ed.). *Migration: mechanisms and adaptive significance. Contributions to Marine Science (Supplement) 27.*
- Miller, D.C., R.J. Geider, and H.L. MacIntyre. 1996. Microphytobenthos: the ecological role of the "secret garden" of unvegetated, shallow-water marine habitats. II. Role in sediment stability and shallow-water food webs. *Estuaries* 19(2A):202–212.
- Miller, M.J., P.M. Rowe, and K.W. Able. 2002. Occurrence and growth rates of young-of-year northern kingfish, *Menticirrhus saxatilis*, on ocean and estuarine beaches in southern New Jersey. *Copeia* 2002:815–823.
- Mitsch, W.J. and J.G. Gosselink. 1993. *Wetlands, Second Edition.* Van Nostrand Reinhold, New York, NY, Second Edition.
- Modde, T. 1980. Growth and residency of juvenile fishes within a surf zone habitat in the Gulf of Mexico. *Gulf Research Reports* 6:77–385.
- Modde, T., and S.T. Ross. 1981. Seasonality of fishes occupying a surf zone habitat in the northern Gulf of Mexico. *Fishery Bulletin* 78:911–922.
- Montgomery, G. 2001. By-catch comparison of flounder gill nets utilizing different denier webbing. North Carolina Sea Grant Fisheries Resource Grant, Final Report 99-FEG-36, Morehead City, North Carolina.
- Montgomery, G. 2002. Catch comparison of three gill net designs in the N.C. flounder gill net fishery. North Carolina Sea Grant Fisheries Resource Grant , Final Report 01-FEG-15, Morehead City, North Carolina.
- Moore, K. A., H.A. Neckles, and R.J. Orth. 1996. *Zostera marina* (eelgrass) growth and survival along a gradient of nutrients and turbidity in the lower Chesapeake Bay. *Marine Ecology Progress Series.* 142(.):247–259.
- Moore, K. A., R.L. Wetzel, and R.J. Orth. 1997. Seasonal pulses of turbidity and their relations to eelgrass (*Zostera marina* L.) survival in an estuary. *Journal of Experimental Marine Biology and Ecology.* 215:115–134.
- Moser, M. L. and S. W. Ross. 1995. Habitat use and movements of shortnose and Atlantic sturgeons in the lower Cape Fear River, North Carolina. *Transactions of the American Fisheries Society* 124:225–234.
- Moser et al. 1998

- Murawski, S. A. 1996. Factors influencing by-catch and discard rates: Analyses from multispecies/multifishery sea sampling. *Journal of Northwest Atlantic Fishery Science*. 19:31-39. Musick, J.A., D.E. Barnard, and J.A. Keinath. 1994. Aerial estimates of seasonal distribution and abundance of sea turtles near the Cape Hatteras faunal barrier. Pages 121–123 in B.A. Schroeder and B. E. Witherington, editors. *Proceedings of the Thirteenth Annual Symposium on Sea Turtle Biology and Conservation*. National Oceanic and Atmospheric Administration National Marine Fisheries Service, Technical Memorandum NMFS-SEFSC-341, Miami, Florida.
- Mzimela, H.M., V. Wepener, and D.P. Cyrus. 2003. Seasonal variation of selected metals in sediments, water and tissues of the groovy mullet, *Liza dumerelii* (Mugilidae) from the Mhlathuze Estuary, South Africa. *Marine Pollution Bulletin* 46:659–676.
- NCDMF (North Carolina Division of Marine Fisheries). 1990. Justification for submerged aquatic vegetation critical habitat designation. North Carolina Division of Marine Fisheries, Unpublished Report, Morehead City, North Carolina.
- NCDMF (North Carolina Division of Marine Fisheries). 1999. Shrimp and crab trawling in North Carolina's estuarine waters. DENR, Morehead City, NC Report to NC Marine Fisheries Commission.
- NCDMF (North Carolina Division of Marine Fisheries). 2007. North Carolina Fishery Management Plan for Kingfish. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- NCDMF (North Carolina Division of Marine Fisheries). 2012. Assessment of North Carolina Commercial Finfisheries, 2007-2012. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina.
- NCDWQ (North Carolina Division of Water Quality). 1998. Neuse River estuary SAV ground-truthing study. DWQ, Unpub. Rep.
- NCDWQ (North Carolina Division of Water Quality). 2000a. Water quality progress in North Carolina in 1998-1999, 305(b) report. Department of Environmental and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- NCDWQ (North Carolina Division of Water Quality). 2000b. A citizen's guide to water quality management in North Carolina. Department of Environmental and Natural Resources, Division of Water Quality, Raleigh, North Carolina.
- NRC (National Research Council). 2006. Review of recreational fisheries survey methods. Committee on the Review of Recreational Fisheries Survey Methods, National Research Council. The National Academies Press, Washington, D.C.
- NMFS (National Marine Fisheries Service). 2012. New Method Improves Catch Estimates. [http://www.countmyfish.noaa.gov/aboutus/downloads/MRIP_Estimation_Fact_Sheet\(Jan%2024\).pdf](http://www.countmyfish.noaa.gov/aboutus/downloads/MRIP_Estimation_Fact_Sheet(Jan%2024).pdf) [Accessed December 1, 2014].
- NMFS (National Marine Fisheries Service). 2013. Incidental Take Permit #16230. National Marine Fisheries Service, Silver Spring, Maryland. Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=7289a542-09fd-4403-bb55-324cbe631944&groupId=38337 (May 2014).

- NMFS (National Marine Fisheries Service). 2014. Incidental Take Permit #18102. National Marine Fisheries Service, Silver Spring, Maryland. Available: http://portal.nce.dnr.org/c/document_library/get_file?uuid=0125e89c-1c6d-4d59-a430-1206754517c5&groupId=38337 (August 2014).
- NMFS (National Marine Fisheries Service), and USFWS (United States Fish and Wildlife Service). 1991a. Recovery plan for U.S. population of Atlantic green turtle. National Marine Fisheries Service, Silver Spring, Maryland 52.
- NMFS (National Marine Fisheries Service), and USFWS (United States Fish and Wildlife Service). 1991b. Recovery plan for U.S. population of loggerhead turtle. National Marine Fisheries Service, Silver Spring, Maryland 64.
- NMFS (National Marine Fisheries Service), and USFWS (United States Fish and Wildlife Service). 1992. Recovery plan for leatherback turtles in the U.S. Caribbean Sea, Atlantic Ocean and Gulf of Mexico. National Marine Fisheries Service and U.S. Fish and Wildlife Service.
- NMFS (National Marine Fisheries Service), and USFWS (United States Fish and Wildlife Service). 1993a. Recovery plan for the Kemp's Ridley sea turtle. National Marine Fisheries Service, St. Petersburg, Florida 40.
- NMFS (National Marine Fisheries Service), and USFWS (United States Fish and Wildlife Service). 1993b. Recovery plan for hawksbill turtles in the U.S. Caribbean Sea, Atlantic Ocean, and Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, Florida 52.
- NOAA (National Oceanic and Atmospheric Administration). 2011. A User's Guide to the National and Coastal State I/O Model. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Miami, Florida.
- Ojeda, G.Y., P.T. Gayes, A.L. Sapp, P.C. Jutte, and R.F. Van Dolah. 2001. Habitat mapping and sea bottom change detection on the shoreface and inner shelf adjacent to the Grand Strand beach nourishment project. Coastal Carolina University and South Carolina Department of Natural Resources, Charleston, South Carolina.
- Paerl, H. 2002. Connecting atmospheric nitrogen deposition to coastal eutrophication. *Environmental Science & Technology* 36:323A–326A.
- Paerl, H.W., M.M. Mallin, C.A. Donahue, M. Go, and B.L. Peierls. 1995. Nitrogen loading sources and eutrophication of the Neuse River, North Carolina: direct and indirect roles of atmospheric deposition. University of North Carolina - Chapel Hill, Water Resources Research Institute, Publication, Chapel Hill, North Carolina.
- Palmeira, L. P., and C. Monteiro-Neto. 2010. Ecomorphology and food habits of teleost fishes *Trachinotus carolinus* (teleostei:Carangidae) and *Menticirrhus littoralis* (teleostei:Sciaenidae), inhabiting the surf zone off Niteroi, Rio De Janeiro, Brazil. *Brazilian Journal of Oceanography* 58:1–9.

- Palmer, W.M., and C.L. Cordes. 1988. Habitat suitability index models: Diamondback terrapin (nesting) — Atlantic Coast. United States Fish and Wildlife Service, Biological Report 82(10.151):18, Washington, D.C.
- Perillo, L., and T.E. Lankford. 2010. Long-term effects of beach nourishment on the diets of juvenile *Trachinotus carolinus* (Florida pompano) and *Menticirrhus littoralis* (Gulf kingfish). University of North Carolina at Wilmington, Wilmington, North Carolina.
- Peterson, C.H. and N.M. Peterson. 1979. The ecology of intertidal flats of North Carolina: A community profile. U.S. Fish and Wildlife Service, OBS-79/39, Washington, D.C.
- Peterson, B.J. and R.W. Howarth. 1987. Sulfur, carbon, and nitrogen isotopes used in trace organic matter flow in the salt-marsh estuaries of Sapelo Island, Georgia. *Limnology and Oceanography* 32:1195–1213.
- Peterson, C.H., H.C. Summerson, E. Thompson, H.S. Lenihan, J. Grabowski, L. Manning, F. Micheli, and G. Johnson. 2000. Synthesis of linkages between benthic and fish communities as a key to protecting essential fish habitat. *Bulletin of Marine Science* 66(3):759–774.
- Posey, M.H. and T.D. Alphin. 2001. Monitoring of benthic faunal responses to sediment removal associated with the Carolina Beach and vicinity - area south project. University of North Carolina-Wilmington, U.S. Army Corps of Engineers Final Report, Wilmington, North Carolina.
- Posey, M.H. and W.G. Ambrose Jr. 1994. Effects of proximity to an offshore hard-bottom reef on infaunal abundances. *Marine Biology* 118(4):745–753.
- Potthoff, M.T. 2004. Long haul seine fishery assessment *in* Assessment of North Carolina commercial finfisheries 2003-2004. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Completion Report for Project NA 03 NMF 4070160, Morehead City, North Carolina
- Price, B. 2004. Sea turtle bycatch monitoring of the 2003 fall flounder gill-net fishery of southeastern Pamlico Sound, North Carolina. National Marine Fisheries Service, Incidental Take Permit 1398 Final Report, Silver Spring, Maryland 26.
- Price, B. 2005. Sea turtle bycatch monitoring of the 2004 fall gill-net fisheries of southeastern Pamlico Sound, North Carolina. National Marine Fisheries Service, Incidental Take Permit 1398 Final Report, Silver Spring, Maryland 26.
- Price, B. 2006. Sea turtle bycatch monitoring of the 2005 fall gill-net fisheries of southeastern Pamlico Sound, North Carolina. National Marine Fisheries Service, Incidental Take Permit 1528 Final Report, Silver Spring, Maryland.
- Price, B. 2007. Sea turtle bycatch monitoring of the 2006 fall flounder gill net fishery of southeastern Pamlico Sound, North Carolina. National Marine Fisheries Service, Incidental Take Permit 1528 Final Report, Silver Spring, Maryland 25.
- Price, B. 2009. Sea turtle bycatch monitoring of the 2008 fall flounder gill net fishery of southeastern Pamlico Sound, North Carolina. National Marine Fisheries Service, Incidental Take Permit 1528 Final Report, Silver Spring, Maryland 26.

- Price, B., and C. Van Salisbury. 2007. Low-profile gill net testing in the deep water region of Pamlico Sound, NC. North Carolina Sea Grant Fisheries Research Grant, Final Report 06-FEG-02, Morehead City, North Carolina 24.
- Rakocinski, C., S.E. LeCroy, J.A. McLelland, and R.W. Heard. 1993. Responses by macroinvertebrate communities to beach renourishment at Perdido Key, Florida: benthic recovery. U.S. Department of the Interior, National Park Service, Washington, D.C.
- Ralph, D.E. 1982. Biological and fisheries data on the northern kingfish, *Menticirrhus saxatilis*. National Oceanic and Atmospheric Administration's Nations Ocean Service, Technical Series Report. No. 27, Washington, D.C.
- Rebel, T.P. 1974. Sea turtles and the turtle industry of the West Indies, Florida, and the Gulf of Mexico. University of Miami Press, Coral Gables, Florida.
- Reed, A.J., and J.T. Wells. 2000. Sediment distribution patterns offshore of a renourished beach: Atlantic Beach and Fort Macon, North Carolina. *Journal of Coastal Research* 16(1):88-98.
- Reilly, F.J., Jr. and B.J. Bellis. 1983. The ecological impact of beach nourishment with dredged materials on the intertidal zone at Bogue Banks, North Carolina. U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Virginia.
- Riggs, S.R. 1996. Sediment evolution and habitat function of organic-rich muds within the Albemarle estuarine system, North Carolina. *Estuaries* 19(2A):169–185.
- Riggs, S.R., J.T. Bray, E.R. Powers, C. Hamilton, D. Ames, D. Yeates, K. Owens, S. Lucas, J. Watson, and M. Williamson. 1991. Heavy metal pollutants in organic-rich muds of the Neuse River Estuary: their concentration and distribution. North Carolina Department of Environmental and Natural Resources, Albemarle-Pamlico Estuarine Study Report Project no. 90-07, Raleigh, North Carolina.
- Rodrigues, F. L., and J. P. Vieira. 2010. Feeding strategy of *Menticirrhus americanus* and *Menticirrhus littoralis* (Perciformes:Sciaenidae) juveniles in a sandy beach surf zone of southern Brazil. *Zoologia* 27 (6):73–880.
- Roosenburg, W. M., W. Cresko, M. Modesitte, and M. B. Robbins. 1997. Diamondback terrapin (*Malaclemys terrapin*) mortality in crab pots. *Conservation Biology* 11:1166–1172.
- Rose, T. L. 2000. Migratory bird bycatch in submerged versus floating shad gill nets. North Carolina Sea Grant Fisheries Research Grant, Final Report 99-FEG-34, Morehead City, North Carolina 53.
- Rose, T. L. 2001. Migratory bird bycatch in submerged versus floating shad gill nets. North Carolina Sea Grant Fisheries Research Grant, Final Report 00-FEG-22, Morehead City, North Carolina 54.
- Rose, T. L. 2004. Migratory bird bycatch in submerged versus floating shad gill nets. North Carolina Sea Grant Fisheries Research Grant, Final Report 01-FEG-04, Morehead City, North Carolina 62.

- Ross, J., and L. Noble. 1990. Justification for submerged aquatic vegetation critical habitat designation. North Carolina Marine Fisheries Commission, Report, Morehead City, North Carolina
- Ross, S.T., R.H. McMichael Jr., and D.L. Ruple. 1987. Seasonal and diel variation in the standing crop of fishes and macroinvertebrates from a Gulf of Mexico surf zone. *Estuarine, Coastal, and Shelf Science* 25:391–412.
- Ross, S. W., F. C. Rohde, and D. G. Lindquist. 1988. Endangered, threatened, and rare fauna of North Carolina, part 2. A re-evaluation of the marine and estuarine fishes. North Carolina Biological Survey, Occasional Papers 1988–7, Raleigh, North Carolina.
- Ross, S.W., and J.E. Lancaster. 2002. Movements and site fidelity of two juvenile fish species using surf zone nursery habitats along the southeastern North Carolina coast. *Environmental Biology of Fishes* 63:161–172.
- SAFMC (South Atlantic Fisheries Management Council). 1998. Final habitat plan for the South Atlantic region: Essential Fish Habitat requirements for fishery management plans of the South Atlantic Fishery Management Council. South Atlantic Fisheries Management Council, Final Report, Charleston, South Carolina.
- SAFMC (South Atlantic Fishery Management Council). 2009. Fishery ecosystem plan of the south Atlantic region. Volume II: South Atlantic habitats and species. South Atlantic Fishery Management Council, Charleston, South Carolina.
- Sargent, F. J., T.J. Leary, D.W. Crewz, and C.R. Kruer. 1995. Scarring of Florida's seagrasses: Assessment and management options. Florida Department of Environmental Protection, FMRI Technical Report TR-1, St. Petersburg, Florida.
- Schaefer, R.H. 1965. Age and Growth of the northern kingfish in New York waters. *New York Fish and Game Journal* 12:191–216.
- Seabergh, W.C. 1988. Observations on inlet flow patterns derived from numerical and physical modeling studies. *American Fisheries Symposium* 3:16–25.
- SEAMAP-SA (Southeast Area Monitoring and Assessment Program). 2004. SEAMAP Deep water (200 - 2,000 meters) Bottom Mapping Protocols to Capture and transform data into standardized database. SEAMAP South Atlantic Bottom Mapping Workgroup, Charleston, South Carolina.
- SEAMAP (Southeast Area Monitoring and Assessment Program). 2013. SEAMAP-SA program. Coastal Survey, Reef Fish Survey, Red Drum Survey, Data Management and Southeast Regional Taxonomic Center at South Carolina Department of Natural Resources FY 2012, No. NA11NMF4350043, South Carolina Department of Natural Resources, Marine Research Division, Charleston, South Carolina.
- Seigel, R.A. 1980. Predation by raccoons on diamondback terrapins, *Malaclemys terrapin tequesta*. *Journal of Herpetology* 14:87–89.
- Seigel, R.A., and J.W. Gibbons. 1995. Workshop on the ecology, status, and management of the diamondback terrapin (*Malaclemys terrapin*), Savannah River Ecology

Laboratory, 2 August 1994: Final results and recommendations. *Chelonian Conservation and Biology* 1:240–243.

- Shoop, C.R., and R.D. Kenney. 1992. Seasonal distributions and abundances of loggerhead and leatherback sea turtles in waters of the northeastern United States. *Herpetological Monographs* 6:43–67.
- Smith, T. I. J. 1985. The fishery, biology, and management of Atlantic sturgeon, *Acipenser oxyrinchus*, in North America. *Environmental Biology of Fishes* 14:61–72.
- Smith, J.W., and C.A. Wenner. 1985. Biology of the southern kingfish in the South Atlantic Bight. *Transactions of the American Fisheries Society* 114:356–366.
- SSSRT (Shortnose Sturgeon Status Review Team). 2010. A biological assessment of shortnose sturgeon (*Acipenser brevirostrum*). National Marine Fisheries Service, Northeast Regional Office, Woods Hole, Massachusetts 417.
- Snover, M. L. 2002 Growth and ontogeny of sea turtles using skeletochronology: methods, validation, and applications to conservation. Dissertation, Duke University, Durham, NC. STAC (Sea Turtle Advisory Committee). 2006. Sea Turtle Interactions with North Carolina Fisheries. North Carolina Marine Fisheries Commission, Sea Turtle Advisory Committee Review and Recommendations, Morehead City, North Carolina 72.
- Tagatz, M.E., and D.L. Dudley. 1961. Seasonal occurrence of marine fishes in four shore habitats near Beaufort, NC, 1957-1960. United States Fish and Wildlife Service, Special Scientific Report No. 390, Washington, D.C.
- Taylor, L., and N. Donello. 2000. Night vs. day bycatch comparison for shrimp trawling in the inland waters of the southern district of North Carolina. North Carolina Sea Grant Fisheries Research Grant, Final Report 99-FEG-28, Morehead City, North Carolina.
- Teal, J. 1962. Energy flow in salt marsh macrophyte production: a review. *Ecology* 43:614–624.
- Tenore, K.R. 1972. Macrobenthos of the Pamlico River estuary, North Carolina. *Ecological Monographs* 42:51–69.
- Thayer, G.W., W.J. Kenworthy, and M.S. Fonseca. 1984. The ecology of eelgrass meadows of the Atlantic coast: a community profile. U.S. Fish and Wildlife Service, FWS/OBS-84/02, Washington, D.C.
- Thieler, E.R., A.L. Brill, W.J. Cleary, C.H. Hobbs III, and R.A. Gammisch. 1995. Geology of the Wrightsville Beach, North Carolina shoreface: implications for the concept of shoreface profile of equilibrium. *Marine Geology* 126:271–287.
- Thieler, E.R., W.C. Schwab, M.A. Allison, J.F. Denny, and W.W. Danforth. 1998. Sidescan-sonar imagery of the shoreface and inner continental shelf, Wrightsville Beach, North Carolina. United States Geological Survey, Open-file Report 98-596, Washington, D.C.

- Thompson, N.B., and H. Huang. 1993. Leatherback turtles in southeast U.S. waters. National Oceanic and Atmospheric Administration National Marine Fisheries Service, Technical Memorandum NMFS-SEFSC-318, Miami, Florida.
- Thorpe, T., D. Beresoff, and K. Cannady. 2001. Gillnet bycatch potential, discard mortality, and condition of red drum (*Sciaenops ocellatus*) in southeastern North Carolina. North Carolina Sea Grant Fisheries Research Grant, Final Report 00-FEG-14, Morehead City, North Carolina 78.
- Thorpe, T., M. Hooper, and T. Likos. 2004. Bycatch potential, discard mortality and condition of fish and turtles associated with the spring commercial blue crab (*Callinectes sapidus*) pot fishery. Final Report to: North Carolina Marine Fisheries Commission Blue Crab Research Program. 04-POP-03.
- Thorpe, T., and D. Beresoff. 2005. Effects of gillnet tie-downs on fish and bycatch rates associated with American shad (*Alosa sapidissima*) and flounder (*Paralichthys* spp.) fisheries in southeastern North Carolina. North Carolina Sea Grant Fisheries Research Grant, Completion Report 04-FEG-03, Morehead City, North Carolina 124.
- Twilley, R.R., W.M. Kemp, K.W. Staver, J.C. Stevenson, and W.R. Boynton. 1985. Nutrient enrichment of estuarine submersed vascular plant communities. 1. Algal growth and effects on production of plants and associated communities. Marine Ecology Progress Series 23:179–191.
- Uncles, R.J., J.A. Stephens, and T.Y. Woodrow. 1988. Seasonal cycling of estuarine sediment and contaminant transport. Estuaries 11:108–116.
- USACE (United States Army Corps of Engineers). 2001. The New York District's biological monitoring program for the Atlantic coast of New Jersey, Asbury Park to Manasquan section beach erosion control project. United States Army Corps of Engineers Final report, Vicksburg, Mississippi.
- USACE (United States Army Corps of Engineers). 2003. Effects of dredged material beach disposal on surf zone and nearshore fish and benthic resources on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach, North Carolina: Interim study findings. Versar, Inc., Columbia, Maryland.
- Van Den Avyle, M. J. 1984. Species profile: Life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic): Atlantic sturgeon. United States Fish and Wildlife Service, Report FWS/OBS-82/11.25, and United States Army Corps of Engineers, TR EL-82-4, Washington, D.C.
- Van Dolah, R.F., R.M. Martore, A.E. Lynch, M.V. Levison, P.H. Wendt, D.J. Whitaker, and W.D. Anderson. 1994. Environmental evaluation of the Folly Beach nourishment project. South Carolina Department of Natural Resources Marine Resources Division, Final Report by United States Army Corp of Engineers, Charleston, South Carolina.
- Van Dolah, R.F., P.H. Wendt, R.M. Martore, M.V. Levison, and W.A. Roumillat. 1992. A physical and biological monitoring study of the Hilton Head beach nourishment project. South Carolina Department of Natural Resources, Final Report prepared for

the Town of Hilton Head Island and South Carolina Coastal Council, Charleston,
South Carolina.

- Viosca, P. 1959. Kingfish, blonde and brunette. *Louisiana Conservationist* 11:8–20.
- Virnstein, R. W., and L.J. Morris. 1996. Seagrass preservation and restoration: a diagnostic plan for the Indian River Lagoon. St. Johns River Water Management District, Technical Memo #14, Palatka, Florida.
- Vladykov, V. D., and J. R. Greeley. 1963. Order Acipenseriformes. Pages 46–56 in H. B. Bigelow, editor. *Fishes of the western North Atlantic: Part three soft-rayed bony fishes*. Sears Foundation for Marine Research, Yale University, New Haven, Connecticut.
- Voudrias, E.A., and C.L. Smith. 1986. Hydrocarbon pollution from marinas in estuarine sediments. *Estuarine Coastal Shelf Sciences* 22:71-284.
- Wannamaker, C.M., and J.A. Rice . 2000. Effects of hypoxia on movements and behavior of selected estuarine organisms from the southeastern United States. *Journal of Experimental Marine Biology and Ecology* 249:145–163.
- Waring G.E., J. E. K. Maze-Foley, and P.E. Rosel, editors. 2009. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments — 2009. National Oceanic and Atmospheric Administration National Marine Fisheries Service - Northeast Regional Office, Technical Memorandum, Woods Hole, Massachusetts 213:528.
- Watling, L., and E. Norse. 1998. Disturbance of the seabed by mobile fishing gear: a comparison to forest clearcutting. *Conservation Biology* 12(6):1180–1197.
- Weis, J.S., P. Weis, and T. Proctor. 1998. The extent of benthic impacts of CCA-treated wood structures in Atlantic coast estuaries. *Archives of Environmental Contamination and Toxicology* 34(4):313–322.
- Weis, J.S., and P. Weis. 1989. Effects of environmental pollutants on early fish development. *Aquatic Sciences* 1(1):45–55.
- Wells, J.T. 1989. A scoping study of the distribution, composition, and dynamics of water-column and bottom sediments: Albemarle-Pamlico estuarine system. Institute of Marine Sciences, University of North Carolina-Chapel Hill, Morehead City, North Carolina, 89-05.
- Welsh, W.W. and C.M. Breder. 1923. Contributions to the life histories of Sciaenidae of the eastern United States coast. *Bulletin of United States Bureau of Fisheries* 39:141-201.
- Wendt, P.H., R.F. Van Dolah, M.Y. Bobo, and J.J. Manzi. 1990. Effects of marina proximity on certain aspects of the biology of oysters and other benthic macrofauna in a South Carolina estuary. South Carolina Wildlife and Marine Resources Department, South Carolina Marine Resources Center Tech. Rep. No. 74, Charleston, South Carolina.

- White, R.R., and J.L. Armstrong. 2000. Survival of Atlantic sturgeon captured by flounder gill nets in Albemarle Sound. North Carolina Sea Grant Fisheries Research Grant, Final Report 98-FEG-39, Morehead City, North Carolina.
- Wilbur, A.R., and M.W. Pentony. 1999. Human-induced nonfishing threats to essential fish habitat in the New England region. p. 299-321 *in* L.R. Benaka (ed.). *Fish Habitat: Essential Fish Habitat and Rehabilitation*. American Fishery Society, Silver Springs, Maryland, Symposium 22.
- Wilber, D.H., and D.G. Clarke. 2001. Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. *North American Journal of Fisheries Management* 21(4):855-875.
- Wilk, S.J., W.W. Morse, and D. E. Ralph. 1978. Length-weight relationships of fishes collected in the New York Bight. *Bull. New Jersey Acad. Sci.* 23(2): 58-64.
- Williams, V.G. 2000. Characterization of shallow water mullet gill net fisheries by species, by catch, and fishing method. North Carolina Sea Grant Fisheries Research Grant, Final Report 97-FEG-37, Morehead City, North Carolina.
- Witzell, W.N., and T. Azarovitz. 1996. Relative abundance and thermal and geographic distribution of sea turtles off the U.S. Atlantic Coast based on aerial surveys (1963–1969). National Oceanic and Atmospheric Administration National Marine Fisheries Service, Technical Memorandum NMFS-SEFSC-381, Miami, Florida.
- Wood, R. 1995. Terrapins, tires and traps. *New Jersey Outdoors* 1995:16–19.
- White, H. 2012. Ocean gill net fishery assessment *in* Assessment of North Carolina Commercial Finfisheries. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Final Performance Report for Award Number NA07NMF4070047, Morehead City, North Carolina.
- Wright, G. 2012. Long haul seine fishery assessment *in* Assessment of North Carolina commercial finfisheries. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Completion Report for Award Number NA07NMF4070047, Morehead City, North Carolina.

15.0 APPENDICES

15.1 APPENDIX 1. EVALUATION OF MANAGEMENT TRIGGERS FOR KINGFISH

November 2014
Updated January 2015

Laura Lee
Ray Mroch
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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 \geq length at 50% maturity (L_{50}) for NCDMF Program 195 June

Proportion of adults $\geq L_{50}$ for NCDMF Program 915

Proportion of adults $\geq L_{50}$ for SEAMAP summer

→ If the proportion of adults $\geq L_{50}$ falls below 2/3 of the average proportion of adults $\geq L_{50}$ 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 $\geq L_{50}$ are shown in Figures 4 through 6. The proportions of adults $\geq L_{50}$ 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.

REFERENCES

- Francis, R.I.C.C., and D.J. Jellyman. 1999. Are mean size data adequate to monitor freshwater eel fisheries? *Marine and Freshwater Research* 50(4):355–366.
- Francis, R.I.C.C., and D.C. Smith. 1995. Mean length, age, and otolith weight as potential indicators of biomass depletion for orange roughy, *Hoplostethus atlanticus*. *New Zealand Journal of Marine and Freshwater Research* 29(4):581–587.
- Harley, S.J., R.A. Myers, and A. Dunn. 2001. Is catch-per-unit-effort proportional to abundance? *Canadian Journal of Fisheries and Aquatic Sciences* 58(9):1760–1772.
- Maunder, M.N., and A.E. Punt. 2004. Standardizing catch and effort data: a review of recent approaches. *Fisheries Research* 70(2-3):141–159.
- 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.

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.

Year	BIOLOGICAL MONITORING			FISHERIES-INDEPENDENT SURVEYS			OTHER
	Proportion of Adults >= L50			YOY Indices		Adult Index	Relative <i>F</i>
	Program 195 June	Program 915	SEAMAP Summer	Program 195 September	SEAMAP Fall	SEAMAP Summer	Relative <i>F</i>
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
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Total Years	27	13	25	27	25	25	25
n Exceed	2	0	4	14	9	11	14

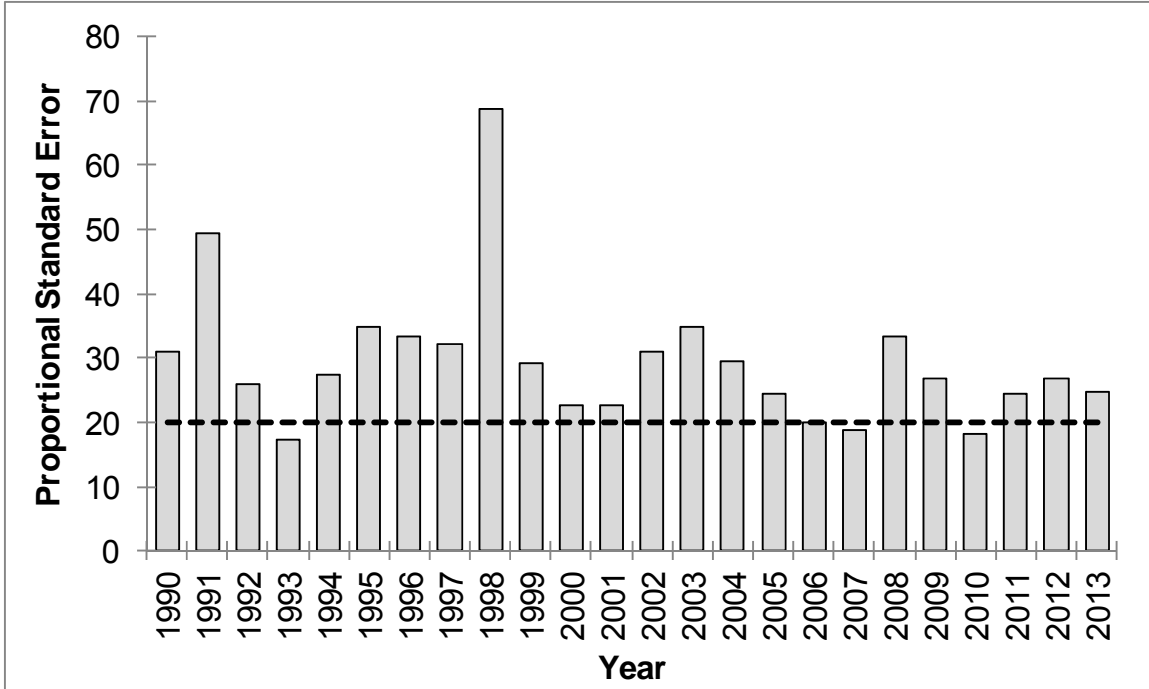


Figure 1. Annual PSE values associated with the GLM-standardized index of southern kingfish occurring in the June component of the Pamlico Sound Survey, 1990–2013. Dotted line represents 20% PSE.

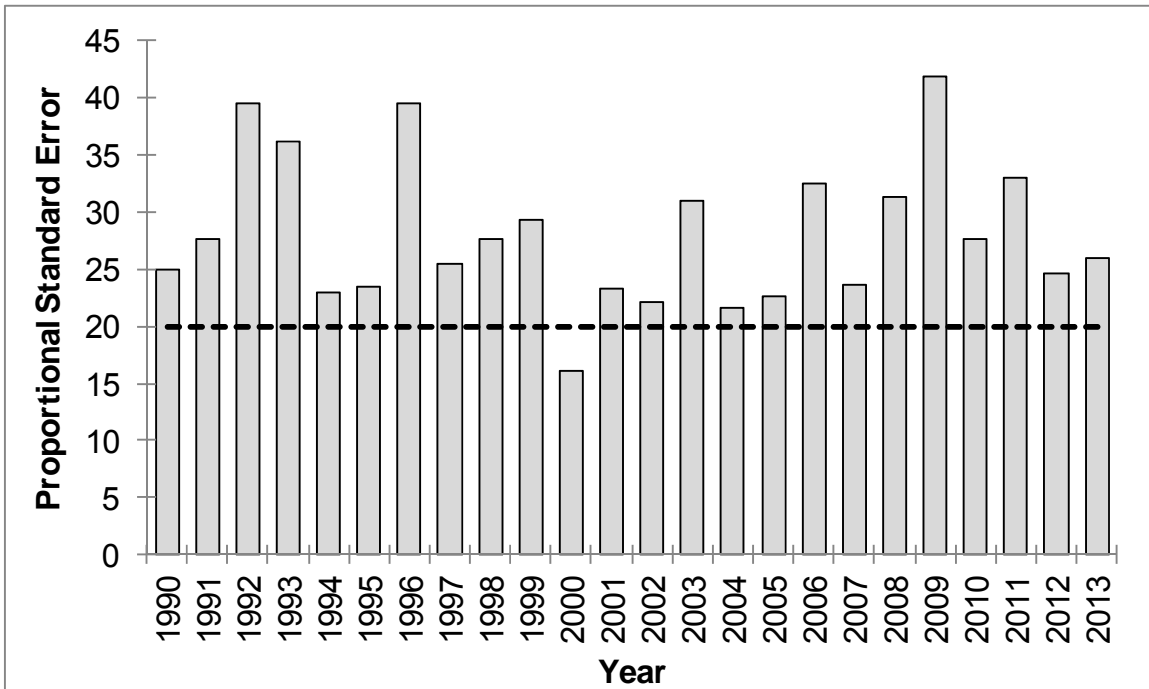


Figure 2. Annual PSE values associated with the GLM-standardized index of southern kingfish occurring in the September component of the Pamlico Sound Survey, 1990–2013. Dotted line represents 20% PSE.

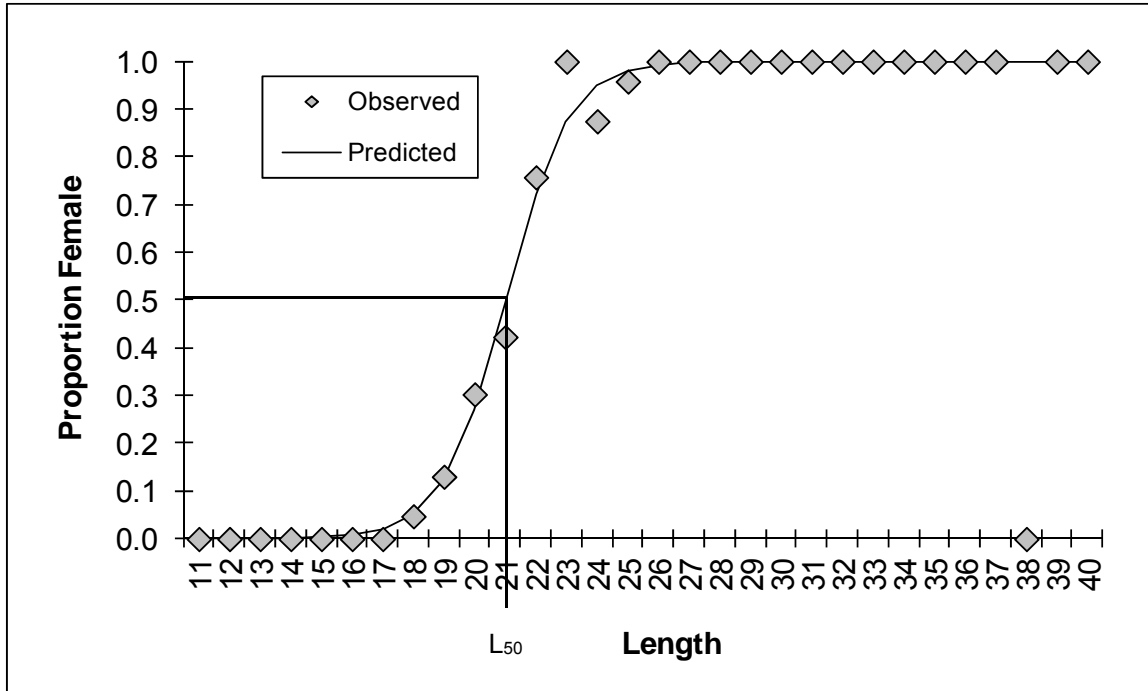


Figure 3. Predicted maturity schedule for male and female (pooled) southern kingfish.

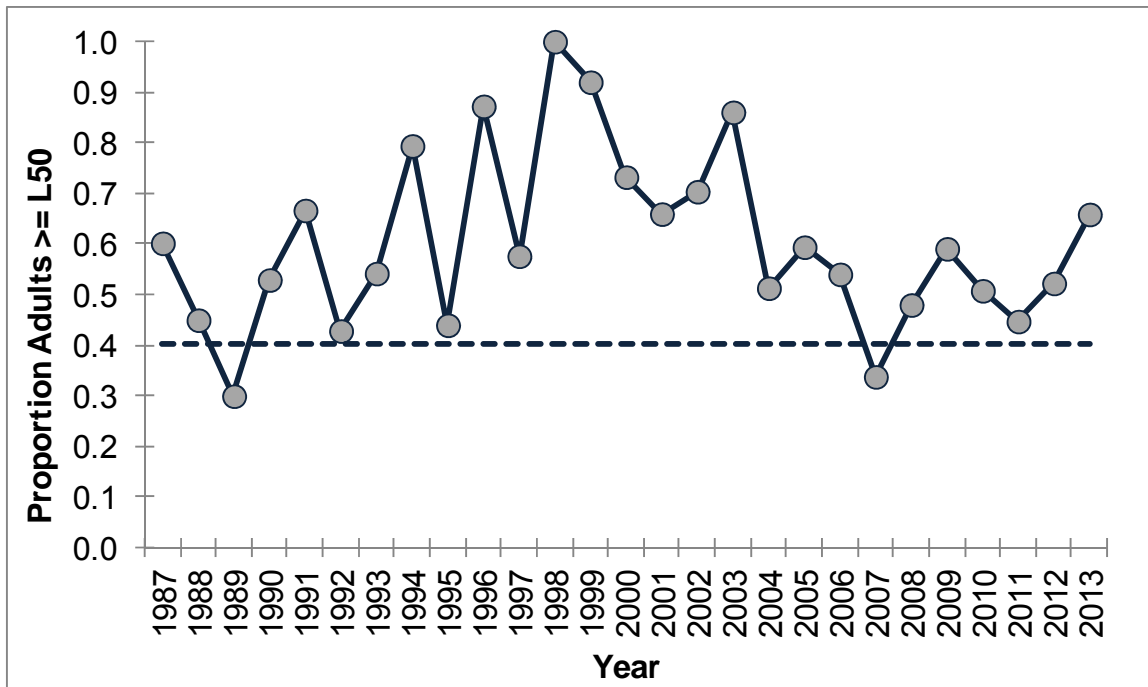


Figure 4. Annual proportions of adults greater than or equal to the length at 50% maturity occurring in the June component of the NCDMF Program 195 survey (excluding strata NR, PR, and PUN), 1987–2013. Dotted line represents 2/3 of the average of the time series.

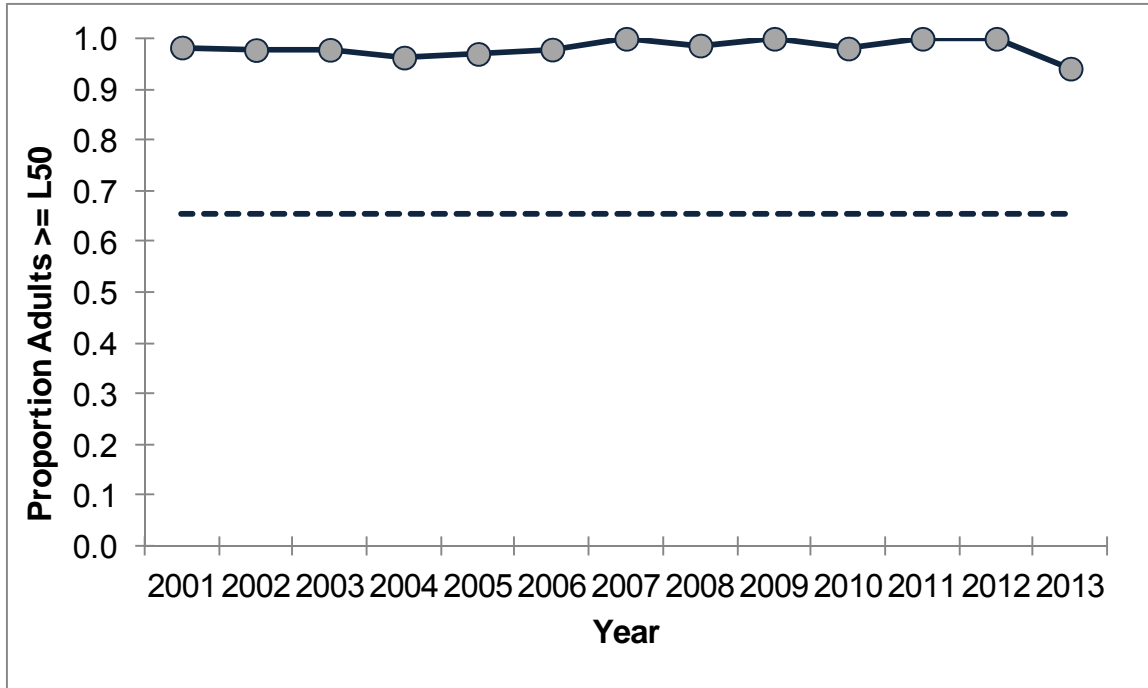


Figure 5. Annual proportions of adults greater than or equal to the length at 50% maturity occurring in the July–September component of the NCDMF Program 915 survey (Pamlico Sound deep strata only), 2001–2013. Dotted line represents 2/3 of the average of the time series.

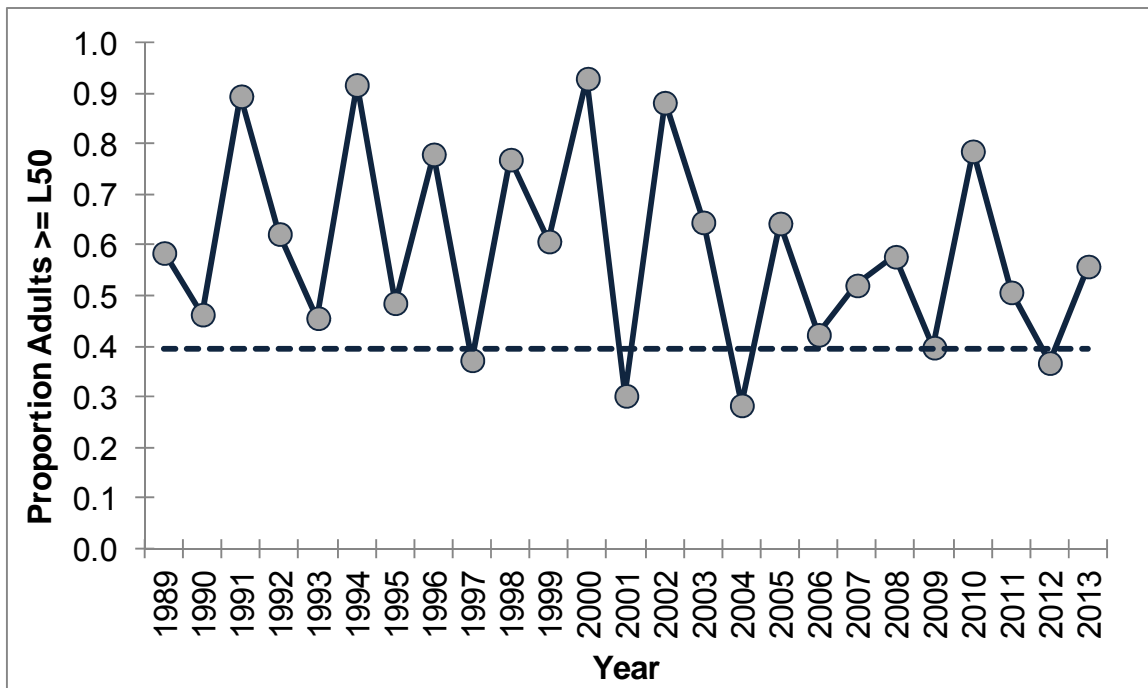


Figure 6. Annual proportions of adults greater than or equal to the length at 50% maturity occurring in the summer component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

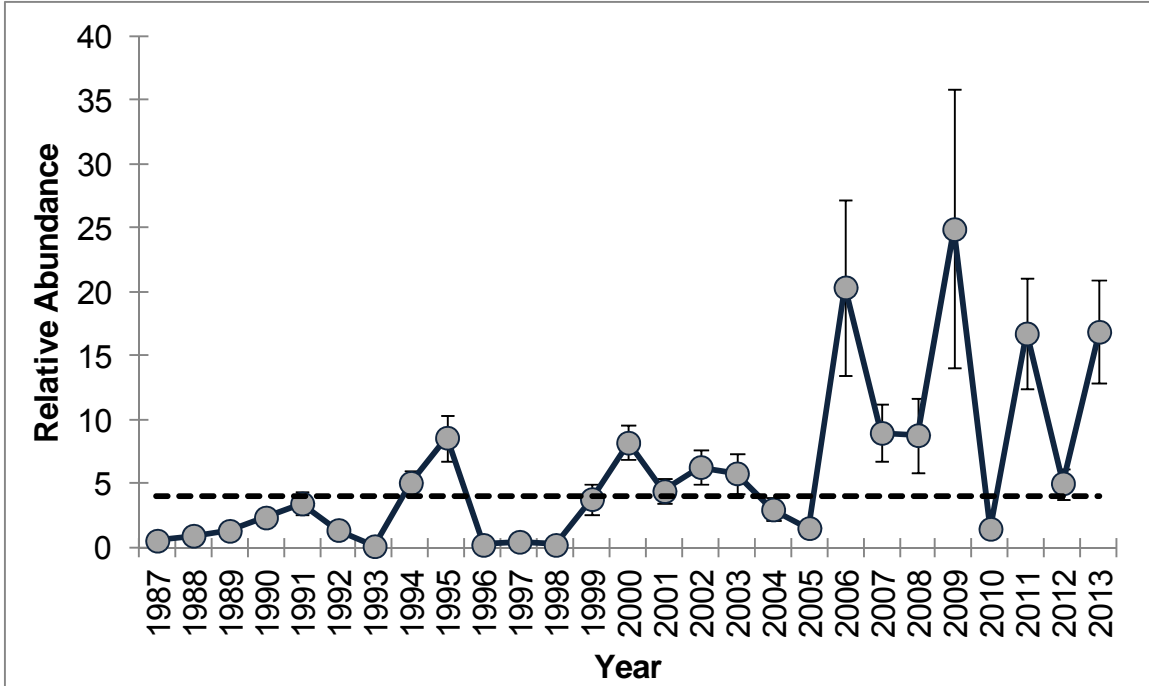


Figure 7. Annual index of relative YOY abundance derived from the September component of the NCDMF Program 195 survey (excluding strata NR, PR, and PUN), 1987–2013. Dotted line represents 2/3 of the average of the time series.

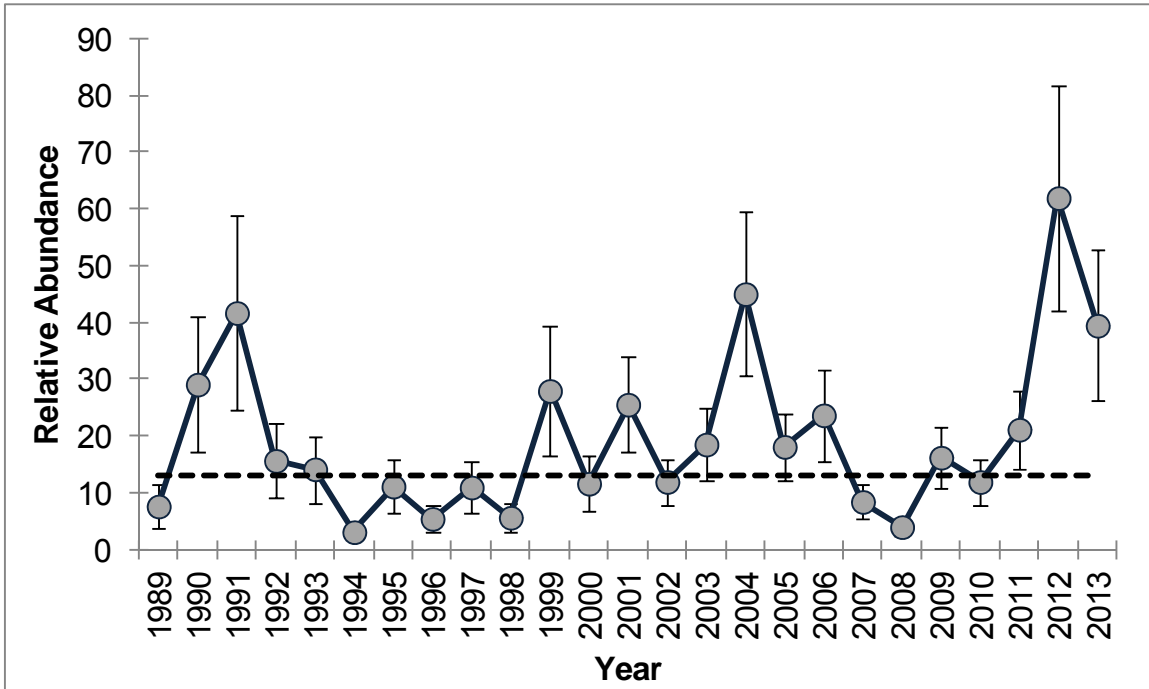


Figure 8. Annual index of relative adult abundance derived from the summer component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

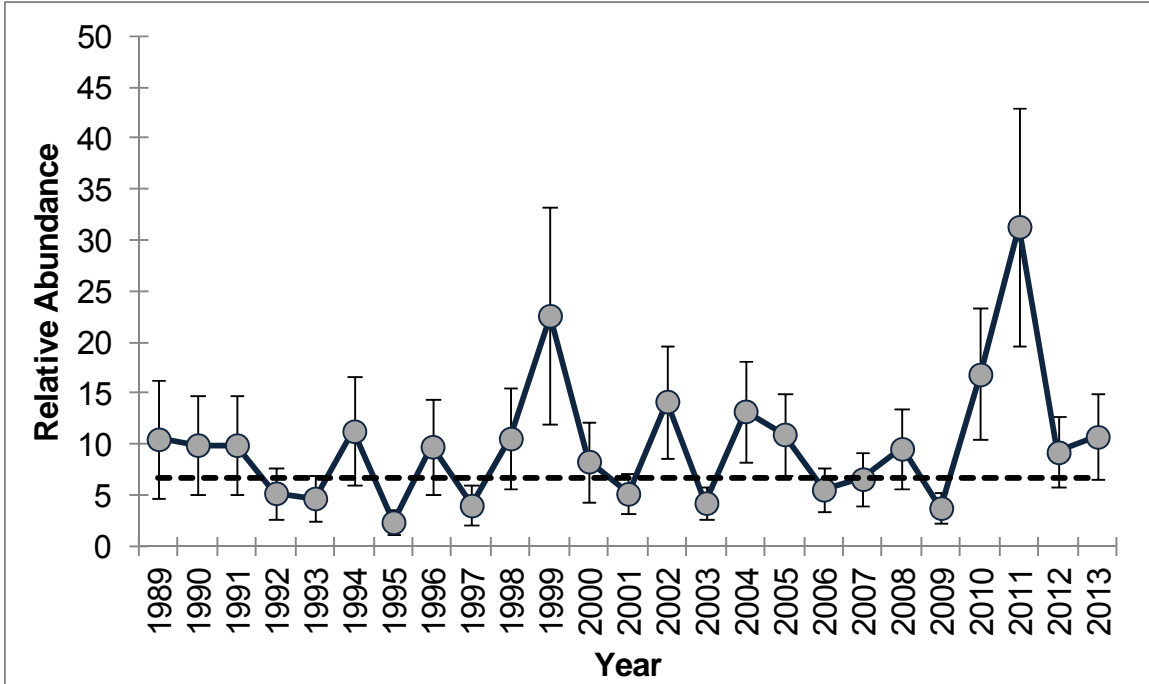


Figure 9. Annual index of relative YOY abundance derived from the fall component of the SEAMAP survey (Onslow, Raleigh, and Long bays, inner—shallow—strata), 1989–2013. Dotted line represents 2/3 of the average of the time series.

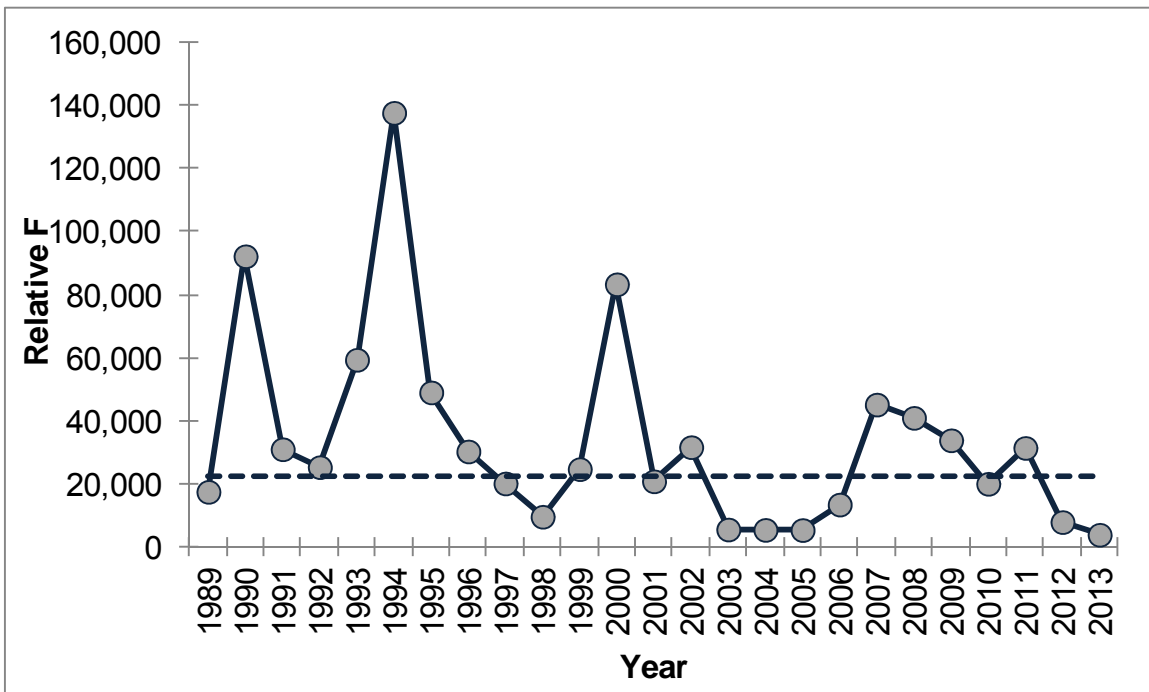


Figure 10. Annual estimates of relative fishing mortality rate (F), 1989–2013. Dotted line represents 66% of the average of the time series.

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 I 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

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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)].

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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)						<p>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.</p>

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

DRAFT – NCMFC Review and approval for public comment August 2015

All parts of this document are subject to change until final adoption

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.

N.C. Kingfish Fishery Management Plan 2007

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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 (5-3/4-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 1 and 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 PDT's 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. Giggling 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 giggling 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

VOLUME 30 • ISSUE 03 • Pages 262 - 431

August 3, 2015

I. EXECUTIVE ORDERS	
Executive Order No. 75	262 – 264
II. IN ADDITION	
Environmental Management Commission – Extension of Comment Period	266
Pharmacy, Board of – Extension of Comment Period	265
III. PROPOSED RULES	
Environment and Natural Resources, Department of	
Environmental Management Commission	284 – 291
Marine Fisheries Commission	291 – 297
Health and Human Services, Department of	
Medical Care Commission	267 – 268
Justice, Department of	
Criminal Justice Education and Training Standards Commission	268 – 284
Occupational Licensing Boards and Commissions	
Irrigation Contractors Licensing Board	297 – 298
Optometry, Board of Examiners in	298
Veterinary Medical Board	298 – 299
IV. APPROVED RULES	300 – 347
Commerce, Department of	
Employment Security, Division of	
Health and Human Services, Department of	
Public Health, Commission for	
Social Services Commission	
Environment and Natural Resources, Department of	
Coastal Resources Commission	
Public Health, Commission for	
Occupational Licensing Boards and Commissions	
Certified Public Account Examiners, Board of	
Dental Examiners, Board of	
Pharmacy, Board of	
V. RULES REVIEW COMMISSION	348 – 352
VI. CONTESTED CASE DECISIONS	
Index to ALJ Decisions	353
Text of ALJ Decisions	
13 CPS 14371	354 – 359
13 DHR 10745	360 – 371
13 DHR 18151	372 – 386
13 DHR 19653/19654	387 – 401
13 EHR 18085	402 – 431

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.

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Fiscal Notes & Economic Analysis and Governor's Review

Office of State Budget and Management

116 West Jones Street

Raleigh, North Carolina 27603-8005

Contact: Anca Grozav, Economic Analyst

(919) 807-4700

(919) 733-0640 FAX

osbmruleanalysis@osbm.nc.gov (919) 807-4740

NC Association of County Commissioners

215 North Dawson Street

Raleigh, North Carolina 27603

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NC League of Municipalities

215 North Dawson Street

Raleigh, North Carolina 27603

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Legislative Process Concerning Rule-making

Joint Legislative Administrative Procedure Oversight Committee

545 Legislative Office Building

300 North Salisbury Street

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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:	270 th 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
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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.

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.

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, IDENTIFICATION, 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 a mesh length less than two and one-half inches.
(2) In internal waters in Internal Coastal Waters from April 15 through December 15, with a mesh length five inches or greater and less than 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 southwestly 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 southwestly 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 southwestly 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 southwestly 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 southwestly to a point 35° 01.4985' N - 76° 11.4353' W near Beacon "HL"; running southwestly 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;

- (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) ~~Caffee~~ 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° 17.1825' N~~ 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~~ 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 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 Shackelford 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.

~~(e) 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.