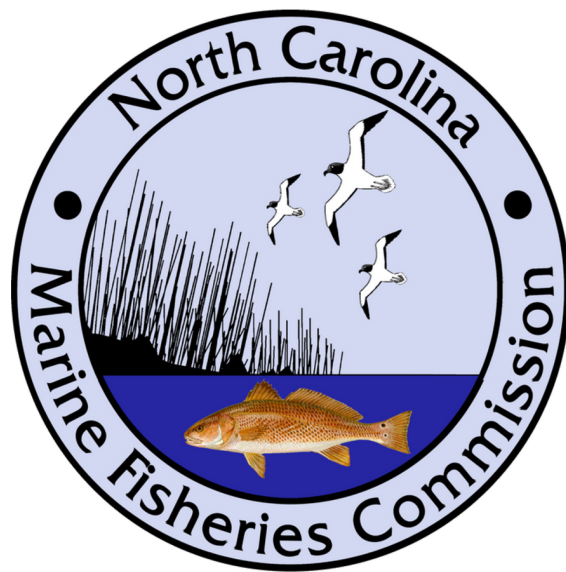


SHELLFISH/ CRUSTACEAN ADVISORY COMMITTEE



SEPTEMBER 26, 2024

Briefing Materials

Shellfish/Crustacean Advisory Committee

Table of Contents

September 2024 Meeting

Contents

Meeting Agenda

April 2024 Meeting Minutes

Blue Crab Adaptive Management
Decision Document

N.C. MFC Shellfish/Crustacean Standing Advisory Committee
Central District Office, Morehead City, N.C.
September 26, 2024
6 p.m.

- 6:00 p.m. Call to Order*
- Vote on the Approval of the Agenda****
- Vote on the Approval of the Minutes from April 11, 2024 ****
- 6:05 p.m. Presentation on the status of the Blue Crab stock and the Fishery Management Plan Amendment 3 Adaptive Management
- An update on the status of the Blue Crab stock and the framework to implement Adaptive Management through Amendment 3*
- 6:35 p.m. Public Comment
- 6:50 p.m. Discussion on Blue Crab FMP Amendment 3 Adaptive Management Potential Options
- Collaborative conversation between the Division and the Advisory Committee on options available under the Adaptive Management framework adopted in Amendment 3.*
- 7:50 p.m. Issues from AC Members
- 8:00 p.m. Adjourn

** Times indicated are merely for guidance. The committee will proceed through the agenda until completed.*

***Action Items*

****Applies only to Marine Fisheries Commission members*

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

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

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



ROY COOPER
Governor

ELIZABETH S. BISER
Secretary

KATHY B. RAWLS
Director

April 26, 2024

MEMORANDUM

TO: Marine Fisheries Commission
Shellfish/Crustacean Advisory Committee

FROM: Tina Moore, Southern District Manager, Fisheries Management Section

SUBJECT: Meeting of the Marine Fisheries Commission's Shellfish Crustacean Advisory Committee, April 11, 2024, to provide recommendations for management options for Marine Fisheries Commission consideration on protection of critical seagrass habitat through shrimp trawl area closure

The Marine Fisheries Commission's Shellfish/Crustacean Advisory Committee (AC) held an in-person meeting on April 11, 2024, at the Division of Marine Fisheries, Central District Office, Morehead City, NC.

The following AC members were in attendance: Lauren Burch, Tim Willis, Michael Hardison, Mike Marshall, Ted Wilgis, Ryan Bethea, Mike Blanton, Mary Sue Hamann (Absent: Bruce Morris, Jim Hardin, and Brian Shepard)

Division of Marine Fisheries (DMF) Staff: Debbie Manley, Steve Poland, Chris Stewart, Tina Moore, Brooke Anderson, Jason Rock, Dan Zapf, Kathy Rawls, Carter Witten, Mike Loeffler, Charlie Deaton, Jason Peters, Chloe Dorin

Public: Glenn Skinner, Michell Hostetler, Warren Hostetler, Monic Smith, Thomas Smith, Woody Daughtrey, Kenny Rustick, C. R. Frederick, Ken Seigler, Barbara Garrity-Blake, Thomas A. Smith Sr., Zach Davis, Cayton Daniels, Wendy Johnson, Landon Merkley, Billy Merkley, Jeffrey Moore, Savannah Gillikin, Grace Masencerp, Larry Mizelle. Thirty viewers watched on YouTube.

Shellfish/Crustacean AC Chair Mike Blanton called the meeting to order at 6:05 p.m.

Chair Blanton provided some introductory remarks, reminding the committee of the requirements for conflict of interest per N.C.G.S. 138A-15(e) which committee members noted no known conflict. The Shellfish/Crustacean AC members in attendance met a quorum.

APPROVAL OF AGENDA AND APPROVAL OF THE MINUTES

A motion was made by Tim Willis to approve the agenda. Second by Mary Sue Hamann. The motion passed without objection.

A motion was made by Mike Marshall to approve the minutes from the Shellfish Crustacean AC meeting held on January 11, 2024. Second by Tim Willis. The motion passed without objection.

PRESENTATION OF THE PROTECTION OF CRITICAL SEA GRASS HABITAT THROUGH SHRIMP TRAWL AREA CLOSURES

Steve Poland, Section Chief, Fisheries Management provided introductory remarks for context of this meeting. The MFC instructed DMF to look at current SAV layers on maps and bring the MFC options for shrimp trawl closures to protect SAV as part of the Shrimp FMP Amendment 2 adopted in 2022. Chris Stewart, lead biologist for shrimp, presented the issue paper to the AC. The issue paper was previously presented to the MFC in Feb. 2024 and the MFC passed a motion to bring the issue paper to the MFC regional and Shellfish Crustacean Advisory Committees for further input. Adjustments to the closure options that were not shown in the issue paper were included in the presentation to the ACs. This action to consider additional SAV protection was directed to DMF by the MFC and any closures would be implemented by proclamation through adaptive management adopted in Amendment 2 of the Shrimp FMP. The intent is to work collaboratively with stakeholders to balance protection of SAV and limit impacts to the shrimp trawl industry. The DMF is extending the timeline to provide recommendations to the MFC until later this year and not as initially planned for the May 2024 meeting. DMF will reach out to more stakeholders for direct input and encourage the public to reach out to participate in these smaller stakeholder group discussions.

Chris Stewart presented information on submerged aquatic vegetation (SAV) overlays also known as the mosaic with the current open and closed areas to trawling and initial DMF lines to extend areas closed to shrimp trawling to protect SAV. He iterated several times in the presentation, this was the first step to allow for stakeholder input. He noted that this adaptive management strategy was directly from the MFC in the Shrimp FMP Amendment 2 and is limited to addressing the impacts of shrimp trawl on SAV. He encouraged the public to reach out to the two other commissions (CRC and EMC) who have the responsibility for dealing more directly with water quality concerns as outlined in the Coastal Habitat Protection Plan. Information was provided on the importance of SAV as a critical habitat and impacts to this habitat from bottom-disturbing gears. Aerial imagery with results of sampling conducted randomly at sites was updated to identify the maximum known extent of SAV in NC. The original DMF options would close about 9.5% of the current open shrimp trawl areas and maps of the proposed line changes by region were presented. In addition, the alternative options not provided in the issue paper that were developed to reduce the extent of the closed areas were also shown in the presentation. The MFC Habitat and Water Quality Advisory Committee met in Jan. 2024 and endorsed the current recommendations only after further input from stakeholders and recommended a monitoring program for SAV.

After the presentation questions and comments were brought forward from AC members. Mary Sue Hamann asked for the reasoning behind the updated closure areas. Stewart said the new options followed discussions with stakeholders, division staff, the MFC Habitat and Water Quality AC, and Marine Patrol to help reduce the extent of shrimp trawl closure areas. Vice-Chair Ryan Bethea asked Marine Patrol about how many shrimp trawling violations there are, how big of a problem is it? Colonel Carter Witten said he'd have to look into it further but recalls a violation for someone fishing without proper license. Beathea asked Marine Patrol about enforcement and if trawling in SAV was a concern to them and if the proposed closures are necessary? Witten said this is a request from the MFC and it is Marine Patrol's job to enforce MFC rules. Straight lines are the easiest for enforcement, but they also enforce depth contours, distance from shore, under other current spatial regulations. Enforcement options are region specific and vary because some methods don't work as well in one area over another. Hamann asked whether this committee can make recommendations outside shrimp trawling and Stewart responded they can make recommendations for other concerns (i.e., water quality). Hamann wanted to know if there is research on if limiting shrimp trawling is actually the best approach to protecting SAV versus other approaches (i.e., water quality).

Lauren Burch wanted to know if SAV grows like fungus and needs connectivity to branch out? Stewart said spreading can occur and other grass species can populate in a bed. Connectivity is important for nursery protection. Burch asked if we've seen growth in SAV in historic closure areas? Stewart said we see mostly a decline throughout the state and there are numerous reasons for declines in SAV, not only shrimp trawling. Burch added that SAV then should be growing in areas where shrimp trawls cannot occur and this suggests the trawl closures are not working to increase SAV. The areas looking to expand closures will impact small vessels the most. Why add closures to areas where SAV is not going to grow in the deep-water areas? The fishermen know where they can't trawl. Stewart noted the lines were drawn for connectivity and ease of enforcement. These lines are not just for trawlers who know the waters but also novices learning to work the areas, also for RCGL trawls. Lines will help enforcement mostly for those who intentionally go into the grassbeds and don't care about the consequences to the SAV.

Hamann requested a summary of comments and suggestions that have been made, stakeholder concerns, and how DMF is responding to those concerns. She was glad DMF was soliciting further input from stakeholders and noted it was unfortunate that DMF cannot evaluate the economic impact to the industry. Stewart said comments were received that these closures put the burden on fishermen rather than water quality issues that impact SAV and we encourage all stakeholders to go to the CRC/EMC meetings to express their concerns. Stewart noted the trip ticket data doesn't allow level of data resolution to look at effort in specific areas. We only have the authority to address shrimp trawling. He reiterated the need for stakeholder input, and the alternatives presented tonight open the deeper waters to allow access to shrimp trawling that doesn't overlap with SAV.

Tim Willis asked if DMF communicated with other states (SC, GA) about what they've done? There's a lot of areas that have been closed for 10 years still losing SAV. Is there any solid data showing what's causing SAV loss? It's the inexperienced boaters tearing up SAV, not commercial trawlers. And therefore, it is inappropriate to put on shrimp trawlers without data to support further closed areas. Stewart noted there is no inshore trawling in other states and physical disturbances are known to damage SAV.

Ted Wilgis asked how closed areas would impact cultch planting, leases and other gears? What's the trigger or mechanism used to re-evaluate closed areas? Chesapeake does aerial surveys every year with federal funding, maybe we can tap into federal funding. Recommends providing more funding for monitoring and looking into water quality. We need more information on what is having the most impact for SAV protection and work with other groups. Stewart said the closed areas would only impact shrimp trawling. Other gears would still be allowed. APNEP is looking at loss and gains of SAV in closed areas to trawling but APNEP has limited personnel and funding to accomplish the work.

PUBLIC COMMENT

Chair Blanton requested the public to keep their comments tasteful and directed at the issue, not staff. This is an ongoing issue that the division was directed by the MFC to take on and they have done exactly what they were tasked to do. Try to keep comments to three minutes.

Glenn Skinner, commercial fisherman and director of NC Fisheries Association. The NC Fisheries Association board met and voted unanimously to not recommend any closures and didn't find information necessary to support the recommendations. Rulemaking standards must identify if rules are reasonably necessary. They didn't find anything pointing to shrimp trawl closures as described being necessary. I'm not saying the SAV is not necessary. So I looked up the definition of the word "necessary" and it keeps coming back to food and food production being necessary. Commercial shrimp trawlers are essential workers. Voting on this closure would be inappropriate. He asked the committee not to support these options. The MFC Habitat and Water Quality Committee meeting in January indicated that we would go forward to the MFC to vote and asked what changed since? Poland said the original intent was to follow guidance of MFC. Following the MFC Habitat and Water Quality meeting, DMF decided we needed further input from the stakeholders to fine-tune the areas to protect SAV. Skinner requested stakeholder input before any lines are drawn.

Monica Smith, Miss Gina's Shrimp. There is a lack of science directly relating shrimp trawling to SAV loss. DMF doesn't have scientific data to indicate restoration will occur in closed areas. Current shrimp trawl closed areas are still losing SAV. There has been a huge reduction in shrimp trawling over the years, so why does SAV continue to decrease? No scientific data to support the use of buffers. The SAV mosaic doesn't represent current SAV habitat or future habitat and doesn't show yearly data. Economic impact study has not been done. These closures would be devastating to small boats, ~75% of their fishing occurs in the proposed closed areas. Please vote against shrimp trawl closures to protect SAV until science supports it.

Woody Daughtery, lived here since 1972. Tens of thousands of people have moved here to be near the water. New docks, seawalls, boats, and prop scars. This is an agenda for a piece of paper to say we've stopped shrimping, shrimpers already stay off your grass.

Kenny Rustick, commercial trawler. Stewart keeps bringing up turbidity. Shrimped many hours on the shrimp lines. Shrimp go to turbid areas to feed. I have seen Core Sound flourish in the past when there were a lot of trawlers and think the loss of shrimpers has reduced the ecological productivity in Core Sound. I remember when the wind blew 100 mph through Cape Lookout.

More turbidity caused by nature than all trawlers combined over a year. Places they want to close in Core Sound is where the shrimpers work. About 95% of the money, I made last fall was in the Straits channel. In 1989 we had a cold storm and froze Core Sound over, then in spring of 1990 there was no more grass.

C.R. Frederick, commercial trawler with 50+ years of commercial fishing, on smaller waters. I spent 5 years working with NOAA on TEDs in skimmer rigs. We addressed reduction of bycatch, met and exceeded those reductions, now we are moving on to SAV. Commercial fishermen don't want to catch the last fish or destroy the last SAV. What is the preferred depth of eelgrass? Mentioned Spooners Bay clam gardens. If SAV grows into that garden, will they be banned from their gardens? If we don't know shrimp trawls are responsible for 90% or 60% of SAV damage, why are they getting 100% of impact from closures. We need to establish lines better than using data from 1981. Reckless to put this on the backs of commercial shrimp trawlers. We need more data, research, flyovers before putting people out of work.

Ken Seigler, commercial fisherman. Rain and wind cause green slime algae to grow in the water at the same time eelgrass grows. Wind, rain, turbidity makes algae smother eelgrass. The problem is algal blooms from nutrient overload. The primary mechanisms for loss of eelgrass is nutrient loading and shading by algae, not shrimpers towing their trawl nets. There's no market for eelgrass, they don't want to catch it. Shrimpers aren't the problem. Eelgrass will not return if water quality is not good. Rainfall and runoff causing nutrient overloading. We are at the extreme southern limit of eelgrass. Nutrient load is the problem. I urge this committee to not recommend any shrimp trawl closures until further data is collected.

Barbara Garrity-Blake, president of NC Catch. NC Catch advocates for local seafood and threats to consumers access to local seafood. We host seafood festivals in downeast community of NC and feature local seafood including shrimp, free for the public. We get seafood for these festivals from many of the shrimpers here tonight at this meeting. I am proud of local fishermen and connecting the public to local seafood and community. Commercial shrimpers support our community. NC Catch also shares concerns about loss of SAV. We are increasing fishing restrictions but loosening environmental protection restrictions. Not protecting wetlands. Another concern in Gloucester is that the downeast conservation group included a 50 ft buffer from a structure being built near the water. And now no longer have that buffer. Environmental regulations are getting looser, fishing regulations are getting tighter. Appreciates DMF agreeing to meet with fishermen and delaying an MFC recommendation. The management strategy would be improved by collaboration with fishermen.

Zach Davis, shrimps in Core Sound. Done research on APNEP and CHPP. A study by NC State showed SAV decline is caused by turbidity related to sediment pollution which leads to algae growth. Bottom disturbance is not causing turbidity-related loss of SAV. Another study in Florida showed SAV can have a growth rate of 8 mm per day following cutting. In 21 days you can't tell it was ever altered. This should indicate shrimp trawls aren't impacting SAV long-term. Substantial reduction of SAV in closed areas (up to +70%), provided data. Trawling is not the problem, it's water quality and pollution. Trawl closures are not going to matter. I have the data and can share it with DMF. Chair Blanton requested Davis to provide the information to AC and the staff lead. Tina Moore provided Mr. Davis with her email address to send the information. As of writing these minutes Davis has not followed up with the information.

Cayton Daniels, commercial trawler. These closures would put me out of business. No justification for closures, the science isn't there. There is no support that shrimp trawls are causing damage to SAV and that shrimp trawl closures would also cause growth in SAV. There are larger reductions in SAV in closed areas than open areas. There has been a huge reduction in the number of shrimp trawl participants over the years. Closures will cut the small trawlers out. The industry has given until there's no more to give. Look into SAV in Bogue Sound following the previous closure. Need further studies. Turbidity is natural, the sound looks like chocolate milk after the cownose rays move through. Closures from the 2022 FMP has had huge effect on the industry. We can't take it anymore.

Landon Merkley, welding and boat repair, college student, commercial fishermen. I trawl mostly in the potential closed areas of Straights, Back Sound, and Core Sound. Closures will hurt me financially from selling and eating shrimp. The bottom of Back Sound has become harder and beaches in front have washed away. He has seen a decline in water quality and encroachment of sand in these areas to cause loss of SAV. There is more loss in closed areas than open areas. Wants to see evidence that SAV loss is caused by trawlers. If SAV is already stressed, then why stress it further? The shrimpers have been stressed. He asked the AC to vote against these closures and identify what is really impacting seagrass.

Jeffrey Moore, I have been shrimping since my childhood. My daughter loves to go shrimping. The potential closures are the only areas they fish in. Only shrimp there 20-30 days a year. We fill our freezers for food and to make some money. Please vote against closures as there's no science to support them. Closing these areas would be a real blow to the trawling community. Development, runoff and hurricanes are more impactful.

Chair Blanton asked if anyone else wanted to speak. No one spoke up. Chair Blanton said your concerns are valid. There are places to address these concerns. Pushed this as an MFC Commissioner for 6 years to bridge the gap. We heard your opinions and input. Asks stakeholders to start outlining facts and knowledge that you know and take that to the people that need to hear it the most.

SHRIMP FMP AMENDMENT 2 – ADAPTIVE MANAGEMENT – PROTECTION OF CRITICAL SEA GRASS HABITAT THROUGH SHRIMP TRAWL AREA CLOSURES

Chair Blanton said we need to vote on options to bring to MFC and opened the floor for discussions. Hamann wanted clarification on what the AC can recommend all, each, defer. Blanton said can make any motion we want.

Mary Sue Hamann made the motion to defer a vote until all public comments are heard and summarized to us a full set of options from the experts are made available. Second by Michael Hardison.

Lauren Burch then moved to amend the motion to recommend more funding for further research in already closed areas and not close any new areas until there is a determination of a correlation to SAV loss by trawling activity. Second by Ted Wilgis.

Discussion by the committee continued. Hardison asked for more funding, what are we looking for to understand losses and how do you quantify losses and cause, seems generic. Referenced losses identified on page 2 in the paper. Stewart said that is the value from the APNEP study. Hardison asked how do you quantify what causes the loss and the economic value of SAV? Mike Marshall recommends the amendment supersedes the motion because the motion can be carried out quickly whereas the other motion cannot be done quickly and therefore are at odds with one another. Suggested they should be considered as two separate motions. Wilgis asked if we need to have one all-encompassing motion or several motions. After further discussion the Chair suggested there are ways to address this. One we could have the maker withdraw the amended motion and vote on the first motion or we can take a vote on the amended one to make it all or part of the original motion.

Burch agreed to withdraw her motion to amend the original motion, which was approved by the second, Ted Wilgis.

Willis asked what is meant by the full set of options in the motion. Hamann clarified she wanted to see more options after gaining more public comment on shrimp trawling closures. Easier if we had the full set of options rather than thinking of all that could occur on our own.

A call to vote by Chair Blanton. **The motion failed 2-4 with 2 abstentions.**

A motion made by Lauren Burch to recommend more funding for further research in already closed areas and not close any new areas until a determination of a correlation of SAV loss by trawling activity, second by Ted Wilgis.

Discussion on what kind of research? Burch said she did not want to specify because it would limit what could occur for research. Hardison said it may have value to look further into the economic value of SAV and determine the causes to its loss.

Motion to amend made by Mary Sue Hamann to add the continued collection and synthesis of stakeholder input, second by Tim Willis.

Blanton noted DMF will be reaching out further to stakeholder groups. Already looking for those groups to gain their input. Your motion would mimic the intentions of what is already occurring. Hamann said this would be an endorsement to DMF to know the importance this information is to us. Wilgis asked if this information from the MFC ACs plus the stakeholder groups will go back to the MFC? Poland responded that DMF will bring all information back to the MFC and use the information gained to adjust the options. It will be up to the MFC to determine if they would send the information collected back out to the MFC ACs. Burch asked if information can be published for these meetings in fish houses not online. Poland said DMF plans to reach out individually to fishermen to get targeted, individual level in small groups together for input in regions with most impact.

Motion to amend passed 4-2 with 2 abstentions. Which becomes part of the main motion which now reads:

A fully amended motion made by Lauren Burch to recommend further research to determine if there is a correlation of SAV loss in open and closed areas to shrimp trawling, continue collection, and synthesis of stakeholder input. No closure of new areas until a determination of a correlation of SAV loss by trawling activity. And seek more funding for monitoring, second by Ted Wilgis.

Marshall noted we also need research in non-closed areas. If sampling only in closed areas how do you tell the difference? Have to have correlation in loss or gain of SAV in open and closed areas. Further discussion amongst the committee adjusted the motion to its final state. Both the first and second of the motion accepted the changes to the motion.

The motion passed 6-0, with 2 abstentions.

ISSUES FROM ADVISORY COMMITTEE MEMBERS

Mike Marshall stated that this whole thing seems extremely awkward, and staff did what they were tasked to do. You may want to get some structure together on habitat issues. It needs a little work. Wilgis added to that point, these are items through the CHPP which doesn't have much regulatory teeth. Could the EMC, CRC, and MFC have a joint meeting and work through some of the issues more. Blanton said it would be difficult.

Tim Willis made a motion to adjourn. Seconded by Lauren Burch. The meeting adjourned at 8:38 p.m.

DECISION DOCUMENT

Blue Crab Fishery Management Plan Amendment 3 Adaptive Management



This document was developed to help the MFC track previous activity and prepare for upcoming actions for Blue Crab FMP Amendment 3 Adaptive Management.

September 2024

Background

The original [North Carolina Blue Crab Fishery Management Plan \(FMP\)](#) was adopted in December 1998, [Amendment 1](#) was adopted in December 2004, and [Amendment 2](#) was adopted in November 2013. The Amendment 2 adaptive management strategy relied on annual updates to the Traffic Light Assessment (TLA) to provide information on relative condition of the stock. Based on results of the TLA update with 2015 data, management action was required by the North Carolina Marine Fisheries Commission (MFC). To improve the condition of the blue crab stock, the MFC adopted management measures documented in the May 2016 [Revision to Amendment 2](#).

Comprehensive review of the Blue Crab FMP was originally scheduled to begin in July 2018, but at its August 2016 business meeting, the MFC voted to begin formal review immediately to assess the status of the blue crab stock and identify more comprehensive management strategies. Consequently, development of Amendment 3 began in August 2016.

Amendment 3 Background

As part of [Amendment 3 to the North Carolina Blue Crab FMP](#) a benchmark [stock assessment](#) was undertaken using data from 1995-2016. Based on assessment results, the N.C. blue crab stock was classified as overfished in 2016. The probability the stock was overfished was 98% with the average spawner abundance in 2016 estimated at 50 million crabs (below the threshold estimate of 64 million crabs). Overfishing was also occurring in 2016 with a 52% probability. The average fishing mortality in 2016 was estimated at 1.48 (above the fishing mortality threshold of 1.46).

The North Carolina Fishery Reform Act of 1997 requires the State specify a time period not to exceed two years to end overfishing and achieve a sustainable harvest within 10 years of the date of adoption of the plan. To meet the legal requirement, the division determined reductions in commercial harvest were necessary. A harvest reduction of 0.4% (in numbers of crabs) was projected to end overfishing and a harvest reduction of 2.2% was projected to achieve sustainable harvest and rebuild the blue crab spawning stock within 10 years with a 50% probability of success (Table 1).

Table 1. Catch reduction projections for varying levels of fishing mortality (F), based on 2016 data from the stock assessment, and the probability of achieving sustainable harvest within the 10-year rebuilding period defined in statute. The bolded row indicates the minimum requirement defined in statute.

F (yr-1)	Catch Reduction (%)	Probability of achieving sustainable harvest within 10 years (%)	Comments
1.48	0.0	31	2016 average F from stock assessment
1.46	0.4	45	Catch reduction to meet F threshold and end overfishing
1.40	1.7	46	Catch reduction to meet spawner abundance threshold and end overfished status
1.38	2.2	50	Catch reduction to meet minimum statutory requirement for achieving sustainable harvest
1.30	3.8	67	
1.22	5.9	90	Catch reduction to meet F target
1.10	9.3	96	
1.00	12.3	100	
0.90	15.7	100	
0.80	19.8	100	Catch reduction to meet spawner abundance target
0.70	24.3	100	

The MFC adopted Amendment 3 to the Blue Crab FMP in February 2020 to rebuild the blue crab stock. Prior to adoption, the division recommended that, at a minimum, the MFC should adopt a commercial harvest reduction of 2.2% (50% probability of success) but encouraged the MFC to consider a further reduction to at least 5.9% (90% probability of success). Further, the division encouraged the MFC to adopt a management strategy that included a prohibition on immature female hard crab harvest, a 5-inch minimum size limit for mature females, and a continuous closure period resulting in a reduction of at least 4.6% to make up the remainder of the preferred reduction. A comprehensive list of Amendment 3 sustainable harvest options can be found in [Table 4.1.12](#) and [Table 4.1.14](#) of Amendment 3.

The management strategy that the Marine Fisheries Commission ultimately adopted was estimated to result in a harvest reduction lower than the initial recommendation and provided an estimated 2.4% harvest reduction with a 50% probability of success. This reduction would be just above the statutorily required minimum (2.2%), but below the harvest reduction level needed to reduce F to the target (5.9%) and the reduction needed to increase spawner abundance to the target (19.8%). Amendment 3 management strategies have been fully in place since January 2021. Amendment 3 also maintained all measures implemented with the May 2016 Revision to the Blue Crab FMP. The management changes adopted in Amendment 3 were:

- Season closures (pot closure periods):
 - January 1-31 north of the Highway 58 bridge
 - March 1-15 south of the Highway 58 bridge
 - Possession of blue crabs is prohibited during the season closure period.
- A 5-inch minimum size limit for mature female crabs statewide.
- Remove all cull ring exempted areas.

- New crab spawning sanctuaries were established in Beaufort, Bogue, Bear, Browns, New River, Topsail, Rich, Mason, Masonboro, Carolina Beach, Cape Fear River, Shallotte, Lockwoods Folly, and Tubbs inlets with a March 1-October 31 closure.
- Crab trawls prohibited in areas where shrimp trawls were already prohibited in the Pamlico, Pungo, and Neuse rivers.
- Crab bycatch allowance in oyster dredges reduced to 10% of the total weight of the combined oyster and crab catch or 100 pounds, whichever is less.
- Criteria were approved for designating Diamondback Terrapin Management Areas where use of approved terrapin excluders will be required.
- The adaptive management framework was revised (more details about this are below).

A summary of all management measures in place through Amendment 3 can be found in the annual [FMP Update](#) or in the [Amendment 3 flyer](#).

Amendment 3 Adaptive Management

1. Update the stock assessment at least once in between full reviews of the FMP, timing at the discretion of the division
 - a. If the stock is overfished and/or overfishing is occurring or it is not projected to meet the sustainability requirements, then management measures shall be adjusted using the director's proclamation authority
 - b. If the stock is not overfished and overfishing is not occurring, then management measures may be relaxed provided it will not jeopardize the sustainability of the blue crab stock
2. Any quantifiable management measure, including those not explored in this paper, with the ability to achieve sustainable harvest (as defined in the stock assessment), either on its own or in combination, may be considered
3. Use of the director's proclamation authority for adaptive management is contingent on:
 - a. Consultation with the Northern, Southern, and Shellfish/Crustacean advisory committees
 - b. Approval by the Marine Fisheries Commission

Upon evaluation by the division, if a management measure adopted to achieve sustainable harvest (either through Amendment 3 or a subsequent Revision) is not working as intended, then it may be revisited and either: 1) revised or 2) removed and replaced as needed provided it conforms to steps 2 and 3 above.

Post Amendment 3 Stock Assessment Update

Following full implementation of Amendment 3 management measures in 2021, division monitoring programs continued to observe historically low [commercial landings](#), coupled with continued [low abundance of all blue crab life stages](#) (e.g., male and female juveniles, male and female adults, mature females). In response to stock concerns expressed by commercial crabbers and continued poor trends in abundance since adoption of Amendment 3, the division began updating the stock assessment with data through 2022, adding six years of data to the benchmark assessment. As an assessment update, there were no changes to model parameters and a peer review was not conducted, as the model configuration of the prior peer reviewed model was maintained. Results of the model update indicate the magnitude and trends for estimated recruitment, female spawner abundance, and fishing mortality were similar to the prior benchmark assessment (Figure 1), however, the Maximum Sustainable Yield (MSY)

based reference points used to determine stock status for both female spawner abundance and fishing mortality both drastically changed with the update time series (Figures 2-3). Due to the magnitude of the change in reference points, the division requested an external review of the updated stock assessment.

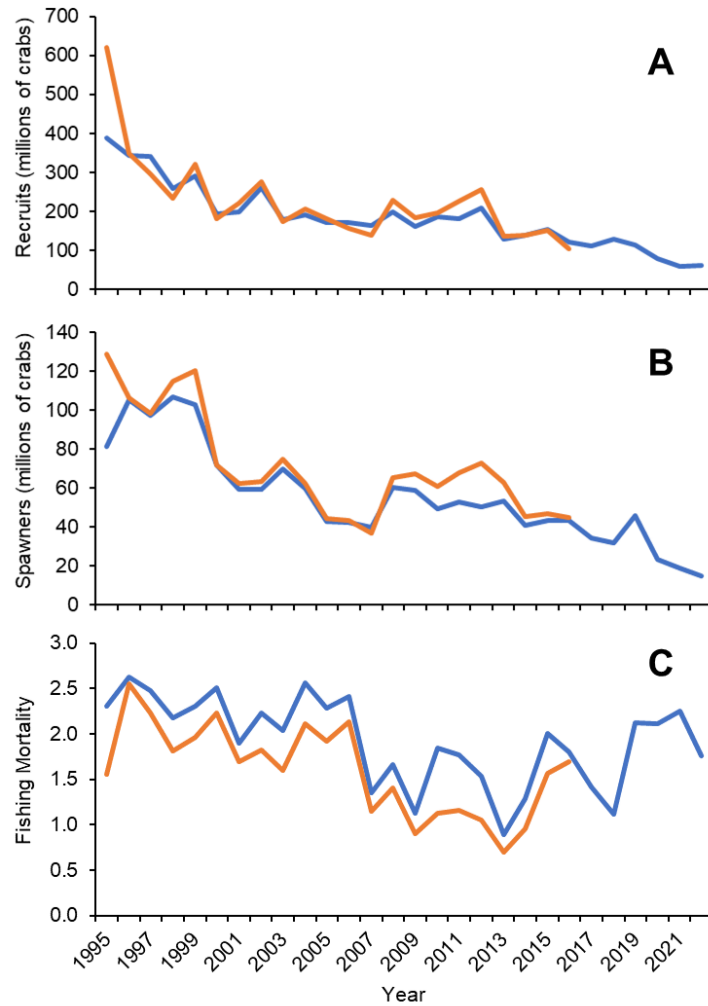


Figure 1. Comparison of estimates of (A) total recruitment, (B) female spawner abundance, and (C) fishing mortality between the 2023 stock assessment update (blue line) and the 2018 benchmark stock assessment (orange line).

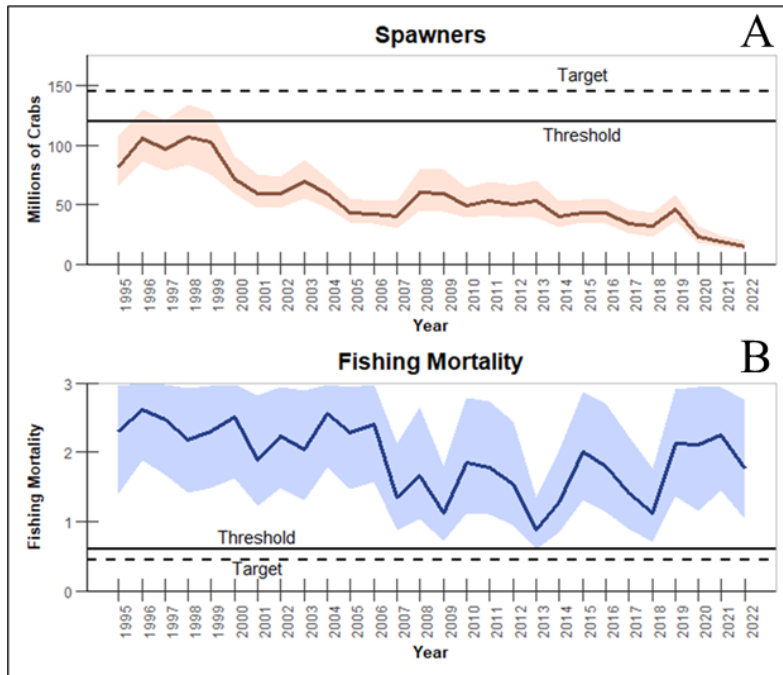


Figure 2. Annual estimates of (A) mature female spawner abundance and (B) fishing mortality relative to associated reference points for hard blue crabs in North Carolina from the 2023 stock assessment update.

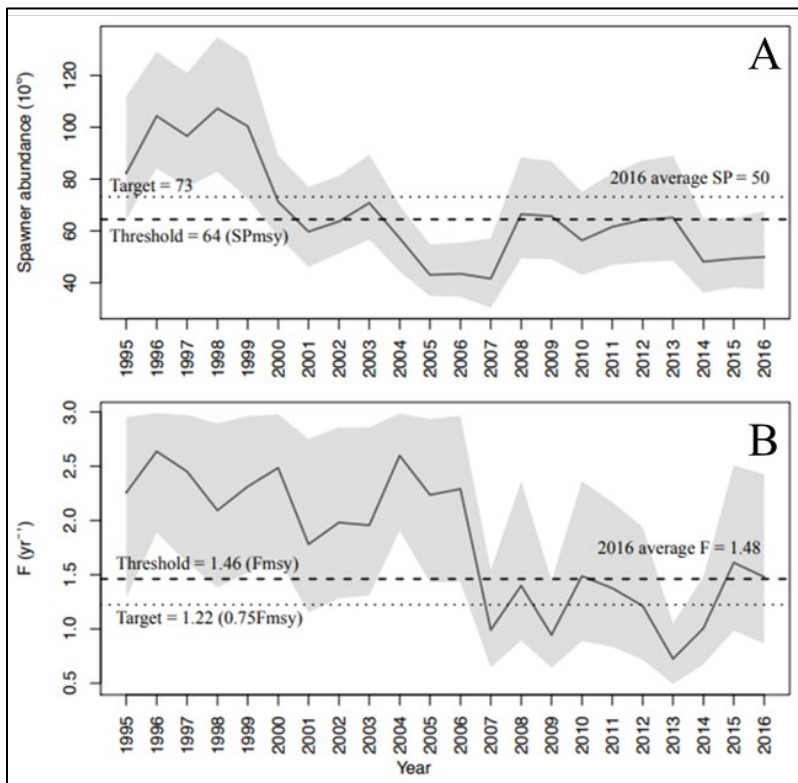


Figure 3. Annual estimates of (A) mature female spawner abundance and (B) fishing mortality relative to associated reference points for hard blue crabs in North Carolina from the 2018 benchmark stock assessment.

This external review was completed in late December 2023. The reviewers identified concerns with model specifications and results and strongly recommended resolving these issues before basing any management decisions solely on the assessment update. Suggestions provided by reviewers can only be incorporated with a new benchmark stock assessment. Given concerns with the assessment update identified by the division and external peer reviewers, **the division does not recommend using results of the 2023 stock assessment update to inform harvest reductions.**

Regardless of the availability of management advice from an updated stock assessment, stock concerns raised by commercial crabbers and trends in available data clearly show Amendment 3 management measures have not worked to reverse declining population trends as intended. Amendment 3 adopted management measures were only projected to result in a 2.4% harvest reduction with a 50% probability of achieving sustainable harvest, the minimum required by statute.

In addition, declines in the North Carolina blue crab stock are not unique, as blue crab stocks in other Atlantic coast states have shown similar declines. In January 2023 the South Carolina Department of Natural Resources released a [status report](#) for the South Carolina blue crab fishery. The report concluded the South Carolina blue crab stock has been in decline for nearly two decades and provided recommendations to prevent overharvesting, gradually reduce fishing pressure, prevent overexploitation, and strengthen enforcement capabilities. Concerns for the [Chesapeake Bay blue crab stock have also persisted](#). While the Chesapeake Bay blue crab stock is not depleted and overfishing is not occurring, juvenile abundance remains low. Precautionary management, focusing on protecting mature females and juveniles, has been recommended for the Chesapeake Bay stock and a benchmark stock assessment has been started to better understand the population.

Adaptive Management

All available information suggests the blue crab stock has continued to decline since adoption of Amendment 3 management measures in February 2020. The Amendment 3 adaptive management framework will be used to immediately address the overall declining trends in the blue crab stock. This action is appropriate given the Amendment 3 adaptive management framework states: *“upon evaluation by the division, if a management measure adopted to achieve sustainable harvest is not working as intended, then it may be revisited and either 1) revised or 2) removed and replaced as needed...”*.

Because the 2023 stock assessment update cannot be used to inform management, the division will develop recommendations based on results of the 2018 stock assessment. Using 2018 assessment results provides some guidance on appropriate management in lieu of a current stock assessment.

The Amendment 3 adaptive management framework allows any quantifiable management measure, including those not discussed in Amendment 3, with the ability to achieve sustainable harvest either on its own or in combination to be considered. The division has begun reaching out to stakeholders about fishery perceptions and management ideas and has conducted preliminary analysis of potential management measures (Table 2). Prior to implementation, the division will consult with the Northern, Southern, and Shellfish/Crustacean advisory committees and management recommendations will be brought to the MFC for approval.

Table 2. Summary of potential quantifiable management options that can be considered through Amendment 3 adaptive management including pros, cons, and anticipated level of complexity to analyze and implement.

Management Options	Pros	Cons	Complexity
Limit Crab Trawls	<ul style="list-style-type: none"> • Quantifiable • Protects females prior to spawning • Possible habitat protections • Low effort • Low market demand from fishery 	<ul style="list-style-type: none"> • Limits already small segment of fishery • Small harvest reduction 	Low
Extend existing closure period (e.g., statewide closure January 1-March 15)	<ul style="list-style-type: none"> • Quantifiable • Protect females prior to spawning • Low market demand when fishery occurs 	<ul style="list-style-type: none"> • Increased market price due to VA and MD having no harvest • Crabbers active during winter months have close relations with direct markets • Could affect “peeler crab season” • Small harvest reduction 	Moderate
Bushel/Trip Limits, sex specific or life stage specific bushel/trip limits, season specific bushel/trip limits	<ul style="list-style-type: none"> • Quantifiable • Implemented in other states • Limit harvest of vulnerable or important life stages (e.g., mature females) • Limits total harvest • Could reduce effort 	<ul style="list-style-type: none"> • Requires additional culling • Actual reductions may not be realized • Likely longer soak times of pots • Likely to affect some areas more than others 	Very High
Regional Closures	<ul style="list-style-type: none"> • Quantifiable • Current closure periods are split north and south • Accounts for region specific fishery differences 	<ul style="list-style-type: none"> • Creates inequity between regions • Possible effort shifts • Data uncertainties 	Moderate
Size limit changes/Female max size limit/Peelers min size limit	<ul style="list-style-type: none"> • Quantifiable (for max size) • Size limits currently used • Protect biologically important crabs 	<ul style="list-style-type: none"> • Requires additional culling • Loss of market value • Likely to affect some areas more than others 	High
Limit sponge crab harvest or life stage closures	<ul style="list-style-type: none"> • Quantifiable (can estimate reduction with fish house data) • Implemented in other states • Protect biologically important crabs • Some past support from public 	<ul style="list-style-type: none"> • Likely to affect some areas more than others • Unknown success of clutch once potted • Requires additional culling 	Moderate

Amendment 3 Adaptive Management Timeline (gray indicates a step is complete)

May 2024	Division presents results of stock assessment update and adaptive management plan to MFC
May 2024 – August 2024	Outreach and analysis
August 2024	Division updates the MFC on progress
September 2024	Division updates Northern, Southern, and Shellfish/Crustacean advisory committees
September 2024 – December 2024	Additional outreach and analysis. Division drafts Revision to Amendment 3
February 2025	Update MFC on draft Revision
March 2025	Public and MFC AC (Northern, Southern, Shellfish/Crustacean) review draft
May 2025	MFC approves Revision to Amendment 3

Current step →

Key Takeaways

- Amendment 3 management strategies have been fully in place since January 2021.
- The Blue Crab Stock Assessment Update was completed in 2023, but given the concerns expressed by the external peer reviewers, the Division does not recommend using the results of that update to inform harvest reductions.
- All available information suggests that the blue crab stock has continued to decline since the adoption of Amendment 3 management measures by the Commission in February 2020.
- The Amendment 3 adaptive management framework will be used to address the overall declining trends in the blue crab stock.
- The division will develop management recommendations that would have resulted in higher harvest reductions with a greater probability of achieving sustainable harvest based on 2018 assessment results and apply them to the current fishery.
- The Amendment 3 adaptive management framework allows any quantifiable management measure, including those not discussed in Amendment 3, that has the ability to achieve sustainable harvest either on its own, or in combination, to be considered.
- Prior to the implementation of any management, management recommendations will be brought to the MFC for approval.