

NC Marine Fisheries Commission

Fishery Management Plans

November 2025 Quarterly Business Meeting

Contents

Blue Crab

Striped Bass

NC Marine Fisheries Commission

Blue Crab Fishery Management Plan

November 2025 Quarterly Business Meeting

Documents

Blue Crab Adaptive Management
Decision Document

Blue Crab FMP Amendment 3
Revision

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.

November 2025

Summary

Amendment 3 to the N.C. Blue Crab Fishery Management Plan (FMP) was adopted in February 2020 and is nearly halfway through the legislatively mandated 10-year stock rebuilding period with little evidence suggesting management measures have been successful in ending overfishing or achieving sustainable harvest. The intent of the Amendment 3 adaptive management framework is to allow for management changes if measures are not meeting objectives. Because stock indicator trends continue to show long-term decline in all blue crab life stages and both sexes, the adaptive management framework will be used to implement management measures projected to reduce fishing mortality (F) closer to the F target and rebuild the spawning stock closer to the spawner abundance target with greater than 50% probability of success.

Amendment 3 Background

As part of [Amendment 3 to the North Carolina Blue Crab FMP](#), a benchmark [stock assessment](#) was conducted using data from 1995–2016. Based on assessment results, the N.C. blue crab stock was overfished and overfishing was occurring in 2016.

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 sustainable harvest within 10 years of the date of adoption of the plan. To meet this requirement, a minimum 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) and the probability of achieving sustainable harvest within the 10-year rebuilding period defined in statute. Bolded row is minimum required harvest reduction.

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	

At their February 2020 business meeting the MFC adopted Amendment 3 to the FMP with the following management strategies to end overfishing and achieve sustainable harvest in the blue crab fishery:

- North of the Highway 58 Bridge: January 1 through January 31 blue crab harvest closure.
- South of the Highway 58 Bridge: March 1 through March 15 blue crab harvest closure.
- A 5-inch minimum size limit for mature female crabs statewide.
- Align the pot closure period with the regional season closures and remain closed in entirety (cannot be reopened early).
- Maintain the prohibition on harvest of immature female hard crabs statewide established in the 2016 Revision to Amendment 2.
- Maintain the 5% cull tolerance established in the 2016 Revision to Amendment 2.
- Adopt proposed adaptive management framework and allow measures to be relaxed if the assessment update indicated the stock was not overfished and overfishing was not occurring and recommend updating the stock assessment once 2019 data are available.

The adopted management provided an estimated 2.4% harvest reduction with a 50% probability of achieving sustainable harvest. This reduction was slightly over the statutorily required minimum (2.2% reduction), but below the harvest reduction level needed to reduce F to the target (5.9% reduction) and the reduction needed to increase spawner abundance to the target (19.8% reduction; Table 1).

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

Amendment 3 Adaptive Management

In addition to management strategies to reduce harvest, Amendment 3 also includes the following adaptive management framework

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, DMF 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 DMF began [updating the stock assessment](#) with data through 2022. [Results](#) of the model update indicate the magnitude and trends for estimated recruitment, female spawner abundance, and fishing mortality were similar to the 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 changed drastically (Figures 2-3).

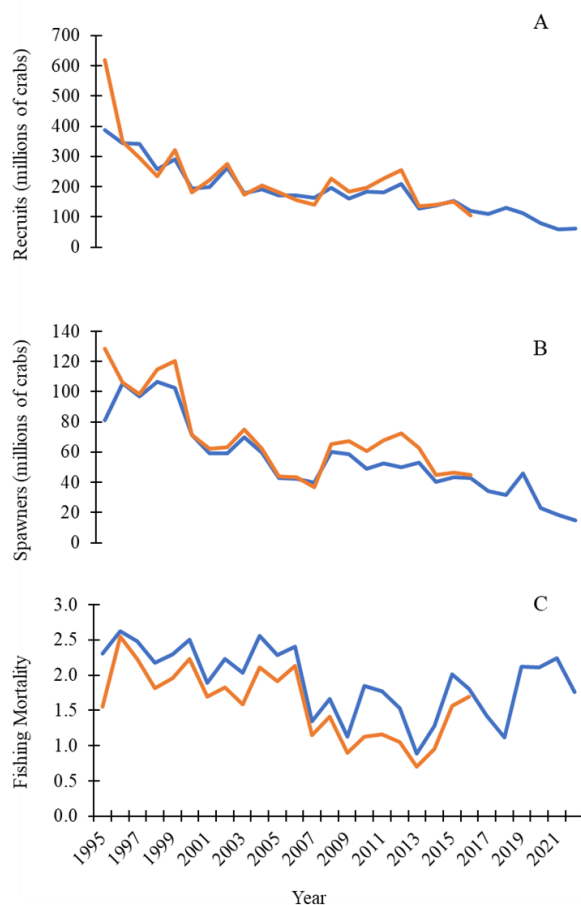


Figure 1. Comparison of estimates of (A) total recruitment, (B) female spawner abundance, and (C) fishing mortality between the 2023 stock assessment update (blue line) and the 2018 benchmark stock assessment (orange line).

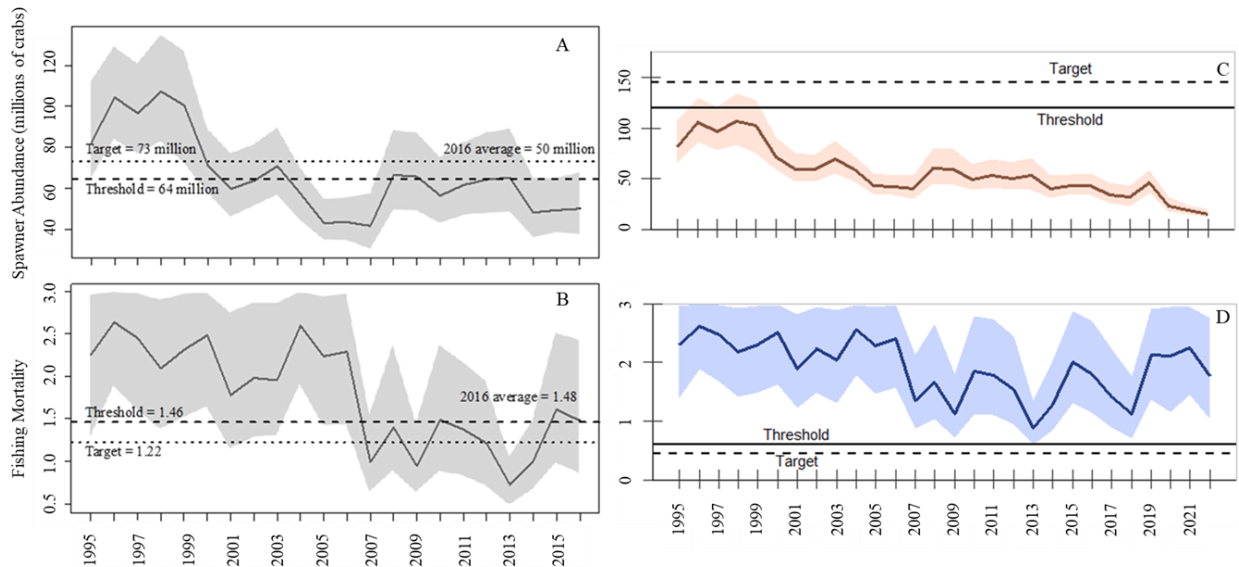


Figure 2. Annual estimates of (A) mature female spawner abundance and (B) fishing mortality relative to associated reference points from the 2018 benchmark stock assessment. Annual estimates of (C) mature female spawner abundance and (D) fishing mortality relative to associated reference points from the 2023 stock assessment update.

Due to the magnitude of the change in reference points, the DMF requested an external review of the assessment update, which was completed in late December 2023. 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 DMF and external peer reviewers, the DMF does not recommend using results of the 2023 stock assessment update to inform management. The model specification issues in the update do not invalidate the benchmark stock assessment or the data sources used in the benchmark or the updated model.

Declines in the North Carolina blue crab stock are not unique, as blue crab stocks in other Atlantic coast states have declined similarly. 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. In addition, because the conservation trigger for male harvest has been exceeded several times, consideration of management to protect male crabs has been recommended.

Management Strategies and Recommendations

The Division explored several quantifiable management strategies that could be considered for implementation based on specifications of the Amendment 3 Adaptive Management Framework.

Size limits are used to protect a portion of the stock. Currently, male and mature female hard crabs are subject to a 5-inch minimum carapace width (CW) statewide (harvest of immature females is prohibited).

Because a minimum size limit is already in place for blue crabs, and because achieving necessary harvest reductions through size limit changes alone is unlikely, management options for increasing the minimum size limit or establishing a maximum size limit were not developed.

Prohibiting Crab Trawling prevents harvest from a gear that primarily harvests female crabs prior to the spawning season. Most crab trawl harvest occurs from December through April and is highly variable from year to year. Due to location and time of year crab trawls operate, most crabs harvested by crab trawls are females of lower market value. In 2024, crab trawls accounted for 2.0% of all blue crab landings, but on average account for 0.7% of blue crab landings (2019–2024). There is often conflict between the crab trawl and crab pot fisheries. While the crab trawl fishery does not currently have a lot of participants, because this fishery primarily harvests female crabs, further growth may be detrimental to the crab stock.

Seasonal Closures can be used to reduce overall harvest by restricting harvest during specific times of year. Amendment 3 implemented a January 1–31 closure in areas north of the Highway 58 bridge to Emerald Isle and a March 1–15 closure in areas south of the Highway 58 bridge to Emerald Isle.

Life Stage Closures and Limits are used to limit harvest of specific life stages (e.g., immature females, sponge crabs, etc.). Amendment 3 maintained the prohibition on harvest of immature female hard blue crabs and harvest of dark sponge crabs from April 1–30. The intent of prohibiting harvest of immature female blue crabs is to allow immature females the opportunity to mature and spawn before being subject to harvest. Prioritizing the reproductive potential of female crabs through life-stage closures serves as a proactive investment to the sustainability of the blue crab population. This strategy not only fosters increased abundance within the crab population but likely contributes to higher recruitment. It also continues to allow harvest opportunities on male crabs.

Trip or Bushel Limits limit catch while continuing to allow harvest opportunities. Maryland and Virginia each manage blue crab harvest with some form of a trip limit in combination with other measures.

Management Options

Current management of the N.C. blue crab fishery recognizes the conservation value of protecting mature female crabs by prohibiting harvest of dark sponge crabs from April 1–30 and by establishing crab spawning sanctuaries (CSS) at all coastal inlets. The purpose of the CSS is to protect mature females in these areas prior to and during the spawning season, though sanctuary size and other factors limit their effectiveness. Season closures and life stage harvest limits can be used to enhance the effectiveness of the existing CSS by providing broader protections.

Management options provided below focus on limiting harvest of blue crabs during biologically important times of year (e.g., mating and spawning seasons) and specifically limiting harvest of mature females.

Option 1 – Prohibit Crab Trawling (year-round, statewide; estimated 0.7% harvest reduction relative to 2019–2024 landings).

Option 2 – Prohibit Sponge Crab Harvest (year-round, statewide; estimated 1.4% harvest reduction relative to 2019–2024 landings).

Options 3 and 4 – propose various **trip limits** (see Table 2a for statewide option details and estimated harvest reduction and Table 3 for regional option details and estimated harvest reduction)

Option 5 and 6 – propose various combinations of **trip limits and season closures** (see Table 2a for statewide option details and estimated harvest reduction and Table 3 for regional option details and estimated harvest reduction)

Options 7, 8, 9, 10, and 11 – propose various **life stage specific trip limits, and season closures** (see Table 2b for option details and estimated harvest reduction)

Initial DMF Recommendation Presented to Advisory Committees in March 2025

In consideration of blue crab life history and blue crab fishery characteristics, the preliminary DMF recommendation presented to the Northern, Southern, and Shellfish/Crustacean Advisory Committees in March 2025 was Option 11.a (was labeled as Option 8.a when it was presented to the ACs in March 2025), 10-bushel limit for mature female blue crabs from June–December and no harvest of mature female blue crabs from January–May (Table 2b). The DMF also preliminarily recommended maintaining existing season closures and all other blue crab management measures currently in place. In combination, these management measures would effectively reduce harvest by an estimated 22.5 percent compared to landings from 2019–2024 (21.7 percent compared to landings from 2019–2023), increase the spawning stock biomass, and promote increased recruitment.

Table 2a. Estimated percent harvest reductions from season closure and trip limit management options compared to annual commercial hard blue crab landings, 2019-2024. Unless stated otherwise all options are in addition to existing management including season closures and apply statewide. One bushel is estimated to be 40 pounds.

Option #	Measures	2019-2024
3	a. 10-bushel hard crab trip limit year-round	47.6
	b. 15-bushel hard crab trip limit year-round	34.1
	c. 20-bushel hard crab trip limit year-round	24.6
	d. 25-bushel hard crab trip limit year-round	18.0
	e. 30-bushel hard crab trip limit year-round	13.2
	f. 35-bushel hard crab trip limit year-round	9.7
	g. 40-bushel hard crab trip limit year-round	7.1
	h. 45-bushel hard crab trip limit year-round	5.2
	i. 50-bushel hard crab trip limit year-round	3.9
4	a. 10-bushel hard crab trip limit Sept–Dec	22.2
	b. 15-bushel hard crab trip limit Sept–Dec	17.1
	c. 20-bushel hard crab trip limit Sept–Dec	13.1
	d. 25-bushel hard crab trip limit Sept–Dec	10.1
	e. 30-bushel hard crab trip limit Sept–Dec	7.7
	f. 35-bushel hard crab trip limit Sept–Dec	5.9
	g. 40-bushel hard crab trip limit Sept–Dec	4.5
	h. 45-bushel hard crab trip limit Sept–Dec	3.4
	i. 50-bushel hard crab trip limit Sept–Dec	2.5
5	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	28.0
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	22.9
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	18.9
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	15.4
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	12.6
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	10.4
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	8.6
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	6.1
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	4.3
6	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	24.4
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	19.5
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	15.7
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	12.5
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	10.1
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	8.1
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	6.6
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	4.8
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	3.5

Table 2b. Estimated percent harvest reductions from mature female season closure and trip limit management options compared to annual commercial hard blue crab landings, 2019-2024. Unless stated otherwise all options are in addition to existing management including season closures and apply statewide. One bushel is estimated to be 40 pounds. *Initial DMF recommendation presented to Northern, Southern, and Shellfish/Crustacean Advisory Committees in March 2025.

Option #	Measures	2019-2024
7	a. 10-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-Mar	14.9
	b. 15-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-Mar	12.8
	c. 20-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-Mar	11.3
8	a. 10-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-May	19.2
	b. 15-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-May	17.1
	c. 20-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-May	15.5
9	a. 10-bushel all hard crabs limit Sept-Nov, complete closure Dec-Jan, no mature females Feb-May	30.7
	b. 15-bushel all hard crabs limit Sept-Nov, complete closure Dec-Jan, no mature females Feb-May	26.0
	c. 20-bushel all hard crabs limit Sept-Nov, complete closure Dec-Jan, no mature females Feb-May	22.3
10	a. 10-bushel mature females Sept-Dec, no mature females Jan-May	17.7
	b. 15-bushel mature females Sept-Dec, no mature females Jan-May	14.5
	c. 20-bushel mature females Sept-Dec, no mature females Jan-May	12.2
11	a. 10-bushel mature females June-Dec, no mature females Jan-May*	22.5
	b. 15-bushel mature females June-Dec, no mature females Jan-May	17.3
	c. 20-bushel mature females June-Dec, no mature females Jan-May	13.9

Table 3. Region-specific estimated percent harvest reductions from season closure and trip limit management options 3-6 (see Table 7a) compared to annual commercial hard blue crab landings, 2019-2024. The Highway 58 Bridge to Emerald Isle separates the northern and southern regions. For each option and region, estimated percent reductions were calculated relative to landings within the given region and relative to statewide landings. Unless stated otherwise all options are in addition to existing management including season closures. One bushel is estimated to be 40 pounds. NOTE: Ocean landings and some landings from 2023 and 2024 were excluded from regional calculations because they cannot be assigned as north or south of the Highway 58 Bridge; therefore, reductions will not be equal to reductions in Table 2a. [#]DMF recommendation for south of the Highway 58 Bridge and ^{*}DMF Recommendation for north of the Highway 58 Bridge presented to MFC in November 2025.

Option #	Measures	Northern Landings		Southern Landings	
		Region	Statewide	Region	Statewide
3	a. 10-bushel hard crab trip limit year-round	49.4	45.4	26.4	2.2
	b. 15-bushel hard crab trip limit year-round	35.8	32.9	14.6	1.2
	c. 20-bushel hard crab trip limit year-round	26.1	24.0	8.4	0.7
	d. 25-bushel hard crab trip limit year-round	19.1	17.6	5.3	0.4
	e. 30-bushel hard crab trip limit year-round	14.0	12.9	3.6	0.3
	f. 35-bushel hard crab trip limit year-round	10.3	9.5	2.6	0.2
	g. 40-bushel hard crab trip limit year-round	7.6	6.9	2.0	0.2
	h. 45-bushel hard crab trip limit year-round	5.6	5.1	1.5	0.1
	i. 50-bushel hard crab trip limit year-round	4.1	3.8	1.2	0.1
4	a. 10-bushel hard crab trip limit Sept–Dec	23.3	21.4	9.5	0.8
	b. 15-bushel hard crab trip limit Sept–Dec[#]	18.2	16.7	5.4	0.4
	c. 20-bushel hard crab trip limit Sept–Dec	14.1	12.9	3.0	0.2
	d. 25-bushel hard crab trip limit Sept–Dec	10.8	9.9	1.7	0.1
	e. 30-bushel hard crab trip limit Sept–Dec[*]	8.3	7.6	1.1	0.1
	f. 35-bushel hard crab trip limit Sept–Dec	6.4	5.8	0.7	0.1
	g. 40-bushel hard crab trip limit Sept–Dec	4.8	4.4	0.6	<0.1
	h. 45-bushel hard crab trip limit Sept–Dec	3.6	3.3	0.5	<0.1
	i. 50-bushel hard crab trip limit Sept–Dec	2.7	2.5	0.4	<0.1

Table 3 continued.

Option #	Measures	Northern landings		Southern landings	
		Region	Statewide	Region	Statewide
5	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	28.4	26.1	23.0	1.9
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	23.6	21.6	19.9	1.6
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	19.7	18.1	18.0	1.5
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	16.7	15.3	17.1	1.4
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	14.3	13.1	16.7	1.4
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	12.4	11.4	16.5	1.4
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	11.0	10.1	16.4	1.3
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	9.8	9.0	16.3	1.3
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	8.9	8.2	16.3	1.3
6	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	24.9	22.9	17.7	1.5
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	20.1	18.5	14.5	1.2
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	16.3	14.9	12.7	1.0
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	13.2	12.1	11.8	1.0
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	10.8	10.0	11.4	0.9
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	9.0	8.2	11.2	0.9
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	7.5	6.9	11.1	0.9
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	6.4	5.8	11.0	0.9
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	5.5	5.0	10.9	0.9

Advisory Committee Review

The Amendment 3 adaptive management framework requires “consultation” with the Northern, Southern, and Shellfish/Crustacean advisory committees before management changes can be approved by the MFC. To fulfill this requirement, the advisory committees met the week of March 18–20, 2025 to discuss adaptive management and provide recommendations. DMF staff provided background information and the preliminary DMF recommendation. In addition, DMF staff were available prior to each meeting to answer questions and discuss blue crab science and management with the public.

Key takeaways from all meetings included:

- Concern about the economic impact of the preliminary DMF recommendation
- Concern about how the preliminary recommendation would disproportionately impact certain fishery segments and areas and the need for fair management between regions
- Distrust of stock assessment results and data
- Concern that landings declines are the result of market conditions and participation declines, not a declining blue crab stock
- Concern about the effects of water quality and predation on the blue crab stock
- Questions about authority to make management changes without an updated stock assessment
- The need for cooperation with industry for data collection and formulating management
- Some acknowledgement the stock has declined since the 1990s even if it is not because of fishing
- Some concern about long-term declining trends

Advisory Committee Recommendations

Northern

Motion for the Marine Fisheries Commission to not take final action on Blue Crab Amendment 3 Adaptive Management until August 2025, instead of May 2025 (motion passes 10-0)

Motion for the Marine Fisheries Commission to remain status quo regarding the Blue Crab FMP Amendment 3 Adaptive Management (motion passes 7-2, with 1 abstention)

Southern

Motion to recommend the Marine Fisheries Commission to remain status quo regarding Blue Crab FMP Amendment 3 Adaptive Management and to move the Marine Fisheries Commission action on Blue Crab to the August 2025 meeting (motion passes 6-1, with 1 abstention)

Shellfish/Crustacean

Motion for the Marine Fisheries Commission to not take final action on Blue Crab Amendment 3 Adaptive Management until August 2025, instead of May 2025 (motion passes, 5-0, with 2 abstentions)

Motion to recommend to the Marine Fisheries Commission to remain status quo regarding Blue Crab FMP Amendment 3 (motion passes 4-0, with 3 abstentions)

DMF Amendment 3 Adaptive Management Recommendations

Following the March Advisory Committee meetings, the DMF further evaluated potential management options and stock indicators updated with data from 2024. The stock indicator trends continue to show long-term decline in all blue crab life stages and both sexes. Even without an updated stock assessment, there is little evidence overfishing has ended, or sustainability objectives of Amendment 3 will be met with the current management strategy. Therefore, the DMF recommends that some action be taken immediately to begin in 2026 through Amendment 3 Adaptive Management to address continued declines in the stock. In consideration of Advisory Committee recommendations and public comment, the DMF revised the recommendations to reduce harvest to a level that approximates the reduction needed to meet the *F* target (5.9%) and increases the probability of meeting the spawner threshold from 50% (current strategy) to 90% (see Table 1). The final DMF recommendations are as follows:

- Maintain all blue crab management measures including existing season closures.
- **Option 1**, effective January 1, 2026, prohibit crab trawling statewide year-round (estimated 0.7% harvest reduction relative to 2019–2024 landings)
- **Option 4e** (North of the Highway 58 Bridge), 30-bushel hard crab trip limit from September–December (estimated 8.3% harvest reduction relative to 2019–2024 northern landings and 7.6% harvest reduction from statewide landings)
- **Option 4b** (South of the Highway 58 Bridge), 15-bushel hard crab trip limit from September – December (estimated 5.4% harvest reduction relative to 2019–2024 southern landings and 0.4% harvest reduction from statewide landings)

These recommendations should be viewed as a first step rather than a comprehensive solution. Recommendations are based on a stock assessment that indicated the stock was overfished and overfishing was occurring but has a terminal year of 2016. Fishery-independent stock indicators suggest stock status has not improved since then. The DMF has begun the process of developing a new benchmark stock assessment which should provide an updated stock status. If the assessment indicates additional management is necessary, it will be important to implement additional measures through adaptive management to ensure stock sustainability. Review of the Blue Crab FMP is scheduled to begin in 2026, at which time comprehensive management will be explored. Until then, Amendment 3 management, including adaptive management and changes made through adaptive management will remain in place.

See the updated timeline for revision development below:

May 2024	DMF presents results of stock assessment update and adaptive management plan to MFC
May–August 2024	Outreach and analysis
September 2024	DMF updates Northern, Southern, and Shellfish/Crustacean advisory committees
September–December 2024	Additional outreach and analysis. DMF drafts Revision to Amendment 3
March 2025	MFC AC (Northern, Southern, Shellfish/Crustacean) review draft
May 2025	DMF updates MFC on advisory committee recommendations and next steps
August 2025	DMF provides update to MFC
November 2025	MFC vote to select management options for Revision to Amendment 3

*Gray indicates a step is complete.

North Carolina Blue Crab Fishery Management Plan Amendment 3 Adaptive Management Options

ISSUE

Implement management measures through the Blue Crab Fishery Management Plan (FMP) Amendment 3 adaptive management framework to end overfishing and achieve sustainable harvest in the North Carolina blue crab fishery.

ORIGINATION

[Amendment 3 to the North Carolina Blue Crab Fishery Management Plan.](#)

BACKGROUND

As part of [Amendment 3 to the North Carolina Blue Crab FMP](#) (NCDMF 2020), a benchmark [stock assessment](#) (NCDMF 2018) was conducted using data from 1995–2016. Assessment [results](#) indicated the blue crab stock was overfished and overfishing was occurring in 2016. North Carolina General Statute 113–182.1 states that fishery management plans shall: 1) specify a time period not to exceed two years from the date of adoption of the plan to end overfishing, 2) specify a time period not to exceed 10 years from the date of adoption of the plan for achieving sustainable harvest, and 3) must also include a standard of at least 50% probability of achieving sustainable harvest for the fishery. Sustainable harvest is defined in North Carolina General Statute 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”. A minimum commercial harvest reduction of 0.4% (in numbers of crabs) was projected to end overfishing and a minimum commercial 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).

The North Carolina Marine Fisheries Commission (MFC) adopted Amendment 3 to the Blue Crab FMP in February 2020 to rebuild the blue crab stock, and all Amendment 3 management measures have been in place since January 2021. Prior to adoption, the Division of Marine Fisheries (DMF) 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 DMF encouraged the MFC to adopt a management strategy that included a prohibition on immature female hard crab harvest (established in 2016 Revision; NCDMF 2016), 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.

Table 1. Catch reduction projections for varying levels of fishing mortality (F), based on 2016 stock assessment data, and the probability of achieving sustainable harvest within the 10-year rebuilding period defined in statute. Bolded row indicates 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 with the following management strategies to end overfishing and achieve sustainable harvest in the blue crab fishery:

- North of the Highway 58 Bridge: January 1 through January 31 blue crab harvest closure.
- South of the Highway 58 Bridge: March 1 through March 15 blue crab harvest closure.
- A 5-inch minimum size limit for mature female crabs statewide.
- Align the pot closure period with the regional season closures and remain closed in entirety (cannot be reopened early).
- Maintain the prohibition on harvest of immature female hard crabs statewide established in the 2016 Revision to Amendment 2.
- Maintain the 5% cull tolerance established in the 2016 Revision to Amendment 2.
- Adopt an adaptive management framework that allows measures to be relaxed if the assessment update indicated the stock was not overfished and overfishing was not occurring and recommends updating the stock assessment once 2019 data are available.

The adopted management provided an estimated 2.4% harvest reduction with a 50% probability of achieving sustainable harvest. This reduction was slightly over the statutorily required minimum (2.2% reduction), but below the harvest reduction level needed to reduce F to the target (5.9% reduction) and the reduction needed to increase spawner abundance to the target (19.8% reduction).

Amendment 3 also maintained all measures implemented by the [May 2016 Revision to the Blue Crab FMP](#) (NCDMF 2016). A summary of all management measures in place through Amendment 3 can be found in [Amendment 3](#), the annual [FMP Update](#) or in the [Amendment 3 flyer](#).

Amendment 3 Adaptive Management

In addition to management strategies to reduce harvest, Amendment 3 also includes the following adaptive management framework:

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, DMF monitoring programs continued to observe historically low [commercial landings](#) (Figure 1), coupled with continued [low abundance of all blue crab life stages](#) (Figures 2 and 3) based on fishery-independent sampling (e.g., male and female juveniles, male and female adults, mature females) through 2024.

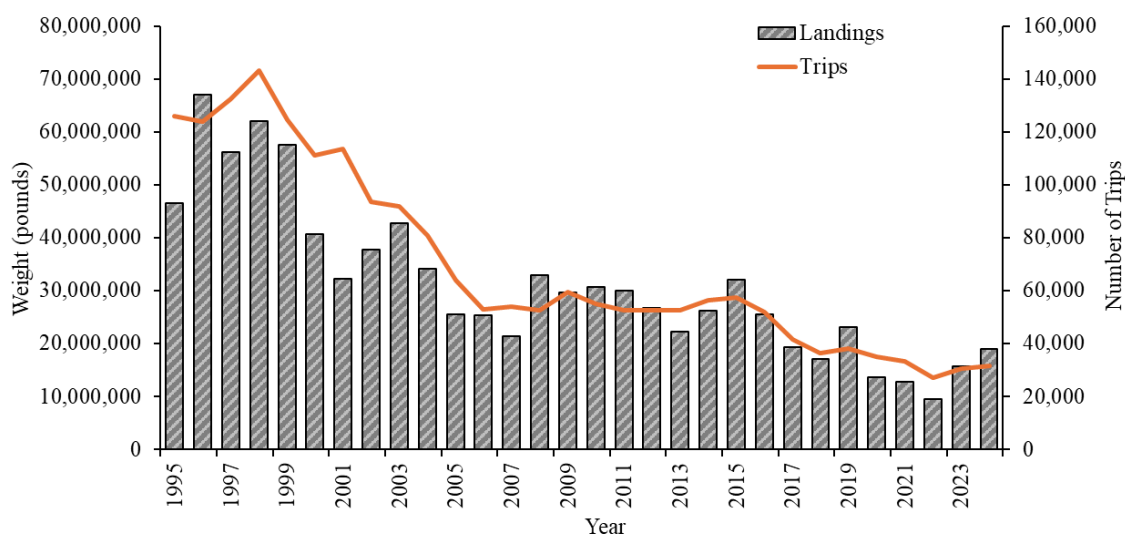


Figure 1. Annual blue crab commercial landings compared to number of trips recorded, 1995–2024. Landings include hard, soft, and peeler crabs. (Data sourced from the DMF Trip Ticket Program)

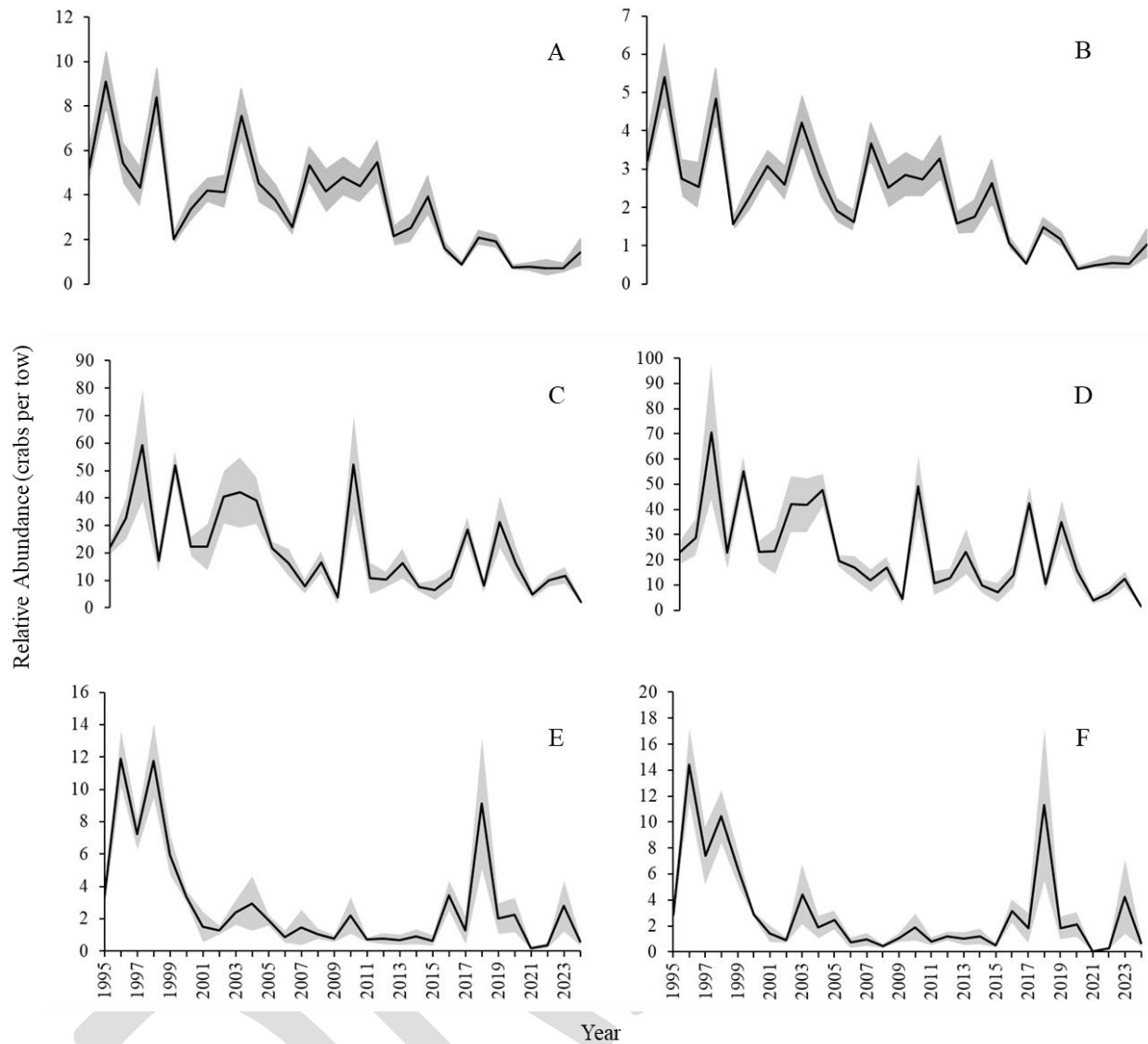


Figure 2. Relative abundance of recruit crabs (<127 mm, 5 inches Carapace Width, CW) from DMF independent sampling programs, Program 120 and Program 195, 1995–2024. (A) is Program 120 males, (B) is Program 120 females, (C) is June Program 195 males, (D) is June Program 195 females, (E) is September Program 195 males, (F) is September Program 195 females. Note differences in Y-axis scales.

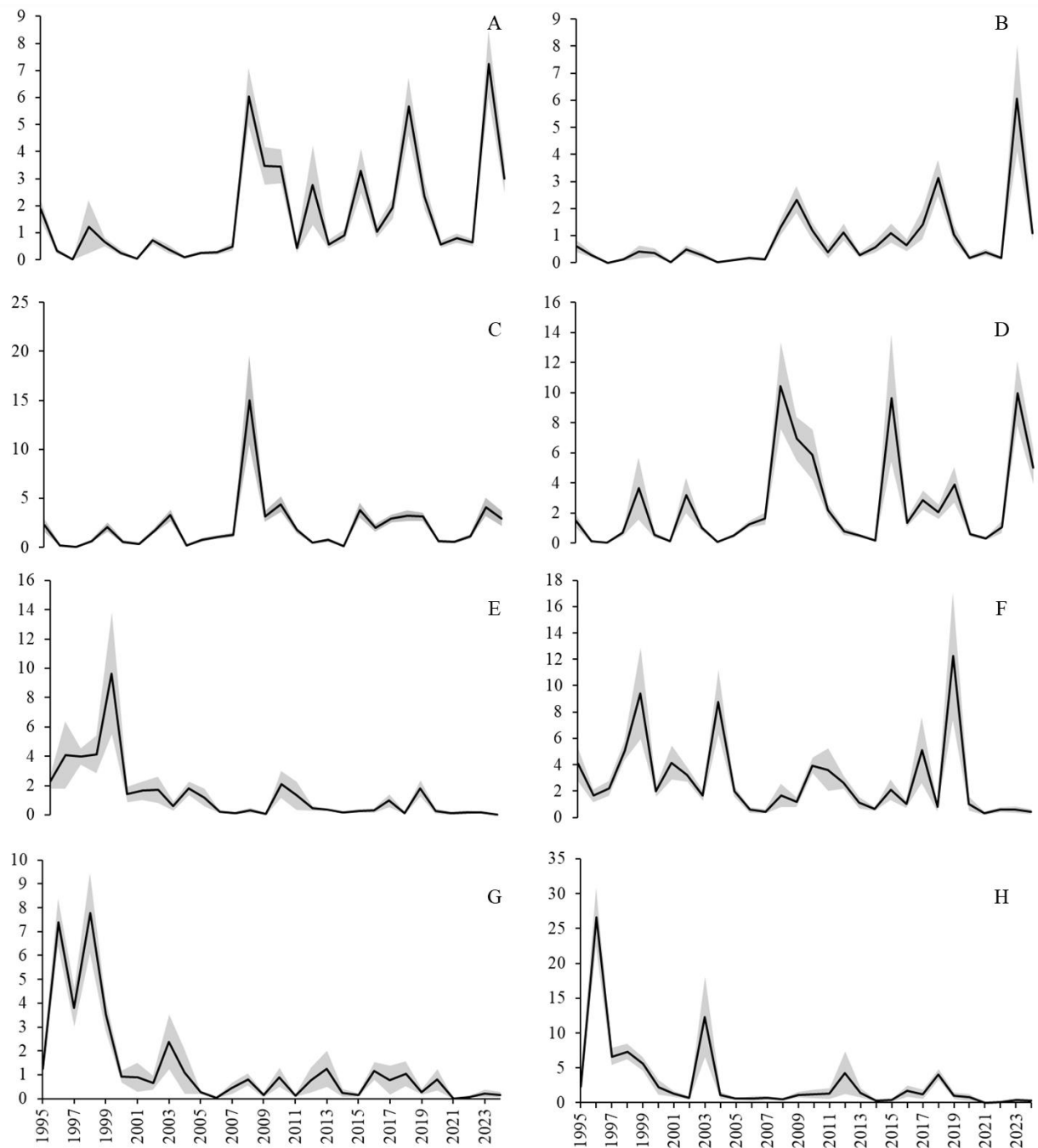


Figure 3 Relative abundance of fully recruited crabs (≥ 127 mm, 5 inches, Carapace Width, CW) from DMF independent sampling programs, Program 100 and Program 195, 1995–2024. (A) is Program 100 summer males, (B) is Program 100 summer females, (C) is Program 100 fall males, (D) is Program 100 fall females, (E) is Program 195 June males, (F) is Program 195 June females, (G) is Program 195 September males, and (H) is Program 195 September females. Note differences in Y-axis scales.

In response to stock concerns expressed by commercial crabbers and continued poor trends in abundance since adoption of Amendment 3, the DMF updated 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. Results of the update indicated the magnitude and trends for estimated recruitment, female spawner abundance, and fishing mortality were similar to the benchmark assessment (Figure 4); 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 (Figure 5).

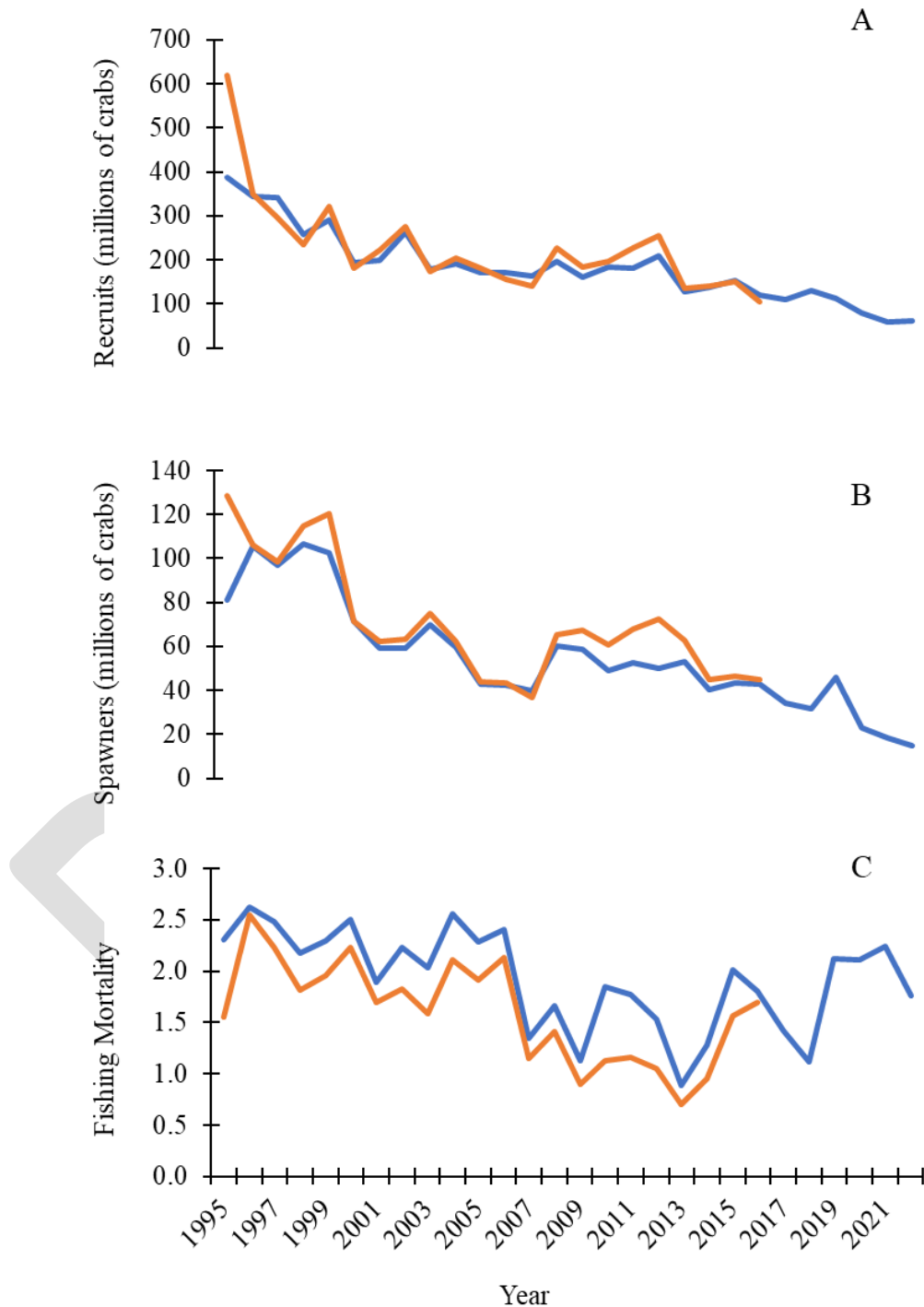


Figure 4. Comparison of estimates of (A) total recruitment, (B) female spawner abundance, and (C) fishing mortality between the 2023 stock assessment update (blue line) and the 2018 benchmark stock assessment (orange line).

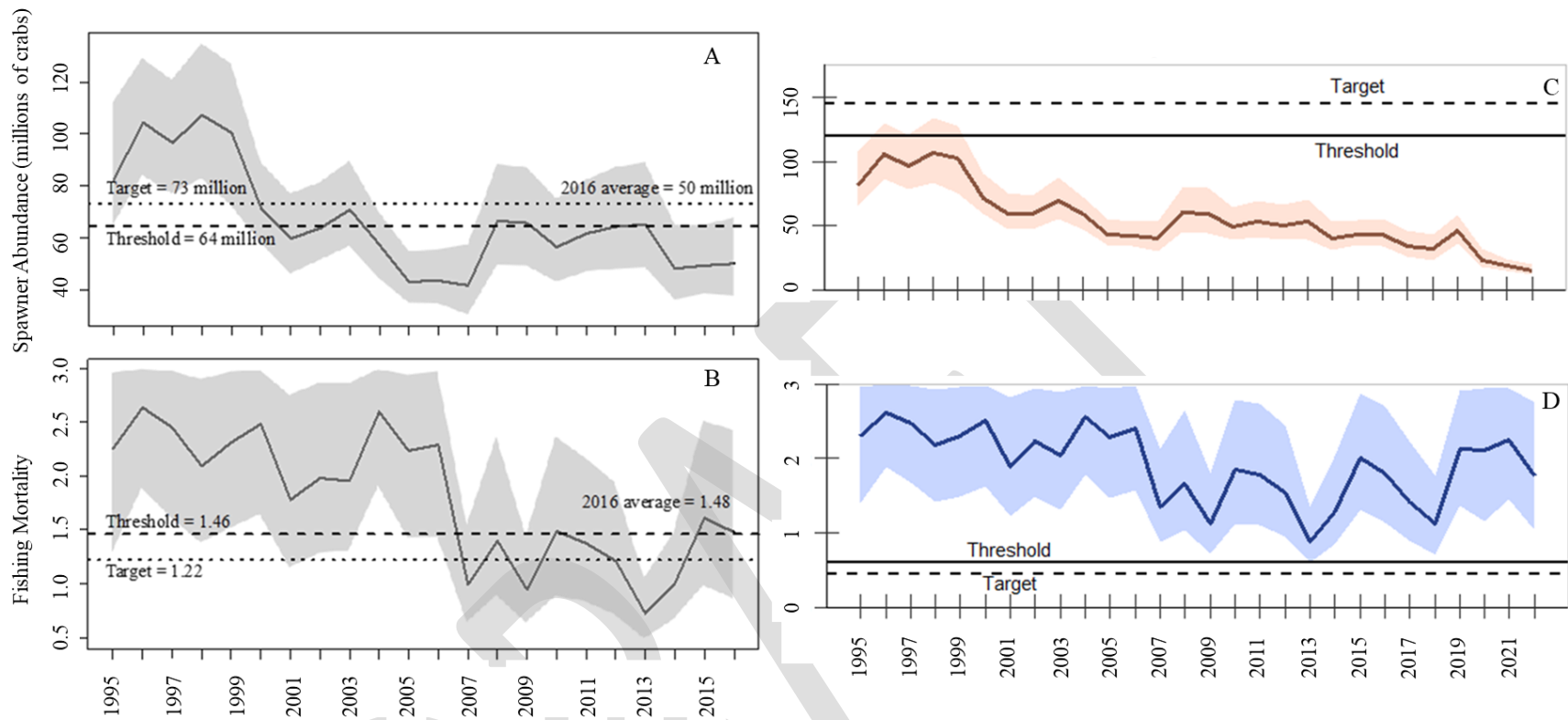


Figure 5. Annual estimates of (A) mature female spawner abundance and (B) fishing mortality relative to associated reference points from the 2018 benchmark stock assessment. Annual estimates of (C) mature female spawner abundance and (D) fishing mortality relative to associated reference points from the 2023 stock assessment update.

Due to the magnitude of the change in reference points, the DMF requested an external review of the assessment update, which was completed in late December 2023 (Appendix 1). 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 DMF and external peer reviewers, the DMF recommended against using results of the 2023 stock assessment update to inform management. Model specification issues in the update do not invalidate the benchmark stock assessment or the data sources used in the benchmark or the updated model.

Declines in the North Carolina blue crab stock are not unique, as blue crab stocks in other Atlantic coast states have declined similarly. In January 2023 the South Carolina Department of Natural Resources released a [status report](#) for the South Carolina blue crab fishery (SCDNR 2023). 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. Beginning July 2025, South Carolina began requiring a limited commercial blue crab license to commercially harvest blue crabs in addition to a commercial saltwater license and a blue crab trap license. South Carolina also capped the number of traps an individual can use based on the number of traps an individual was licensed in previous years (Appendix 2). Concerns for the [Chesapeake Bay blue crab stock have also persisted](#) (Garvey 2025). 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. In addition, because the conservation trigger for male harvest has been exceeded several times, consideration of management to protect male crabs has been recommended.

Adaptive Management

While an updated stock assessment is not currently available to inform stock status, there is little evidence overfishing has ended or sustainability objectives of Amendment 3 will be met. Because Amendment 3 is nearly halfway through the required rebuilding timeline, management measures projected to rebuild spawner abundance to a level above the spawner abundance threshold with a much higher probability of success must be implemented (Table 1). 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...”*.

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.

AUTHORITY

North Carolina General Statutes

G.S. 113–134 RULES

G.S. 113–182 REGULATIONS OF FISHING AND FISHERIES

G.S. 113–182.1 FISHERY MANAGEMENT PLANS

G.S. 113–221.1 PROCLAMATIONS; EMERGENCY REVIEW

G.S. 143B–289.52 MARINE FISHERIES COMMISSION - POWERS AND DUTIES

DISCUSSION

Even without an updated stock assessment there is little evidence overfishing has ended, or sustainability objectives of Amendment 3 will be met with the current management strategy as stock indicator data show long-term decline in all blue crab life stages and both sexes. In consideration of blue crab life history, blue crab fishery characteristics, and concerning trends in stock indicator data from fisheries-independent sampling management changes must be considered. While observed declines may not be entirely the result of fishing (Voigt et al. 2025), maintaining the spawning stock through management changes may be important to prevent further stock decline.

Management measures specific to recreational harvest and commercial peeler and soft blue crab harvest are not included in this discussion because the needed harvest reductions relate specifically to the hard blue crab fishery. The discussion includes quantifiable management measures projected to meet the necessary harvest reductions to end overfishing within two years and achieve sustainable harvest within 10 years with at least a 50% probability of success based on the terminal year of the stock assessment (2016). Amendment 3 is statutorily required to end overfishing of the blue crab stock by May 2022 and achieve sustainable harvest by May 2030. Because Amendment 3 is nearly halfway through the required rebuilding timeline, management measures projected to rebuild spawner abundance to a higher level with a much higher probability of success must be considered. This revision includes management options projected to reduce F closer to the F target and rebuild the spawning stock closer to the spawner abundance target with greater than 50% probability of success (Table 1).

Several management tools are immediately available to increase the probability of achieving sustainable harvest by promoting increased recruitment and adult abundance. These include size limit changes, season and life stage closures, trip/bushel limits, or some combination of these measures.

The Amendment 3 adaptive management framework states “any quantifiable management measure...with the ability to achieve sustainable harvest (as defined in the stock assessment), either on its own or in combination, may be considered”. Therefore, management measures where harvest reductions cannot be quantified such as gear modifications, and area closures are not discussed.

Unless otherwise specified all [Amendment 3 management](#) strategies will remain in place. These management strategies include but are not limited to the following:

Commercial

- 5-inch minimum size limit on male and mature female crabs
- No size limit on peeler crabs
- No possession of immature crabs
- No possession of dark sponge crabs April 1–30
- 5% cull tolerance
- Season closures (pot closure periods)
 - January 1–31 north of the Highway 58 bridge to Emerald Isle
 - March 1–15 south of the Highway 58 bridge to Emerald Isle
- Possession of blue crabs prohibited during season closures

Recreational

- Equivalent to commercial regulations
- Bag limit 50 crabs/day not to exceed 100 crabs/vessel/day

Economic Impact

Data from the NC TTP was used to determine the economic value and contribution of the commercial blue crab fishery. Economic contribution estimates represent the fishing activity of blue crab harvesters, dealers, and processors and are calculated using the DMF commercial fishing economic impact model (NCDMF 2024). These estimates are produced by market grade, which consists of hard crab, peeler crab, and soft crab. Estimates span the years 2014–2024.

Economic contribution estimates are calculated using ex-vessel value and participation counts. Ex-vessel value is the estimated dollar value of commercial harvest during the original transfer of a seafood product from the harvester to the dealer (NCDMF 2024). Some participants in the blue crab fishery may participate in other fisheries either independently or during the same trip. Output measures are not additive and may be over-estimating total contributions while still capturing the relative socioeconomic importance of the blue crab fisheries by market grade to North Carolina's economy.

The economic contribution of the commercial blue crab fishery is the highest of any commercial fishery in the state. The hard crab fishery has the highest contribution at over sixty million dollars in sales impact in 2024 (Table 2). In 2024 the blue crab fishery was the highest ranked fishery by ex-vessel value boasting 34% of total ex-vessel value, which is the highest percent of total ex-vessel value in the reported time frame (Figure 6).

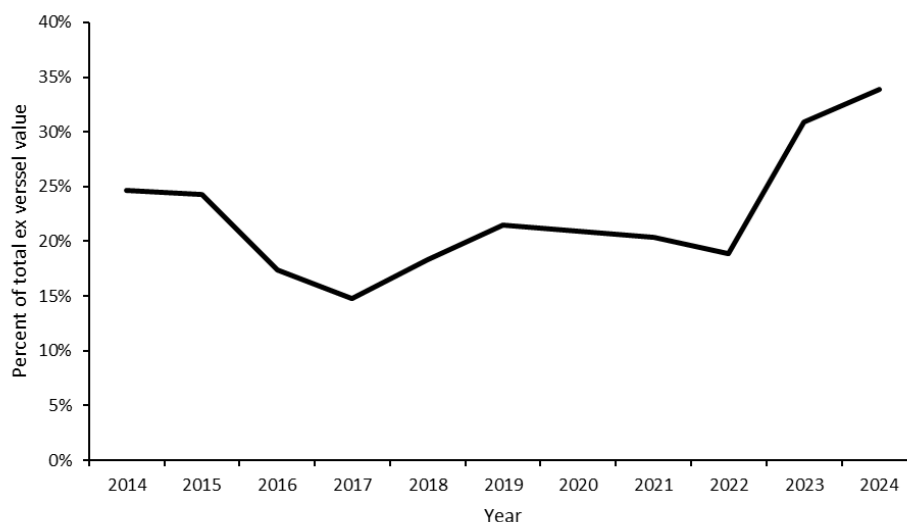


Figure 6. Commercial blue crab fishery value as a percentage of total ex-vessel value, 2014–2024. All data provided by the DMF Trip Ticket Program.

Table 2. Economic contribution of the hard crab fishery, peeler crab fishery, and soft crab fishery in 2023 dollars, 2014–2024.

Year	Pounds landed	Ex-vessel value (\$)	Job impacts	Income impacts (\$)	Value Added impacts (\$)	Sales impacts (\$)
Hard blue crab						
2024	18,713,280	26,048,087	1,314	\$28,245,903	\$58,877,293	\$61,633,254
2023	15,307,436	18,185,103	1,196	\$23,131,071	\$45,969,039	\$50,867,437
2022	9,088,826	13,476,343	1,153	20,751,181	39,220,013	45,994,603
2021	12,052,138	20,553,734	1,398	31,036,700	55,161,991	70,315,728
2020	13,109,488	19,093,928	1,342	28,973,393	55,982,186	62,824,715
2019	22,377,971	22,221,353	1,705	38,130,806	60,813,677	89,355,961
2018	16,412,897	17,298,274	1,390	27,117,159	51,512,951	60,024,348
2017	18,059,855	17,767,075	1,514	30,668,395	50,993,565	70,099,109
2016	24,732,243	20,738,636	1,790	35,058,368	62,547,925	78,578,971
2015	31,019,406	29,607,419	2,170	49,541,126	89,166,922	110,372,047
2014	25,242,795	29,954,723	2,312	52,327,474	87,470,082	119,842,262
Peeler blue crab						
2024	283,951	1,292,255	300	1,798,211	3,435,371	3,982,917
2023	313,905	1,038,757	298	1,555,246	2,929,303	3,451,522
2022	289,075	956,518	298	1,472,868	2,783,741	3,264,585
2021	531,179	1,644,073	367	2,482,595	4,412,354	5,624,486
2020	314,723	807,743	345	1,225,681	2,368,252	2,657,716
2019	465,091	1,247,065	406	2,128,129	3,395,389	4,992,667
2018	368,259	857,909	411	1,344,878	2,554,789	2,976,912
2017	776,161	1,649,472	460	2,847,214	4,734,176	6,507,909
2016	445,932	1,315,141	536	2,223,228	3,966,479	4,983,088
2015	704,354	2,099,220	625	3,512,556	6,322,097	7,825,580
2014	621,040	1,935,462	626	3,584,983	6,044,800	8,234,000
Soft blue crab						
2024	83,633	938,568	219	2,239,625	3,675,947	4,646,463
2023	71,648	765,540	207	1,630,534	2,786,546	3,6722,642
2022	131,341	1,210,514	207	1,863,978	3,522,943	4,131,471
2021	236,523	1,753,965	218	2,648,535	4,707,281	6,000,434
2020	124,170	765,587	181	1,165,078	2,250,770	2,530,023
2019	183,946	1,199,842	217	2,058,874	3,283,636	4,824,776
2018	234,503	1,501,315	233	2,353,495	4,470,803	5,209,506
2017	427,742	2,791,960	330	4,819,305	8,013,250	11,015,540
2016	284,768	2,062,996	329	3,487,466	6,222,016	7,816,720
2015	375,874	2,221,331	338	3,716,881	6,689,852	8,280,791
2014	367,277	2,137,335	361	3,733,680	6,241,182	8,551,008

As is the case in many commercial fisheries in North Carolina, there has been a general decline in participants, ex-vessel value, trips, and landings in the last thirty years (NCDFM 2024). In the blue crab fishery, there has been an increase in ex-vessel value per participant over the same period. These trends could indicate there is

a quicker decline in participants than value, there is consolidation of fishing effort, and/or improved technology has allowed for more efficient fishing practices. Across the blue crab fisheries, the largest increase in value per participant from 2014–2024 was for hard blue crabs.

Value of the blue crab fishery varies throughout the year (Figure 7).

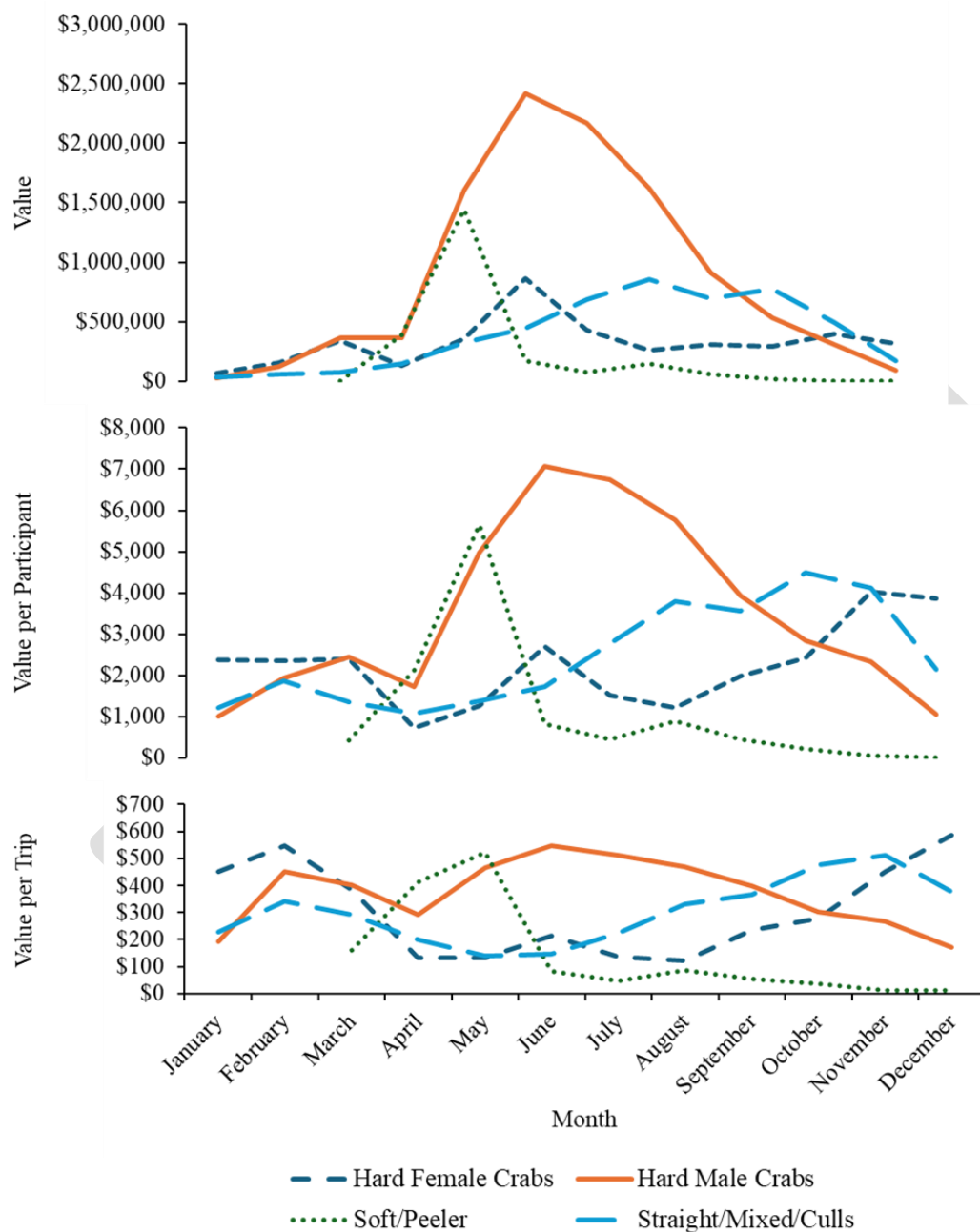


Figure 7. Ex-vessel value per participant by month (A), ex-vessel value per trip by month (B), Ex-vessel value by month (C), averaged from 2014–2024. Note differences in Y-axis.

May has the highest ex-vessel value, and value per participant for the soft and peeler crab fisheries. The highest ex-vessel value, and value per participant for the hard blue crab fishery occurs in June, July and August. Management changes that limit blue crab harvest may decrease ex-vessel value. However, effort and supply are not easily projected and, therefore, the response of blue crab prices to management are unknown.

MANAGEMENT STRATEGIES

Size Limits

Size limits are used to rebuild or protect a portion of the stock. Currently, male and mature female hard crabs are subject to a 5-inch minimum carapace width (CW) statewide (harvest of immature females is prohibited; maturity stage of male blue crabs cannot be differentiated visually).

Because a minimum size limit is already in place for blue crabs, and because achieving necessary harvest reductions through size limit changes alone is unlikely, management options for increasing the minimum size limit or establishing a maximum size limit were not developed. Advantages and disadvantages of increasing minimum size limits or establishing maximum size limits are briefly discussed below.

Increase Minimum Size Limit

Minimum size limits are implemented so some portion of the stock can spawn at least once before being harvested; they are uncomplicated and easily enforced. In addition, increasing minimum size limits ensures smaller, less valuable crabs are left to grow and contribute to the population, potentially leading to higher overall yield and economic value. Increasing minimum size limits may help reduce the number of "lay days," where commercial crabbers stop fishing due to an oversupply of low-value crabs in the market, promoting a more stable and predictable fishery. Changes to minimum size limits can be applied evenly statewide or tailored to specific regions, providing flexibility to adapt to region specific fishery and stock characteristics.

Increasing minimum size limits for blue crabs also presents challenges. Crabbers will face increased culling effort, requiring more time and resources to sort crabs leading to added labor costs or costs to install larger cull rings. Updated measuring tools will be needed by law enforcement and the time it takes for their construction, verification and distribution can be prohibitive if management is enacted quickly. In addition, the intended harvest reduction may not be met if harvest is delayed, as undersize crabs quickly reach legal size and become susceptible to harvest. Finally, region specific stock characteristics will create uneven reductions across different areas that will create inequity and impact market prices leading to economic uncertainty for crabbers.

Establish a Maximum Size Limit

Maximum size limits allow for flexibility to adapt to region specific fishery and stock characteristics; they are uncomplicated and easily enforced. Protecting the largest crabs preserves the portion of the spawning stock that survives past the legal maximum size, potentially providing greater reproductive potential to the stock, which is crucial for long-term sustainability. Unlike minimum size limits, maximum size limits do not have the same concerns of delayed harvest not resulting in actual harvest reductions.

While seemingly straightforward, there are drawbacks to implementing maximum size limits for blue crab. Because cull ring changes are unlikely to exclude larger crabs, maximum size limits are likely to increase the time and effort required for crabbers to cull their catch, as oversized crabs will need to be identified and released. This strategy will be particularly burdensome during periods of high catch volume if the catch includes crabs from many size classes. Enforcement may also be complicated by the time it takes to manufacture, validate, and distribute new measuring devices to law enforcement officers. It is important to note that increasing maximum size limits alone will have minimal impact on overall harvest reductions. To achieve significant conservation benefits, this strategy would likely need to be combined with other

management measures, such as minimum size limits (creating a slot limit), gear restrictions, and/or seasonal closures to prevent overharvest of crabs under the maximum size limit. Maximum size limits are likely to be unpopular with crabbers because larger crabs are often the most valuable.

Seasonal female maximum size limits have been implemented for the N.C. blue crab fishery in the past through adaptive management action. However, compliance was marginal and largely ineffective at protecting large mature females. Even when the size limit was complied with, released females may have been captured multiple times and injured, or ultimately harvested after the seasonal maximum size limit was removed.

Prohibit Crab Trawling

Crab trawling in North Carolina primarily occurs in the late winter and early spring with catches composed primarily of female crabs prior to the spawning season (~80% based on fishery-dependent sampling). For example, of 382,495 pounds of blue crab harvested by trawls in 2024, an estimated 305,996 pounds were female crabs (Table 3). Prohibiting crab trawling would protect female crabs during a critical time of year, increasing the spawning stock biomass to promote increased recruitment.

Although crab trawling makes up a small portion of the total harvest (2.0% in 2024; 0.7% from 2019–2024), recent growth could become a threat to the crab stock over time (Table 3). Prohibiting crab trawling is simple to enforce and would eliminate conflicts between fishermen using crab trawls and those using crab pots.

Table 3. Total blue crab landings (pounds; hard, soft, peeler crabs), blue crab landings from crab trawls, estimated landings of female crabs from trawls, and percent of total landings from crab trawls, 2019–2024.

Year	Total landings	Crab trawl landings	Female crab landings from trawls	% Trawl landings
2019	23,027,008	76,759	61,407	0.3%
2020	13,548,381	82,505	66,004	0.6%
2021	12,819,840	23,617	18,894	0.2%
2022	9,509,242	21,447	17,158	0.2%
2023	15,738,994	87,488	69,990	0.6%
2024	18,943,488	382,495	305,996	2.0%
Total	93,724,448	674,311	539,449	0.7%

Because crab trawls accounts for a small part of the total catch, a crab trawl prohibition on its own is unlikely to increase recruitment and the overall crab population but could be effective as part of a more comprehensive management strategy. A year-round, statewide prohibition on crab trawling is Option 1.

Life Stage and Seasonal Closures or Limits

In N.C., blue crab mating peaks in April–June and August–September and occurs in brackish areas of the estuary and lower portions of rivers (Darnell et al. 2009). After mating, females migrate throughout the spawning season to high salinity waters (>10 ppt) near ocean inlets to spawn from early summer to fall (Forward et al. 2003; Hench et al. 2004; Forward et al. 2005; Whitaker 2006; Darnell et al. 2009). Females that mate late in the summer begin migrating toward the closest inlet in late September–October and spawning

occurs the following spring (Medici et al. 2006). These female crabs overwinter in the mud along their migration route or near the inlets. Females that mate in early spring, migrate sooner, rather than waiting for fall (Darnell et al. 2009). Commercial crab sampling indicates sponge crabs (egg bearing females) are most abundant from March through May but are typically present from March through August. Males prefer lower salinity water (3 to 15 ppt) and do not migrate regularly as adults (NCDMF 2008).

Current management of the N.C. blue crab fishery recognizes the conservation value of protecting mature female crabs by establishing crab spawning sanctuaries (CSS) at all coastal inlets (NCDMF 2020). The purpose of the CSS is to protect mature females in these areas prior to and during the spawning season allowing them access to ocean waters to release their fertilized eggs. The CSS are closed to the use of pots, and mechanical methods for oysters or clams and to the taking of blue crabs with any commercial fishing equipment from March 1 through August 31 in areas from Barden Inlet north and from March 1 through October 31 in areas from Beaufort Inlet west and south (NCMFC Rule 15A NCAC 03L .0205). The CSS are also permanently closed to trawling (NCDMF 2022).

Migration distance, tidal regime, harvest effort along the migration route, and the proportion of post-mating mature female crabs protected in the sanctuaries influence the overall success of the sanctuaries. The CSS protect a portion of egg bearing females, but designation of migration corridors or expanded sanctuary boundaries could protect more of the spawning stock (Ballance and Ballance 2004; Ballance 2008; Ballance 2009; Eggleston et al. 2009). Life stage limits or season closures can be used to enhance the efficacy of the existing CSS by providing broader protection for the blue crab stock.

In consideration of Amendment 3 adaptive management framework requirements, existing management, and effectiveness, options for season closures, life-stage closures, bushel/trip limits, and sex-specific bushel/trip limits or combinations of management measures were developed (Tables 7a and 7b). After reviewing all potential strategies, these were identified as the most likely to meet sustainability objectives of Amendment 3 within the legislatively mandated 10-year rebuilding period.

Commercial catch of hard blue crabs begins increasing in May, as crabs become more active and market value increases. Landings peak in August remaining relatively high through November (Figure 8). Early in the year (February–May), catch is low but value is high, largely due to blue crab harvest restrictions during this time of year in other blue crab producing states (see Appendix 2). During the summer (June–August), catch and value is high. Later in the year (primarily after Labor Day), catch is high but value is low as the availability of female crabs increases but markets begin to decline. Limiting harvest early in the year is unlikely to result in large harvest reductions but would offer protection to the blue crab stock during the mating season and prior to spawning. Limiting harvest late in the season would result in higher harvest reductions and provides protection to the stock during part of the mating and spawning seasons.

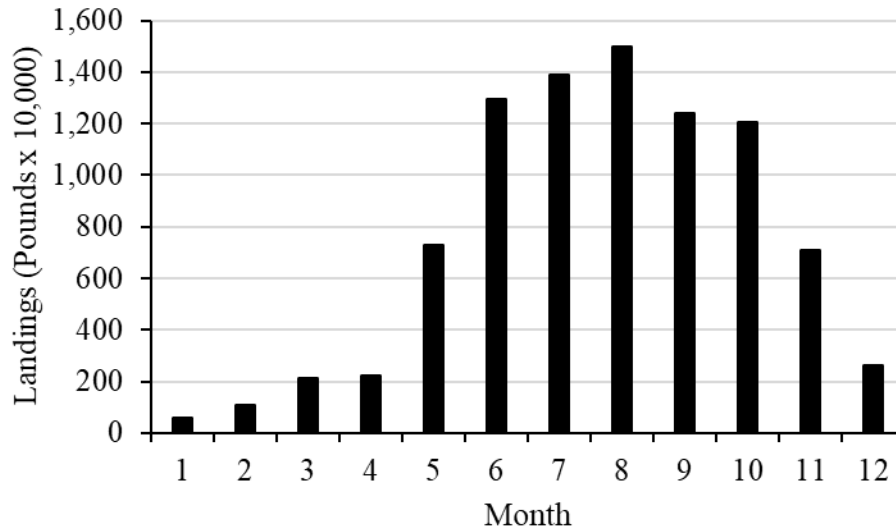


Figure 8. Commercial landings (pounds) of all hard blue crabs by month, 2019–2024.

Prohibit Sponge Crab Harvest

Amendment 3 maintained the prohibition on harvest of dark (brown and black) sponge crabs from April 1–30. Sponge crabs are present year-round; however, they begin to appear in significant numbers in March, peaking in April or May, and persisting at lower levels through the summer as observed in fishery-dependent blue crab harvest sampling programs (Figure 9).

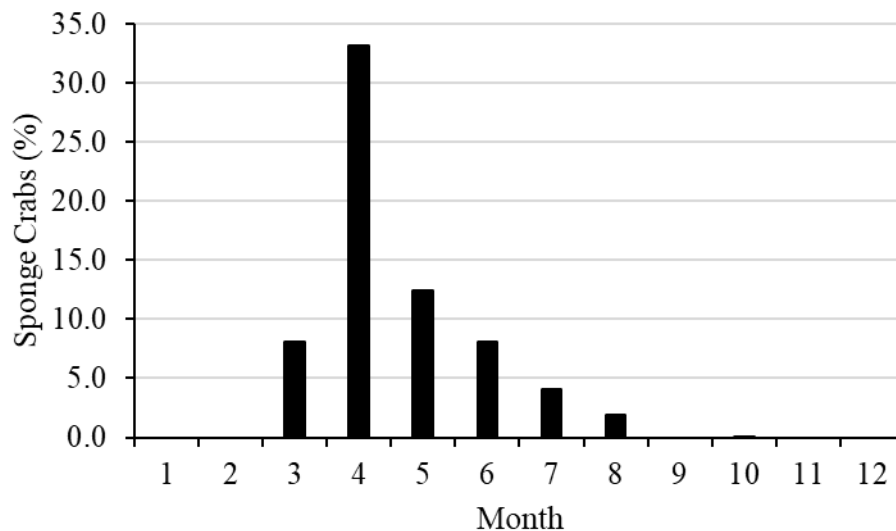


Figure 9. Percentage of commercial female crab samples (Program 436) recorded as sponge crabs by month, 2019–2024 (n = 55,082 total samples; 18,979 recorded as female).

Prohibiting sponge crab harvest year-round would give mature females the opportunity to spawn and possibly spawn more than once prior to being harvested. All east and Gulf coast states have some protections for sponge crabs, including year-round prohibitions on sponge crab harvest in most states (Appendix 2). A sponge crab harvest closure in North Carolina would mostly restrict harvest during the spring and early summer months, would minimally reduce removals from the stock, and potentially increase recruitment.

Fishing gear interactions may negatively affect the spawning potential of female blue crabs even if they are released. Dickinson et al. (2010) reported most sponge crabs caught in pots in the Newport and North rivers of North Carolina had damage to 30-50% of the egg mass. Damage may have been from the gear, capture stress, or interactions with other crabs while in pots. Survival of sponge crabs after pot interactions was not affected by sponge damage; however, the likelihood of crabs producing a second clutch was significantly less if previous sponge damage had occurred (Darnell et al. 2010).

Because sponge presence was not recorded on trip tickets, fishery-dependent data were used to estimate reductions if sponge crab harvest were prohibited. Estimates were developed by applying the percentage of sponge crabs sampled to the landings by month, area, and market grade. However, these data have notable limitations. First trip ticket and fishery-dependent data were not collected at a fine enough scale to estimate sponge crab harvest separately in eastern Pamlico Sound where more female crabs occur and western Pamlico Sound. In addition, blue crab harvest from the ocean was generally low and few fishery-dependent samples were collected from this area making estimating ocean sponge crab harvest difficult.

Based on fishery-dependent sampling, sponge crab harvest occurred from March through August and peaked in April (Table 4). Most sponge crab harvest was from the Pamlico Sound and to a lesser degree southern (south of Core Sound) regions. A year-round, statewide prohibition on sponge crab harvest is estimated to reduce harvest by 1.4% when compared to landings from 2019–2024 (this is Option 2). Based on available data, these reductions would come exclusively from the Pamlico Sound and southern regions of the state.

Table 4. Estimated harvest reduction if sponge crab harvest were prohibited by month and region, 2019–2024. Regions include Albemarle (the sound and its tributaries), Pamlico (the sound and its tributaries), South (areas south of Core Sound), and Ocean waters.

Month	Estimated sponge landings (pounds)	Estimated harvest reduction				
		Albemarle	Pamlico	South	Ocean	Total
January	0	0.0	0.0	0.0	0.0	0.0
February	0	0.0	0.0	0.0	0.0	0.0
March	85,982	0.0	0.1	0.0	0.0	0.1
April	354,420	0.0	0.3	0.1	0.0	0.4
May	281,795	0.0	0.2	0.1	0.0	0.3
June	334,914	0.0	0.3	0.1	0.0	0.4
July	122,926	0.0	0.1	0.0	0.0	0.1
August	45,106	0.0	0.1	0.0	0.0	0.1
September	0	0.0	0.0	0.0	0.0	0.0
October	0	0.0	0.0	0.0	0.0	0.0
November	0	0.0	0.0	0.0	0.0	0.0
December	0	0.0	0.0	0.0	0.0	0.0
Annual	1,225,145	0.0	1.0	0.4	0.0	1.4

Season Closures

A season closure can be used to reduce overall harvest by restricting harvest during specific times of the year. Amendment 3 implemented a January 1–31 closure in areas north of the Highway 58 bridge to Emerald Isle and a March 1–15 closure in areas south of the Highway 58 bridge to Emerald Isle. During these times, all pots must be removed from the water.

Because effort can be increased during open periods to offset losses during the closed season, it is best to have seasonal closures lasting a minimum of two weeks. Late season closures tend to be more effective in achieving harvest reductions because there is less opportunity for recoupment. Season closures implemented prior to or during the spawning season may be effective in protecting the spawning stock and promoting recruitment. However, a possible result of season closures is increased discards, particularly in fisheries that land, but do not target blue crabs. Discards may be less of a concern in the blue crab fishery because most blue crab landings occur in the pot fishery, which targets blue crabs.

Unless otherwise stated all options discussed in this paper maintain the current Amendment 3 season closures. Options 5, 6, and 9 (Tables 7a and 7b) replace the existing season closures with a December–March season closure (Option 5) or a December-January closure (Option 6 and 9) in combination with trip/bushel limits during other times of the year.

Life Stage Closures

Amendment 3 maintained the prohibition on harvest of immature female hard blue crabs. The intent of prohibiting harvest of immature female blue crabs is to allow immature females the opportunity to mature and spawn before being subject to harvest. Prioritizing the reproductive potential of female crabs through life-stage closures serves as a proactive investment to the sustainability of the blue crab population. This strategy not only fosters increased abundance within the crab population but likely contributes to higher recruitment.

While intended to promote long-term sustainability, life-stage closures can present challenges. Crabbers may experience immediate economic hardship due to reduced fishing opportunities. In addition, life-stage closures will lead to increased culling time on the water. Furthermore, life stage closures specific to females pose the risk of shifting fishing pressure towards male crabs disrupting the population's current sex ratio and are likely disproportionately effect segments of the blue crab fishery that occur in higher salinity area, where female crabs are more common.

Harvest of mature female hard blue crabs begins increasing in May and remains relatively stable throughout the summer before peaking in October (Figure 10). During most of the year (March through August), harvest of mature female hard blue crabs makes up less than 50% of the commercial catch in each month (Figure 11). Beginning in September, harvest of mature female crabs makes up an increasing proportion of the catch peaking in December at over 70% and continuing into January. Options 7, 8, 9, 10 and 11 (Table 7b) prohibit harvest of mature female crabs during specific times of year in combination with harvest limits during other times of the year. Option 7 prohibits harvest of mature females from January–March, Options 8, 10 and 11 prohibit harvest of mature females from January–May, Option 9 prohibits harvest of mature females from February–May.

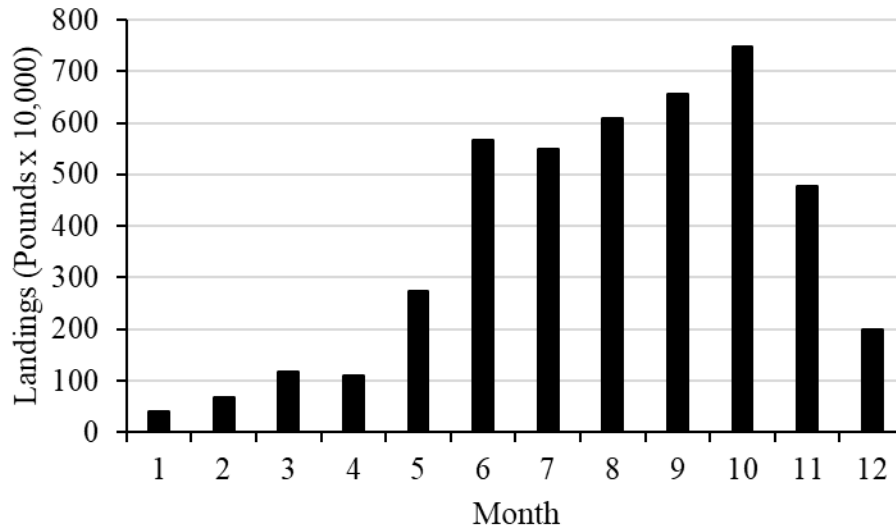


Figure 10. Commercial landings of mature female hard blue crabs by month, 2019–2024.

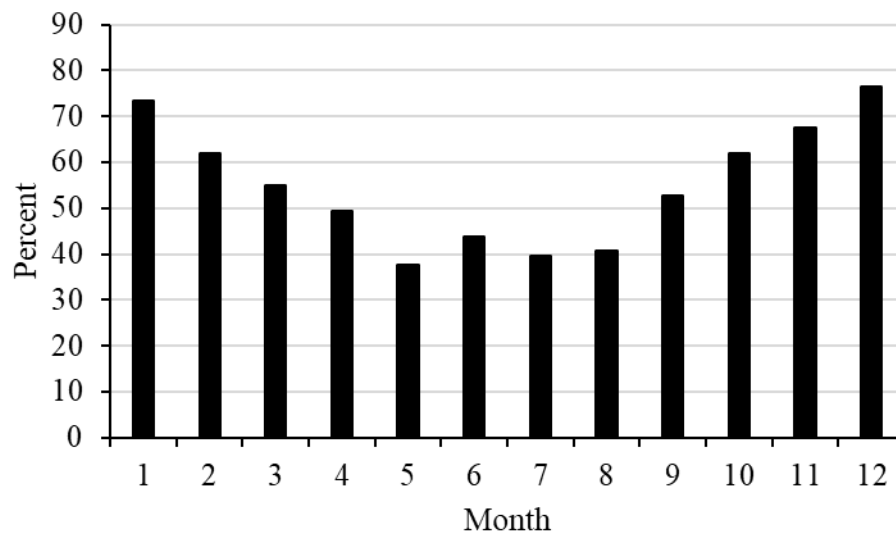


Figure 11. Percent of hard blue crab commercial landings that are mature females in each month, 2019–2024.

Trip/Bushel Limit

Trip or bushel limits for harvesting blue crabs offer several advantages. Trip or bushel limits allow opportunities for crabbers to continue fishing unlike complete season closures. Bushel limits are adaptable; can be implemented seasonally or incrementally accounting for market conditions and stock characteristics to evenly distribute harvest reductions across the fishery. Maryland and Virginia manage blue crab harvest with some form of a trip limit in combination with other measures (e.g., seasons, size limits, gear limits, closed areas; Appendix 2). While the blue crab stock in Chesapeake Bay has declined, the stock is no longer depleted, and overfishing is not occurring like it was throughout most of the 2000's (Garvey 2025). Current management practices, implemented in 2008, aimed at increasing stock size have allowed the Chesapeake Bay blue crab

fishery to consistently land in the range of 40 million pounds, or greater, of blue crab every year since 1990 even as the stock has declined recently.

While bushel limits offer a straightforward approach to managing blue crab harvest, there are drawbacks. One concern is crabbers, driven by high demand and prices, may increase fishing effort (e.g., set more pots, fish more often) beyond pre-regulation levels to meet demand, despite the bushel limit. This could lead to steady or increased pressure on the crab population, even if the daily bushel limits are adhered to. Furthermore, crabbers may fish pots less frequently, holding catch in unfished pots to avoid exceeding the daily bushel limit. Bushel limits will also increase time to sort and cull the catch and lead to discarding of smaller (legal size) and lower value (likely female) crabs, as crabbers prioritize keeping the largest, crabs to maximize the value of their catch within the limit.

A review of TTP data showed that most commercial trips during 2019–2024 landed between one and 15 bushels of hard blue crabs (Table 5). Implementing a hard crab bushel limit of 15 bushels or less would limit harvest while continuing to allow crabbers to operate. Additionally, seasonal bushel limits implemented early or late in the season limit harvest during biologically important periods of the blue crab life cycle, specifically for already mated overwintering females that are first to spawn when temperatures rise in the spring. Limiting harvest of these females will likely contribute to higher recruitment.

Table 5. Percent of commercial trips landing a given number of bushels (bu.) of hard blue crabs per trip by month including the maximum bushels landed per trip, 2019–2024. Includes hard blue crabs landed in pot gear only.

Month	<1	1–5	6–10	11–15	16–20	21–25	26–30	>30	Max bu./trip	# of Trips
January	4%	45%	22%	12%	6%	3%	2%	5%	90	1,559
February	6%	44%	21%	12%	8%	3%	2%	4%	95	2,223
March	9%	48%	21%	10%	5%	3%	1%	2%	204	6,523
April	16%	55%	15%	7%	3%	2%	1%	2%	205	9,372
May	6%	47%	23%	11%	6%	3%	2%	3%	116	21,985
June	3%	37%	23%	14%	9%	5%	3%	5%	208	29,790
July	3%	36%	22%	13%	8%	6%	4%	8%	207	28,942
August	3%	32%	18%	12%	9%	7%	5%	14%	173	24,309
September	2%	30%	18%	12%	9%	7%	5%	17%	290	18,109
October	3%	26%	16%	11%	9%	7%	6%	22%	250	15,253
November	2%	25%	17%	12%	10%	8%	6%	20%	135	9,337
December	4%	38%	20%	12%	8%	6%	4%	9%	155	5,035

Options 3, 4, 5 and 6 implement bushel limits ranging from 10- to 50-bushels on all hard blue crabs year-round (Option 3), from September–December (Option 4), or from September–November (Options 5 and 6; Table 7a). Options 5 and 6 implement seasonal bushel limits in combination with statewide season closures.

Sex-specific Trip/Bushel Limits

Another variation of trip/bushel limits is for the limits to be sex specific, specifically limits for female crabs. Blue crab [sex, and maturity stage of female blue crabs is easily differentiated](#) with external examination of the crab (NCDMF 2020). In addition, culling of crabs by sex already occurs in some segments of the blue

crab fishery; harvest of immature female crabs is prohibited and harvest of dark sponge crabs is prohibited from April 1–30, which necessitates onboard culling of specific life stages.

Comprehensive management of the Chesapeake Bay blue crab stock is focused on limiting harvest of mature female blue crabs. Virginia has implemented extensive [blue crab spawning sanctuaries](#) where the harvest of blue crab is seasonally prohibited and Maryland has implemented [seasonal bushel limits for mature female crabs](#) (Appendix 2). The blue crab management program in Chesapeake Bay, which preferentially protects mature female blue crabs, has recovered the blue crab stock from low levels in the 2000's while allowing for consistent commercial harvest. While the Chesapeake Bay blue crab stock has declined recently, it is not depleted and overfishing is not occurring, though continued protection of mature females as well as immature blue crabs has been recommended (Garvey 2025).

Sex-specific bushel limits focused on mature female crabs provides a targeted approach to conservation, aiming to protect the reproductive potential of the blue crab population and promoting increased recruitment leading to a healthier more sustainable crab population. This targeted approach may have similar population benefits as more restrictive regulations with the benefit of continuing to allow some blue crab harvest. Sex-specific bushel limits allow greater flexibility in managing the fishery based on blue crab life history, specifically reproductive cycles, and fishery preferences. Because female blue crabs, particularly those carrying eggs, are often less commercially valuable, sex-specific bushel limits may result in less economic impact compared to broader restrictions while still resulting in conservation benefits. An advantage of this strategy is that it does not impact the harvest of peeler crabs since female crabs undergo a terminal molt when they reach maturity, meaning they do not molt again (no longer grow) after this stage, so they have no value as peeler crabs.

Depending on implementation specifics, female bushel limits are likely to distribute the burden of catch reductions unevenly, disproportionately impacting crabbers who primarily target females or those fishing in areas with a higher abundance of female crabs. Because female crabs are primarily found in higher salinity waters near coastal inlets, crabbers fishing on the eastern side of Pamlico Sound and in the southern part of the state (south of Pamlico Sound) are likely to be more affected by mature female bushel limits. This strategy would also severely curtail certain components of the blue crab fishery, specifically the crab trawl fishery, which catches a high volume of mature female crabs prior to the spawning season. This strategy requires additional culling effort, as crabbers sort and release female crabs while fishing, potentially slowing down fishing operations and increasing associated costs. Unless a crate limit is also implemented, crabbers who historically harvest crabs by combining both sexes of crabs together as culls or straights will need to purchase bushel baskets (or other gear dependent on specific management) to accommodate the separation of catch, increasing the overall burden on crabbers and adding to the operation cost. Limiting crab catch during times of historically high harvest will reduce the amount available to picking houses, which are already limited in number, to meet industry demand. As a result, to stay competitive, picking houses will likely need to increase reliance on crabs sourced from out of state.

Most commercial trips landing mature female blue crabs land between one and 10 bushels (Table 6). Implementing a mature female crab bushel limit of 10 bushels or less would limit harvest while allowing harvest of male crabs providing opportunity for crabbers to continue fishing. Additionally, seasonal mature female bushel limits implemented early or late in the season limit harvest during biologically important periods of the blue crab life cycle, specifically during or prior to the mating and spawning seasons. Estimated harvest reductions were calculated for Options 7–11 which include combinations of season closures and mature females limits (Table 7b).

Table 6. Percent of commercial trips landing a given number of bushels (bu.) of mature female hard blue crabs per trip by month including the maximum bushels landed per trip, 2019–2024. Includes mature female hard blue crabs landed in pot gear only.

Month	<1	1–5	6–10	11–15	16–20	21–25	26–30	>30	Max bu./trip	# of Trips
January	12%	52%	21%	7%	3%	2%	1%	2%	69	1,521
February	19%	53%	17%	6%	3%	1%	0%	1%	75	2,037
March	37%	44%	9%	4%	3%	1%	1%	1%	140	6,131
April	47%	38%	7%	3%	2%	1%	1%	1%	200	8,147
May	30%	55%	10%	3%	1%	1%	0%	1%	78	20,022
June	18%	55%	16%	6%	3%	1%	1%	1%	124	28,795
July	19%	55%	13%	6%	3%	2%	1%	1%	202	27,553
August	18%	49%	14%	8%	4%	3%	2%	3%	124	22,653
September	11%	43%	17%	10%	6%	4%	3%	6%	197	17,040
October	9%	36%	16%	10%	7%	6%	5%	11%	122	14,678
November	7%	35%	17%	11%	8%	6%	5%	11%	120	9,123
December	8%	45%	18%	10%	6%	4%	3%	6%	108	4,899

Regional Management

Current blue crab season closures are broken up regionally north and south of the Highway 58 bridge to Emerald Isle. North of the Highway 58 bridge the season is closed January 1–31 and south of the Highway 58 bridge the season is closed March 1–15. Season closures are implemented regionally to account for fishery differences between regions.

In consideration of the discrepancy in landings north and south of the Highway 58 (from 2019–2024 91.8% were from north of the Highway 58 bridge compared to 8.2% south of the bridge) and regional fishery characteristics, Table 8 shows the regional impacts of the reductions for options 3, 4, 5 and 6. Estimated harvest reductions were calculated at the regional level relative to landings within the given region and relative to statewide landings. For example, if a 10-bushel trip limit (Option 3a) were implemented year-round in only the northern area (north of Highway 58 bridge), northern landings would be reduced by an estimated 49.4% relative to the 2019–2024 northern landings (Table 8). However, if Option 3a was only implemented in the northern region, statewide landings would be reduced by an estimated 45.4%. If a year-round 10-bushel trip limit were implemented in the southern area (south of Highway 58 bridge), southern landings would be reduced by an estimated 26.4% relative to the 2019–2024 southern landings. If Option 3a was only implemented in the southern region, statewide landings would be reduced by an estimated 2.2%.

PROPOSED MANAGEMENT OPTIONS

All proposed options aim to balance conservation objectives with needs of the blue crab fishery by considering existing management, blue crab life history, and available information about the blue crab fishery and market value. All options in Tables 7a and 7b are estimated to result in a greater than 2.2% harvest reduction (the minimum to meet sustainable harvest requirement) and options to meet the sustainable harvest target or greater are included ($\geq 19.8\%$ harvest reduction). Options with estimated reductions higher than 12.3% are projected to increase the number of spawners closer to the spawner abundance target, increase the probability of achieving sustainable harvest to 100 percent, and reduce F closer to the F target (see Table 1).

Trip or bushel limits rather than season closures allow for continued use of the blue crab resource while providing protection for the blue crab stock. Blue crab catch is low early in the year, but value is high, while late in the year catch is high and value is low. In addition, bushel or trip limits specific to mature female crabs, limit harvest of female blue crabs, which are often lower value, while continuing to allow harvest of higher value male crabs.

Management Options

Option 1 – Prohibit Crab Trawling (year-round, statewide; estimated 0.7% harvest reduction relative to 2019–2024 landings)

Option 2 – Prohibit Sponge Crab Harvest (year-round, statewide; estimated 1.4% harvest reduction relative to 2019–2024 landings)

Options 3 and 4 - Trip Limits (see Table 7a for statewide option details and estimated harvest reduction and Table 8 for regional option details and estimated harvest reduction)

Option 5 and 6 - Trip Limits and Season Closures (see Table 7a for statewide option details and estimated harvest reduction and Table 8 for regional option details and estimated harvest reduction)

Options 7, 8, 9, 10, and 11 – Life Stage Specific Trip Limits, and Season Closures (see Table 7b for option details and estimated harvest reduction)

Table 7a. Estimated percent harvest reductions from season closure and trip limit management options compared to annual commercial hard blue crab landings, 2019-2024. Unless stated otherwise all options are in addition to existing management including season closures and apply statewide. One bushel is estimated to be 40 pounds.

Option #	Measures	2019-2024
3	a. 10-bushel hard crab trip limit year-round	47.6
	b. 15-bushel hard crab trip limit year-round	34.1
	c. 20-bushel hard crab trip limit year-round	24.6
	d. 25-bushel hard crab trip limit year-round	18.0
	e. 30-bushel hard crab trip limit year-round	13.2
	f. 35-bushel hard crab trip limit year-round	9.7
	g. 40-bushel hard crab trip limit year-round	7.1
	h. 45-bushel hard crab trip limit year-round	5.2
	i. 50-bushel hard crab trip limit year-round	3.9
4	a. 10-bushel hard crab trip limit Sept–Dec	22.2
	b. 15-bushel hard crab trip limit Sept–Dec	17.1
	c. 20-bushel hard crab trip limit Sept–Dec	13.1
	d. 25-bushel hard crab trip limit Sept–Dec	10.1
	e. 30-bushel hard crab trip limit Sept–Dec	7.7
	f. 35-bushel hard crab trip limit Sept–Dec	5.9
	g. 40-bushel hard crab trip limit Sept–Dec	4.5
	h. 45-bushel hard crab trip limit Sept–Dec	3.4
	i. 50-bushel hard crab trip limit Sept–Dec	2.5
5	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	28.0
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	22.9
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	18.9
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	15.4
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	12.6
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	10.4
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	8.6
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	6.1
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	4.3
6	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	24.4
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	19.5
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	15.7
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	12.5
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	10.1
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	8.1
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	6.6
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	4.8
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	3.5

Table 7b. Estimated percent harvest reductions from season closure, trip limit, and mature female season closure and trip limit management options compared to annual commercial hard blue crab landings, 2019-2024. Unless stated otherwise all options are in addition to existing management including season closures and apply statewide. One bushel is estimated to be 40 pounds. *Initial DMF recommendation presented to Northern, Southern, and Shellfish/Crustacean Advisory Committees in March 2025

Option #	Measures	2019-2024
7	a. 10-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-Mar	14.9
	b. 15-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-Mar	12.8
	c. 20-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-Mar	11.3
8	a. 10-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-May	19.2
	b. 15-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-May	17.1
	c. 20-bushel mature females Sept-Oct, 5-bushel mature females Nov-Dec, no mature females Jan-May	15.5
9	a. 10-bushel all hard crabs limit Sept-Nov, complete closure Dec-Jan, no mature females Feb-May	30.7
	b. 15-bushel all hard crabs limit Sept-Nov, complete closure Dec-Jan, no mature females Feb-May	26.0
	c. 20-bushel all hard crabs limit Sept-Nov, complete closure Dec-Jan, no mature females Feb-May	22.3
10	a. 10-bushel mature females Sept-Dec, no mature females Jan-May	17.7
	b. 15-bushel mature females Sept-Dec, no mature females Jan-May	14.5
	c. 20-bushel mature females Sept-Dec, no mature females Jan-May	12.2
11	a. 10-bushel mature females June-Dec, no mature females Jan-May*	22.5
	b. 15-bushel mature females June-Dec, no mature females Jan-May	17.3
	c. 20-bushel mature females June-Dec, no mature females Jan-May	13.9

Table 8. Region-specific estimated percent harvest reductions from season closure and trip limit management options 3–6 (see Table 7a) compared to annual commercial hard blue crab landings, 2019-2024. The Highway 58 Bridge to Emerald Isle separates the northern and southern regions. For each option and region, estimated percent reductions were calculated relative to landings within the given region and relative to statewide landings. Unless stated otherwise, all options are in addition to existing management including season closures. One bushel is estimated to be 40 pounds. NOTE: Ocean landings and some landings from 2023 and 2024 were excluded from regional calculations because they cannot be assigned as north or south of the Highway 58 Bridge; therefore, reductions will not be equal to reductions in Table 7a. DMF recommendations presented to MFC in November 2025 are bolded and denoted by # for the southern region and * for the northern region.

Option #	Measures	Northern landings		Southern landings	
		Region	Statewide	Region	Statewide
3	a. 10-bushel hard crab trip limit year-round	49.4	45.4	26.4	2.2
	b. 15-bushel hard crab trip limit year-round	35.8	32.9	14.6	1.2
	c. 20-bushel hard crab trip limit year-round	26.1	24.0	8.4	0.7
	d. 25-bushel hard crab trip limit year-round	19.1	17.6	5.3	0.4
	e. 30-bushel hard crab trip limit year-round	14.0	12.9	3.6	0.3
	f. 35-bushel hard crab trip limit year-round	10.3	9.5	2.6	0.2
	g. 40-bushel hard crab trip limit year-round	7.6	6.9	2.0	0.2
	h. 45-bushel hard crab trip limit year-round	5.6	5.1	1.5	0.1
	i. 50-bushel hard crab trip limit year-round	4.1	3.8	1.2	0.1
4	a. 10-bushel hard crab trip limit Sept–Dec	23.3	21.4	9.5	0.8
	b. 15-bushel hard crab trip limit Sept–Dec[#]	18.2	16.7	5.4	0.4
	c. 20-bushel hard crab trip limit Sept–Dec	14.1	12.9	3.0	0.2
	d. 25-bushel hard crab trip limit Sept–Dec	10.8	9.9	1.7	0.1
	e. 30-bushel hard crab trip limit Sept–Dec[*]	8.3	7.6	1.1	0.1
	f. 35-bushel hard crab trip limit Sept–Dec	6.4	5.8	0.7	0.1
	g. 40-bushel hard crab trip limit Sept–Dec	4.8	4.4	0.6	<0.1
	h. 45-bushel hard crab trip limit Sept–Dec	3.6	3.3	0.5	<0.1
	i. 50-bushel hard crab trip limit Sept–Dec	2.7	2.5	0.4	<0.1

Table 8 continued.

		Northern landings		Southern landings	
		Region	Statewide	Region	Statewide
5	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	28.4	26.1	23.0	1.9
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	23.6	21.6	19.9	1.6
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	19.7	18.1	18.0	1.5
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	16.7	15.3	17.1	1.4
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	14.3	13.1	16.7	1.4
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	12.4	11.4	16.5	1.4
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	11.0	10.1	16.4	1.3
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	9.8	9.0	16.3	1.3
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Mar	8.9	8.2	16.3	1.3
6	a. 10-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	24.9	22.9	17.7	1.5
	b. 15-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	20.1	18.5	14.5	1.2
	c. 20-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	16.3	14.9	12.7	1.0
	d. 25-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	13.2	12.1	11.8	1.0
	e. 30-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	10.8	10.0	11.4	0.9
	f. 35-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	9.0	8.2	11.2	0.9
	g. 40-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	7.5	6.9	11.1	0.9
	h. 45-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	6.4	5.8	11.0	0.9
	i. 50-bushel hard crab trip limit Sept–Nov, closed Dec–Jan	5.5	5.0	10.9	0.9

RECOMMENDATION

In consideration of blue crab life history, blue crab fishery characteristics, and concerning trends in stock indicator data from fisheries-independent sampling, the initial DMF recommendation presented to the Northern, Southern and Shellfish/Crustacean Advisory Committees (ACs) in March 2025 was Option 11a (was labeled as Option 8.a when it was presented to the ACs in March 2025), a 10-bushel trip limit for mature females from June–December and no harvest of mature females from January–May. The DMF also recommended all other blue crab management measures, including existing season closures remain in place. In combination, these measures were estimated to reduce harvest by 22.5 percent relative to landings from 2019–2024 (21.7% from 2019–2023 landings, reduction presented to Advisory Committees), which approximates the catch reduction needed to meet the spawner abundance target with 100% probability of success (see Table 1) and promote increased recruitment through protection of females.

The Amendment 3 adaptive management framework requires “consultation” with the Northern, Southern, and Shellfish/Crustacean advisory committees before management changes can be approved by the MFC. To fulfill this requirement, the ACs met the week of March 18–20, 2025 to discuss adaptive management and provide recommendations. DMF staff provided background information and the preliminary DMF recommendation. In addition, DMF staff were available prior to each meeting to answer questions and discuss blue crab science and management with the public.

Key takeaways from all meetings included:

- Concern about the economic impact of the preliminary DMF recommendation
- Concern about how the preliminary recommendation would disproportionately impact certain fishery segments and areas and the need for fair management between regions
- Distrust of stock assessment results and data
- Concern about the effects of water quality and predation on the blue crab stock
- Questions about authority to make management changes without an updated stock assessment
- Landings declines are the result of market conditions and participation declines, not a declining blue crab stock
- The need for cooperation with industry for data collection and formulating management
- Some acknowledgement the stock has declined since the 1990s even if it is not because of fishing
- Some concern about long-term declining trends

Advisory Committee Recommendations

Northern

Motion for the Marine Fisheries Commission to not take final action on Blue Crab Amendment 3 Adaptive Management until August 2025, instead of May 2023 (motion passes 10-0)

Motion for the Marine Fisheries Commission to remain status quo regarding the Blue Crab FMP Amendment 3 Adaptive Management (motion passes 7-2, with 1 abstention)

Southern

Motion to recommend the Marine Fisheries Commission to remain status quo regarding Blue Crab FMP Amendment 3 Adaptive Management and to move the Marine Fisheries Commission action on Blue Crab to the August 2025 meeting (motion passes 6-1, with 1 abstention)

Shellfish/Crustacean

Motion for the Marine Fisheries Commission to not take final action on Blue Crab Amendment 3 Adaptive Management until August 2025, instead of May 2025 (motion passes, 5-0, with 2 abstentions)

Motion to recommend to the Marine Fisheries Commission to remain status quo regarding Blue Crab FMP Amendment 3 (motion passes 4-0, with 3 abstentions)

Final DMF Recommendations

Following the March Advisory Committee meetings, the DMF further evaluated potential management options and stock indicators were updated with data from 2024. The stock indicator trends continue to show long-term decline in all blue crab life stages and both sexes. Even without an updated stock assessment, there is little evidence overfishing has ended, or sustainability objectives of Amendment 3 will be met with the current management strategy. Therefore, the DMF recommends that some action be taken immediately through Amendment 3 Adaptive Management to address continued declines in the stock. In consideration of Advisory Committee recommendations and public comment, the DMF revised the recommendations to reduce harvest to a level that approximates the reduction needed to meet the *F* target (5.9%) and increases the probability of meeting the spawner threshold from 50% (current strategy) to 90% (see Table 1). The final DMF recommendations are as follows:

- Maintain all blue crab management measures including existing season closures.
- **Option 1**, prohibit crab trawling statewide year-round (estimated 0.7% harvest reduction relative to 2019–2024 landings)
- **Option 4e** (North of the Highway 58 Bridge), 30-bushel hard crab trip limit from September–December (estimated 8.3% harvest reduction relative to 2019–2024 northern landings and 7.6% harvest reduction from statewide landings)
- **Option 4b** (South of the Highway 58 Bridge), 15-bushel hard crab trip limit from September – December (estimated 5.4% harvest reduction relative to 2019–2024 southern landings and 0.4% harvest reduction from statewide landings)

These recommendations should be viewed as a first step rather than a comprehensive solution. Recommendations are based on a stock assessment that indicated the stock was overfished and overfishing was occurring but has a terminal year of 2016. Fishery-independent stock indicators suggest stock status has not improved since then. The DMF has begun the process of developing a new benchmark stock assessment which should provide an updated stock status. If the assessment indicates additional management is necessary, it will be important to implement additional measures through adaptive management to ensure stock sustainability. Review of the Blue Crab FMP is scheduled to begin in 2026, at which time comprehensive management will be explored. Until then, Amendment 3 management, including adaptive management and changes made through adaptive management will remain in place.

MFC Selected Management Options

TBD

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October 29, 2025

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**Review Report
for the
2023 Update Stock Assessment
of
Blue Crab in the North Carolina**

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January 3, 2024

A desk review of the update stock assessment of North Carolina blue crab (*Callinectes sapidus*) was conducted in November-December 2023. The reviewers evaluated the data sources, the model configuration, and model diagnostics. The reviewers also compared the results of this update assessment with those from the 2018 benchmark assessment. The reviewers appreciate all the hard work by the Assessment Team (AT) and are impressed with the quantity and quality of research and analysis conducted by the AT. The reviewers also thank Steve Poland, the Chief of Fisheries Management for providing an assessment report and additional support throughout the review.

Based on the information provided in the assessment report the reviewers believe the AT did an excellent job of summarizing and analyzing a large number of complex data sets that went into the assessment model. However, the reviewers feel the current model results are concerning due to (1) the strong residual patterns in the model fit to survey indices, especially Program 100 indices, (2) the extremely high estimates of fishing mortality over the entire assessment period, and (3) the constantly overfishing/overfished stock status over the entire assessment period. The following report provides detailed comments and recommendations from the reviewers:

1. Strong residual patterns were shown in the model fits to Program 100 indices (i.e., female fully recruit summer index, male fully recruit summer index, female fully recruit fall index, and male fully recruit fall index). Almost all residuals are negative before 2008 and positive afterwards (Figs. 3.6 and 3.7). Also, the model does not fit the high and variable indices after 2007/2008. This indicates potential model misspecifications. These strong residual patterns and lack of fit would undermine the validity and credibility of the overall results and conclusions, and thus, the reviewers strongly recommend resolving this issue before basing any management decisions on this update assessment. The reviewers recommend the following:
 - a. Investigate the Program 100, especially any changes before and after 2008 in fisheries management, environmental conditions or fishing behaviors
 - b. Consider time-block catchability when fitting these indices, with one catchability before and one after 2008
 - c. Reviewers did not find the CVs used for these indices (therefore, not sure about how they were weighted in the model fitting process). Suggest investigating the uncertainty associated with each index and weight them accordingly.
 - d. Run a sensitivity analysis with Program 100 indices removed
 - e. There are multiple surveys included in the assessment. Given the nature of these surveys (e.g., spatial coverages, survey timing), they may measure different portions of the blue crab population. The reviewers understand that catch rates were standardized using GLM for each index. However, the potential issue of sampling representativeness may remain. Therefore, the reviewers strongly recommend

future studies should explore combining all the survey and develop an integrated single index which may be more representative of the population.

2. The estimated fishing mortality is extremely/unrealistically high (Fig. 4.1). The estimated fishing mortality of the early time period was above 2, which suggests that about 90% of the population was removed by the fishery. The estimated natural mortality had an upper bound as twice as the one in the 2018 benchmark assessment (Fig. 3.32). The reviewers recommend the following:
 - a. Compared to the 2018 benchmark assessment, the estimated initial population size was low (Figs. 3.23-3.25). Setting a reasonable prior for the initial population is critical to regulate the overall scale of the estimation of parameters including fishing mortality.
3. The stock status of overfishing and overfished over the entire assessment period seems uncommon and concerning (Fig. 4.1). Addressing the above issues may potentially help resolve this issue.
4. The reviewers finally recommend investigating an integrated seasonal size-structured assessment model, which is often used for crustacean, in future. Such a model can potentially better describe the life history of blue crab and account for seasonality.

Appendix 2

East Coast and Gulf of Mexico blue crab effort regulations by state as of September 2025.

State	Harvest restrictions			
	Season	Catch Limit	Time	Days
New Jersey	Delaware Bay open Apr. 6 – Dec 4 Other Waters open Mar. 15 – Nov. 30	None	Delaware Bay 4am-9pm Other Waters 24-hrs	None
Delaware	Open Mar. 1-Nov 30	None	1 hr. before sunrise- sunset for trotlines	None
Maryland	Males open Apr. 1-Nov 30 Mature female open Apr. 1-June 30	No more than 6 females/bushel/lug or 13 females/barrel of males*	½ hr. before sunrise – 7 ½ hrs. after sunrise	Prohibited either Sun. or Mon.
Virginia	Open Mar. 17-Nov 30 Dark sponge crabs prohibited Mar. 17- June 15**	47 bushels May 16-Oct.31 36 bushels for 425 pot license March 17-May 15 and Nov. 1-Dec. 16 for 425 pot license***	3am-5pm	Prohibited Sunday except peeler pots
North Carolina	No pots Jan. 1–31 in Northern Region No pots March 1–15 in Southern Region	None	1 hr. before sunrise- 1hr. after sunset	None
South Carolina	None	None	5am-9pm Apr. 1-Sept 15 6am-7pm Sept 16-Mar.31	None
Georgia	None	None	None	None
Florida	10 day closure for derelict trap removal	200 pounds as bycatch w/ permit (from trawls)	1 hr. before sunrise- 1hr. after sunset	None
Alabama	Periodic derelict trap removal with no set closure period	None	1 hr. before sunrise- sunset	None
Mississippi	Possible 10–30 day closure for abandoned trap removal	None	½ hr. before sunrise – ½ hr. after sunset	None
Louisiana	Possible 14 day closure for abandoned trap removal	None	½ hr. before sunrise – ½ hr. after sunset	None
Texas	No pots Feb. 16–25	None	½ hr. before sunrise – ½ hr. after sunset	None

*daily limit varies by license type and season,

**no more than 10 dark sponge crabs per bushel may be possessed from March 17-June 15

***varies by license type (i.e. 85, 127, 170, 255, 425 pot license), sex-specific possession in Potomac River 8-30 bu. (varies by season and license type)

East Coast and Gulf of Mexico blue crab pot gear regulations by state as of September 2025.

State	Gear restrictions				
	Pots (max)	Escape Rings	Degradable Panels	Terrapin Excluders	Buoys
New Jersey	Delaware Bay 600 Other Waters 400	None	Yes	Some areas	Reflective I.D. Sink line
Delaware	200/vessel 500/vessel	None	None	None	I.D. Color coded
Maryland	50 up to 900/vessel w/ 2 crew	1 (2–3 /16") 1 (2–5 /16") May close for peelers	None	None But limited pot area	I.D.
Virginia	Chesapeake Bay 85 up to 425 Tributaries and Potomac Trib. in VA 255 Peeler 210	Seaside Eastern Shore 1 (2–3 /16") 1 (2–5 /16") Bay & Tribs. 2 (2–3 /8") May close for peelers	None	None	I.D.
North Carolina	None Newport River only 150	3 (2–5 /16")* May be closed in some areas	None	Some areas	I.D. Sink line
South Carolina	200 or highest number of pots fished in 3 previous years	2 (2–3 /8")*	None	None	I.D. With colors
Georgia	200 including peeler pots	2 (2–3 /8")*	None	None	I.D. No green
Florida	Inshore 600 Offshore 400 Non-transfer 100 Peeler 400	3 (2–3 /8") May close for peelers	Yes	None	I.D. Sink line
Alabama	None	2 (2–5 /16") May be closed for peelers Apr. 1- Oct. 30	None	None	I.D. ½ white Sink line
Mississippi	None	2 (2–3 /8") Can be closed Apr. 1- Jun. 30 Sept. 1-Oct. 31	None	None	I.D. or Color code Sink line
Louisiana	None	3 (2–3 8")* Can be closed Apr. 1- Jun. 30 Sept. 1-Oct. 31	None	None	I.D. on metal trap tag/plastic bait cover Sink line
Texas	200	2 (2–3 /8")	Yes	None	I.D. White Gear tag

*Special placement required

East Coast and Gulf of Mexico blue crab life stage regulations by state as of September 2025.

East Coast and Gulf of Mexico Crab Catches and Bag Regulations by State as of September 2020					
State	Minimum size limits (inches)				Sponge Crab Protection
	Hard	Soft	Peeler	Culling Tolerance	
New Jersey	4.75” 4.5” mature female	3.5”	3”	Zero	Prohibited
Delaware	5”	3.5”	3”	5% by number	Prohibited
Maryland	5” Apr. 1- July 14 5.25” July 15- Dec 15	3.5” Males	3.25” Apr. 1- July 14 3.5” July 15- Dec 15 Separated from catch	6 hard crabs/ bushel or 13/barrel 10 peelers	Prohibited to take but may import from another state May 11- July 20
Virginia	5”	3.5”	3.25” Mar. 17-Jul. 15 3.5” Jul. 16-Nov. 30	10 hard crabs/ bushel or 35/barrel 10 peelers/bushel or 5% in other containers	Prohibit brown/black sponge March 17- June 15 Crabbing prohibited in sanctuary zones May 16-Sept. 15
North Carolina	5” Prohibit immature female	None	None Separated. White-lines no sale	5% by number/container	Prohibit brown/black sponge Spawning sanctuaries
South Carolina	5” Includes mature female	5” Includes mature female	None with peeler permit	Zero	Prohibited to take but may import from another state
Georgia	5” Mature female exempt	5”	3”	Zero	Prohibited to take but may import from another state
Florida	5” Includes mature female	5”	None Separated from catch	5% by number/ container except bait	Prohibited
Alabama	5” Includes mature female Bait Dealer exempt	None Separate from catch	None Separated from catch No white-lines	Zero except bait and work box	Prohibited May 16- Jan 14
Mississippi	5” Includes mature female	None	None	Zero	Prohibited Crab sanctuaries
Louisiana	5” Includes mature female Prohibit immature female	None	None Separated from catch	10% undersized in 50 crab random sample 2% immature female crabs in 50 crab random sample	Prohibited Crab sanctuaries
Texas	5” Includes mature female	5”	5”	5% by number in separate container for bait only	Prohibited

East Coast and Gulf of Mexico blue crab trawl regulations as of September 2025.

State	Regulations				
	Crab Trawls allowed	Season	Area	Catch Limit	Gear Restrictions
New Jersey	No	N/A	N/A	N/A	N/A
Delaware	No	N/A	Permitted in Delaware Bay and Delaware River only	N/A	N/A
Maryland	No	N/A	N/A	N/A	N/A
Virginia	No	N/A	N/A	N/A	N/A
North Carolina	Yes	Set by proclamation	Specified in proclamation	None	3-4 in. minimum mesh for hard crabs Headrope<25 ft and 2 in. minimum mesh for peelers and softshell
South Carolina	Yes	Open Dec. 1-Mar. 31 and in shrimp trawls during shrimp season	General Trawling Zone	None	4 in minimum mesh Chafing gear no more than ½ tailbag circumference
Georgia	Yes	May be open year-round in ocean Some sounds may open Jan.-Mar.*	Seaward side of sounds and sounds when authorized	No limit w/ crab endorsement	4 in minimum mesh TEDs
Florida	Yes**	Subject to shrimp trawl regulations	Subject to shrimp trawl regulations	Up to 200 pounds as bycatch in shrimp trawl	Subject to shrimp trawl regulations
Alabama	Yes***	Subject to shrimp trawl regulations	Subject to shrimp trawl regulations	No limit w/ crab license 5 gal. bucket w/o crab license	Subject to shrimp trawl regulations
Mississippi	Yes***	Subject to shrimp trawl regulations	Subject to shrimp trawl regulations	No limit w/ crab license	Subject to shrimp trawl regulations
Louisiana	Yes	Subject to shrimp trawl regulations	Subject to shrimp trawl regulations	None	Subject to shrimp trawl regulations
Texas	Yes	Subject to shrimp trawl regulations	Subject to shrimp trawl regulations	No limit w/ crab license	Subject to shrimp trawl regulations

*Opening and closing dates determined by Commissioner

**Allowed with incidental take endorsement

***Allowed as bycatch in shrimp trawls

Striped Bass Fishery Management Plan

November 2025 Quarterly Business Meeting

Documents

Tar-Pamlico and Neuse Rivers Stocks
Summary Document

Tar-Pamlico and Neuse Rivers Stocks
Harvest Management Strategy

SUMMARY DOCUMENT

Estuarine Striped Bass Fishery Management Plan Amendment 2 Adaptive Management Data Evaluation and Harvest Strategy for Tar-Pamlico and Neuse Rivers Stocks



This Summary Document provides background information for Amendment 2 to the N.C. Striped Bass Fishery Management Plan and the adaptive management steps prescribed for the Tar-Pamlico and Neuse Rivers stocks.

November 2025

Summary

Estuarine striped bass (*Morone saxatilis*) in North Carolina are managed under Amendment 2 to the North Carolina Fishery Management Plan (FMP) adopted in November 2022 and its subsequent revision (2024). Striped bass stocks in North Carolina are managed jointly by the North Carolina Marine Fisheries Commission (MFC) and the North Carolina Wildlife Resources Commission (WRC). Amendment 2 management for the Tar-Pamlico and Neuse rivers stocks carried forward the Supplement A no-possession measure, maintained the gill net closure above the ferry lines, and maintained the use of 3-foot tie-downs for gill nets below the ferry lines. The Amendment 2 adaptive management framework for the Tar-Pamlico and Neuse rivers stocks prescribes that in 2025, data through 2024 will be evaluated to determine if populations are self-sustaining and if sustainable harvest can be determined. In addition, the MFC approved the following measure in Amendment 2 regarding the gill net closure: “maintain the gill net prohibition through 2024 to allow for assessment of its performance”. Results of the data evaluation indicate the harvest and gill net closures have been ineffective at increasing abundance of adult striped bass, expanding the age structure, or promoting recruitment. Factors other than fishing mortality are preventing sustainability of the Tar-Pamlico and Neuse rivers striped bass stocks. Consistent with the Amendment 2 adaptive management framework, staff with the DMF and WRC have developed alternate management strategies that provide protection for and access to the resource.

Amendment 2 Goal and Objectives

The goal of Amendment 2 is to manage the estuarine striped bass fisheries to achieve self-sustaining populations that provide sustainable harvest based on science-based decision-making processes. If biological and/or environmental factors prevent a self-sustaining population, then alternate management strategies will be implemented that provide protection for and access to the resource. The following objectives will be used to achieve this goal.

- Implement management strategies within North Carolina and encourage interjurisdictional management strategies that maintain and/or restore spawning stock with adequate age structure and abundance to maintain recruitment potential and to prevent overfishing.
- Restore, enhance, and protect critical habitat and environmental quality in a manner consistent with the Coastal Habitat Protection Plan, to maintain or increase growth, survival, and reproduction of the striped bass stocks.
- Use biological, social, economic, fishery, habitat, and environmental data to effectively monitor and manage the fisheries and their ecosystem impacts.
- Promote stewardship of the resource through public outreach and interjurisdictional cooperation regarding the status and management of the North Carolina striped bass stocks, including practices that minimize bycatch and discard mortality.

Background

There are two estuarine striped bass management units and four stocks in North Carolina. The Northern Management Unit includes the Albemarle Sound Management Area (ASMA) and Roanoke River Management Area (RRMA). The striped bass stock in these management areas is the Albemarle-Roanoke (A-R) stock. The A-R stock is also included in the management unit of Amendment 7 to the Atlantic States Marine Fisheries Commission (ASMFC) Interstate FMP for Atlantic Striped Bass. The Southern Management Unit is the Central/Southern Management Area (CSMA) and includes stocks in the Tar-Pamlico, Neuse, and Cape Fear rivers.

CSMA Stock Status

Stock status of the CSMA striped bass is unknown, no stock status determination has been performed, and no biological reference points have been generated. The [CSMA Estuarine Striped Bass Stocks](#) report, completed in 2020, is a collection of 1) all available data, 2) all management effort, and 3) all major analyses that have been completed for CSMA stocks; this report served as an aid in development of Amendment 2. While this report does not determine stock status, it does indicate sustainability of Tar-Pamlico and Neuse rivers stocks is unlikely at any level of fishing mortality, citing the lack of natural recruitment as the primary limiting factor. The report concludes that without stocking, abundance will decline.

Supplement A to Amendment 1

At the November 2018 MFC business meeting, the N.C. Division of Marine Fisheries (DMF) [recommended development](#) of temporary management measures to supplement the N.C. Estuarine Striped Bass FMP Amendment 1 providing for a no-possession provision for striped bass in the internal coastal and joint waters of the CSMA to protect important year classes of striped bass while Amendment 2 to the FMP was developed. This supplement, [Supplement A](#), was [adopted](#) by the MFC at their February 2019 business meeting and by the WRC in March 2019. Supplement actions were implemented March 29, 2019, consisting of the following:

- Commercial and recreational no possession measure for striped bass (including hybrids) in coastal and inland fishing waters of the CSMA ([Proclamation FF-6-2019](#)). The WRC hook and line closure proclamation had the effect of suspending rules 15A NCAC 10C .0107 (l) and 10C .0314 (g). A no-possession requirement already exists in the Cape Fear River by rule.
- Consistent with [Amendment 1](#), commercial anchored gill-net restrictions requiring tie-downs and distance from shore measures will apply year-round.

Ferry Line Gill Net Closures

Prior to 2019, after the commercial striped season in the Tar-Pamlico and Neuse rivers closed, large mesh gill nets were required to use three-foot tie downs throughout the entirety of the rivers and be set greater than 50 yards from shore in the upper portions of the rivers.

These restrictions were based on data indicating their effectiveness with subsequent analysis estimating striped bass discards were reduced by approximately 82% after these restrictions were implemented.

See Figure 1 for gill net restrictions in the Tar-Pamlico, Pungo, Bay, and Neuse rivers in place prior to implementation of the ferry line gill net closures.

Independent of Supplement A but also at the February 2019 MFC business meeting, the following [motion passed](#):

“Ask the director of NCDMF to issue a proclamation, effective in conjunction with the Supplement, that restricts the use of gill-nets that interact with striped bass upstream of the ferry lines and requires attendance of gill-nets that interact with striped bass upstream of the tie-down lines.”

After careful consideration, the director declined the motion request, concluding the scientific data did not support the requested management measure ([see letter from the DMF director to the MFC chairman dated March 4, 2019](#)).

On March 13, 2019, the [MFC held an emergency meeting](#) and passed a [motion](#) directing the director to issue a proclamation regarding gill nets, beyond what was contained in Supplement A. [Proclamation M-6-2019](#) implemented the following:

- Prohibits the use of all gill nets upstream of the ferry lines from the Bayview Ferry to Aurora Ferry on Pamlico River and the Minnesott Beach Ferry to Cherry Branch Ferry on the Neuse River.
- Maintains tie-down (vertical height restrictions) and distance from shore restrictions for gill nets with a stretched mesh length 5 inches and greater in the western Pamlico Sound and rivers.

[North Carolina General Statute section 113-221.1\(d\)](#), authorizes the Chair of the MFC to call an emergency meeting (pursuant to the request of five or more MFC members) to review the desirability of directing the fisheries director to issue a proclamation. Once the MFC votes under this provision to direct issuance of a proclamation, the fisheries director has no discretion to choose another management option and is bound by law to follow the MFC decision. In these cases, under existing law, the decision of the MFC to direct the director to issue a proclamation is final and can only be overruled by the courts.

Amendment 2

[Amendment 2](#) to the N.C. Estuarine Striped Bass FMP was adopted by the MFC at its November 2022 business meeting. The amendment included the no-possession measure for the Tar-Pamlico and Neuse rivers stocks that was included in Supplement A. Amendment 2 also maintained the gill net closure above the ferry lines and the use of 3-foot tie-downs for gill nets below the ferry lines. The draft of Amendment 2 presented to the MFC at their February 2022 business meeting included discussion of the ferry line gill net closures and options that would have provided limited access for the gill net fishery above the ferry lines while continuing to minimize striped bass discards. However, [at that meeting](#), the MFC

approved a [motion](#) to send the draft Estuarine Striped Bass FMP Amendment 2 for review by the public and advisory committees with the change of deleting these options. Therefore, the only option considered by the public, Advisory Committees, and MFC related to the ferry line gill net closure in Amendment 2 was to maintain it.

Amendment 2 included two measures for the Tar-Pamlico, and Neuse rivers stocks that require reconsideration after 2024. First, [the adaptive management framework](#) prescribes that in 2025, data through 2024 will be reviewed “*to determine if populations are self-sustaining and if sustainable harvest can be determined*”. In addition, the MFC approved the following [motion](#): “*maintain the gill net prohibition through 2024 to allow for assessment of its performance*”.

Adaptive Management

Adaptive management allows managers to adjust management measures based on new information or data. Management options which are selected during FMP adoption account for the most up-to-date data on biological and environmental factors which affect the stock. Data through 2024 were reviewed in early 2025 to determine the impact of the 2019 no-possession provision on the stocks.

If the data review suggests continuing the no-possession provision is needed for stock recovery, no changes in harvest management measures will be recommended until the next FMP Amendment is developed. Adaptive management may be used to adjust management measures including area, time, and gear restrictions if it is determined additional protections for the stocks are needed.

If analysis indicates the populations are self-sustaining and a level of sustainable harvest can be determined, recommendations for harvest strategies will be developed. Conversely, if analysis indicates biological and/or environmental factors prevent a self-sustaining population, then, consistent with the goal of Amendment 2, alternate management strategies will be developed that provide protection for and access to the resource.

2025 Data Review

Methods

Several data sets were updated with data through 2024 and analyzed to assess the impact of the 2019 no-possession provision on the Tar-Pamlico and Neuse rivers stocks. Analysis included evaluation of adult abundance, age structure, natural recruitment, and hatchery contribution. The analysis also considered environmental conditions (e.g., river flow), changes to stocking strategies, and new life history information. Details of complete data analysis and results can be found in “[Analysis of Striped Bass Fishery-Independent and Fishery-Dependent Data from the Tar-Pamlico and Neuse Rivers for Purposes of Amendment 2 Adaptive Management](#)”.

Summary of Results

- No ‘wild’ juveniles have been caught in the Tar-Pamlico or Neuse rivers since the juvenile survey began in 2017, except two “wild” fish were caught in 2021
- During 2019–2024 the percentage of hatchery striped bass on the spawning grounds of the Tar-Pamlico and Neuse rivers has increased to nearly 100%
- During 2019–2024 the percentage of hatchery origin striped bass in the lower Tar-Pamlico and Neuse rivers has been variable ranging from <50% to >90%
- Abundance of all age classes in the lower rivers is significantly lower after the harvest closure
- Abundance of all age classes on the spawning grounds did not increase significantly after the harvest closure

Conclusions

- The harvest and gill net closures have been ineffective at increasing adult abundance, expanding the age structure, and promoting recruitment
- The Tar-Pamlico and Neuse rivers striped bass stocks are currently not sustainable
- Factors other than fishing mortality and inadequate spawning abundance are preventing sustainability of the Tar-Pamlico and Neuse rivers striped bass stocks
- Acoustic and conventional tagging data indicate most ‘wild’ fish in the Tar-Pamlico and Neuse rivers are part of the Albemarle-Roanoke stock
- Environmental factors and declines in the Albemarle-Roanoke stock have contributed to reduced striped bass abundance in the Tar-Pamlico and Neuse rivers

Based on data from the DMF and WRC fishery-independent and dependent sampling programs reviewed through 2024, the striped bass populations in the Tar-Pamlico and Neuse rivers are currently not self-sustaining. Evaluation of the harvest and gill net closures shows these measures have been ineffective at increasing adult abundance, expanding the age structure, and promoting natural recruitment through year six of implementation. Striped bass have been shown to quickly rebound even at low population levels given favorable environmental conditions (Robitaille et al. 2011; DFO 2023), suggesting factors other than fishing mortality and inadequate spawner abundance are preventing successful reproduction and self-sustaining striped bass populations in the Tar-Pamlico and Neuse rivers.

Acoustic telemetry and genetic data suggest there are three groups of striped bass in the Tar-Pamlico and Neuse rivers. Most of the fish are hatchery reared stocked fish, followed by ‘wild’ fish originating from the Albemarle-Roanoke, with a small portion of ‘wild’ fish originating from the spawning grounds on the Tar-Pamlico and Neuse rivers.

Management Changes

Consistent with the Amendment 2 goal and adaptive management framework, the DMF and WRC staff have developed a harvest management strategy that provides protection for and access to the resource. Tagging data was reviewed to evaluate the spatial extent and timing of Albemarle-Roanoke and stocked striped bass residence in the Tar-Pamlico and Neuse rivers. The harvest management strategy limits the timing of and spatial extent of allowed harvest in the Tar-Pamlico and Neuse rivers to concentrate harvest on stocked fish while limiting harvest of Albemarle-Roanoke stock striped bass to the greatest extent possible. Additionally, harvest will be limited to allow for mature stocked striped bass abundance in the rivers to be maintained so in the event of favorable environmental conditions, natural reproduction could occur.

Management measures for the recreational fishery will be:

- Open recreational harvest season above the large-mesh gill net distance from shore demarcation lines (Figure 1) in the Tar-Pamlico and Neuse rivers April 1–30
- One fish per person per day recreational creel limit
- An 18–22 inch total length harvest slot, or >27 inch total length

Management measure for the commercial fishery will be:

- Open commercial harvest season above the large-mesh gill net distance from shore demarcation lines (Figure 1) in the Tar-Pamlico and Neuse rivers April 1–30
- One fish per person per day trip limit
- An 18–22 inch total length harvest slot, or >27 inch total length
- Allow hook-and-line as a legal commercial gear in the striped bass commercial fishery ([consistent with Amendment 2](#))
- Continue commercial tagging requirement
- Maintain tie-down and distance from shore requirements for non-incident take permit exempt gill nets and implement additional gill net restrictions to further reduce incidental take of striped bass in the shad gill net fishery

Recreational and commercial seasons in Joint and Coastal Fishing Waters will be opened by proclamation.

Timeline

(gray indicates completed step)

Supplement A to Amendment 1 adopted	March 2019
Ferry Line Gill Net Closure implemented	March 15, 2019
Amendment 2 adopted	November 2022
Division begins data review	January 1, 2025
Division provides background to MFC	May 21 - 23, 2025
Division presents data analysis/conclusions/next steps to MFC	August 2025
Division and WRC hold public information meeting to present harvest plan and answer questions	November 5, 2025
Division presents harvest management plan to MFC	November 2025
Harvest season opens	April 1 2026

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- Fisheries and Ocean Canada (DFO). 2023. Update of spawner abundance and biological characteristics of Striped Bass (*Morone saxatilis*) in the southern Gulf of St. Lawrence to 2022. DFO Canadian Science Advisory Secretariat Science Response. 2023/004.
- North Carolina Division of Marine Fisheries (NCDMF). 2019. Supplement A to Amendment 1 to the N.C. Estuarine Striped Bass Fishery Management Plan. Implementation of a Striped Bass No-Possession Limit in the Internal Coastal and Joint Fishing Waters of the Central Southern Management Area. North Carolina Department of Environmental Quality. Division of Marine Fisheries. Morehead City, NC. 37 p.
- NCDMF. 2022. North Carolina Estuarine Striped Bass Fishery Management Plan, Amendment 2. North Carolina Division of Marine Fisheries, Morehead City, North Carolina. 149 p.
- Robitaille, J., M. Bérubé, A. Gosselin, M. Baril, J. Beauchamp, J. Boucher, S. Dionne, M. Legault, Y. Mailhot, B. Ouellet, P. Sirois, S. Tremblay G. Trencia, G. Verreault and D. Villeneuve. 2011. Recovery Strategy for the Striped Bass (*Morone saxatilis*), St. Lawrence Estuary Population, Canada. Species at Risk Act Recovery Strategy Series. Ottawa : Fisheries and Oceans Canada. xi + 51 p.

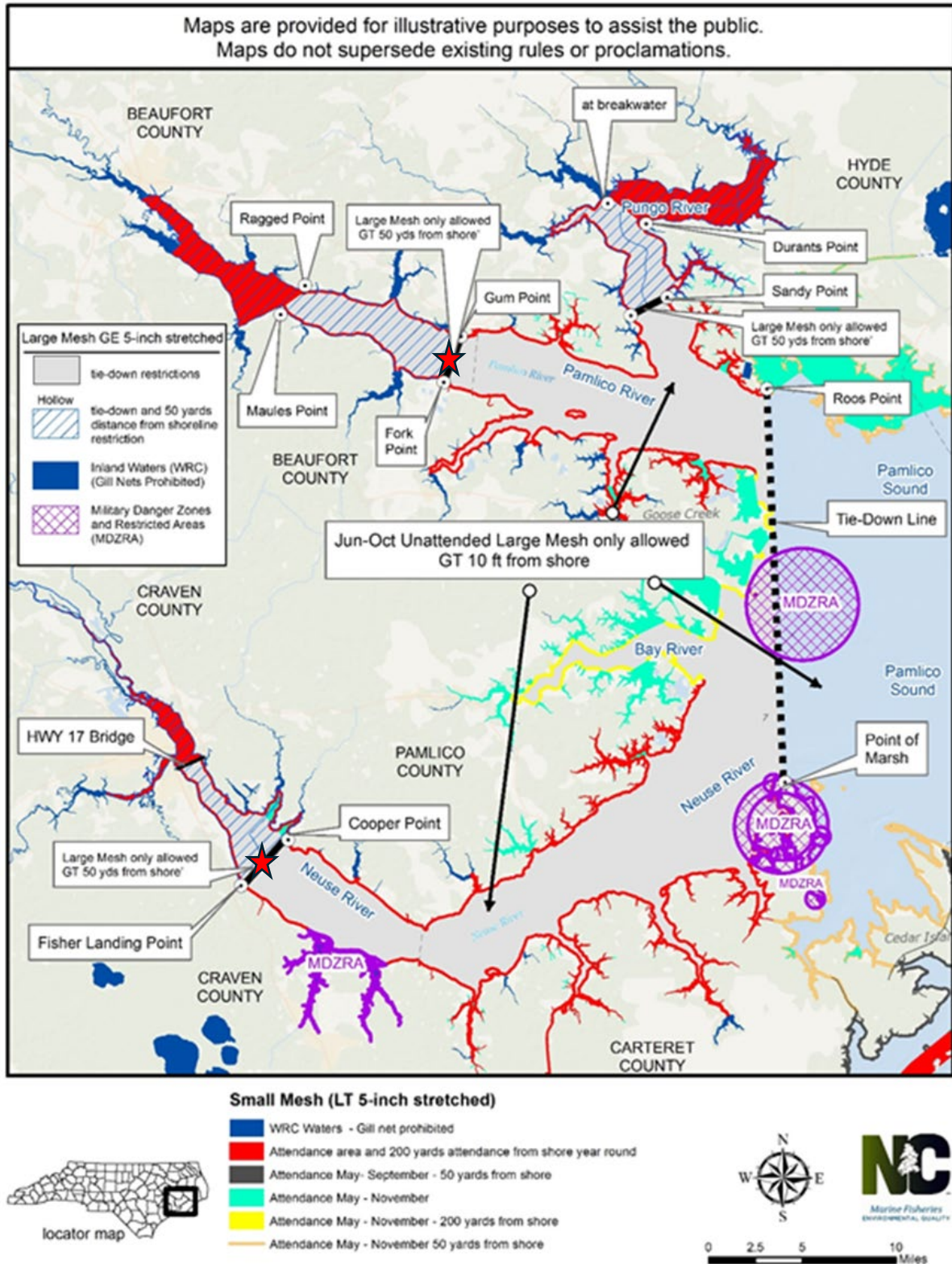


Figure 1. Gill-net regulations for small and large mesh gill nets in the Pamlico, Pungo, Bay, and Neuse rivers. LT=less than; GT=greater than. Distance from shore lines indicated by red stars.

IMPLEMENTATION OF ALTERNATIVE MANAGEMENT STRATEGIES FOR STRIPED BASS HARVEST IN THE TAR-PAMLICO AND NEUSE RIVERS THAT PROVIDE PROTECTION FOR AND ACCESS TO THE RESOURCE

Oct. 29, 2025

ISSUE

The [goal of Amendment 2](#) to the N.C. Estuarine Striped Bass Fishery Management Plan is to manage the estuarine striped bass fisheries to achieve self-sustaining populations that provide sustainable harvest based on science-based decision-making processes. If biological and/or environmental factors prevent self-sustaining populations in the Tar-Pamlico and Neuse rivers, then alternate management strategies will be implemented that provide protection for and access to the resource.

The 2025 data evaluation for the Tar-Pamlico and Neuse rivers concluded biological and/or environmental factors are preventing self-sustaining populations in these rivers ([Appendix 1](#)). Consistent with [Amendment 2 Adaptive Management](#), management will be implemented providing protection for and access to the resource.

ORIGINATION

Adaptive management for the striped bass stocks in the Tar-Pamlico and Neuse rivers, [North Carolina Estuarine Striped Bass Fishery Management Plan Amendment 2](#), Appendix 3: Achieving Sustainable Harvest for the Tar-Pamlico and Neuse Rivers Striped Bass Stocks.

BACKGROUND

Amendment 2 to the N.C. Estuarine Striped Bass FMP was adopted by the MFC in November 2022. The Amendment 2 adaptive management strategy for the Tar-Pamlico and Neuse rivers was to maintain the harvest closure in the Tar-Pamlico and Neuse rivers through 2024, and then in 2025 evaluate key population parameters including adult abundance, age structure, natural recruitment, and hatchery contribution to determine whether the populations are self-sustaining and if sustainable harvest can be determined. Per the amendment, if analysis indicates the populations are self-sustaining and a level of sustainable harvest can be determined, recommendations for harvest strategies will be developed. If analysis indicates biological and/or environmental factors prevent a self-sustaining population, alternate management strategies will be developed that provide protection for and access to the resource. Adaptive management may be used to adjust management measures including area and time restrictions and gear restrictions if it is determined additional protections for the stocks are needed.

Results of the analysis indicate the harvest closure was ineffective at promoting natural recruitment, increasing adult abundance, or expanding the age structure and increasing the number of older (age-10+), larger striped bass through year six of implementation of the harvest closure. Factors other than fishing mortality and inadequate spawner abundance are preventing successful reproduction and self-sustaining Tar-Pamlico and Neuse rivers striped bass stocks. ([Appendix 1](#)).

Consistent with the Amendment 2 adaptive management framework, Division of Marine Fisheries (DMF) and Wildlife Resources Commission (WRC) staff have developed a harvest management strategy that provides access to and protection for the resource.

Confounding management changes is the documented residency of a portion of the Albemarle-Roanoke (A-R) striped bass stock in the Tar-Pamlico and Neuse rivers outside of the A-R striped bass spawning season. The A-R striped bass stock has had chronic poor spawning success since 2017 (Figure 1; NCDMF 2025), and striped bass harvest in the Albemarle Sound Management Area (ASMA) and the Roanoke River Management Area (RRMA) has been prohibited since January 2024 (NCDMF 2024 [Revision to Amendment 2](#)). Striped bass harvest for both the recreational and commercial sectors in the Tar-Pamlico and Neuse rivers system averaged 7,635 fish per year during 2004–2018 (Table 1). Reverting back to management measures in place before the harvest closure that allowed this level of harvest risks unintended capture of A-R striped bass. The revised harvest management strategy will instead focus harvest on stocked fish in the Tar-Pamlico and Neuse rivers, while limiting harvest of A-R stock striped bass present in the Tar-Pamlico and Neuse rivers to the greatest extent possible, by restricting the times and areas harvest can occur. Harvest will be restricted to a level low enough that mature striped bass abundance in the Tar-Pamlico and Neuse rivers is maintained so in the event of favorable environmental conditions, natural reproduction could occur.

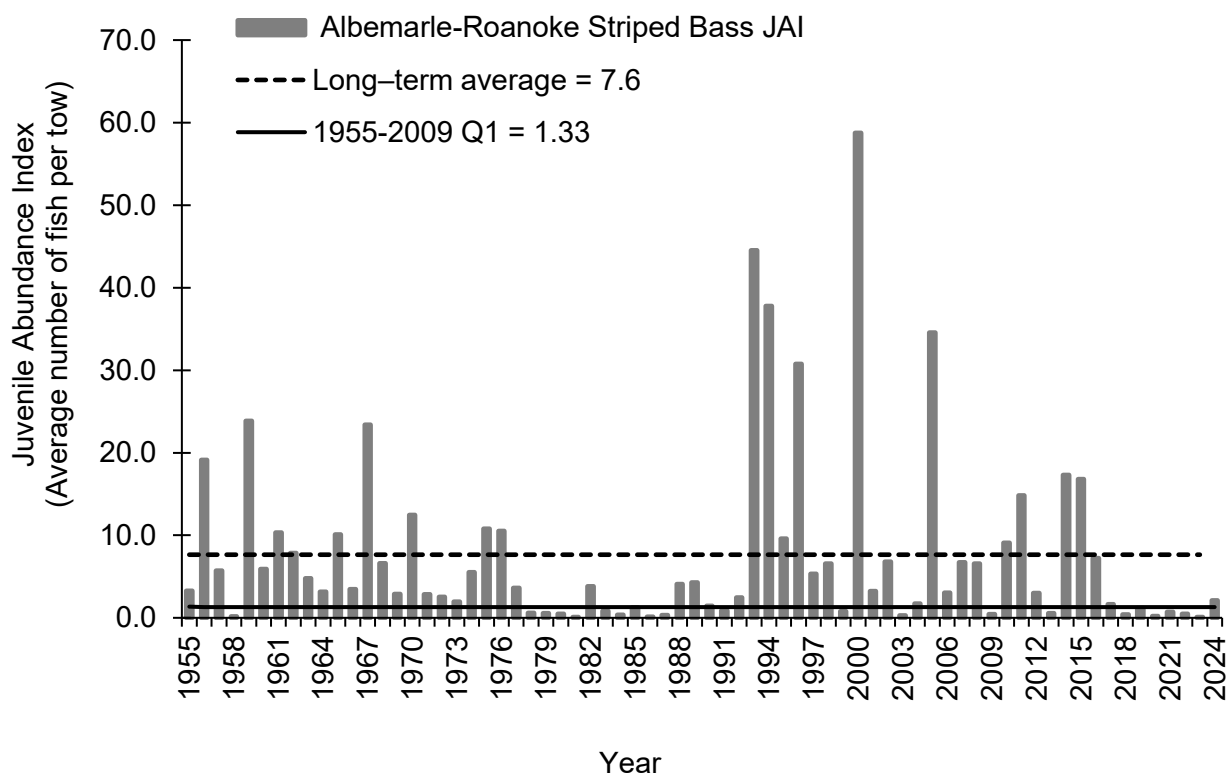


Figure 1. The juvenile abundance index (JAI) for the Albemarle-Roanoke striped bass stock, 1955–2024. Values below the Q1 value of 1.33 (the 75% percentile) are considered spawning failures.

Table 1. Recreational harvest estimates (number and weight in pounds) and releases (number of fish) and total commercial harvest (number and weight in pounds) of striped bass in the Tar-Pamlico, Pungo, and Neuse rivers, 2004–2024. There was a limited recreational harvest season in 2019 (January 1–March 19, 2019) prior to the harvest closure, which remains in effect. Data sources: DMF Striped Bass Creel Survey for recreational data and the Division of Marine Fisheries Trip Ticket Program for commercial data. Gray shading indicates large increase in recreational releases that, in part, prompted development of Supplement A (NCDMF 2019).

Year	Recreational			Commercial		Total Weight Landed
	Number Landed	Number Released	Weight Landed	Number Landed	Weight Landed	
2004	6,141	13,557	22,958	3,950	32,479	55,437
2005	3,832	16,854	14,965	3,723	27,132	42,097
2006	2,481	14,895	7,352	2,850	21,149	28,501
2007	3,597	23,527	10,794	3,608	25,008	35,802
2008	843	17,966	2,990	1,719	10,115	13,105
2009	895	6,965	3,061	4,140	24,847	27,908
2010	1,757	7,990	5,537	4,486	23,888	29,425
2011	2,728	24,188	9,474	4,083	28,054	37,528
2012	3,922	43,313	15,240	3,693	22,725	37,964
2013	5,467	32,816	19,537	4,439	28,597	48,134
2014	3,301	30,209	13,368	5,830	25,245	38,613
2015	3,934	31,353	14,269	6,029	27,336	41,605
2016	6,697	75,461	25,260	4,123	23,041	48,301
2017	7,334	131,129	26,973	4,382	23,018	49,991
2018	3,371	49,122	10,884	3,788	20,057	30,941
2019	959	36,080	3,562	0	0	3,562
2020	0	19,420	0	0	0	0
2021	0	23,216	0	0	0	0
2022	0	30,026	0	0	0	0
2023	0	13,536	0	0	0	0
2024	0	9,795	0	0	0	0
Mean	3,579	31,020	12,889	4,056	24,179	35,557

AUTHORITY

N.C. Marine Fisheries Commission and N.C. Wildlife Resources Commission Rules 2020 (15A NCAC)

15A NCAC 03H .0103 PROCLAMATIONS, GENERAL
15A NCAC 03M .0201 GENERAL

15A NCAC 03M .0202	SEASON, SIZE AND HARVEST LIMIT: INTERNAL COASTAL WATERS
15A NCAC 03M .0512	COMPLIANCE WITH FISHERY MANAGEMENT PLANS
15A NCAC 03Q .0107	SPECIAL REGULATIONS: JOINT WATERS
15A NCAC 03Q .0108	MANAGEMENT RESPONSIBILITY FOR ESTUARINE STRIPED BASS IN JOINT WATERS
15A NCAC 03Q .0109	IMPLEMENTATION OF ESTUARINE STRIPED BASS MANAGEMENT PLANS: RECREATIONAL FISHING
15A NCAC 03Q .0202	DESCRIPTIVE BOUNDARIES FOR COASTAL-JOINT-INLAND WATERS
15A NCAC 03R .0201	STRIPED BASS MANAGEMENT AREAS
15A NCAC 10C .0107	SPECIAL REGULATIONS: JOINT WATERS
15A NCAC 10C .0108	SPECIFIC CLASSIFICATION OF WATERS
15A NCAC 10C .0110	MANAGEMENT RESPONSIBILITY FOR ESTUARINE STRIPED BASS IN JOINT WATERS
15A NCAC 10C .0111	IMPLEMENTATION OF ESTUARINE STRIPED BASS MANAGEMENT PLANS: RECREATIONAL FISHING
15A NCAC 10C .0301	INLAND GAME FISHES DESIGNATED
15A NCAC 10C .0314	STRIPED BASS

DISCUSSION

To further evaluate the temporal and spatial extent of A-R stock striped bass residency in the Tar-Pamlico and Neuse rivers, DMF conventional and acoustic tagging data, along with results of other tagging studies were reviewed. This information was used to develop the timing and spatial extent of an open striped bass harvest season in the Tar-Pamlico and Neuse rivers that minimizes, to the greatest extent possible, harvest of A-R stock striped bass while allowing modest harvest of stocked fish.

MOVEMENT AND MIGRATION

Striped bass stocks in the mid-Atlantic bight are anadromous and originate from four principal spawning areas; the Hudson River, Delaware River, numerous rivers within the Chesapeake Bay, and the Roanoke River (Merriman 1941; Boreman and Lewis 1987; Dorazio et al. 1994, Waldman et al. 1997; Welsh et al. 2007; Able et al. 2012; Callihan et al. 2014; Kneebone et al. 2014). Tag return data show that larger A-R stock striped bass migrate outside of the Albemarle Sound after spawning and return to the Roanoke River each year with no evidence of straying (i.e., spawning in a river system other than the Roanoke River; Callihan et al. 2015). Callihan et al. (2014) reported A-R stock striped bass greater than 24 inches (in.) total length (TL) were more likely to emigrate to ocean waters after spawning, while fish less than 24 in. TL were more likely to remain within the Albemarle Sound. Callihan et al. (2014) also noted up to 31% of the A-R stock may migrate outside of the Albemarle Sound estuary to adjacent internal estuarine systems, and migratory fish less than 24 in. TL were more likely to remain in inshore estuarine waters, especially the Pamlico Sound, Tar-Pamlico, Pungo and Neuse rivers, and the lower Chesapeake Bay (Callihan et al. 2014; Figure 2).

Striped bass stocks south of Albemarle Sound, including stocks in the Tar-Pamlico and Neuse rivers, are considered riverine rather than anadromous spending their entire life in the estuary and river systems (Raney 1952; Dudley et al. 1977; Setzler et al. 1980; Rulifson et al. 1982; Bulak 2004; Callihan 2014).

CONVENTIONAL TAGGING DATA

Tag return data can be used to provide insight on where and when stocked hatchery fish and A-R stock fish occur in the Tar-Pamlico and Neuse rivers to inform the best harvest management strategy.

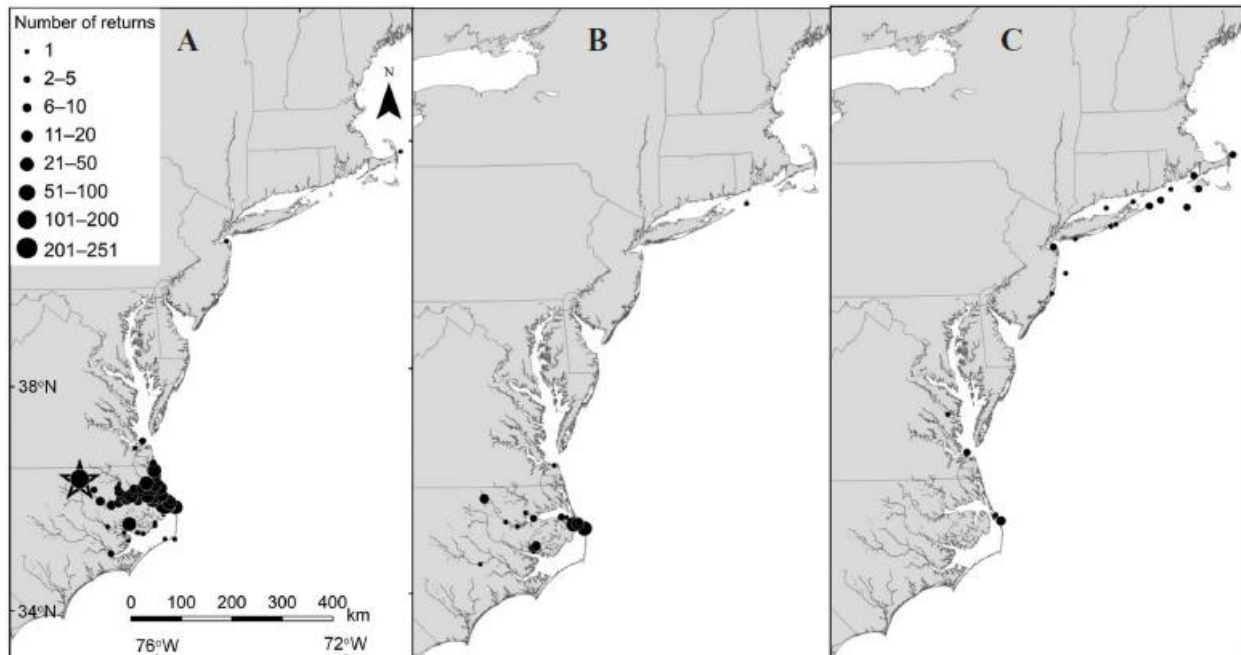


Figure 2. Tag return locations of striped bass along the eastern seaboard of the United States by length group (data pooled across years): **(A)** fish 287–599 mm in total length (TL; $n = 1,020$ returns), **(B)** fish 600–799 mm TL ($n = 101$ returns), and **(C)** fish 800–1,105 mm TL ($n = 55$ returns). Bubble sizes represent the number of tag returns from each location (within each length group). The star in panel A denotes the location where striped bass were tagged and released during annual spring electrofishing surveys conducted in the Roanoke River in 1991–2008. Only those tag returns that occurred after the first 2 weeks but within the first calendar year at liberty were included in analyses and are shown (Callihan et al. 2014).

The DMF and WRC have consistently tagged striped bass during surveys in the Roanoke, Tar-Pamlico, Neuse and Cape Fear rivers with external tags since 1980 (Winslow 2010). A portion of hatchery reared phase-II (5–8 inches) striped bass are also tagged each year before being released into the Tar-Pamlico and Neuse rivers. Phase-I (1–2 inches) and phase-II annual stocking numbers for the Albemarle Sound and the Tar-Pamlico and Neuse rivers 2014–2024 are provided in Table 2.

During 2014–2024 DMF staff tagged 8,232 A-R striped bass on the Roanoke River spawning grounds, of which 999 have been returned (i.e., caught by a fisherman and reported to DMF) through 2024, for a tag return rate of 12% (Table 3). Tag return locations for all months of the year show 7% of returns came from the Tar-Pamlico and Neuse rivers (Figure 3), and no returns came from outside the Albemarle Sound Management Area (ASMA) during April (Figure 4).

From 2014–2024, 25,044 hatchery reared phase-II striped bass were tagged and released into the Tar-Pamlico River and 34,848 were tagged and released into the Neuse River (Table 3). For tagged striped bass released in the Tar-Pamlico River, 21% of returns occurred outside the Tar-

Pamlico River (Figure 5), and for striped bass tagged in the Neuse River, 26% of returns came from outside the Neuse River (Figure 6). Most returns from outside of the tagging system occurred in the adjacent river (i.e., either the Tar-Pamlico or Neuse; Figures 5 and 6). Less than 5% of returns for tagged fish released in either the Tar-Pamlico and Neuse rivers came from outside of the system during April, and all were from adjacent rivers (Figures 7 and 8).

Table 2. Annual stocking numbers of phase-I (1–2 inches) and phase-II (5–8 inches) hatchery striped bass by area, 2014–2024.

Year-Class	Albemarle Sound		Tar-Pamlico River		Neuse River	
	Phase-I	Phase-II	Phase-I	Phase-II	Phase-I	Phase-II
2014	0	0	138,889	92,727	79,864	78,866
2015	0	0	0	52,922	0	109,107
2016	0	0	234,718	121,190	80,910	134,559
2017	0	0	0	101,987	0	14,203
2018	0	0	0	120,668	96,900	86,556
2019	0	0	0	97,920	0	85,694
2020	0	0	0	90,614	0	96,933
2021	0	0	0	23,082	31,208	80,122
2022	0	0	175,633	55,465	91,569	33,560
2023	668,243	0	116,989	66,165	62,885	71,527
2024	427,176	133,395	0	0	0	0

Table 3. Number (No.) of striped bass tagged with conventional external tags, number of overall tag returns (i.e., caught by a fisherman and reported to DMF), number of returns outside of the system where they were tagged, and number of returns in April outside the system they were tagged, 2014–2024.

Tagging Location	No. tagged	No. overall tag returns (% of tagged)	No. tag returns outside of system (% of overall returns)	No. April tag returns outside of system (% of overall returns)
Roanoke River A-R Spawning Stock	8,232	999 (12%)	68 (7%)	0 (0%)
Tar-Pamlico Phase-II Hatchery Stockings	25,044	105 (0.4%)	22 (21%)	3 (3%)
Neuse Phase-II Hatchery Stockings	34,848	150 (0.4%)	39 (26%)	6 (4%)

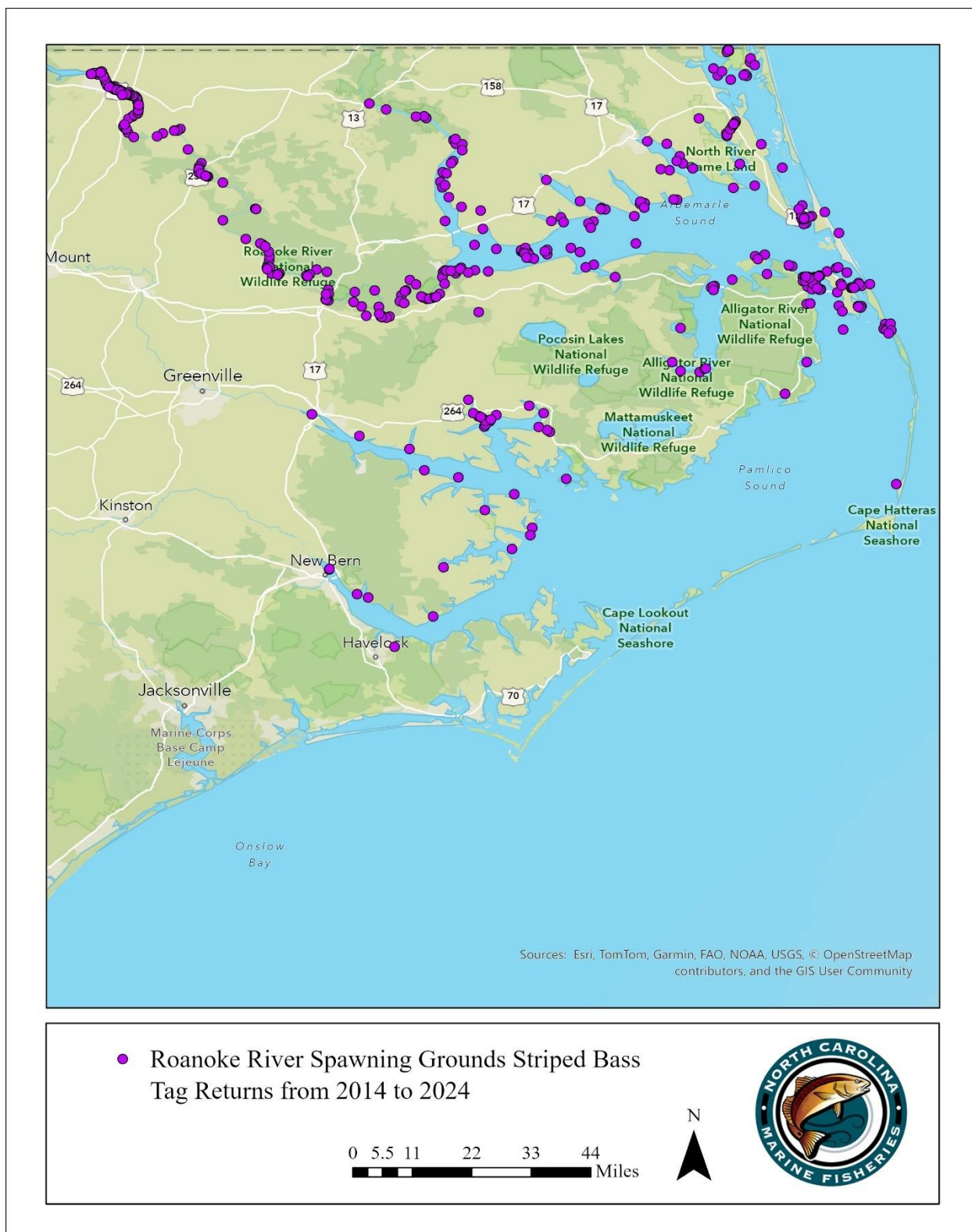


Figure 3. Tag return locations (all months) of Albemarle-Roanoke striped bass tagged and released on their spawning grounds in the Roanoke River near Weldon, 2014–2024. Tag returns outside of N.C. are not shown.

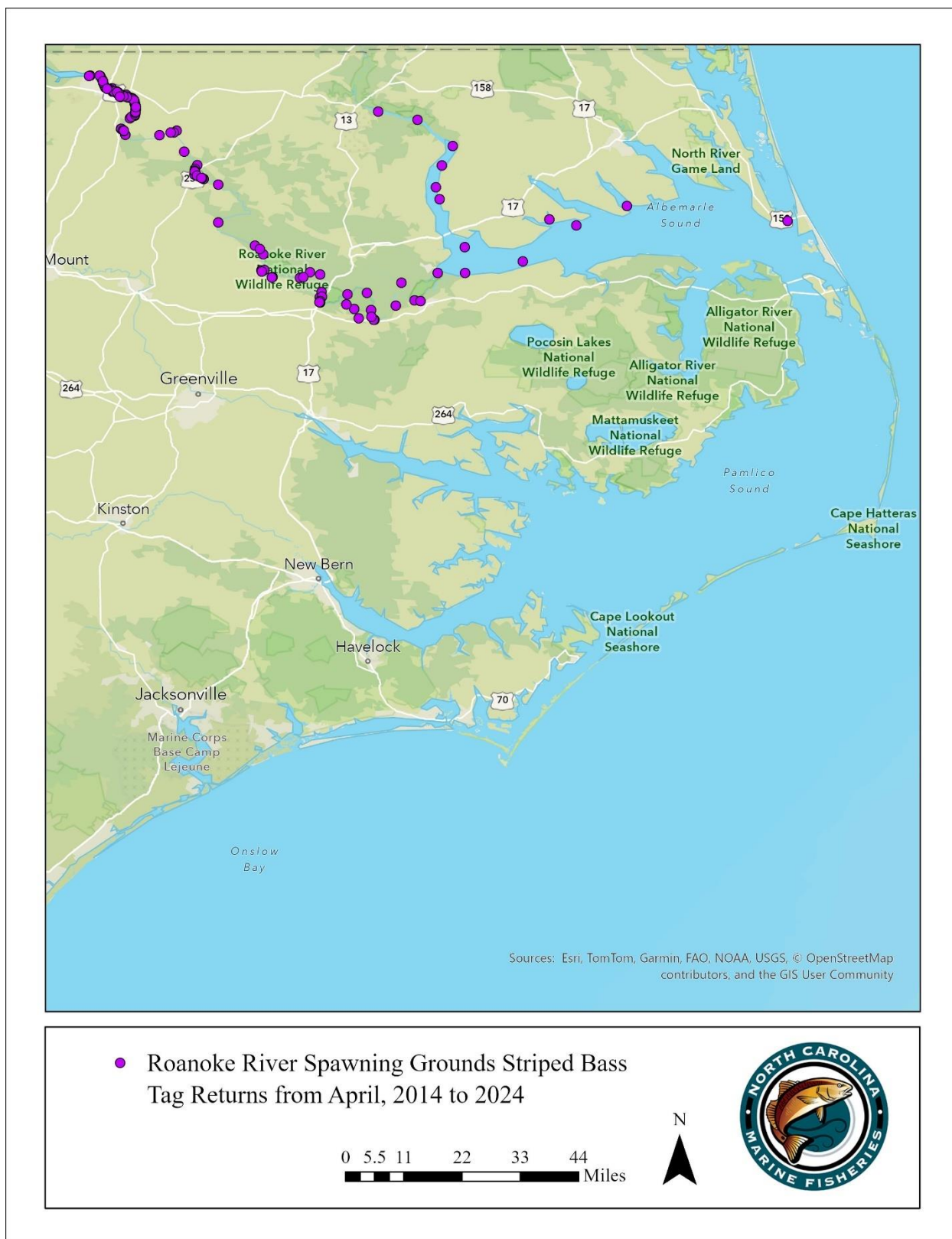


Figure 4. Tag return locations during April of Albemarle-Roanoke striped bass tagged and released on their spawning grounds in the Roanoke River near Weldon, 2014–2024. Tag returns outside of N.C. are not shown.

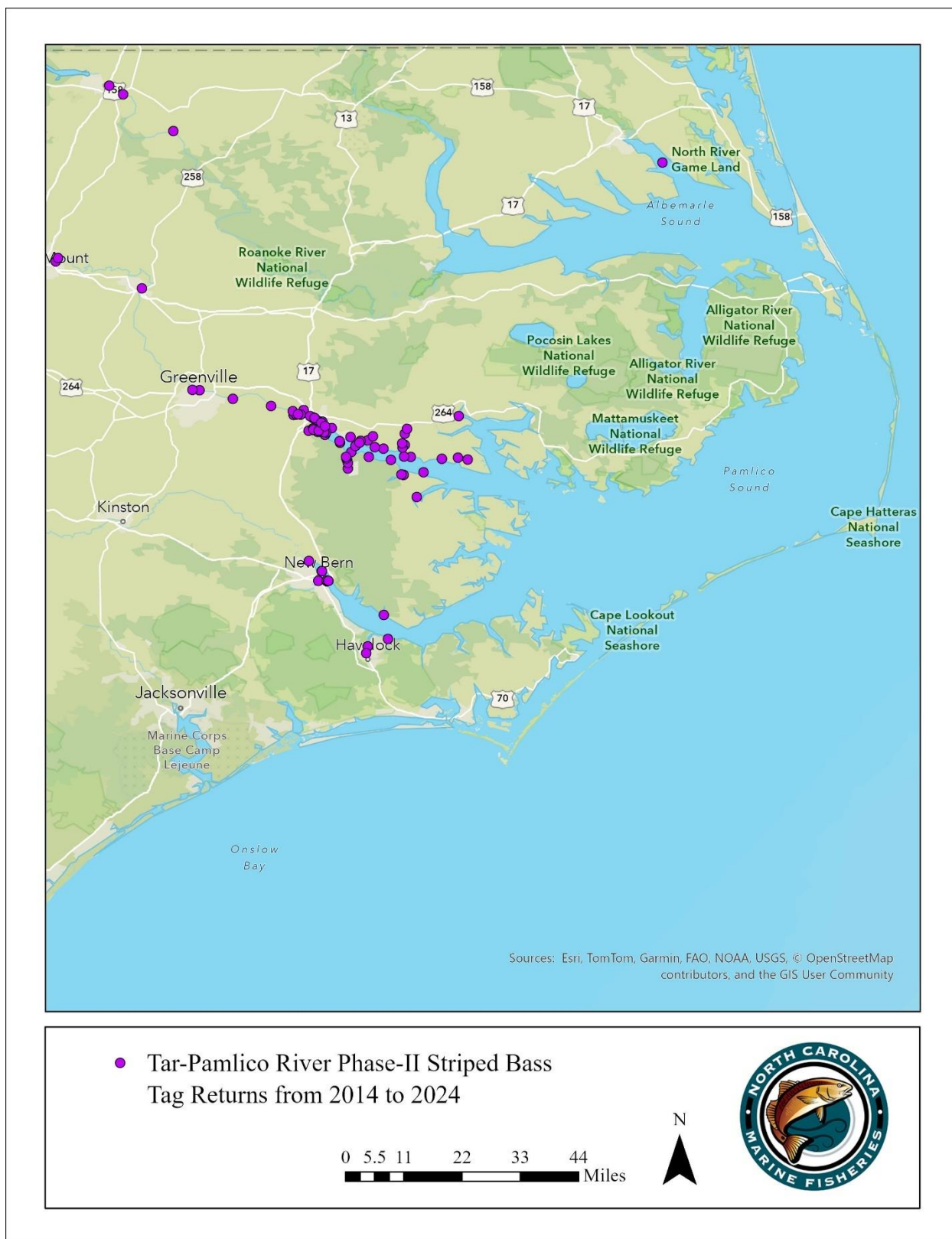


Figure 5. Tag return locations (all months) of phase-II (5–8 inches) hatchery reared striped bass tagged and released in the Tar-Pamlico River, 2014–2024. Tag returns outside of N.C. are not shown.

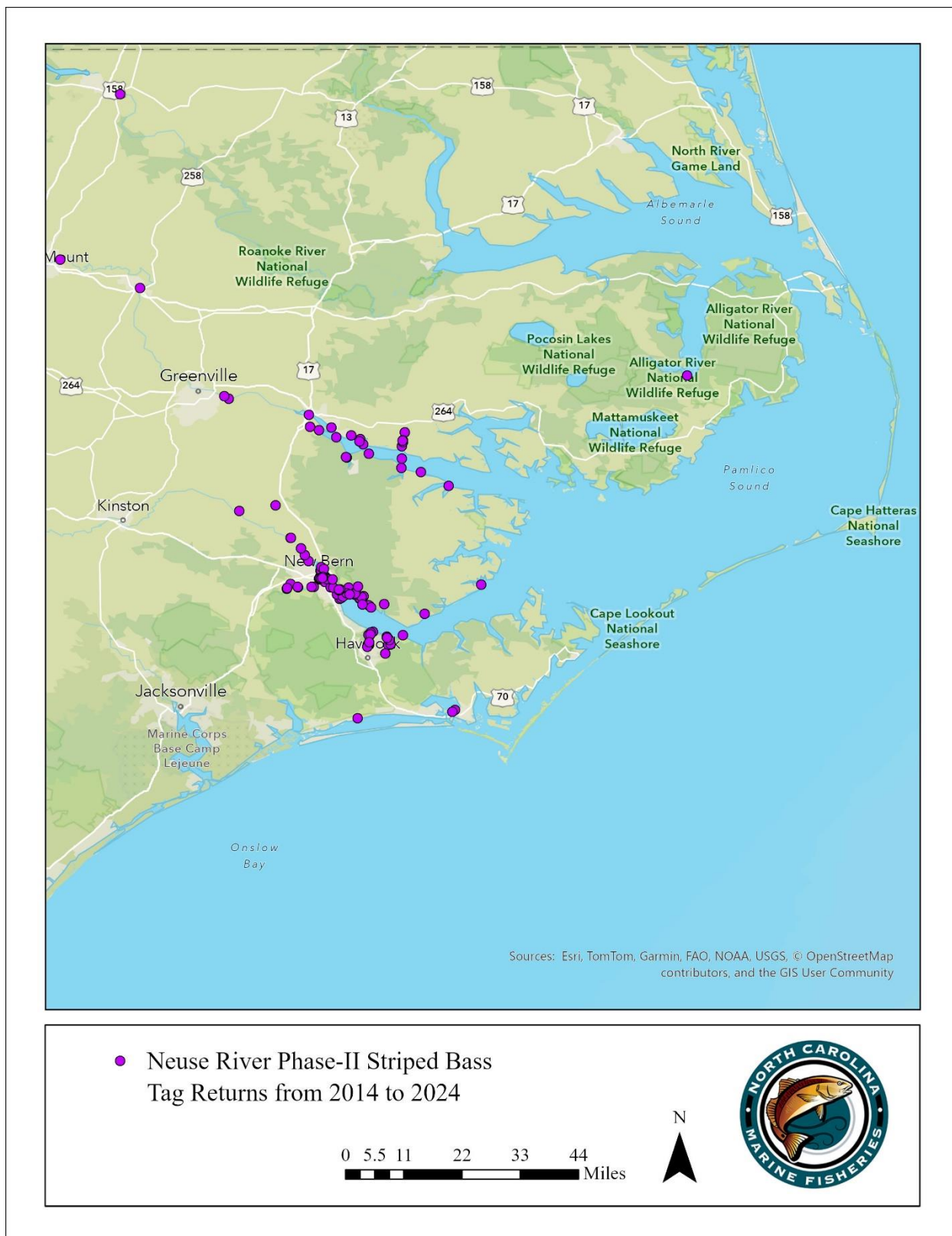


Figure 6. Tag return locations (all months) of phase-II (5–8 inches) hatchery reared striped bass tagged and released in the Neuse River, 2014–2024. Tag returns outside of N.C. are not shown.

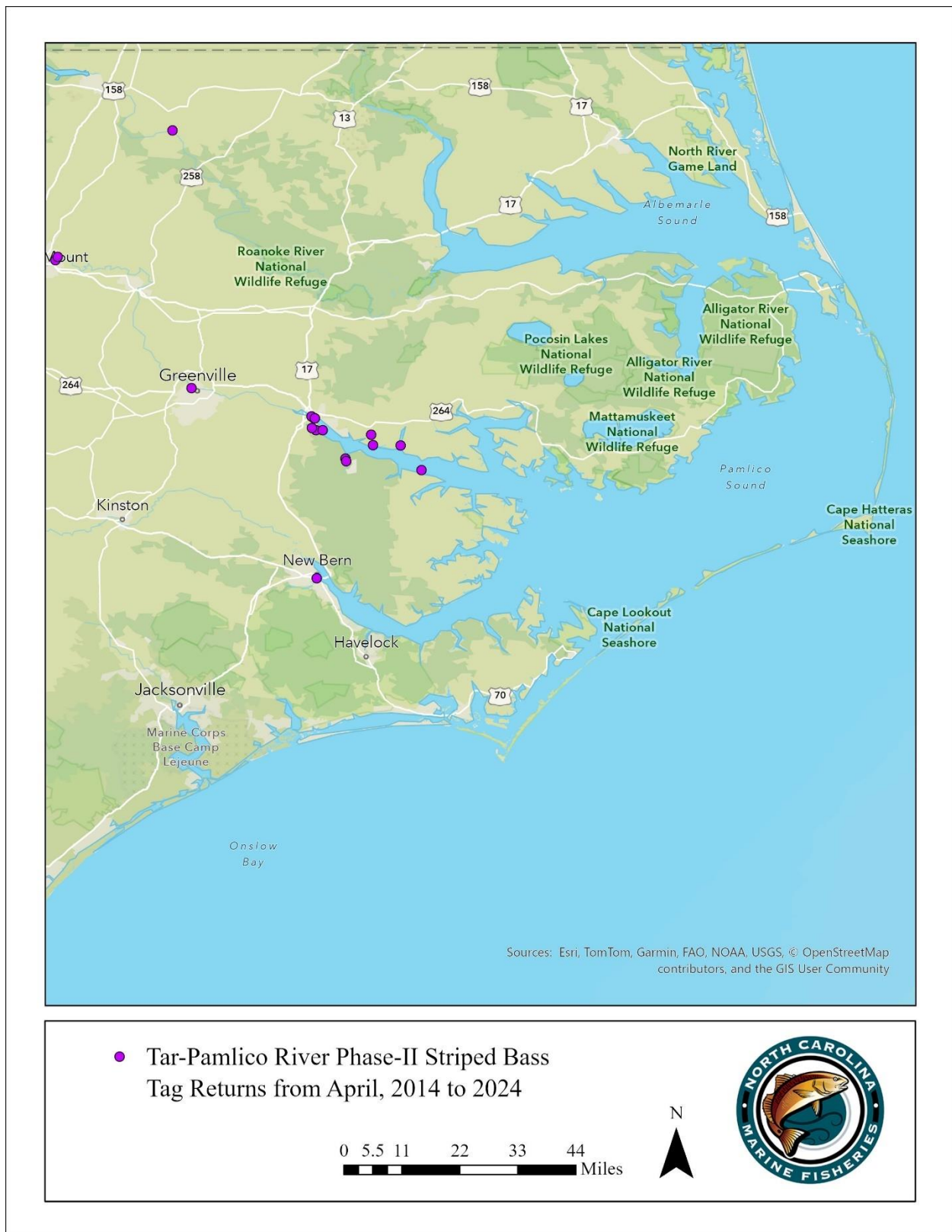


Figure 7. Tag return locations during April of phase-II (5–8 inches) hatchery reared striped bass tagged and released in the Tar-Pamlico River, 2014–2024

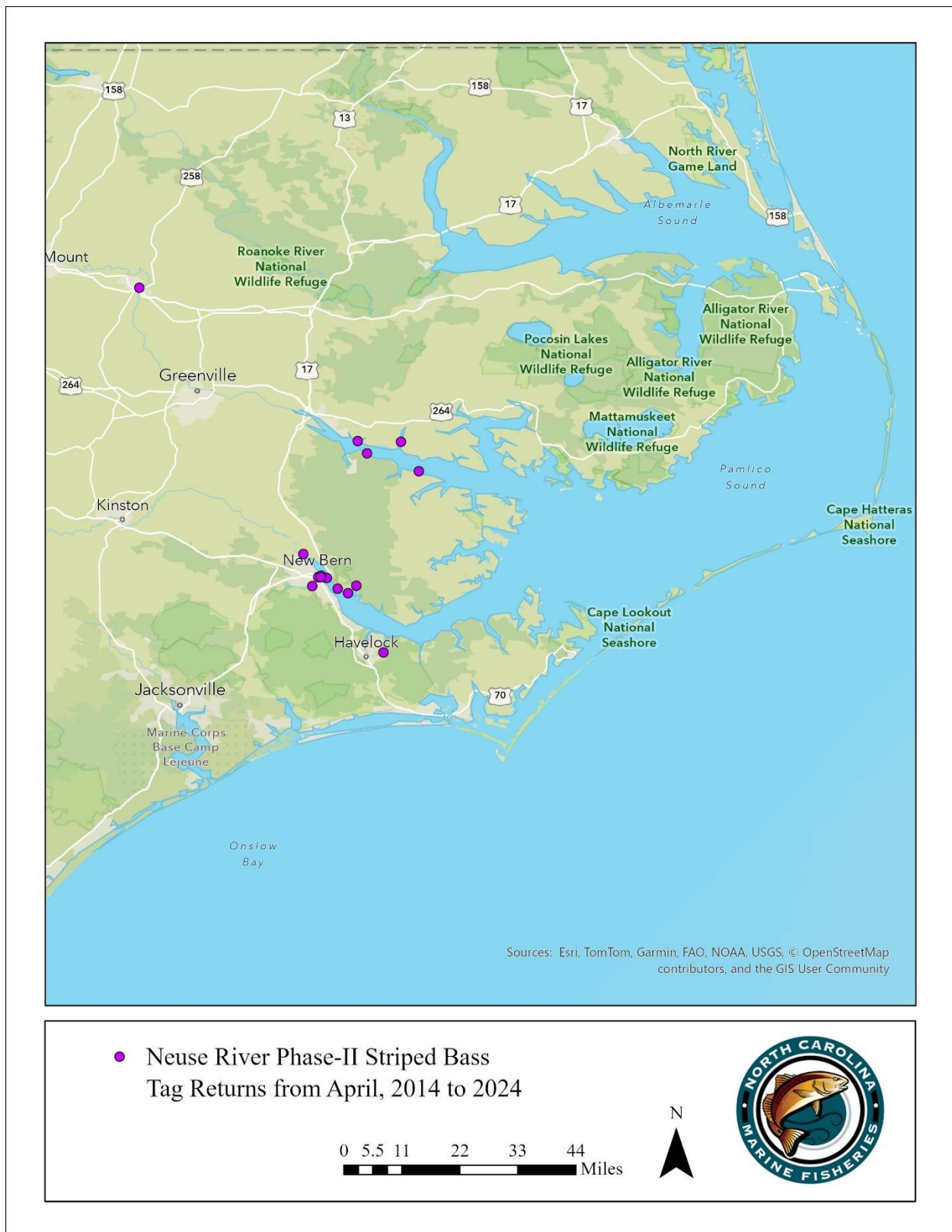


Figure 8. Tag return locations during April of phase-II (5–8 inches) hatchery reared striped bass tagged and released in the Neuse River, 2014–2024.

ACOUSTIC TELEMETRY TAGGING DATA

Acoustic telemetry data provide additional information about striped bass movement that does not rely on a fish being recaptured and reported. Acoustic telemetry data in combination with conventional tag data can be used to further refine where and when harvest can occur in the Tar-Pamlico and Neuse rivers so harvest of A-R stock striped bass is minimized.

In response to a significant increase in undersized recreational striped bass releases in 2016 and 2017 (Table 1) and increased abundance of non-hatchery origin (wild) striped bass present in the Tar-Pamlico and Neuse rivers in 2017 and 2018 (Farrae and Darden 2018; NCDMF 2022), DMF initiated an acoustic telemetry study in 2019 to track movements of acoustically tagged fish. Because A-R striped bass return to natal rivers to spawn (Callihan 2015), the objective of the acoustic tagging study was to infer natal origin of wild striped bass found in the lower-middle Tar-Pamlico and Neuse rivers by tracking spring spawning migrations of acoustically tagged fish.

Fifty adult striped bass (from the 2014 and 2015 year classes, age 4–5 in 2020 and 2021 based on length and scale ages) from the lower-middle Tar-Pamlico and Neuse rivers were implanted with acoustic tags. Fin clips were taken from each fish, and Parentage Based Tagging (PBT) analysis was conducted to determine if the fish were of hatchery or ‘wild’ origin. Results of PBT analysis indicated 30 of the tagged striped bass were ‘wild’. Six of those 30 “wild” striped bass did not have enough detection data to be used in analysis. Of the 30 wild striped bass, 70% (n=21) were later detected in the Albemarle Sound or on the Roanoke River spawning grounds in the spring. Most (53%, 11 out of 21) of the wild fish entering the Albemarle Sound were detected on the spawning grounds near Weldon, N.C., with five making repeated annual migrations in the spring back to the Roanoke River spawning grounds, suggesting these fish are part of the A-R stock. A single ‘wild’ striped bass tagged in the Tar-Pamlico River was later detected on the spawning grounds in the Tar-Pamlico River and one ‘wild’ striped bass tagged in the Neuse River was later detected on the spawning grounds in the Neuse River, suggesting limited natural recruitment in these rivers, or possible straying of A-R stock fish to the Tar-Pamlico and Neuse rivers spawning grounds. Additionally, one wild striped bass tagged in the Neuse River was later detected on the spawning grounds in the Tar River. The patterns indicated by the acoustic detections suggest most wild fish from the 2014 and 2015 year classes present in the Tar-Pamlico and Neuse rivers are part of the A-R stock, which had above-average recruitment in 2014 and 2015 (Figure 1; see [Appendix 1](#) for additional details).

In contrast to conventional tag return data, telemetry data indicate a portion of the A-R stock resides in the Tar-Pamlico and Neuse rivers during the month of April. Residency analysis, which is the amount of time a tagged fish remained in an area based on acoustic detections, indicates A-R stock striped bass were in the Tar-Pamlico and Neuse rivers above the gill net tie down line 41% of the month of April (Table 4; Figure 9). However, residency analysis considering other boundaries farther upriver, indicates A-R stock striped bass are not found throughout the entire Tar-Pamlico and Neuse rivers during the entire month of April. Residency analysis of hatchery origin striped bass in the Tar-Pamlico and Neuse rivers indicates hatchery striped bass are concentrated in upriver areas during the entire month of April (Table 5; Figure 10).

Table 4. Percent residency time of 'wild' acoustically tagged Albemarle-Roanoke striped bass in segments of the Tar-Pamlico and Neuse rivers during the month of April, 2021–2022. Harvest line boundaries are based on existing management boundaries and locations of acoustic receivers in the Tar-Pamlico and Neuse rivers.

Harvest line boundaries	Percent residency time 'wild' Albemarle- Roanoke striped bass
Coastal/Joint/Inland Boundaries	12%
Small Mesh Attendance Line	18%
Distance From Shore Line	26%
Tie-Down Line	41%

HARVEST STRATEGY DISCUSSION

HARVEST SEASON

Based on conventional tag returns, A-R fish start moving from the Tar-Pamlico and Neuse rivers to the Albemarle Sound in March and April and are absent from the rivers in April (Figures 3 and 4). However, acoustic tag data indicate A-R stock striped bass remain in parts of the Tar-Pamlico and Neuse rivers in April. So, while A-R stock striped bass are still present in the Tar-Pamlico and Neuse rivers during April before they leave the system to migrate to the Albemarle Sound and Roanoke River, limiting the spatial extent of where harvest can occur in the rivers can be used to further minimize harvest of A-R fish.

Harvest Season Management: Based on analysis of conventional and acoustic tagging data, harvest of striped bass in the Tar-Pamlico and Neuse rivers will only be allowed April 1–April 30.

HARVEST AREA

Residency patterns of A-R fish versus stocked fish were compared to determine the downstream extent of where harvest can occur in April to minimize harvest of A-R stock fish. Residency analysis (Table 4; Figure 9) indicates if harvest were allowed upstream of the of the tie-down line (the furthest downstream boundary considered) in the Tar-Pamlico and Neuse rivers, acoustic tagged A-R striped bass would have been available for harvest 41% of the month of April. If the harvest area was limited to upstream of the Distance From Shore (DFS) lines in both rivers, acoustic tagged A-R stock striped bass were only available for harvest 26% of the month of April. If harvest were only allowed upstream of the small mesh attendance lines in both rivers, acoustic tagged A-R stock striped bass were only available for harvest 18% of the month of April. If harvest was only allowed upstream of the Coastal-Inland boundary in the Tar-Pamlico River and the Coastal-Joint boundary in the Neuse River, acoustic tagged A-R stock striped bass were only available for harvest 12% of the month of April.

Residency analysis for the 20 acoustically tagged hatchery striped bass (Table 5; Figure 10) shows hatchery fish reside in the Tar-Pamlico and Neuse rivers year-round. April tag detections indicate hatchery fish reside between the Coastal/Joint/Inland Fishing Waters boundary lines and the distance from shore line, with very little residency time above the Coastal/Joint/Inland Fishing Waters boundary lines (Table 5; Figure 10). In addition, most conventional tag returns are from

the middle and lower parts of the rivers, with very few returns above the Coastal/Joint/Inland Fishing Waters boundary lines (Figures 7 and 8).

Unless the harvest line is at least upstream of the distance from shore line in each river, there will be limited opportunity to harvest stocked striped bass.

Harvest Area Management: Considering the intent of allowing harvest of hatchery striped bass while limiting potential harvest of A-R striped bass, harvest will be allowed upstream of the distance from shore demarcation lines.

HARVEST SIZE LIMIT

Current size limits for striped bass are established in rule and proclamation, but vary across N.C. jurisdictional waters. For example, the MFC has authority over striped bass in coastal fishing waters (excluding joint fishing waters), while the WRC has authority over striped bass in inland fishing waters. The MFC and WRC share authority over striped bass in joint fishing waters through joint rules 15A NCAC 03Q .0107 and 15A NCAC 10C .0107, which allow harvest of fish between 18 and 22 inches Total Length (TL), or over 27 inches TL. For coastal and inland fishing waters, changes to size limits can be made relatively quickly. Changes to size limits in coastal fishing waters can be made effective within 48 hours through the MFC's delegation of proclamation authority to the DMF Director (15A NCAC 03M .0202); changes in inland fishing waters can be accomplished through WRC's temporary rulemaking process, which can happen in well under a year. However, standardizing size limits in joint fishing waters requires amending the joint rules 15A NCAC 03Q .0107 and 15A NCAC 10C .0107, which must be approved by the MFC and WRC and go through the established permanent rule-making process (e.g., approximately two to three years).

The striped bass harvest season in April 2026 will open with an 18–22 in TL slot limit, or over 27 in TL. These are the current size restrictions for joint fishing waters. Implementing the same size limit across jurisdictional boundaries in the Tar-Pamlico and Neuse rivers and their tributaries above the distance from shore lines should help to avoid angler and enforcement confusion. To accomplish this, the WRC will initiate temporary rulemaking to amend the size limit in their rule for inland fishing waters prior to the April 2026 harvest season and the DMF Director will set the size limit for coastal fishing waters through proclamation prior to the April 2026 harvest season. Based on the length frequency of striped bass observed in the recreational harvest, very few fish greater than 27 inches TL are expected to be harvested (Figure 11).

DMF and WRC staff plan to begin the process for joint rulemaking to establish a consistent size limit for striped bass fisheries across all jurisdictions and management areas, including the Roanoke River Management Area (RRMA), ASMA, and Central Southern Management Area (CSMA).

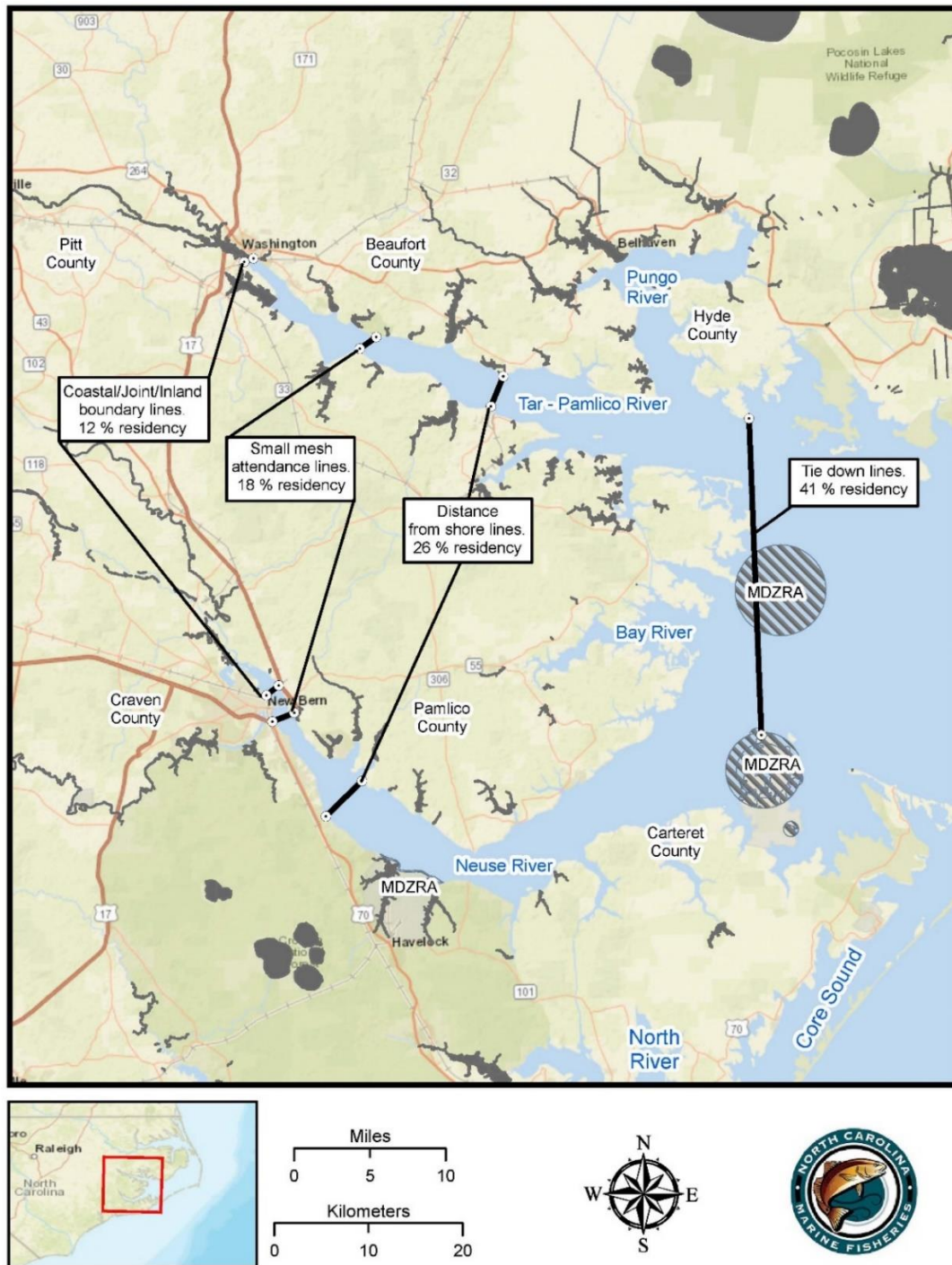


Figure 9. Harvest area lines analyzed using acoustic tagged 'wild' Albemarle-Roanoke striped bass in the Tar-Pamlico and Neuse rivers during the month of April, 2020–2021.

Table 5. Percent residency time of hatchery stocked acoustically tagged striped bass in segments of the Tar-Pamlico and Neuse rivers during the month of April 2021–2022. Harvest line boundaries are based on existing management boundaries and locations of acoustic receivers in the Tar-Pamlico and Neuse rivers.

Harvest line boundaries	Percent residency time hatchery striped bass
Coastal/Joint/Inland Boundaries	55%
Small Mesh Attendance Line	57%
Distance From Shore Line	70%
Tie-Down Line	100%

Size Limit Management: For the Coastal/Joint/Inland fishing waters of the Tar-Pamlico and Neuse rivers and all tributaries above the distance from shore demarcation lines, allow harvest of striped bass 18–22 in TL, or >27 in TL until the MFC and WRC joint rules can be amended to not allow harvest of fish >27 in TL.

HARVEST DAILY POSSESSION LIMITS

During 2004–2018 (fishery has been closed since 2019), the average annual harvest of striped bass was 3,753 fish per year (range = 843–7,334) for the recreational sector and 4,056 fish per year (range = 1,719–6,029) for the commercial sector (Table 1). Daily possession limits were two fish per person per day for the recreational sector, and 10–15 fish per operation per day for the commercial sector. The recreational season was open October 1–April 30 each year with no harvest quota, while the commercial season opened April 1 and usually caught the 25,000 lb quota in 3–4 weeks.

With the goal of allowing protection for and access to the resource, while also limiting harvest of A-R fish, possession limits must be conservative to limit overall harvest. Potential harvest levels can be inferred from historical data. During 2007–2018, annual recreational harvest estimates for April averaged 803 fish per year, though harvest in 2010 and 2016 was greater than 2,000 fish (Table 1). During 2012–2017, the number of commercial participants in the striped bass fishery in the Tar-Pamlico and Neuse rivers ranged from 63 to 97 participants (NCDMF 2019; [Supplement A](#)). A 10-fish commercial daily limit per operation could potentially result in over 20,000 striped bass harvested if commercial effort and participation were high during April.

To limit harvest levels below what occurred from 2004–2018, the daily possession limit will be one fish per person for both the commercial and recreational sectors. The intent is to not allow a directed commercial gill net fishery but allow limited incidental harvest in other gill net fisheries occurring in April (e.g., American shad anchored large-mesh gill net fishery, spotted seatrout and striped mullet small mesh runaround gill net fisheries). The Amendment 2 Adaptive Management Framework provides for adjustment of management measures, including area, time, and gear restrictions if it is determined additional protections for the stocks are needed. As [described in Amendment 2](#), additional restrictions on the use of large mesh gill nets during the open shad season will also be implemented to limit incidental capture of striped bass. Analysis of observer data shows striped bass are less abundant in shad nets set greater than 200 yards offshore (striped bass observed in only 26% of nets), while harvest of hickory and American shad was not significantly impacted. All other small and large mesh regulations currently in rule will remain in effect (Figure 12).

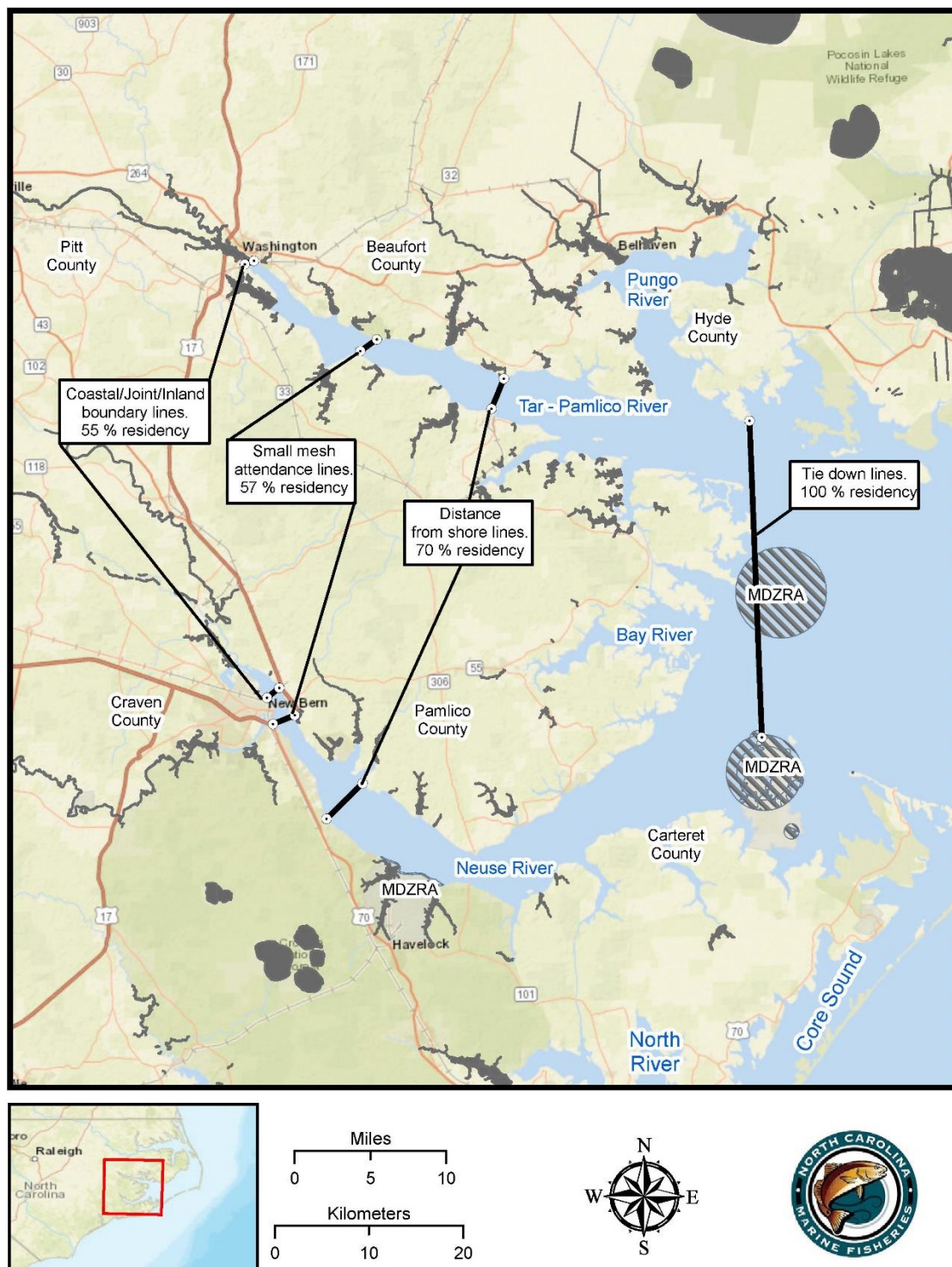


Figure 10. Harvest area lines analyzed using acoustic tagged hatchery stocked striped bass in the Tar-Pamlico and Neuse rivers during the month of April, 2020–2021.

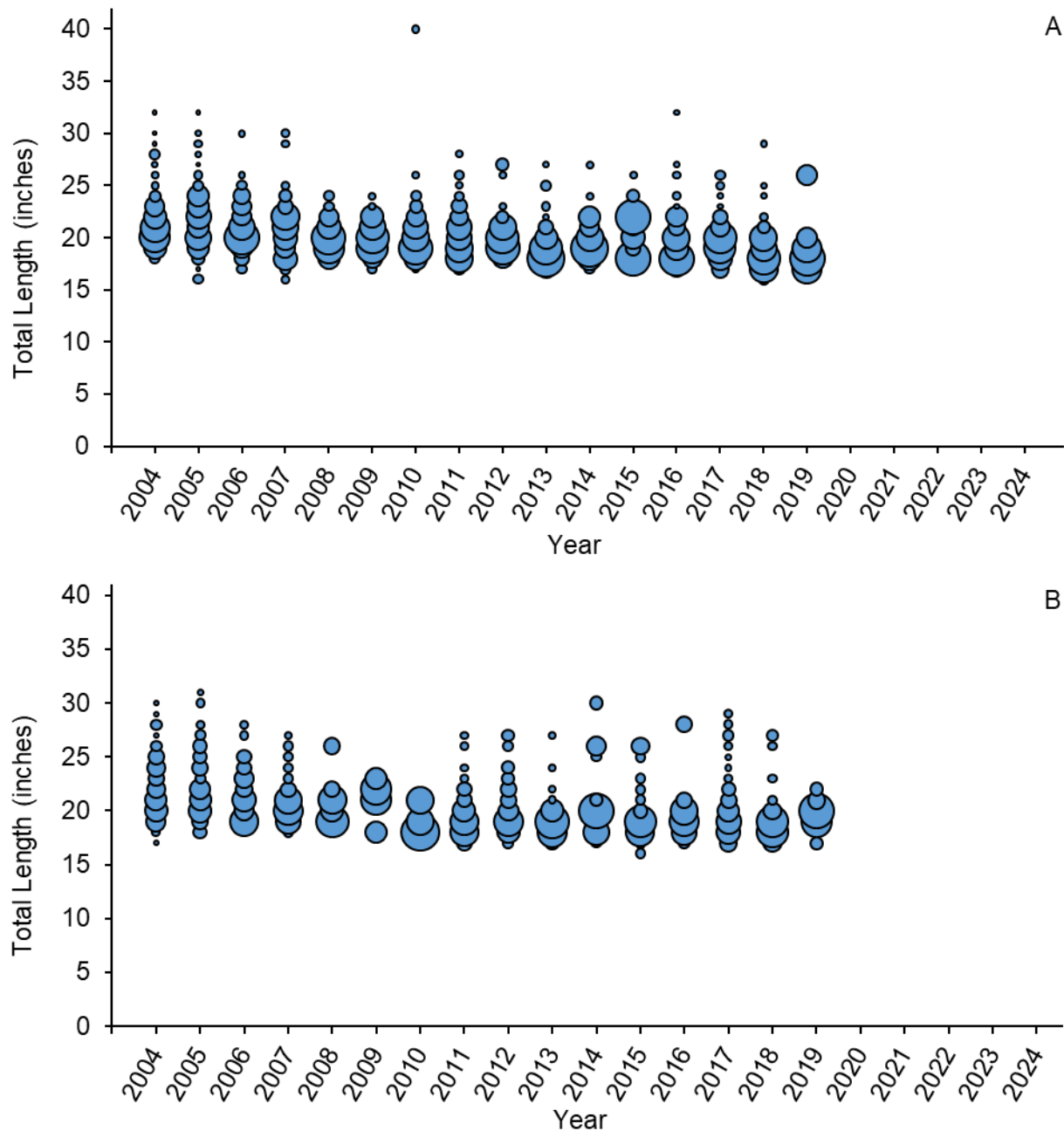


Figure 11. Recreational length frequency of measured striped bass harvested in the Tar-Pamlico/Pungo rivers (A), and the Neuse River (B), 2004–2024. Bubbles represent fish at length and the bubble size is proportional to the number of fish at that length. There was a limited recreational harvest season in 2019 (January 1–March 19, 2019) prior to the harvest closure.

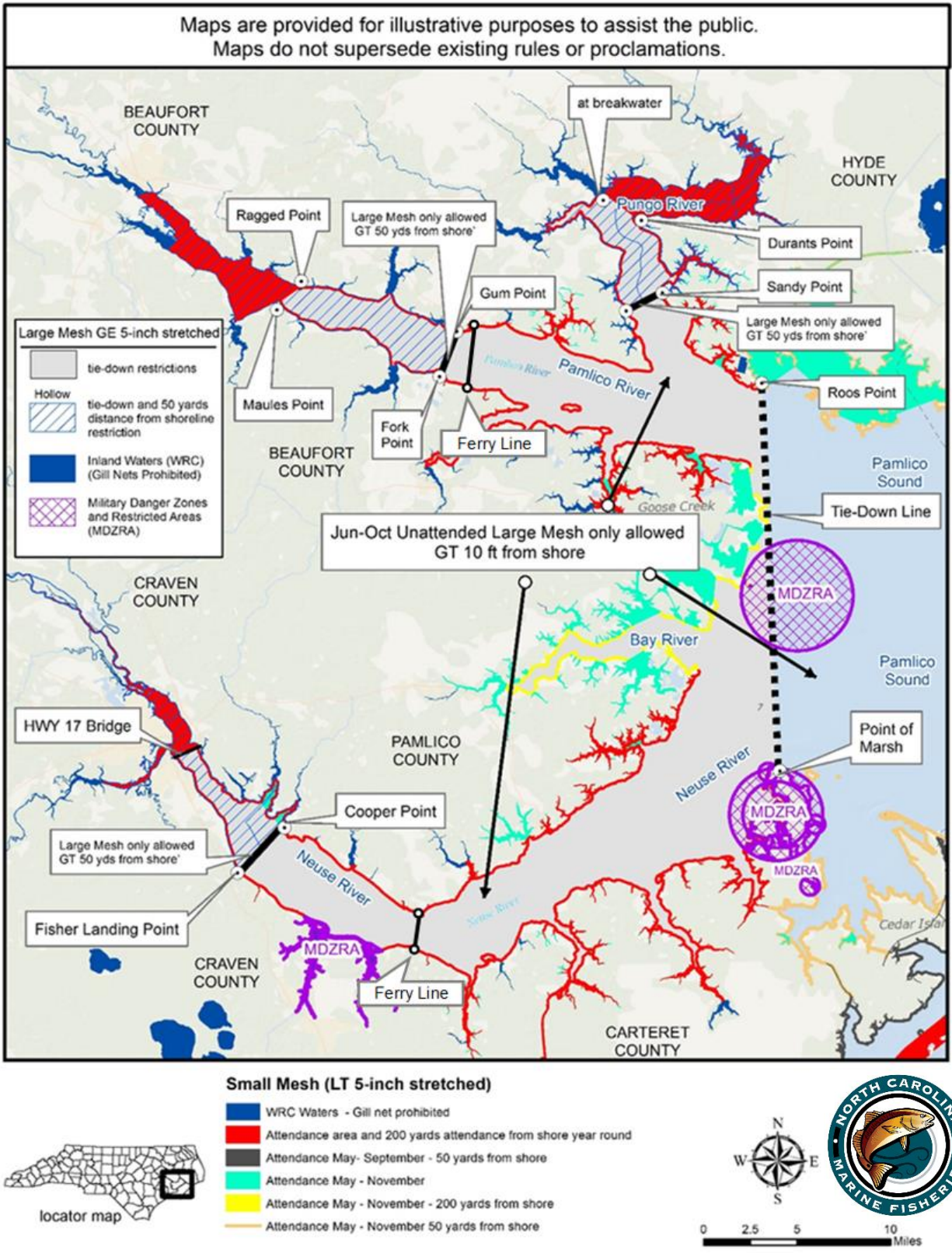


Figure 12. Gill net regulations in the Tar-Pamlico and Neuse rivers.

Per the Amendment 2 adaptive management framework described in the [use of hook-and-line as a commercial gear in the estuarine striped bass fishery issue paper](#), hook-and-line will be a legal commercial gear for directed harvest of striped bass in the coastal and joint waters of the Tar-Pamlico and Neuse rivers with a possession limit of one fish per person per day, 18–22 in. TL, or >27 in. TL. Dealers will still have the requirement to tag each striped bass landed and to call in landings in pounds and the number of tags used each day.

Harvest Daily Possession Limit Management: one fish per person daily possession limit for both the commercial and recreational sectors. Hook-and-line gear will be a legal commercial gear to directly harvest striped bass when the harvest season opens. Incidental harvest of striped bass in commercial gill net fisheries will also be allowed.

MONITORING AND ADAPTIVE MANAGEMENT

It is crucial to evaluate both the total level of harvest and the percent of harvest attributed to hatchery or A-R striped bass (assuming all non-hatchery ‘wild’ striped bass are from the A-R stock) during the April harvest seasons. Fin clips will be obtained from the commercial and recreational fisheries and analyzed to determine the percentage of hatchery versus ‘wild’ fish in the harvest. If harvest of A-R striped bass is determined to be excessive, the Amendment 2 adaptive management framework will be used to implement changes to the Harvest Management Strategy prior to future harvest seasons. Additional information collected from the recreational and commercial harvest, including length and age, will provide important information to further monitor the stocks.

Onboard observer coverage in the applicable gill net fisheries will be important so estimates of striped bass discards can be calculated. If striped bass discards are excessive, the Amendment 2 adaptive management framework will be used to implement changes to the Harvest Management Strategy prior to future harvest seasons.

PROPOSED RULE(S)

DMF and WRC staff plan to begin the process for joint rulemaking to establish a consistent size limit for striped bass fisheries across all jurisdictions and management areas. Establishing a consistent size limit will provide protection for larger, older striped bass, alleviate angler confusion, and ease enforcement of size limits.

FINAL MANAGEMENT STRATEGY

- Recreational and commercial harvest season for striped bass in the Coastal and Joint fishing waters, and recreational harvest season in the Inland fishing waters of the Tar-Pamlico and Neuse rivers, including all adjacent tributaries, upstream of the distance from shore demarcation lines (Figure 12).
- The season will be open April 1–30.
- One fish per person per day possession limit for recreational and commercial sectors
- Harvest slot of 18–22 in. TL, or over 27 in. TL.
- Hook-and-line will be a legal commercial gear in the Coastal and Joint fishing waters.

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