FISHERY MANAGEMENT PLANS

STATUS OF ONGOING PLANS

SOUTHERN FLOUNDER FMP AMEMDMENT 3

ESTUARINE STRIPED BASS FMP AMENDMENT 2 DEVELOPMENT

SHRIMP FMP AMENDMENT 2 UPDATE

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

JOHN G. BATHERSON
Acting Director

Jan. 29, 2021

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Corrin Flora, Fishery Management Plan Coordinator
Fisheries Management Section

SUBJECT: Fishery Management Plan Update

Issue
Update the N.C. Marine Fisheries Commission (MFC) on the status of ongoing North Carolina fishery management plans (FMPs).

Action Needed
For informational purposes only, **no action is needed at this time**.

Overview
This memo provides an overview on the status of six North Carolina FMPs for the Feb. 2021 MFC business meeting.

Southern Flounder FMP
Staff continue to develop the Southern Flounder FMP Amendment 3, addressing comprehensive, long-term management strategies. In fall 2020, the Southern Flounder FMP Advisory Committee (AC) assisted the division with development of Amendment 3 to continue rebuilding the stock. Lead staff provided a summary overview of Amendment 3 progress at the Nov. 2020 MFC business meeting. The MFC passed a motion requesting analysis of varying commercial and recreational harvest allocation percentages. Lead staff will provide a summary of harvest allocation analysis at the Feb. 2021 MFC business meeting.

Shrimp FMP
At its Feb. 2020 business meeting, the MFC received a summary of the public comments submitted, received an overview of the potential management strategies and the FMP timeline, and approved the goal and objectives for Amendment 2. The goal adopted by the MFC is to manage the shrimp fishery to provide adequate resource protection, optimize long-term harvest, and minimize ecosystem impacts. Staff continue to develop the first draft of the Shrimp FMP Amendment 2. The division is examining management strategies to promote habitat protection,

reduce bycatch in the shrimp trawl fishery, and potential changes to existing shrimp management strategies adopted in previous plans.

The Shrimp FMP AC has been appointed. The AC will assist the division with development of Amendment 2 through virtual workshops in March 2021. At the Feb. 2021 MFC business meeting, lead staff will provide an overview of the FMP development and request additional feedback on management strategies developed to address issues as they relate to the goal and objectives.

Estuarine Striped Bass FMP

At the Nov. 2020 MFC business meeting, lead staff provided an overview of the Amendment 1 FMP review, including the Central Southern Management Area stock report, the Albemarle-Roanoke stock report, and the recent Revision to Amendment 1. Commercial and recreational harvest reductions implemented through the 2020 Revision management strategy went into effect Jan. 1, 2021. On Jan. 14, 2021, and in accordance with the harvest reductions, the Wildlife Resources Commission issued a proclamation outlining the 2021 striped bass harvest in the Roanoke River Management Area. Management strategies implemented through the Revision to Amendment 1 will continue until the adoption of Amendment 2.

Development of Amendment 2 began with a scoping period held Nov. 2-15, 2020. Lead staff will present an overview of the scoping period and the draft goal and objectives of Amendment 2 at the Feb. 2021 MFC business meeting. Additionally, the division will solicit input from the MFC on any additional management strategies to be considered for Amendment 2.

Spotted Seatrout FMP

A benchmark stock assessment for spotted seatrout is underway coinciding with the scheduled Spotted Seatrout FMP review. The prior stock assessment from 2014 indicated the stock is not overfished and is not experiencing overfishing. The benchmark stock assessment will be completed late 2021 or early 2022.

Striped Mullet FMP

A benchmark stock assessment for striped mullet is underway coinciding with the scheduled Striped Mullet FMP review. The previous stock assessment update, through terminal year 2017, indicated the stock is not experiencing overfishing. Due to a poor relationship between spawning stock biomass and juvenile abundance, overfished status was unable to be determined. The benchmark stock assessment will be completed in 2022.

Interjurisdictional FMP

The scheduled review of the Interjurisdictional (IJ) FMP is underway. The management strategy of this unique state FMP is to adopt management measures appropriate for North Carolina contained in existing finfish FMPs approved by the Council or the Atlantic States Marine Fisheries Commission (ASMFC), which North Carolina is subject to, by reference as minimum standard(s). This avoids duplication of effort in the development of North Carolina species plans under the Fisheries Reform Act for species or species groups already subject to federal FMPs. When adopted by reference in the IJ FMP, the Council and ASMFC FMPs are held to the standards established in G.S. 113-182.1 and most associated policies. The last IJ FMP update was completed in 2015. The Plan Development Team met in Jan. 2021 to begin their review of

the plan. A process to be incorporated in the plan will addresses the best mechanism to “retire” a state plan covered by the IJ FMP.

- Division holds public scoping period

Striped Bass

- Marine Fisheries Commission approve goal and objectives of FMP
- Division draft FMP

Shrimp

- Division holds workshops to further develop draft FMP with plan advisory committee

Southern Flounder

- Division update draft plan for Marine Fisheries Commission presentation
- Marine Fisheries Commission vote to send draft FMP for public and advisory committee review
- Commission advisory committees meet to review draft FMP and receive public comment
- Marine Fisheries Commission select preferred management options
- Department of Environmental Quality secretary and legislature review draft FMP
- Marine Fisheries Commission vote on final adoption of FMP
- Division and Marine Fisheries Commission implement management strategies

SOUTHERN FLOUNDER FMP AMENDMENT 3

SOUTHERN FLOUNDER FMP AMENDMENT 3 MEMO

SOUTHERN FLOUNDER FISHERY SECTOR ALLOCATIONS

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

JOHN G. BATHERSON
Acting Director

January 29, 2021

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Michael S. Loeffler and Anne L. Markwith Southern Flounder FMP Co-Leads

SUBJECT: Southern Flounder FMP Allocation Issue Paper

Issue
At its November 2020 business meeting the N.C. Marine Fisheries Commission (MFC) asked the division to review several allocation scenarios for Amendment 3 to the NC Southern Flounder FMP. The division has provided the MFC with analysis that shows various commercial and recreational harvest allocation percentages as requested. The sector allocation selected by the MFC will provide the basis for implementing quota management in the southern flounder fishery.

Action Needed
At its February 2021 business meeting the commission is scheduled to vote to select their preferred sector allocations for Amendment 3 to the Southern Flounder FMP. If the commission chooses an allocation other than the historically based allocation, they may also need to consider ramifications to the gear sub-allocations.

Findings

- National Oceanic and Atmospheric Administration (NOAA) defines allocation as a direct and deliberate distribution of the opportunity to participate in a fishery among identifiable, discrete user groups or individuals. In fisheries managed by the South Atlantic and Gulf of Mexico fishery management councils, the share a sector gets is typically based on historical harvest amounts.
- Redistribution of harvest or allocations among sectors at this time is not based on a biological need, may alter rebuilding timelines, and impacts each user group.
- The division analyzed commercial and recreational data from 2017, the terminal year of the stock assessment. Table 1 shows the allocations as requested by the MFC as well as an option for an allocation based on the historical harvest. The historically based allocation of 73% commercial 27% recreational, which was used in Amendment 2, is based on historical harvest.
- Changes to sector allocation may have negative and positive impacts to different sub-sectors in the southern flounder fishery. Allocation shifts to the recreational sector would provide additional harvest, possibly allowing for longer seasonal access if the daily bag limit is lowered. If the daily bag limit is not lowered from four fish, gains from increased allocation may provide a buffer against potential overages from increased angler success.
- Reductions in the commercial allocation may have negative impacts on the commercial fishery as a lower allocation will result in a reduced harvest period. It is also prudent to consider gear sub-allocations within the sectors as allocation shifts may have consequences that impact one gear category more than another.

- Changes in allocation may alter the rebuilding schedule. Projections for rebuilding use a model that accounts for the rate of removal according to the size class that each sector harvests to estimate changes in spawning stock biomass. Allocation changes would impact the overall size range of fish removed from the population and could impact model projections.
- With the exception of the historical allocation, we expect these proposed scenarios to further reduce the overall value of the commercial southern flounder fishery at the gain of the recreational sector. The magnitude of these economic changes within each sector is unknown and unquantifiable.

Table 1. Allocation options for the North Carolina southern flounder fishery that maintain overall landings reduction of 72%, with 532,352 lb available for allocation. The % Allocation value describes the percentage of the TAL that would be made available to each sector. The % Reduction describes the percent reduction each sector would incur when compared with the 2017 harvest. The Historically based allocation is based on 2017 landings data.

	Total Allowable Landings (TAL) in Pounds					
		Commercial		Recreational		
	% Allocation (Comm./Rec.)	TAL	% Reduction	TAL	% Reduction	Change in TAL
Historical Harvest	73/27	390,493	72%	141,859	72%	0
MFC Requested Options	70/30	372,646	73%	159,706	68%	+/- 17,847
	65/35	346,029	75%	186,323	63%	+/- 44,464
	60/30/10*	358,459	74%	173,893	66%	+/- 32,034
	60/40	319,411	77%	212,941	58%	+/- 71,082
	50/50	266,176	81%	266,176	47%	+/- 124,317

* *This denotes a 10% allocation for gigs that was further divided out to each sector based on historically based allocation (73/27).*

For more information, please refer to the full document titled, "Southern Flounder Fishery Sector Allocations Issue Paper" that is included in the briefing materials.

SOUTHERN FLOUNDER FISHERY SECTOR ALLOCATIONS

February 04, 2021

I. ISSUE

Provide the N.C. Marine Fisheries Commission (MFC) with analysis that shows various commercial and recreational allocation percentages.

II. ORIGINATION

At the November 2020 MFC business meeting; the MFC passed a motion to consider commercial and recreational allocations in the Southern Flounder Fishery Management Plan (FMP) Amendment 3 of 70/30, 65/35, 60/30 with 10% allotment for gigging, 60/40, and 50/50.

III. BACKGROUND

National Oceanic and Atmospheric Administration (NOAA) defines allocation as a direct and deliberate distribution of the opportunity to participate in a fishery among identifiable, discrete user groups or individuals (NOAA 2006). In fisheries managed by the South Atlantic and Gulf of Mexico fishery management councils, the share a sector gets is typically based on historical harvest amounts. Revisions to allocations do occur, most commonly to account for changes among sectors or stock status. Changes among sectors includes scenarios where one group consistently has excess allocation remaining, which can be re-allocated to another sector based on management preferences. Changes to stock status also impact reallocation; if the stock rebuilds and harvest levels can be increased quota would be increased to allow for more harvest. Authority to make changes to allocations lies with the commission or body charged with making management decisions. For the purpose of this paper the term "sector" will be used to differentiate between the commercial and recreational components of the southern flounder fisheries.

At its November 2020 business meeting the MFC asked the division to review several allocation scenarios for Amendment 3 to the NC Southern Flounder FMP. The sector allocation selected by the MFC will provide the basis for implementing quota management in the southern flounder fishery. Selection of allocations is informed by data provided by the division, in this case historical landings. The commission can also rely on economic, social, and behavioral aspects of each sector that may influence allocation decisions.

The historically based allocation of 73% commercial 27% recreational (Table 1) in Amendment 2 is based on historical harvest for each sector from 2017. As with the 73/27 historically based allocation, the commercial and recreational sectors include gear sub-allocations based on historical harvest. In the initial draft of Amendment 3 discussed with the FMP Advisory Committee (AC) the recommendation for the commercial sector is for separate mobile gear (all gears except pound nets) and pound net categories (approximately 50/50) and for the recreational sector to have separate hook-and-line and gig gears (89/11 allocation). Different allocation scenarios will significantly change available harvest in a sector, so the commission will need to consider ramifications to the gear sub-allocations and whether those fisheries remain realistically viable to prosecute. The amount of landings for a specific fishery may be too low to invest further in the expense of the gear, if sub-allocations are not changed.

Much like regional councils, the MFC and North Carolina Wildlife Resources Commission (WRC) have historically allocated quotas to fishing sectors based on historical harvest, and in some fisheries like the Albemarle Sound and Roanoke River Management Areas striped bass fishery the quota was ultimately revised so a 50/50 parity was achieved between the commercial and recreational sectors. In 1991, the initial striped bass quota was allocated 62.5/37.5 based on historical landings. After seven years of rebuilding at this initial allocation, the stock's spawning stock biomass (SSB) was declared recovered, allowing for an increase in quota. In 1998, the quota was increased by 94,340 pounds, of which 29% was allocated to the commercial sector and the remaining 71% was allocated to the recreational sector. This increase brought the quota allocation to a 50/50 parity.

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

V. DISCUSSION

Initial analyses of southern flounder quota allocations followed the convention of using historical landings from a previous year or years. To provide information for the MFC motion, commercial and recreational data were analyzed based on 2017 harvest data, the terminal year of the stock assessment. Table 1 shows the allocation options as requested by the MFC.

Shifting allocation between sectors is within the authority of the MFC (G.S. 113-134, 113-182, 113-182.1, and 143B-289.52). Changes to sector allocation may have negative and positive impacts to different sub-sectors in the southern flounder fishery. Allocation shifts to the recreational sector would provide additional harvest possibly allowing for longer seasonal access if the daily bag limit is lowered. If the bag limit is not lowered, gains from increased allocation may help to provide a buffer against potential overages from increased angler success (see *Sustainable Harvest issue paper*).

The commercial sector total allowable landings (TAL) would be lowered by the same amount of the recreational gains. As noted earlier it is also prudent to consider the gear sub-allocations within the sectors as allocation shifts may have consequences that impact one gear category more than another (Table 2). Reductions in the commercial allocation may have negative impacts on the commercial fishery as a lower allocation will result in a reduced harvest period. The *Description of the Fishery* section within draft Amendment 3 contains additional information that provides background details on landings, effort, and economic data for the commercial and recreational fisheries. For reference those tables have been added to this Issue Paper. Table 3 provides commercial southern flounder landings by year and gear and Table 4 provides the number of trips, average pounds per trip, and the number of participants by year and gear.

Table 5 shows the annual variation in harvest for the recreational hook-and-line fishery and what the following years TAL consequences might have been. In table 5, landings during the identified season were displayed on a yearly basis to provide examples of overages that could have occurred

compared to the TAL necessary for rebuilding based on historical landings. If more fish are available because of a good year class both sectors would likely see increases in harvest. For the recreational sector, where daily reporting is not available, the larger the bag limit the greater the risk of exceeding the TAL.

Tables 6 & 7 demonstrate the effects to the recreational sector between the historical landings (73/27) and a 60/40 allocation. For each table, annual landings data (2008 through 2017) were prorated to an Aug 16-Sept 30 season under different bag limits (1 fish, 2 fish, 3 fish, 4 fish). Estimated landed pounds were then compared to a 73/27 allocation (Table 6) and a 60/40 allocation (Table 7) to determine whether or not the TAL would be exceeded for each bag limit option based on the percent of the allocated harvested. Finally, the percent of the allocated harvested for each year was used to calculate the subsequent year allocation for each bag limit option. Any overages that occur in one year will be deducted in subsequent years, possibly resulting in no recreational fishery for a year or more. It should be noted that for the recreational sector, where daily reporting is not realistic, the larger bag limits increase the risk of exceeding the TAL. When compared to each other, Tables 6 and 7 also show that with more allocation provided to the recreational fishery and a lower bag limit, the lower the chance of the recreational fishery of exceeding their TAL.

Future increases in total quota would not occur until the southern flounder SSB is recovered and this cannot be determined until an updated stock assessment is completed. Additionally, changes in allocation may alter the rebuilding schedule. Projections for rebuilding use a model that accounts for the rate of removal according to the size class that each sector harvests to estimate changes in SSB. Allocation changes would impact the overall size range of fish removed from the population and could therefore have some impact on the model projections.

All of the proposed reallocation scenarios increase recreational quota while lowering the commercial quota, there is the expectation that similar economic effects will follow. Specifically, as the overall commercial allocation is reduced, the total value of the commercial southern flounder industry will decrease, while the value of the recreational southern flounder fishery may be mitigated to some extent due to increased angler expenditures to target this species (Figure 8, Figure 9, Figure 10). However, economic losses and gains are unpredictable.

Decreasing the commercial allocation may result in a proportional decrease in value. It is possible, per-pound southern flounder prices may rise with reduced supply, counter-acting the losses from reduced quota. However, if commercial quota reductions were large enough, the southern flounder fishery could see reduced participation, creating even larger economic losses. The magnitude of these economic changes within each sector is unknown and unquantifiable.

Allocation deliberations should take into consideration the limited southern flounder TAL. Reallocation between sectors at this time could have unintended social and economic consequences that are most noticeable at the finer level of specific fisheries within each sector. It may be more prudent to allocate future quota increases towards one sector over the other as SSB expands. This can be achieved in future amendments with methodic increases until the preferred allocation is achieved.

VI. PROPOSED MANAGEMENT OPTIONS

Below are possible overarching positive and negative impacts for all options which may inform the MFC's deliberations in its decision. The options are listed after the impacts.

+ Shifting allocation to the recreational sector may buffer against recreational overages.
+/- Allocation not based on biological need.
+/- Allocation other than historically based allocation is not based on historical landings.
+/- Increasing allocation to the recreational sector provides more fish to harvest but depending on amount may not increase the season dates, season lengths or bag limits.
+ Increasing allocation to the recreational sector mitigates some of the economic impact of the severe reductions to the recreational fishery.
- Decreasing allocation to the commercial fishery exacerbates the economic impact of the commercial fishery.
- Increasing allocation to the recreational fishery provides additional harvest to the sector with the least precise estimates.
- Changes in allocation may alter the rebuilding schedule (changing allocation changes the fish available to each sector and their associated selectivity, projections are based on sector specific selectivity's).
- Depending on how much allocation is shifted to the recreational sector there may be significant impacts to the commercial seasons.
- May be necessary to adjust allocations within a sector to maintain specific gear-based fisheries.
- Shifting allocation to the recreational sector may increase the chance of the commercial sector exceeding their allocation.

Option 1. Historically based allocation (73 commercial/27 recreational)
Option 2. 70/30
Option 3. 65/35
Option 4. 60/30/10, includes a 10 percent allocation for the gig fishery
Option 5. 60/40
Option 6. 50/50

VII. LITERATURE CITED

NOAA 2006, NOAA Tech. Memo NMFS-F/SPO 69

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Revised Date December 07, 2020
December 17, 2020
January 04, 2021
January 19, 2021
February 01, 2021
February 04, 2021

Table 1. Allocation options for the North Carolina Southern Flounder fishery that maintain overall landings reduction of 72% with 532,352 lb available for allocation.

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	65/35	346,029	75%	186,323	63%	+/- 44,464
	60/30/10*	358,459	74%	173,893	66%	+/- 32,034
	60/40	319,411	77%	212,941	58%	+/- 71,082
	50/50	266,176	81%	266,176	47%	+/- 124,317

1. This denotes a 10% allocation for gigs that was further divided out to each sector based on historically based allocation (73/27).

Table 2. Sub-allocations for the commercial and recreational sectors for NCMFC options based on the 2017 harvest.

	Commercial		Recreational	
NCMFC Option	**Mobile Gear**	**Pound Net**	**Hook-and-Line**	**Gig**
Historically Based Allocation	195,105	195,388	126,315	15,544
70/30	186,188	186,458	142,206	17,500
65/35	172,889	173,140	165,907	20,416
[1].60/30/10	180,228	178,231	159,706	14,187
60/40	159,590	159,821	189,608	23,333
50/50	132,992	133,184	237,010	29,166

1. This denotes a 10% allocation for gigs that was further divided out to each sector based on historically based allocation (73/27).

Table 3. Annual commercial southern flounder landings in pounds by gear type, 2008-2017. Numbers in parentheses are the percent of the total landings for each gear in a given year. Source: North Carolina Trip Ticket Program.

Year	Gill Net	Pound Net	Gigs	Other	Total
2008	1,770,204 (68%)	685,546 (26%)	82,846 (3%)	63,793 (2%)	2,602,390
2009	1,658,074 (69%)	591,534 (25%)	84,303 (4%)	62,329 (3%)	2,396,240
2010	958,271 (57%)	571,151 (34%)	128,081 (8%)	32,054 (2%)	1,689,557
2011	652,810 (52%)	464,546 (37%)	113,414 (9%)	16,680 (1%)	1,247,450
2012	879,373 (53%)	569,388 (35%)	149,387 (9%)	47,989 (3%)	1,646,137
2013	1,096,060 (50%)	924,887 (42%)	118,489 (5%)	46,955 (2%)	2,186,391
2014	659,394 (39%)	860,216 (51%)	135,273 (8%)	18,628 (1%)	1,673,511
2015	392,339 (33%)	667,847 (56%)	130,277 (11%)	12,422 (1%)	1,202,885
2016	361,570 (40%)	398,258 (44%)	126,983 (14%)	10,953 (1%)	897,765
2017	552,292 (40%)	697,814 (50%)	136,094 (10%)	8,416 (1%)	1,394,617
Average	898,039 (53%)	643,119 (38%)	120,515 (7%)	32,022 (2%)	1,693,694

*Percentages may not total 100% due to rounding.

Table 4. Annual trips, average landings per trip (APT), and number of participants (#PAR) by gear type in the southern flounder fishery, 2008-2017. Source: North Carolina Trip Ticket Program.

Year	Trips[1] / APT / #PAR[2]	Gill Net Trips/ APT/ #PAR	Pound Net Trips / APT / #PAR	Gig Trips / APT / #PAR	Other Trips / APT / #PAR
2008	28,966 / 90 / 1,235	23,493/ 75 / 924	1,508 / 455 / 83	1,459 / 57 / 140	2,510 / 25 / 413
2009	29,395 / 82 / 1,299	23,691 / 70 / 992	1,746 / 339 / 85	1,450 / 58 / 143	2,510 / 25 / 426
2010	20,408 / 83 / 1,182	15,134 / 63 / 837	1,610 / 355 / 84	2,283 / 56 / 226	1,384 / 23 / 329
2011	15,810 / 79 / 1,039	11,403 / 57 / 759	1,370 / 339 / 63	2,076 / 55 / 212	963 / 17 / 250
2012	20,926 / 79 / 1,202	14,713 / 60 / 855	1,754 / 325 / 84	3,000 / 50 / 288	1,462 / 33 / 291
2013	23,579 / 93/ 1,286	16,968 / 65 / 933	2,111 / 438 / 82	2,408 / 49 / 270	2,094 / 22 / 343
2014	18,121 / 92 / 1,222	11,778 / 56 / 799	1,806 / 476 / 88	2,655 / 51 / 316	1,887 / 10 / 373
2015	13,880 / 87 / 1,029	8,465 / 46 / 674	1,803 / 370 / 81	2,616 / 50 / 307	1,002 / 12 / 249
2016	13,336 / 67 / 945	8,422 / 43 / 591	1,423 / 280 / 77	2,657 / 48 / 323	838 / 13 / 227
2017	17,963 / 78 / 1,048	12,363 / 45 / 713	1,908 / 366 / 88	2,752 / 49 / 310	943 / 9 / 237
Average	20,238 / 84 / 1,149	14,643 / 61 / 808	1,704 / 377/ 82	2,336 / 52 / 254	1,559 / 21 / 314

1 The number of trips, average landings per trip, and number of participants is from all trips that recorded southern flounder across all gear types including pound nets, gill nets, gigs, and other.
2 The annual number of participants cannot be summed by gear as many individuals fish multiple gears per trip.

Table 5. Recreational hook-and-line landings of southern flounder Aug 16 – Sept 30 at the 4-fish bag limit for current season and years compared to the status quo allocation (73/27 - does not include discards). Highlighted cells indicate overages in TAL the previous year resulting in closures the following year.

Year	Pounds Landed	% Overage	Subsequent Year Allocation
2008	106,493	-15.7%	126,315
2009	204,422	61.8%	48,209
2010	260,665	*106.4%	0
2011	348,203	*175.7%	0
2012	213,170	68.8%	39,461
2013	396,543	^213.9%	0
2014	133,016	5.3%	119,615
2015	142,540	12.8%	110,091
2016	172,348	36.4%	80,283
2017	108,420	-14.2%	126,315

* Denotes a scenario where the recreational hook-and-line fishery would not have quota in subsequent year resulting in a 1-year closure due to overages.

^ Denotes a scenario where the recreational hook-and-line fishery would not have a quota in 2 subsequent years resulting in a 2- year closure due to overages.

Table 6. Example of predicted harvest of southern flounder for a recreational hook-and-line season and compared to a 73/27 allocation and then applied to subsequent years to show future harvest during an Aug 16 – Sept 30 season. Highlighted cells indicate bag limits that exceed the TAL for the indicated year.

		Harvest of Southern Flounder (pounds)				Percent of Allocation Harvested based on 73/27 allocation				Subsequent Year Allocation (pounds)			
Season	**Year**	**4 Fish Bag**	**3 Fish Bag**	**2 Fish Bag**	**1 Fish Bag**	**4 Fish Bag**	**3 Fish Bag**	**2 Fish Bag**	**1 Fish Bag**	**4 Fish Bag**	**3 Fish Bag**	**2 Fish Bag**	**1 Fish Bag**
Aug 16 - Sept 30	2008	106,492	106,492	106,492	91,066	84%	84%	84%	72%	126,315	126,315	126,315	126,315
Aug 16 - Sept 30	2009	204,486	187,897	160,774	126,395	162%	149%	127%	100%	48,144	64,733	91,856	126,235
Aug 16 - Sept 30	2010	260,612	246,868	218,187	166,911	206%	195%	173%	132%	-	5,762	34,443	85,719
Aug 16 - Sept 30	2011	349,421	326,406	310,900	247,169	277%	258%	246%	196%	-	-	-	5,461
Aug 16 - Sept 30	2012	213,292	198,612	184,701	145,504	169%	157%	146%	115%	39,338	54,018	67,929	107,126
Aug 16 - Sept 30	2013	396,801	313,050	278,762	210,948	314%	248%	221%	167%	-	-	-	41,682
Aug 16 - Sept 30	2014	132,458	132,458	127,395	114,937	105%	105%	101%	91%	120,172	120,172	125,235	126,315
Aug 16 - Sept 30	2015	142,881	137,615	129,351	90,711	113%	109%	102%	72%	109,749	115,015	123,279	126,315
Aug 16 - Sept 30	2016	168,236	168,236	165,769	156,700	133%	133%	131%	124%	84,394	84,394	86,861	95,930
Aug 16 - Sept 30	2017	114,667	114,667	110,461	97,184	91%	91%	87%	77%	126,315	126,315	126,315	126,315

Table 7. Example of predicted harvest of southern flounder for a recreational hook-and-line season and compared a 60/40 allocation and then applied to subsequent years to show future harvest during an Aug 16 – Sept 30 season. Highlighted cells indicate bag limits that exceed the TAL for the indicated year.

		Harvest of Southern Flounder (pounds)				Percent of Allocation Harvested based on 60/40 allocation				Subsequent Year Allocation (pounds)			
Season	**Year**	**4 Fish Bag**	**3 Fish Bag**	**2 Fish Bag**	**1 Fish Bag**	**4 Fish Bag**	**3 Fish Bag**	**2 Fish Bag**	**1 Fish Bag**	**4 Fish Bag**	**3 Fish Bag**	**2 Fish Bag**	**1 Fish Bag**
Aug 16 - Sept 30	2008	106,492	106,492	106,492	91,066	56%	56%	56%	48%	189,608	189,608	189,608	189,608
Aug 16 - Sept 30	2009	204,486	187,897	160,774	126,395	108%	99%	85%	67%	174,730	189,608	189,608	189,608
Aug 16 - Sept 30	2010	260,612	246,868	218,187	166,911	137%	130%	115%	88%	118,604	132,348	161,029	189,608
Aug 16 - Sept 30	2011	349,421	326,406	310,900	247,169	184%	172%	164%	130%	29,795	52,810	68,316	132,047
Aug 16 - Sept 30	2012	213,292	198,612	184,701	145,504	112%	105%	97%	77%	165,924	180,604	189,608	189,608
Aug 16 - Sept 30	2013	396,801	313,050	278,762	210,948	209%	165%	147%	111%		66,166	100,454	168,268
Aug 16 - Sept 30	2014	132,458	132,458	127,395	114,937	70%	70%	67%	61%	189,608	189,608	189,608	189,608
Aug 16 - Sept 30	2015	142,881	137,615	129,351	90,711	75%	73%	68%	48%	189,608	189,608	189,608	189,608
Aug 16 - Sept 30	2016	168,236	168,236	165,769	156,700	89%	89%	87%	83%	189,608	189,608	189,608	189,608
Aug 16 - Sept 30	2017	114,667	114,667	110,461	97,184	60%	60%	58%	51%	189,608	189,608	189,608	189,608

Table 8. Economic impacts associated with commercial southern flounder fishing in North Carolina from 2008-2017. Data below represent the actual effort data from southern flounder harvest, along with the estimated economic impacts to the state of North Carolina using IMPLAN statistical software. Data from the 2016 NOAA Fisheries Economics of the U.S. report, along with internal division survey data, are also used to generate estimates. Note: impact estimates across categories are not additive.

Year	Pounds Landed	Ex-vessel Value	Participants	Estimated Sales Impact	Estimated Income Impacts	Estimated Employment Impact	Estimated Value Added Impact
2008	2,602,390	$ 5,650,295	1,235	$ 25,473,137	$ 10,483,954	1,544	$ 19,654,727
2009	2,396,240	$ 4,609,932	1,299	$ 20,547,716	$ 8,550,927	1,545	$ 16,161,407
2010	1,689,557	$ 3,695,889	1,182	$ 15,743,327	$ 6,531,811	1,380	$ 12,223,365
2011	1,247,450	$ 2,753,128	1,039	$ 11,771,643	$ 4,884,958	1,186	$ 9,140,235
2012	1,646,137	$ 4,451,482	1,202	$ 18,795,084	$ 7,827,308	1,440	$ 14,613,360
2013	2,186,391	$ 5,673,190	1,286	$ 23,172,478	$ 9,654,261	1,591	$ 17,977,144
2014	1,673,511	$ 4,839,672	1,222	$ 19,547,618	$ 8,134,986	1,482	$ 15,109,459
2015	1,202,885	$ 3,823,567	1,029	$ 15,852,258	$ 6,621,987	1,235	$ 12,379,619
2016	897,765	$ 3,610,533	945	$ 10,724,064	$ 6,301,409	1,129	$ 11,716,727
2017	1,394,617	$ 5,655,751	1,048	$ 20,489,984	$ 9,494,322	1,335	$ 17,676,161
Average	1,693,694	$ 4,476,342	1,149	$ 18,211,731	$ 7,848,592	1,387	$ 14,665,220

Table 9. Ex-vessel value of the commercial southern flounder fishery by year and gear.

	Gear				
Year	**Gigs**	**Gill Net**	**Other**	**Pound Net**	**Total**
2008	$ 173,360.40	$ 3,798,463.23	$ 132,612.99	$ 1,545,858.19	$ 5,650,294.81
2009	$ 159,031.29	$ 3,160,714.37	$ 116,727.33	$ 1,173,458.93	$ 4,609,931.91
2010	$ 267,481.76	$ 2,067,067.19	$ 66,800.66	$ 1,294,539.05	$ 3,695,888.65
2011	$ 256,846.25	$ 1,397,565.13	$ 34,239.01	$ 1,064,477.33	$ 2,753,127.72
2012	$ 388,313.40	$ 2,343,199.01	$ 126,800.50	$ 1,593,169.23	$ 4,451,482.14
2013	$ 320,379.72	$ 2,742,686.75	$ 114,816.10	$ 2,495,307.19	$ 5,673,189.76
2014	$ 414,205.88	$ 1,884,626.34	$ 53,262.79	$ 2,487,576.97	$ 4,839,671.98
2015	$ 417,188.88	$ 1,235,835.53	$ 38,535.39	$ 2,132,006.71	$ 3,823,566.52
2016	$ 506,533.39	$ 1,442,921.16	$ 42,422.91	$ 1,618,655.33	$ 3,610,532.80
2017	$ 547,308.32	$ 2,220,594.81	$ 32,975.26	$ 2,854,872.71	$ 5,655,751.10
Total	**$ 3,450,649.29**	**$ 22,293,673.52**	**$ 759,192.93**	**$ 18,259,921.64**	**$ 44,763,437.39**

Table 10. Economic impacts associated with recreational southern flounder fishing in North Carolina from 2008-2017. Impacts are generated using IMPLAN statistical software and division recreational survey data. Trips are defined as a fishing trip for which any flounder is the primary or secondary target, or southern flounder was caught during that trip. All job impacts represent both part- and full-time jobs. Note: Impact estimates across categories are not additive.

Year	Estimated Total Flounder Trips	Trip Expenditures	Estimated Sales Impact	Estimated Income Impact	Estimated Employment Impact	Estimated Value-Added Impact
2008	2,701,930	$ 403,612,123	$ 376,417,686	$ 135,957,566	3,292	$ 205,722,681
2009	1,482,500	$ 215,695,683	$ 200,699,372	$ 72,448,738	1,770	$ 109,870,023
2010	1,877,504	$ 280,546,465	$ 262,481,379	$ 95,039,325	2,312	$ 143,569,612
2011	1,796,204	$ 283,056,149	$ 250,861,698	$ 90,609,485	2,212	$ 137,255,698
2012	1,744,458	$ 277,772,559	$ 244,156,371	$ 88,393,860	2,159	$ 133,589,470
2013	1,707,904	$ 273,226,860	$ 238,202,597	$ 86,449,024	2,105	$ 130,332,132
2014	1,639,593	$ 269,763,604	$ 229,373,566	$ 83,466,334	2,027	$ 125,444,042
2015	1,708,499	$ 279,669,886	$ 228,724,518	$ 83,228,735	2,037	$ 125,250,995
2016	1,714,200	$ 279,905,674	$ 232,116,853	$ 84,789,195	2,079	$ 127,093,283
2017	1,250,216	$ 210,976,279	$ 171,358,430	$ 62,652,077	1,532	$ 93,793,106
Average	1,762,301	$ 77,422,528	$ 243,439,247	$ 88,303,434	2,153	$ 133,192,104

ESTUARINE STRIPED BASS FMP

ESTUARINE STRIPED BASS FMP AMENDMENT 2 MEMO

ESTUARINE STRIPED BASS FMP AMENDMENT 2 SCOPING DOCUMENT

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

JOHN G. BATHERSON
Acting Director

Jan. 29, 2021

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Charlton H. Godwin and M. Todd Mathes, Striped Bass FMP Co-Leads
Fisheries Management Section

SUBJECT: Striped Bass Fishery Management Plan Amendment 2

Issue
Review the draft Goal and Objectives for Amendment 2 to the N.C. Estuarine Striped Bass Fishery Management Plan (FMP) and discuss the management strategies to be considered during development of Amendment 2.

Actions Needed
I. Vote on approval of N.C. Estuarine Striped Bass FMP Amendment 2 goal and objectives.
II. Discuss and provide input on potential management strategies to be considered during development of Amendment 2.

Background
The division with Wildlife Resource Commission (WRC) staff are continuing development of Amendment 2 to the N.C. Estuarine Striped Bass FMP. Results from the 2020 benchmark stock assessment indicate the Albemarle-Roanoke striped bass stock is overfished and overfishing is occurring in the terminal year of the assessment (2017). In response, the November 2020 Revision to Amendment 1 to the N.C. Estuarine Striped Bass FMP implemented adaptive management measures to immediately address overfishing by reducing the Total Allowable Landings (TAL) to 51,216 pounds. Management actions for the Albemarle-Roanoke stock in Amendment 2 will focus on ending overfishing and rebuilding the spawning stock biomass to provide sustainable harvest. There is no stock status determination for the Central Southern Management Area (CSMA), comprised of the Tar-Pamlico, Neuse, and Cape Fear rivers. Continuous stocking efforts and lack of natural recruitment in these systems prevented the use of traditional stock assessment techniques.

I. Goal and Objectives:
The next step in the FMP process is for the Marine Fisheries Commission (MFC) to vote on approval of the goal and objectives. The draft of the goal and objectives are as follows:

Goal:
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.

Objectives:

- 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.

II. Potential Management Strategies

The PDT has identified potential management strategies, and associated management measures for the two estuarine striped bass stocks which are listed below. A scoping period was held to solicit public input about these management strategies and any additional strategies suggested by the public. Identifying strategies during scoping allows the PDT adequate time to fully analyze and develop management measures during the drafting of an Amendment. The division is now seeking input from the commission on the management strategies to be

Estuarine Striped Bass FMP Amendment 2 Management Strategies

Sustainable Harvest		Hook and Line as Legal Commercial Gear
Albemarle-Roanoke Stock	**CSMA Stocks^**	**Both N.C. Stocks**
• Manage with Total Allowable Landings (TAL) • Adjust TAL based on stock assessments • Quota monitoring • Seasons and areas • Size limit changes • Gear modifications/limits • Bag/trip limits • Adaptive management • Stocking	• Adaptive management (recovery metrics) **No-Possession Provision Continued:** • Gear modifications/limits • Stocking **No-Possession Provision NOT Continued:** • Manage with TAL • Quota monitoring • Seasons and areas • Size limit changes • Gear modifications/limits • Bag/trip limits • Stocking	• Participation • Gear modifications/limits • Adaptive management

^ Separate management strategies are being developed for the: 1) Tar-Pamlico/Neuse and 2) Cape Fear systems.

considered during development of Amendment 2. Further explanation of these management strategies, as well as the proposed timeline for Amendment 2 can be found in the Amendment 2 Scoping Document.

Scoping Period

The division held its public scoping period for Amendment 2 from Nov. 2 through Nov. 15, 2020. The scoping period is an opportunity for the division to notify the public that development of Amendment 2 to the N.C. Estuarine Striped Bass FMP is underway, to seek public input of proposed management strategies and to help identify additional potential management strategies.

In addition to accepting comments through an online questionnaire and U.S. mail, the division held two virtual scoping meetings where the public could participate online or by telephone. The division received three comments from attendees during the meetings, two comments through U.S. mail, and 20 online comments. Comments were primarily focused on one or more of the management measures under the sustainable harvest management strategy for each system. No additional potential management strategies were identified.

Scoping Document

Photo By: Buzz Bryson

Striped bass spawning in the Roanoke River, Weldon, NC

Management Strategies for

Amendment 2 to the North Carolina Estuarine Striped Bass Fishery Management Plan

October 2020

Photo By: Jesse Bissette

The N.C. Division of Marine Fisheries seeks your input on management strategies for the Estuarine Striped Bass Fishery Management Plan.

A scoping period for public comment begins Nov. 2, 2020 and ends Nov. 15, 2020.

Comments must be received by 5 p.m. (EST) on Nov. 15, 2020.

Can't attend but want to submit comments? Here's how!

Written comments can be submitted by online form or by U.S. mail. Comments sent by U.S. mail must be received by Nov. 15, 2020 to be accepted. The division will not accept public comment through email.

To comment by online form:

The online form can be accessed through the N.C. Estuarine Striped Bass Amendment 2 Information Page (http://portal.ncdenr.org/web/mf/striped-bass-amendment-topic). Please use the link at the bottom of the information page.

To comment by U.S. mail, please submit written comments to:

N.C. Division of Marine Fisheries
N.C. Estuarine Striped Bass
FMP Amendment 2
Scoping Comments
P.O. Box 769
Morehead City, NC 28557

Scoping Meetings

DMF staff will provide information about Amendment 2 to the N.C. Estuarine Striped Bass FMP. A public comment period will follow.

The public may participate in the meeting online or by telephone. To facilitate comments, the division is asking those who wish to speak during the meeting to pre-register.

Links to scoping information, including registration to speak, webinar instructions, the call-in telephone number, and other references, can be found through the N.C. Estuarine Striped Bass Amendment 2 Information Page (http://portal.ncdenr.org/web/mf/striped-bass-amendment-topic).

Thursday, Nov. 5, 2020: 6 p.m. to 8 p.m.

https://ncdenrits.webex.com/ncdenrits/onstage/g.php?MTID=e4fc435aebfcdedafed56b82e7def8173

Event number 171 493 2224

Event password 1234

Join by audio only +1-415-655-0003 US TOLL

Monday, Nov. 9, 2020: 6 p.m. to 8 p.m.

https://ncdenrits.webex.com/ncdenrits/onstage/g.php?MTID=ebedeb5306d80ed62d46c9b0db81f9783

Event number 171 937 9432

Event password 1234

Join by audio only +1-415-655-0003 US TOLL

Questions about the estuarine striped bass stocks, fisheries, or Amendment 2 to the North Carolina Estuarine Striped Bass Fishery Management Plan?


Pictured: Brent Griffin

Contact the leads:

Charlton Godwin

Fisheries Biologist DMF, Elizabeth City

252-264-3911

Co-lead

Todd Mathes

Fisheries Biologist DMF, Washington

252-948-3872

Co-lead

Jeremy McCargo

Fisheries Biologist WRC, Raleigh

919-707-4081

Questions about the FMP Process?

Kathy Rawls

Fisheries Management Section Chief, Morehead City

252-808-8074

Corrin Flora

Fisheries Management Plan Coordinator, Morehead City

252-726-7021

Purpose of the Scoping Document

The purpose of this document is to inform the public the review of the N.C. Estuarine Striped Bass Fishery Management Plan (FMP) is underway and to provide an opportunity for the public to comment on identified management strategies or identify other relevant strategies in the management of the estuarine striped bass fishery. Striped bass in North Carolina are jointly-managed by the N.C. Marine Fisheries Commission (MFC) and N.C. Wildlife Resources Commission (WRC). Input received at the start of the FMP review process may shape the final amendment and its management measures (solutions). To help focus the input received from the public, this document provides an overview of initially identified strategies, as well as background information on the fisheries and the stocks. A series of questions about each strategy is also provided for the public to consider when thinking about the strategies; in general: What should estuarine striped bass management be? Are changes needed and, if so, what changes are needed?

Additional management strategies may be considered in Amendment 2 dependent on statutory requirements, available data, research needs, and the degree of impact the management strategy would have and how effective the solution would be. If the division determines a management strategy raised during the scoping period might have positive impacts on the stocks, additional examination of the strategy may be undertaken in the development of the FMP.

Scoping provides an opportunity for the public to comment on strategies identified by the division as well as any additional relevant strategies for possible consideration for the development of the FMP.

What is Scoping?

Scoping is the first stage of the process to determine the appropriate contents of an FMP. Scoping serves many purposes including: (1) to provide notice to the public that a formal review of the FMP is underway by the N.C. Division of Marine Fisheries (DMF or division), (2) inform the public of the stock status of the species (3) solicit stakeholder input on a list of strategies identified by the DMF and identify other relevant strategies that may need to be addressed, and (4) recruit potential advisors to serve on the advisory committee (AC) for the FMP that is appointed by the MFC. The public will have more opportunity to provide comments as the amendment is developed; however, scoping is the first and best opportunity to provide input on potential strategies for DMF to consider before an amendment is developed.

FISHERY MANAGEMENT PLANS - A TIERED APPROACH

Fishery Management

Management PLANS are implemented to achieve specified management goals for a fishery, such as sustainable harvest, and include background information, data analyses, fishery habitat and water quality considerations consistent with Coastal Habitat Protection Plans, research recommendations, and management strategies.

Management STRATEGIES are adopted to help reach the goal and objectives of the plan. They are the sum of all the management measures selected to achieve the biological, ecological, economic, and social objectives of the fishery.

Management MEASURES are the actions implemented to help control the fishery as stipulated in the management strategies.

Developing an amendment

WRC electrofishing spawning stock survey index of abundance Roanoke River, Weldon, NC.

Annually, the DMF reviews all species for which there are FMPs for North Carolina and provides an update to the MFC. This review indudes any recommended changes to the schedule for FMP review and amendment development. Per N.C. law, any changes to the schedule must be approved by the N.C. Department of Environmental Quality (N.C. DEQ) Secretary.

When a plan is opened for review, the first step of the formal amendment process begins with a stock assessment of the species when applicable, followed by the scoping period. After relevant strategies have been identified by the DMF, the public (during the scoping period), and by the MFC, the division's plan development team (PDT) develops a preliminary draft amendment. The first draft will be completed before the FMP AC is appointed. Once appointed, the AC will meet with the PDT at a series of workshops to assist in developing the FMP by further refining the draft amendment. Upon completion of this draft, the amendment is taken to the MFC for approval to go out for public comment and review by the MFC's standing and regional ACs. Following consideration of public and AC comment, the MFC selects its preferred management measures for Amendment 2. Next, draft Amendment 2 goes to the N.C. DEQ Secretary and the legislature for review before the MFC votes on final approval of the amendment.

In the case of a jointly managed species such as striped bass, the WRC consults throughout the FMP amendment process. WRC staff participate in the development of the stock assessment and serve on the PDT. Concurrent with MFC actions, the WRC board reviews the draft FMP, selects preferred management measures, considers its support of the final FMP recommendations, and initiates rulemaking as required.

FMP Timeline

We are here

- Public scoping meetings
- DMF prepares draft Amendment 2
- FMP AC and DMF work together to further develop Amendment 2
- DMF selects initial management recommendations
- MFC votes to send draft FMP for public and AC review
- Public comment and AC meetings for review of draft Amendment 2
- MFC selects preferred management options
- N.C. DEQ Secretary and legislature review draft FMP

Summer 2022

- MFC votes on final adoption of Amendment 2

Why is this happening now?

The 2020 N.C. FMP Review Schedule shows the review of the N.C. Estuarine Striped Bass FMP is underway. To begin the development of Amendment 2 to the N.C. Estuarine Striped Bass FMP, the division conducted assessments of the Albemarle-Roanoke striped bass stock, and the striped bass stocks in the Tar-Pamlico, Neuse, and Cape Fear rivers.

Pictured: Adam B.
Cape Fear River, N.C.

Amendment 2 Background

There are two geographic management units and four striped bass stocks included in the North Carolina Estuarine Striped Bass FMP. The northern management unit is comprised of two harvest management areas: the Albemarle Sound Management Area (ASMA) and the Roanoke River Management Area (RRMA). The striped bass stock in these two harvest management areas is referred to as the Albemarle-Roanoke (A-R) stock, and its spawning grounds are in the Roanoke River in the vicinity of Weldon, NC. The southern geographic management unit is the Central Southern Management Area (CSMA) and includes all internal coastal, joint and contiguous inland waters of North Carolina south of the ASMA to the South Carolina state line. There are spawning stocks in each of the major river systems within the CSMA; the Tar-Pamlico, the Neuse, and the Cape Fear. Only the A-R stock is included in the management unit of Amendment 6 to the Atlantic States Marine Fisheries Commission's (ASMFC) Interstate FMP for Atlantic Striped Bass (ASMFC 2003).

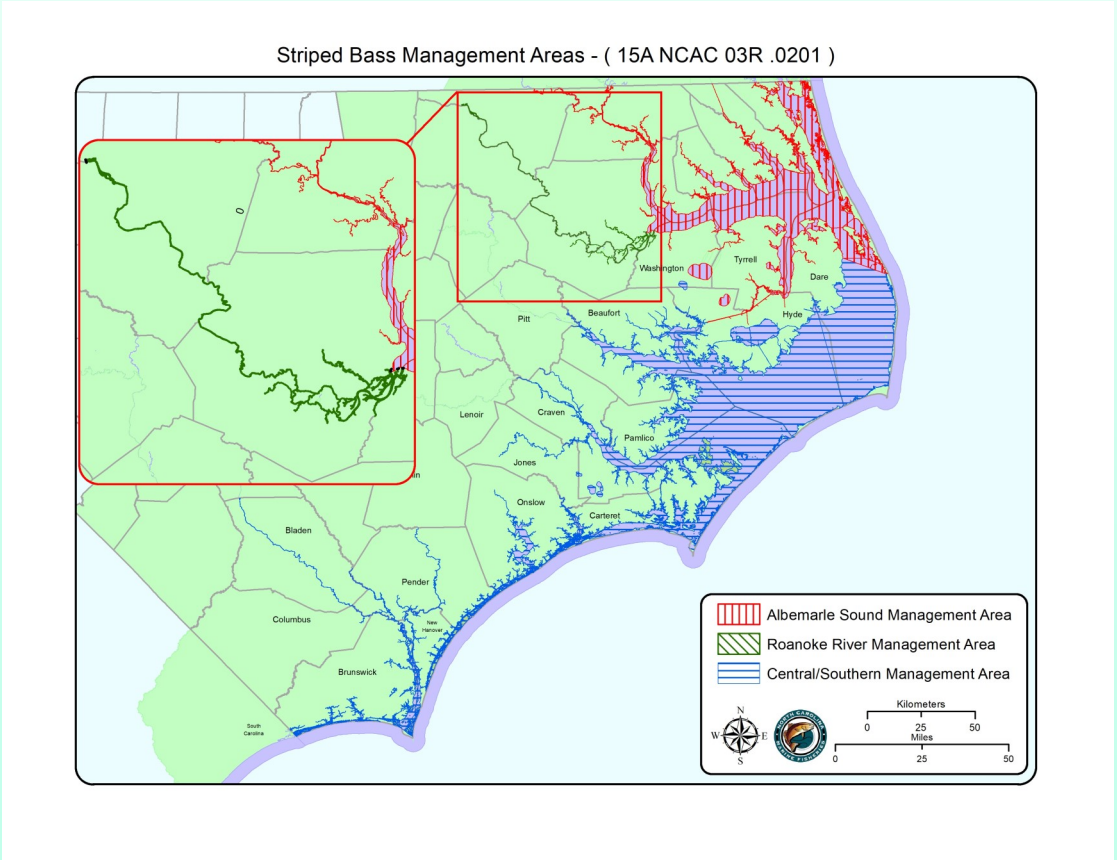


Figure 1. North Carolina's estuarine striped bass management areas.

Albemarle-Roanoke striped bass stock assessment and stock status

Results from the 2020 benchmark stock assessment indicate the A-R striped bass stock is overfished and overfishing is occurring in the terminal year of the assessment (2017) relative to the updated biological reference points (BRPs). These BRPs are based on spawning stock biomass (SSB) targets and thresholds of $SSB_{45\%SPR\ Target}$ = 350,371 lb and $SSB_{35\%SPR\ Threshold}$ = 267,390 lb respectively, and fishing mortality (F) targets and thresholds of $F_{45\%SPR\ Target}$ = 0.13 and $F_{35\%SPR\ Threshold}$ = 0.18 (Figures 2 and 3; Lee et al. 2020).

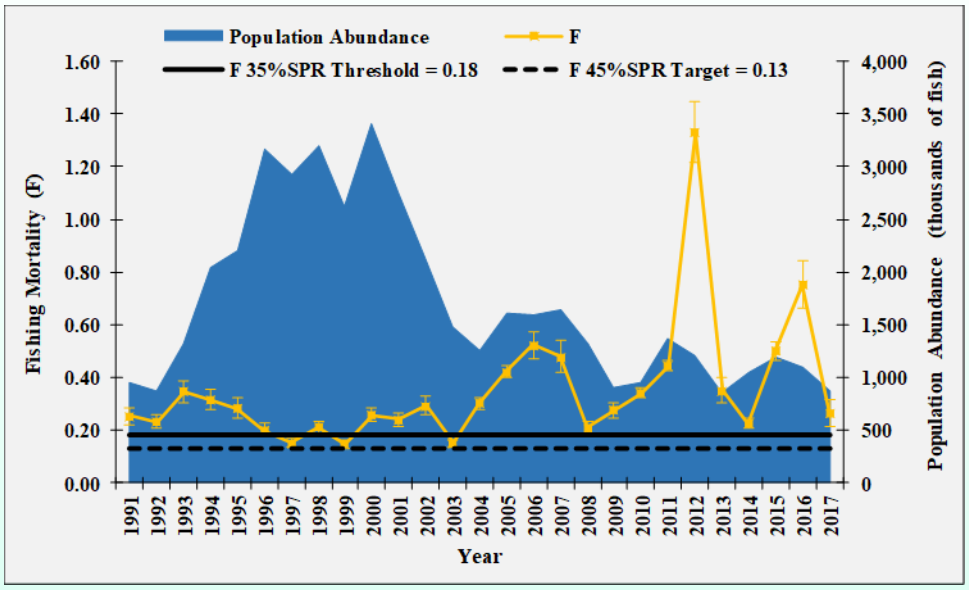


Figure 2. Estimates of fishing mortality (F) and population abundance for the Albemarle-Roanoke striped bass stock, 1991–2017. Source: Lee et al. 2020.

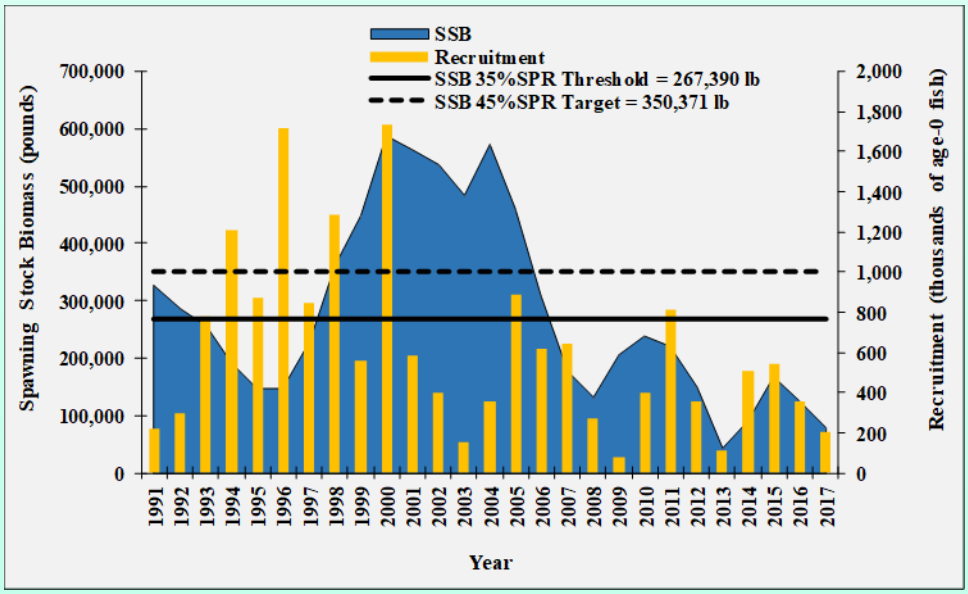


Figure 3. Estimates of spawning stock biomass (SSB) and recruitment of age-0 fish coming into the population each year for the Albemarle-Roanoke striped bass stock, 1991–2017. Source: Lee et al. 2020.

Albemarle-Roanoke Striped Bass in North Carolina

A-R striped bass have long supported recreational and commercial fisheries in the Albemarle Sound region and its tributaries and the northern Outer Banks. Commercial harvest of striped bass occurs throughout the fall and winter into the early spring. Since 1991 gill-nets are the main commercial harvest gear with minimal harvest also from pound nets. Recreational striped bass fishing occurs throughout the year, with harvest seasons allowed in the fall and winter and through the spring as striped bass migrate to the spawning grounds. During the late spring and summer, catch-and-release fishing is also popular.

Recreational anglers, Albemarle Sound bridge. Photo credit: DMF staff
Pictured: K.D. and Kenny Hewitt

Harvest has been controlled by a fixed annual poundage amount known as total allowable landings (TAL) since 1991. The TAL is split evenly between commercial and recreational sectors, and the recreational TAL is further divided evenly between the ASMA and RRMA (Figure 4). Since the last TAL increase to 550,000 lb in 2003, combined landings from all fisheries in the ASMA and RRMA have not exceeded 460,853 lb and have averaged 235,278 lb per year with a low of 108,432 lb in 2013. The commercial sector did not reach their TAL in any years from 2005 to 2013. Even with the 2014 reduction in the TAL to 275,000 lb the commercial and recreational sectors in the ASMA did not reach the TAL for years 2014–2017. Harvest in all sectors has increased since 2017, with the commercial sector reaching the TAL in 2019 causing the DMF to close the fall commercial harvest season before December 31 for the first time since 2010. This increase in harvest is likely due to the above-average year classes produced in 2014 and 2015 (Figures 3 and 4).

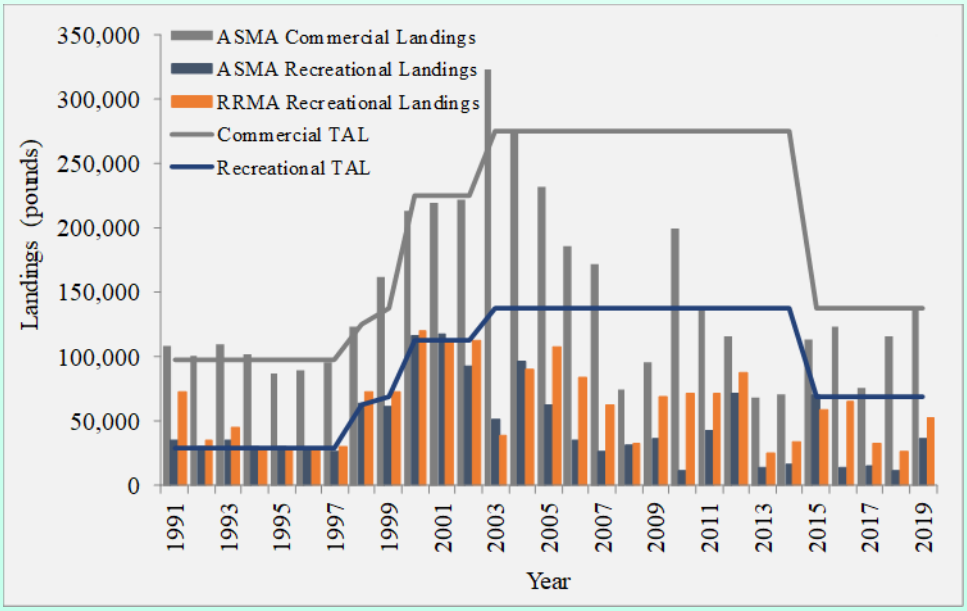


Figure 4. Striped bass landings from the Albemarle Sound Management Area commercial and recreational sectors and Roanoke River Management Area recreational sector, and the commercial and recreational total allowable landings, 1991–2019.

Pictured: Kaden

Based on results from the estimates of total abundance from the stock assessment (Figure 2), the reason for the decline in harvest is likely a decline in overall stock abundance due to poor recruitment starting in 2001 (Figure 3). The assessment noted the importance of river flow on recruitment and noted declining recruitment in the time series does not appear to result solely from reduced abundance due to amount harvested, as recruitment started declining when SSB was at high levels (Figure 3; Lee et. al 2020).

Average total removals in the fisheries (sector combined) during 2012–2017 were composed of 84% landings, with dead discards equaling 16% in numbers of fish (Figure 5). Discards in the ASMA commercial fishery from 2012 to 2017 were estimated using a generalized linear model framework based on on-board observer data combined with data from the DMF Trip Ticket Program. Discards in the recreational fishery are estimated by multiplying the number of fish released by a delayed mortality estimate of 6.4% (Nelson 1998).

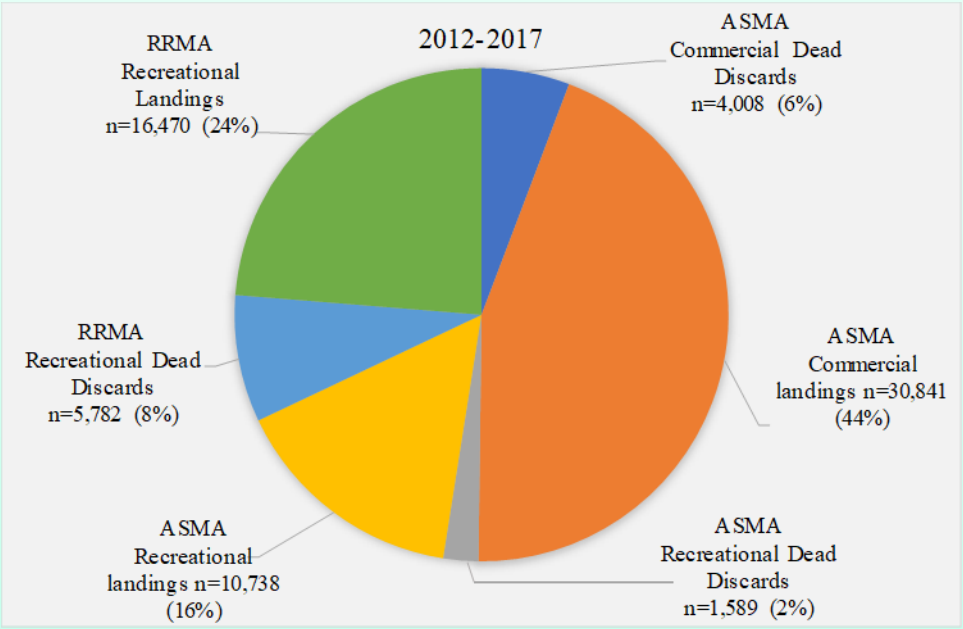


Figure 5. Average number of striped bass landed and discarded from the commercial and recreational fisheries in the Albemarle Sound Management Area (ASMA) and Roanoke River Management Area (RRMA), 2012-2017. Source: Lee et al. 2020.

Tar-Pamlico, Neuse, and Cape Fear river striped bass stocks review

There is no stock status determination for the CSMA striped bass stocks, comprised of the Tar-Pamlico, Neuse, and Cape Fear rivers. Continuous stocking efforts since 1980 and lack of natural recruitment in these waters prevent the use of traditional stock assessment techniques. The Central Southern Management Area Stock Report (Mathes et al. 2020) is a documentation of all data collected, management efforts, and major analyses completed for these river stocks.

Juvenile striped bass tagged for stocking into the Tar-Pamlico River
Photo By: Corrin Flora

Striped Bass Larvae
Photo By: Robert Michelson, Coastal Review Online

The report also serves as a record of completed research efforts with implications for fishery management and as a guide for future research based on results and identified data gaps. It evaluates the likelihood of successful population rebuilding under various simulations of stocking and fishery management strategies such as different harvest levels and size limits. Tagging studies in the Cape Fear River showed a consistent decline in striped bass abundance estimates from 2012 to 2018 despite a no-possession regulation since 2008. The need for continued conservation to achieve a sustainable harvest is supported by the lack of recruitment, constrained size and age distributions, low abundance, the absence of older fish in all stocks, and the high percentage of stocked fish in the population (Cushman et al. 2018; Farrae and Darden 2018).

Tar-Pamlico, Neuse, and Cape Fear river striped bass in North Carolina

Striped bass have long supported recreational and commercial fisheries in the CSMA region and its tributaries. Since 2004 commercial landings in the CSMA have only been allowed in the spring of the year and have been constrained by an annual TAL of 25,000 pounds established in 1994. Over the past 10 years, landings have closely followed the annual TAL due to daily quota monitoring that allows the season to be closed each year when the TAL is reached, except for 2008 when less than half of the TAL was landed and the season stayed open through April 30. Since 2004 striped bass commercial landings in the CSMA have averaged 24,179 pounds and ranged from a low of 10,115 pounds in 2008 to a high of 32,479 pounds in 2004 (Figure 6).

Within the CSMA recreational harvest occurs in the fall and spring and there is a significant recreational catch-and-release fishery throughout the year. Since 2004 striped bass recreational landings have averaged 13,511 pounds but in 2016 and 2017 recreational harvest increased to just over 25,000 lb each year (Figure 6).

From 2012 to 2017 total removals in the commercial and recreational fisheries were composed of 73% landings and 27% dead discards (Figure 7). Discards in the CSMA commercial fishery from 2012 to 2017 were estimated using a generalized linear model framework using on-board observer data combined with data from the DMF trip ticket program. Discards in the recreational fishery are estimated by multiplying the number of fish released by a delayed mortality estimate of 6.4% (Nelson 1998).

Pictured: DMF Staff. Roanoke River, Weldon, NC

There has been a commercial and recreational no-possession provision in the Cape Fear River since 2008. At the MFC's February 2019 business meeting, Supplement A to Amendment 1 to the North Carolina Estuarine Striped Bass FMP was approved instituting a recreational and commercial no-possession provision in the CSMA. On March 13, 2019, the MFC held an emergency meeting at which time they passed a motion requiring the Director to issue a proclamation prohibiting the use of all gill-nets upstream of the ferry lines from the Bayview Ferry to Aurora Ferry on the Pamlico River and the Minnesott Beach Ferry to Cherry Branch Ferry on the Neuse River.

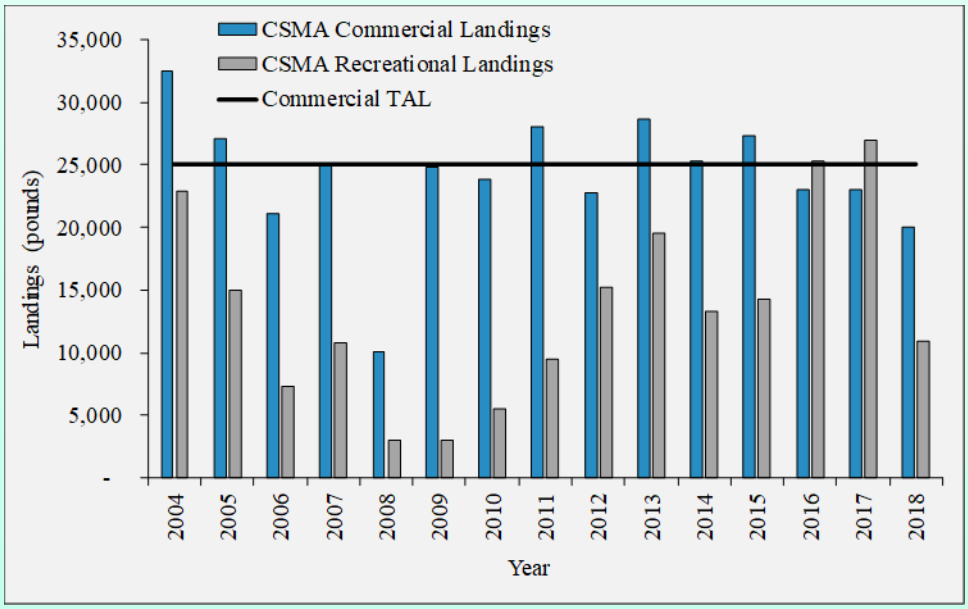


Figure 6. Striped bass landings from the Central Southern Management Area (CSMA) commercial and recreational sectors and the commercial total allowable landings (TAL), 2004–2018. Commercial landings were included for the Cape Fear River for 2004–2008. Recreational landings include the Tar-Pamlico and Neuse rivers only.

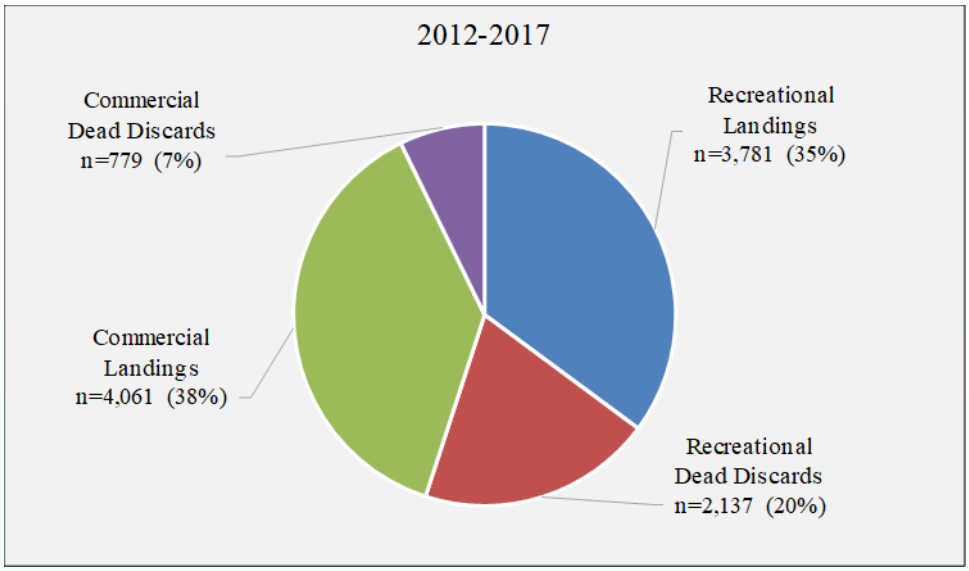


Figure 7. Average number of striped bass landed and discarded from the commercial and recreational fisheries in the Tar-Pamlico and Neuse rivers, 2012–2017.

Habitat and Fish Stocks

With the important relationship between habitat and fish populations, the goal to protect and enhance habitats supporting coastal fisheries comes from the implementation of the Coastal Habitat Protection Plans (NCDEQ. 2016; CHPP, G.S. 143B-279.8). While much of the concern over declining fish stocks has been directed at overfishing, habitat loss and water quality degradation make a stock more susceptible to decline and may hinder stock recovery efforts. The CHPP is undergoing its mandated five-year review, with adoption planned for summer 2021. One of the priority issues, "Submerged Aquatic Vegetation (SAV) Protection and Restoration, with Focus on Water Quality Improvements" has implications for North Carolina striped bass stocks. SAV is especially sensitive to water quality impairment from nutrient and sediment pollution and has been considered a "coastal canary", serving as a valuable bio-indicator of the overall health of coastal ecosystems (Stevenson, 1998). The primary mechanism to restore and sustain SAV is by improving water quality. The CHPP strategy for SAV involves modifying water quality criteria, such as chlorophyll a levels and nutrient standards to reduce nutrient loading, allowing increased light penetration that is critical for submerged vegetation. This will not only benefit SAV but address the algal blooms in the Albemarle Sound area and other poor water quality impacts to fish like striped bass. It is imperative the fishing community actively participate in the ongoing CHPP review and add their voice to support the actions outlined in the CHPP.

Algae Bloom, Chowan River, Bertie County. Photo By: DMF Staff

Amendment 2 Management Strategies

Albemarle-Roanoke Striped Bass Stock Sustainable Harvest:

Background

Although this document is specific to the ongoing development of Amendment 2 to the N.C. Estuarine Striped Bass FMP, it is important to note under the existing Amendment 1 there is adaptive management language that states, "Should the target F be exceeded, then restrictive measures will be imposed to reduce F to the target level" (NCDMF 2013). Actions authorized in Amendment 1 are being considered to lower F to address sustainable harvest in the interim as Amendment 2 is completed. This action maintains compliance with Amendment 1 to the North Carolina Estuarine Striped Bass FMP and ASMFC's Addendum IV to Amendment 6 to the Interstate FMP for Atlantic Striped Bass while the Amendment 2 sustainable harvest management strategy is developed.

Amendment 2 will focus on development of management strategies that address both the overfished and overfishing status of the A-R stock relative to the Fisheries Reform Act (FRA) of 1997, which states each plan "shall specify a time period, not to exceed two years from the date of the adoption of the plan, for ending overfishing…" and "specify a time period, not to exceed 10 years from the date of adoption of the plan, for achieving a sustainable harvest". Projections from the terminal year of the stock assessment that model how SSB responds in the coming years to various levels of harvest are used to calculate a new TAL that will accomplish the dual mandate of the FRA. As shown in Figure 8, the actual level of recruitment occurring in future years is an important factor in the level of expected increase in SSB. Projections use multiple levels of recruitment to inform managers of the uncertainty associated with assumptions about future stock recruitment and the related increases in SSB.

Pictured: Jennifer Lewis

Tagging on the spawning grounds
Roanoke River, Weldon NC. DMF staff

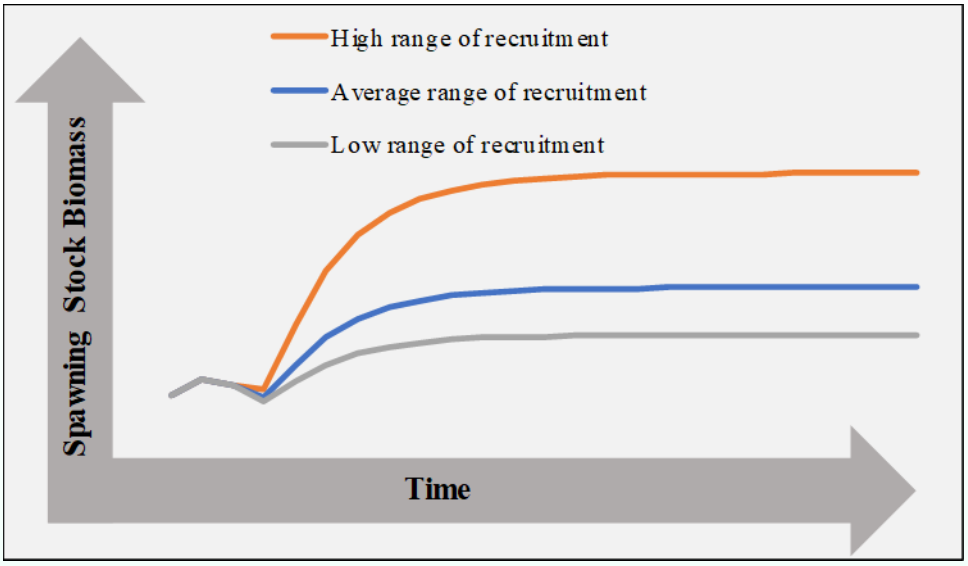


Figure 8. A graphical illustration of how assumptions about the level of future recruitment impacts stock projections of spawning stock biomass (SSB).

The necessary management measures currently in place in Amendment 1 to manage a TAL and prevent harvest from exceeding it each year include:

- adjust the TAL based on benchmark stock assessments and assessment updates
- daily quota monitoring of commercial harvest
- weekly quota monitoring of recreational harvest
- open and/or close harvest seasons to remain below the TAL
- authorize or restrict fishing methods and gear
- limit size, quantitates taken or possessed (i.e., daily recreational creel limits and commercial limits)
- restrict fishing areas

Striped bass being tagged with commercial harvest tags
Frog Island fish house Weeksville, NC
Photo By: Chris Kelly

Pictured: Shane

Questions for the Public

- Which of the existing management measures do you support to maintain harvest within limits of the specified TAL?
- In the event of a low TAL that restricts the regular harvest seasons, would you prefer a short season of consecutive harvest days or slightly longer season with only selected harvest days each week? Which harvest days would you prefer?
- Do you support investigating size limit changes for A-R striped bass?
- What recreational and/or commercial gear or area restrictions would you support to reduce discard mortality to rebuild the A-R stock?

Tar-Pamlico, Neuse, and Cape Fear rivers striped bass stocks:

Sustainable Harvest:

Background

There has been a commercial and recreational no-possession provision in the Cape Fear River and its tributaries since 2008. This no-possession measure was implemented to help support specific goals of Amendment 1, which are to achieve sustainable harvest through science-based decision-making processes that conserves the resource. Prior to 2019, harvest in the CSMA was managed by commercial and recreational seasons, harvest and size limits, and gear restrictions, and constrained by an annual commercial TAL of 25,000 lb. Additionally, measures in Supplement A to Amendment 1 of the N.C. Estuarine Striped Bass FMP were implemented in March 2019 that implemented a no-possession provision in the commercial and recreational striped bass fisheries, as well as commercial set gill-net restrictions requiring tie-downs and distance from shore (DFS) measures to apply year-round, in the CSMA (NCDMF 2019). Supplement actions need to be contained within Amendment 2 management strategies in order to stay in effect.

Concurrent in timing but independent of the MFC's adoption of Supplement A is the MFC directed proclamation that prohibits the use of all gill-nets upstream of the ferry lines from the Bayview Ferry to Aurora Ferry on the Pamlico River and the Minnesott Beach Ferry to Cherry Branch Ferry on the Neuse River. As in this case when the commission enacted the 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 commission decision. The MFC may alter this directive at any time or as part of Amendment 2, and if they choose not to do so, the proclamation actions remain in effect.

Harvest will be allowed if the no-possession measure in Supplement A is not continued in Amendment 2, and other management strategies should be considered to rebuild the stock. Possible stocking and fishery management strategies for CSMA striped bass were evaluated using a demographic matrix model (Mathes et al. 2020). Model results indicated CSMA striped bass populations are depressed to an extent that sustainability is unlikely at any level of fishing mortality. Lack of natural reproduction in CSMA systems requires continuous stocking to maintain the populations unless environmental and biological characteristics are improved.

NCSU graduate student surgically implanting a acoustic tracking tag in a striped bass to be stocked in the Neuse river. Photo By: USFWS.

Management strategies could be implemented to expand the age structure of the population and increase abundance of older fish which, given appropriate environmental conditions, may promote natural reproduction. Some environmental conditions can be addressed through the CHPP while biological characteristics can be addressed by altering stocking strategies including consideration of stocking fish better suited to environmental conditions in the CSMA. However, if management strategies implemented through Amendment 2 are unsuccessful at achieving sustainable harvest and external factors are deemed to make establishment of sustainable striped bass populations in CSMA systems impossible, other management strategies, including returning to a hatchery-supported fishery, could be considered in future Amendments.

If the no-harvest provision in the CSMA remains in place, adaptive management could be used to determine under what conditions the fishery could re-open. For example, collecting young-of-year striped bass in juvenile sampling would indicate successful natural reproduction, decreased contribution of stocked fish could potentially indicate successful recruitment, an increase in the number of older fish would indicate expansion of the age structure of the stock, and increased abundance in the independent surveys could indicate population growth. Conversely, adaptive management could also be used as a means to reconsider management strategies if establishment of self-sustaining populations in CSMA systems is determined to be unattainable.

DMF staff conducting Independent Gill Net Index of Abundance Survey Western Albemarle Sound

Questions for the Public

No-Possession Provision – Amendment 1 (applicable to Cape Fear River) and Supplement A Management Measures

If the No-Possession Provision is Continued

- Do you support continuing the no-possession provision in the CSMA? For how long?
- If the no-possession provision remains, what gear modifications or restrictions should be considered to reduce bycatch and discards?
- Do you support continued stocking in the CSMA?

If the No-Possession Provision is Not Continued

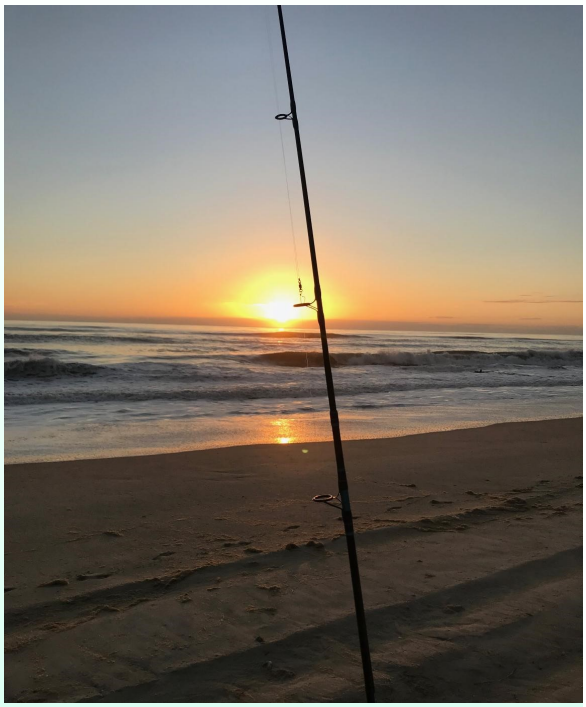
- What management measures should be considered to allow for sustainable harvest (i.e., TAL, closed and open harvest seasons, daily trip limits)?
- Do you support investigating size limit changes for CSMA striped bass?
- What gear modifications or restrictions should be considered to reduce bycatch and discards?
- Do you support continued stocking in the CSMA?

Applicable to all North Carolina's Striped Bass stocks:

Hook-and-line allowed as legal commercial gear in North Carolina's striped bass fisheries:

Background

Amendment 1 to the N.C. Estuarine Striped Bass FMP included an issue paper discussing hook-and-line as a legal commercial gear in the ASMA and CSMA commercial striped bass fisheries. The result was a recommendation by the DMF and MFC to maintain status quo with adaptive management – (Do not allow hook-and-line as commercial gear in the estuarine striped bass fishery unless the use of traditional gears is prohibited). However, through development of the Amendment 1 and discussing the issue paper, the ACs and the DMF recognized that while allowing hook-and-line as a commercial gear could potentially have some positive impacts to the striped bass resource and stakeholders, there would need to be additional discussion of how to best implement the measure. Therefore, the rule that specifically prohibited the use of hook-and-line as a commercial gear was repealed and now that gear is prohibited as a commercial gear in the striped bass fishery through proclamation. If through development of Amendment 2 the MFC votes to allow hook-and-line as a commercial gear, the tools are already in place to implement the measure.



Recreational angling, Outer Banks N.C.
Photo By: Rick Denton

Questions for the Public

- Do you support hook-and-line as a legal commercial gear in the striped bass commercial fishery?

Photo By: Mitchell Blake

Pictured: DMF Staff

Pictured: Adam B. Cape Fear River, N.C.

Questions for the Public about Potential Management Strategies

1. What management strategies already under consideration do you support for Amendment 2?

2. Are there other relevant strategies not included herein that should be consider for Amendment 2?

Additional management strategies may be considered in Amendment 2 dependent on statutory requirements, available data, research needs, and the degree of impact the management strategy would have and how effective the solution would be. If the division determines a management strategy raised during the scoping period might have positive impacts on the stocks, additional examination of the strategy may be undertaken in the development of the FMP Amendment 2.

Photo By: Adam B. Cape Fear River, N.C.

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Photo By: K. D. Hewitt

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Recreational anglers, Roanoke River, Weldon, N.C.

Scoping Document

Management Strategies for Amendment 2 to the N. C. Estuarine Striped Bass Fishery Management Plan

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SHRIMP FMP AMENDMENT 2 UPDATE

SHRIMP FMP AMENDMENT 2
MEMO

SHRIMP FMP AMENDMENT 2
GOAL AND OBJECTIVES

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

JOHN G. BATHERSON
Acting Director

January 29, 2021

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Chris Stewart, Shrimp FMP Co-lead, Fisheries Management
Jason Rock, Shrimp FMP Co-lead, Fisheries Management
Daniel Zapf, Shrimp FMP Co-lead, Fisheries Management

SUBJECT: Shrimp Fishery Management Plan Amendment 2 Update

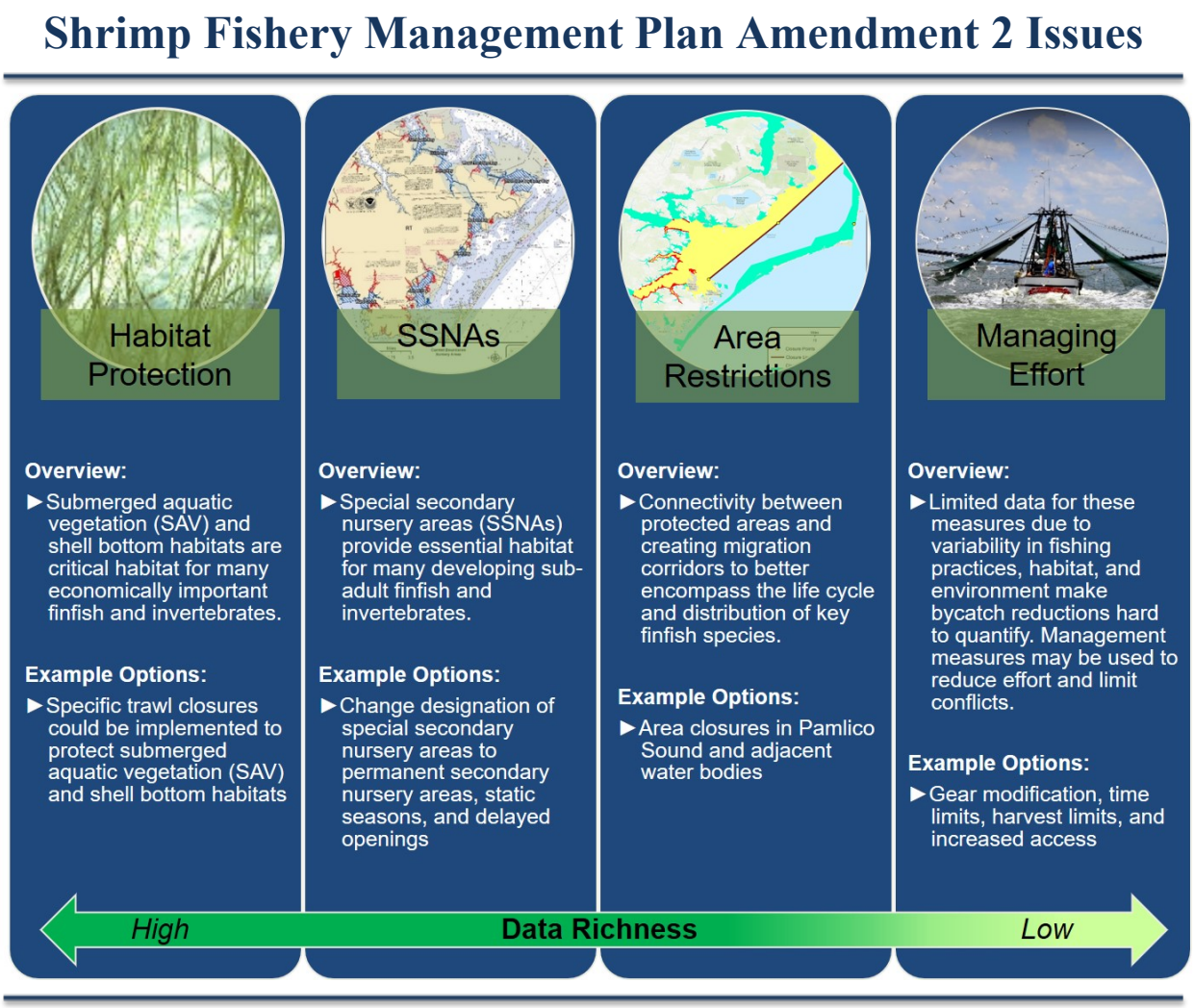
Issue
During the Feb. 2021 Marine Fisheries Commission (MFC) business meeting Division of Marine Fisheries (DMF) staff will present a progress update on the continuing development of the N.C. Shrimp Fishery Management Plan (FMP) Amendment 2 as well as next steps.

DMF staff developed four draft issue papers to address the Shrimp FMP goal and objectives approved by the MFC in February 2020. Issue papers incorporate input provided by the MFC to address concerns identified in recent petitions for rulemaking. Development will continue during the Shrimp Advisory Committee (AC) virtual workshops that are scheduled for March 2021. During the virtual workshops, the Shrimp AC will participate in discussions of and provide input to the division on the issues. Workshops provide a more informal setting for staff and AC members to collaborate in development of the amendment. These discussions allow the division to consider input from the AC, which is comprised of members representing scientific, recreational, commercial, and conservation communities, prior to sending the draft plan to the commission. The MFC will be provided a comprehensive overview of Amendment 2, including the four issue papers, during their May 2021 business meeting. At that time, the MFC will be asked to vote to send the draft FMP out for public and standing and regional advisory committee review. Commissioners are strongly encouraged to attend the AC workshops to hear detailed discussions regarding each FMP issue.

Action Needed
For informational purposes only, no action needed at this time.
The division requests the commission review, discuss, and provide feedback on the issues identified by the division in accordance with the MFC approved Amendment 2 goal and objectives.

Findings
- The issues focus on the impacts of the shrimp fishery to habitat and bycatch.
- Habitat benefits and bycatch reductions from all measures are non-quantifiable.

- Each of the issues are inter-related; management measures discussed in one issue paper are connected to measures in other issue papers and must be considered in conjunction with one another.
- Data richness, which describes the availability and quality of data used for decision making, varies across issue papers and was a key factor in developing DMF's initial discussion points.
- Generalized options within each issue paper are outlined below.



Amendment 2 Issue Papers

Management of Shrimp Trawling for Protection of Critical Habitats

- Examines submerged aquatic vegetation and shell bottom habitats and how they overlap with areas open to shrimp trawling.
- Area specific shrimp trawl closures could be implemented to protect critical habitats; focuses on internal waters from Core Sound south to the NC-SC state line.

Shrimp Management in Special Secondary Nursery Areas

- Examine ways to reduce bycatch in the 15 remaining Special Secondary Nursery Areas (SSNA). Rule changes associated with Amendment 1 are expected in Spring 2021 to change nine SSNAs to permanent Secondary Nursery Areas (SNA), which eliminates trawling in these areas.
- Static seasons with delayed openings could be implemented to reduce bycatch or the remaining SSNAs could be reclassified as SNAs eliminating all trawling in these areas.

Area Restrictions to Reduce Shrimp Trawl Bycatch in North Carolina

- Examines options to increase connectivity between protected areas to better encompass the life cycle and distribution of key economically important species.
- Focuses on Pamlico Sound and adjacent tributaries and must be considered in conjunction with recommendations from the SSNA and critical habitat issue papers which focus on areas south of Pamlico Sound.

Managing Effort and Gear Modifications in the Shrimp Fishery to Reduce Bycatch

- Examines ways to reduce bycatch by further restricting effort via gear modifications (i.e., reducing headrope), allowable fishing times (i.e., reduce days of week fished, daily fishing times, and tow times), and harvest limits as well as increasing access for non-trawl gears.
- Data limitations are apparent and management measures chosen in this paper will likely depend on measures chosen in other issue papers.

Amendment 2 Goal and Objectives

(approved at Feb. 2020 MFC business meeting)

Goal: Manage the shrimp fishery to provide adequate resource protection, optimize long-term harvest, and minimize ecosystem impacts. The following objectives will be used to achieve this goal.

1. Reduce bycatch of non-target species of finfish and crustaceans, as well as protected, threatened, and endangered species.
2. Promote the restoration, enhancement, and protection of habitat and environmental quality in a manner consistent with the CHPP.
3. Develop a strategy through the CHPP to review current nursery areas and to identify and evaluate potential areas suitable for designation.
4. Use biological, environmental, habitat, fishery, social, and economic data needed to effectively monitor and manage the shrimp fishery and its ecosystem impacts (i.e., bycatch, habitat degradation).
5. Promote implementation of research and education programs designed to improve stakeholder and the general public's understanding of shrimp trawl bycatch impacts on fish population dynamics.