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North Carolina
Spotted Seatrout
Fishery Management Plan Amendment 1

North Carolina Division of Marine Fisheries

North Carolina Department of Environmental Quality
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Disclaimer: Data in this Fishery Management Plan may have changed since publication based on updates to source documents.

ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

Spotted Seatrout are one of the most sought-after species in North Carolina's estuarine and coastal waters. Due to their temporal and spatial availability and popularity among anglers, they support an active, year-round recreational fishery. The commercial Spotted Seatrout fishery is smaller compared to the recreational fishery and primarily uses run around gill nets to target Spotted Seatrout.

The 2022 North Carolina and Virginia Spotted Seatrout stock assessment, including data through 2019, determined the stock is not overfished but overfishing is occurring. North Carolina law requires management action be taken to end overfishing within two years from the date the plan is adopted. A 19.9% reduction in harvest is required to end overfishing of the Spotted Seatrout stock. Supplement A to the Spotted Seatrout Fishery Management Plan was adopted in March 2014 and maintained measures adopted by the original Spotted Seatrout Fishery Management Plan. Supplement A management measures expire upon adoption of Amendment 1 by the N.C. Marine Fisheries Commission (NCMFC) unless they are maintained in Amendment 1.

The goal of Amendment 1 is to manage the Spotted Seatrout fishery to maintain a self-sustaining population that provides sustainable harvest based on science-based decision-making processes. The following objectives will be used to achieve this goal: implement management strategies within North Carolina that end overfishing and maintain the Spotted Seatrout spawning stock abundance and recruitment potential; promote restoration, enhancement, and protection of 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 Spotted Seatrout stock; monitor and manage the fishery in a manner that utilizes biological, socioeconomic, fishery, habitat, and environmental data; and promote outreach and interjurisdictional cooperation regarding the status and management of the Spotted Seatrout stock in North Carolina and Virginia waters, including practices that minimize bycatch and discard mortality.

To meet statutory requirements to achieve a self-sustaining Spotted Seatrout stock, sustainable harvest is addressed in Amendment 1. Quantifiable and non-quantifiable management measures are discussed for both the recreational and commercial fisheries. Non-quantifiable management measures for both fisheries in response to a cold stun, as well as information about the small mesh gill net fishery for Spotted Seatrout are also discussed. Specific management measures adopted by the NCMFC at its March 2025 business meeting are as follows:

1) Sustainable Harvest
    - Implement a recreational 14- to 20-inch slot limit with an allowance for one fish over 26 inches.
    - Implement a recreational 3-fish bag limit.
    - Implement a commercial Saturday through Sunday Spotted Seatrout harvest closure from January to September and a Saturday through Monday closure from October to December.

- Formalize the commercial stop net fishery management in the fishery management plan (Option 4.b).
- Adopt the adaptive management framework, with the caveat that adaptive management measures for sustainable harvest must be brought to the Commission for review prior to implementation.

The adopted sustainable harvest management strategy is estimated to result in an approximately 27% harvest reduction in the recreational fishery, a 30% harvest reduction in the commercial fishery, and 27% overall harvest reduction.

2) Cold Stun Management
    - Extend the harvest closure by 15 days, through June 30, following a cold stun.
    - Adopt the cold stun adaptive management framework detailed in the plan.

Additionally, the following management measures from the original FMP are carried forward into Amendment 1:

- It is unlawful to set gill nets in Joint Fishing Waters from 12:01 A.M. on Saturday to 12:01 A.M. on Monday except in Albemarle and Currituck sounds.
- It is unlawful for a commercial fishing operation to possess more than the recreational bag limit of Spotted Seatrout per person per day taken by hook-and-line.
- It is unlawful to take more than the recreational bag limit of Spotted Seatrout per person per day for recreational purposes.
- Commercial trip limit: 75 fish (excluding the stop net fishery and spotted seatrout taken by hook-and-line)

INTRODUCTION

This is Amendment 1 to the Spotted Seatrout Fishery Management Plan (FMP). FMPs are the ultimate product that brings all information and management considerations into one document. The N.C. Division of Marine Fisheries (DMF) prepares FMPs for adoption by the N.C. Marine Fisheries Commission (NCMFC) for all commercially and recreationally significant species or fisheries that comprise state marine or estuarine resources. The goal of these FMPs is to ensure long-term viability of these fisheries. By law, each FMP must be reviewed at least once every five years (G.S. 113–182.1). The DMF reviews each FMP annually and a comprehensive review is undertaken approximately every five years. The last comprehensive review of the Spotted Seatrout FMP was approved by the NCMFC in 2012. All management authority for the North Carolina Spotted Seatrout fishery is vested in the State of North Carolina. The NCMFC adopts rules and policies and implements management measures for the Spotted Seatrout fishery in Coastal and Joint Fishing Waters in accordance with G.S. 113–182.1. Until Amendment 1 is approved for management, Spotted Seatrout is managed under the Spotted Seatrout FMP (NCDMF, 2012, 2014).

Fishery Management Plan History

Original FMP Adoption:	February 2012
Amendments:	None
Revisions:	None
Supplements:	Supplement A to the 2012 FMP – February 2014
Information Updates:	None
Schedule Changes:	None
Comprehensive Review:	Five years after the adoption of Amendment 1

The original Spotted Seatrout FMP (NCDMF 2012) and Supplement A to the 2012 FMP (NCDMF 2014) are available on the DMF website.

Management Unit

The management unit includes all Spotted Seatrout within the Coastal and Joint Fishing Waters of North Carolina.

Goal and Objectives

The goal of this plan is to manage the Spotted Seatrout (*Cynoscion nebulosus*) fishery to maintain a self-sustaining population that provides sustainable harvest based on science-based decision-making processes. The following objectives will be used to achieve this goal.

1. Implement management strategies within North Carolina that end overfishing and maintain the Spotted Seatrout spawning stock abundance and recruitment potential.
2. Promote restoration, enhancement, and protection of 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 Spotted Seatrout stock.
3. Monitor and manage the fishery in a manner that utilizes biological, socioeconomic, fishery, habitat, and environmental data.
4. Promote outreach and interjurisdictional cooperation regarding the status and management of the Spotted Seatrout stock in North Carolina and Virginia waters, including practices that minimize bycatch and discard mortality. including practices that minimize bycatch and discard mortality.

DESCRIPTION OF THE STOCK

Biological Profile

Spotted Seatrout, also known as speckled trout, are an estuarine fish species that inhabit rivers, estuaries, and shallow coastal systems. Spotted Seatrout are found in coastal waters ranging from Massachusetts to southern Florida continuing throughout the Gulf of Mexico but are most abundant in the mid-Atlantic and southeastern regions of the United States. Genetic markers in North Carolina fish suggest mixing between two genetically distinct populations: one population from Georgia to the Cape Fear River, North Carolina and a another that expands north from Bogue Sound, North Carolina (Ellis et al., 2018; O'Donnell et al., 2014).

Spotted Seatrout have distinct seasonal migrations. In the winter, fish migrate to shallow estuarine habitats (Ellis, 2014). As waters warm, fish will return to oyster beds, shallow bays, and grass flats (Daniel, 1988). Although Spotted Seatrout seasonally migrate, based on tag return studies, most individuals exhibit strong site fidelity traveling less than 50 km (Music, 1981; Ellis, 2014; Moulton et al., 2017; Loeffler et al., 2019).

Spawning occurs from April to October with peak spawning occurring in May and June (Burns, 1996). Spawning generally occurs near inlets or within estuaries. Because Spotted Seatrout are batch spawners, females are capable of spawning multiple times throughout the season. Fish mature between the ages of one and three. Younger, newly matured fish may spawn every four days while fish older than three years may spawn every two days (Roumillat & Brouwer, 2004). Estimates of the number of eggs a female can produce in a year vary based on age and size but range between 3–20 million eggs per year (Nieland et al., 2002; Roumillat & Brouwer, 2004; Murphy et al., 2010). Most male Spotted Seatrout in North Carolina are mature at 7.9 inches total length (TL) and most females are mature at 9.9 inches TL. All males are mature at 12 inches and all females are mature at 15 inches.

North Carolina's state record is currently a 12.5 pound, 33.5-inch fish caught from the lower Neuse River in 2022. The annual average size of Spotted Seatrout from 1991–2021

ranged from 14.4 to 18.3 inches in North Carolina's commercial fisheries and 14.2 to 17.6 inches in the recreational fishery. Spotted Seatrout can live as long as ten years old. The oldest, otolith-based age of both male and female fish reported in North Carolina is 9 years old.

Spotted Seatrout are especially susceptible to cold stun events, times in which water temperatures drop below what the fish can survive. The effect of cold stuns on Spotted Seatrout abundance depends on the severity and duration of the event. The impact can be minimal if only sub-adults are affected, if the event is localized to a few areas, or if the event is short lived. Cold stun events can have a substantial impact if all size classes are affected, if larger areas are affected, or if the event lasts for an extended period. Interannual Spotted Seatrout abundance can be driven by cold stun events that cause large losses to the stock, which can prompt management to suspend both recreational and commercial harvests (Hurst, 2007; NCDMF, 2012).

These fish are known to be highly opportunistic predators, feeding on a variety of prey items depending on their size and availability. Their diet mainly consists of small fish, shrimp, crabs, and other invertebrates. Spotted Seatrout are ambush predators, relying on camouflage and patience to wait for prey to come within striking distance. They are most active during dusk and dawn.

Assessment Methodology

A seasonal size-structured assessment model was applied to data characterizing commercial and recreational landings and discards, fisheries-independent survey indices, and biological data collected from 1991 through 2019. A nonstationary process was assumed for natural mortality and growth in the model. The seasonal time step and nonstationary natural mortality assumption allows for capturing the cold-stun effects that have been observed for Spotted Seatrout. Both the observed data and model predictions suggest a shift in population dynamics around 2004 when the fisheries-independent survey index data became available. Lower fishing mortality and higher spawning stock biomass and recruitment with greater variation were predicted for the period after 2004. This trend was also observed in the recreational landing and discard data, which exhibited higher values after 2004.

Stock Status

Reference point thresholds for the Spotted Seatrout stock were based on 20% spawner potential ratio (SPR). Due to large uncertainty in the terminal year (2019) estimates, a weighted average of the estimates over the most recent three years (2017–2019) was used to represent the terminal year estimate for determination of stock status. The estimates of 2017–2019 from the base model were weighted by the inverse of their CV values before calculating the average. The threshold and target values for the terminal year were also averaged over 2017–2019. The estimated F threshold $F20\%$ was 0.60 per year, and the estimated terminal year (2019) F was 0.75 per year. Thus, the estimated $F/F20\%$ for 2019 is greater than one (1.3), suggesting the stock is currently experiencing overfishing (Figure 1). The estimated SSB threshold (SSB20%) for 2019 was 1,143 metric tons, and the estimated 2019 SSB was 2,259 metric tons. Therefore, the estimated

SSB/SSB20% for 2019 is greater than one (2.0), suggesting the stock is not currently overfished (Figure 2).

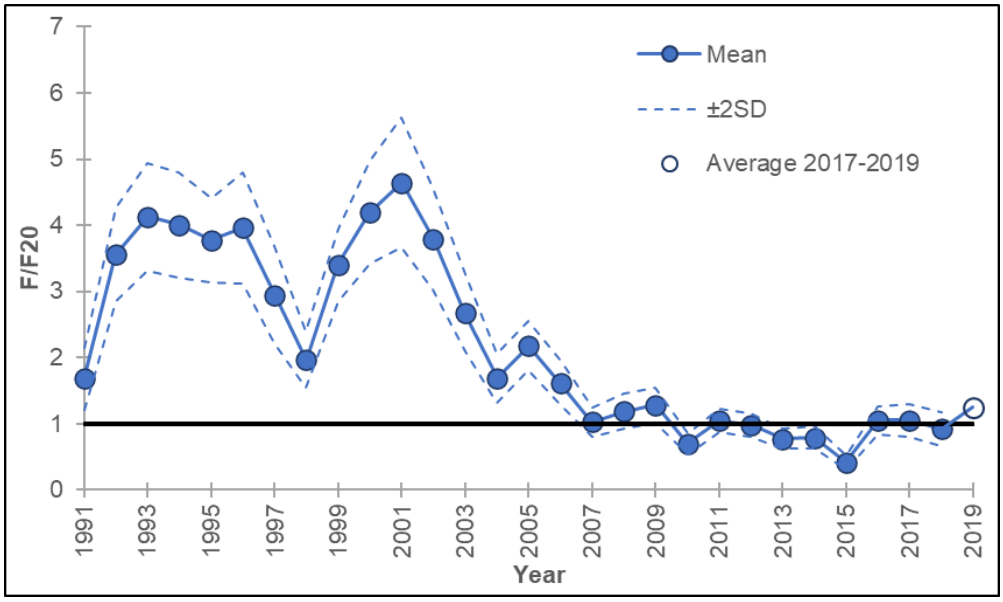

Figure 1. Annual predicted fishing mortality relative to the fishing mortality threshold (F/F20) from the base model of the stock assessment, biological years (Mar–Feb), 1991-2019. The horizontal black line shows a ratio of one. The terminal-year estimate is an average of the most recent three years weighted by the inverse CV values.

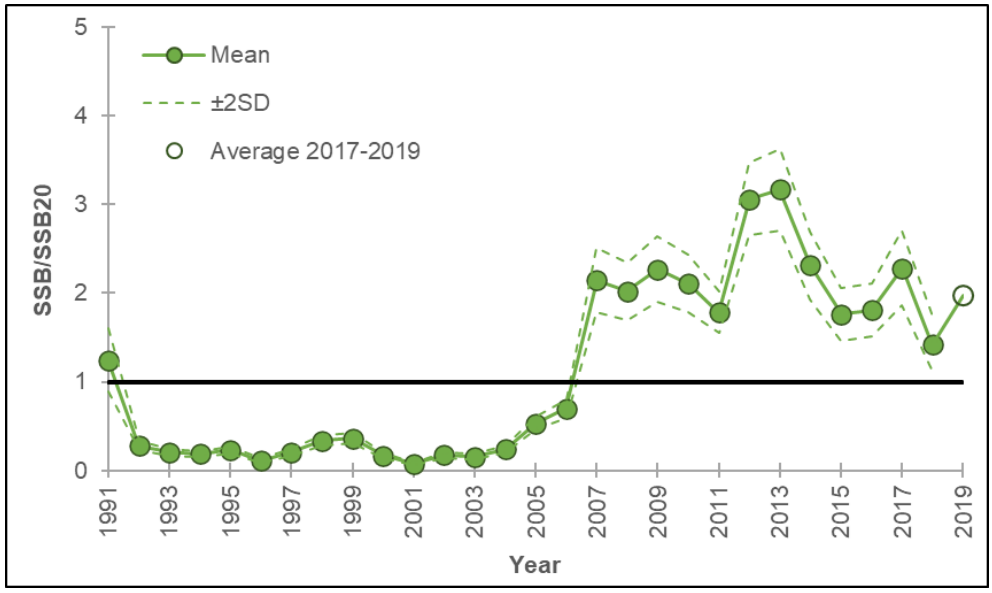

Figure 2. Annual predicted spawning stock biomass (metric tons) relative to the spawning stock biomass threshold (SSB/SSB20) from the base model of the stock assessment, biological years (Mar–Feb) 1991–2019. The horizontal black line shows a ratio of one. The terminal-year estimate is an average of the most recent three years weighted by the inverse CV values.

DESCRIPTION OF THE FISHERY

Additional in-depth analyses and discussion of North Carolina's commercial and recreational Spotted Seatrout fisheries can be found in the original Spotted Seatrout FMP and Supplement A (NCDMF 2012 and 2014); all FMP documents are available on the DMF Fishery Management Plans website and commercial and recreational landings can be found in the License and Statistics Annual Report (NCDMF, 2023) produced by the DMF and found on the Fisheries Statistics page.

Recreational and commercial landings are typically variable from year to year and are influenced by winter weather conditions (i.e., low harvest follows severe winters) and fish availability. Confirmed cold stun events, with varying severity, occurred in 1995, 2000, 2001, 2003, 2004, 2009, 2010, 2014, 2015, 2018, and 2022 (Table 1). Since cold stuns typically occur in December and January (the end of the biological year), their impacts to recreational and commercial landings are experienced the following year.

Table 1. Confirmed Spotted Seatrout cold stun events and harvest closure dates, 1995–2022.

Calendar Year	Month	Biological Year	Closure	Harvest Closure Dates*
1995	December	1995	No	-
2000	January	1999	No	-
2001	January	2000	No	-
2003	January	2002	No	-
2004	December	2004	No	-
2010	January	2009	No	-
2010	December	2010	Yes	Jan. 14 - June 15, 2011
2014	January	2013	Yes	Feb. 5 - June 14, 2014
2015	February	2014	No	-
2018	January	2017	Yes	Jan. 5 - June 14, 2018
2022	December	2022	No	-

Commercial Fishery

The DMF instituted a mandatory, dealer-based, trip-level, reporting system known as the North Carolina Trip Ticket Program (NCTTP) for all commercial species in 1994. All seafood landed in North Carolina and sold by licensed commercial fishermen must be reported on a trip ticket by a licensed seafood dealer. For more information about licensing requirements for purchasing and selling seafood in North Carolina and how commercial fishing data were collected prior to 1994, please refer to the DMF License and Statistics Section Annual Report (NCDMF, 2023). In 2022, 138 seafood dealers reported Spotted Seatrout on trip tickets, landed by 701 fishery participants during 11,695 fishing trips (Figure 3).

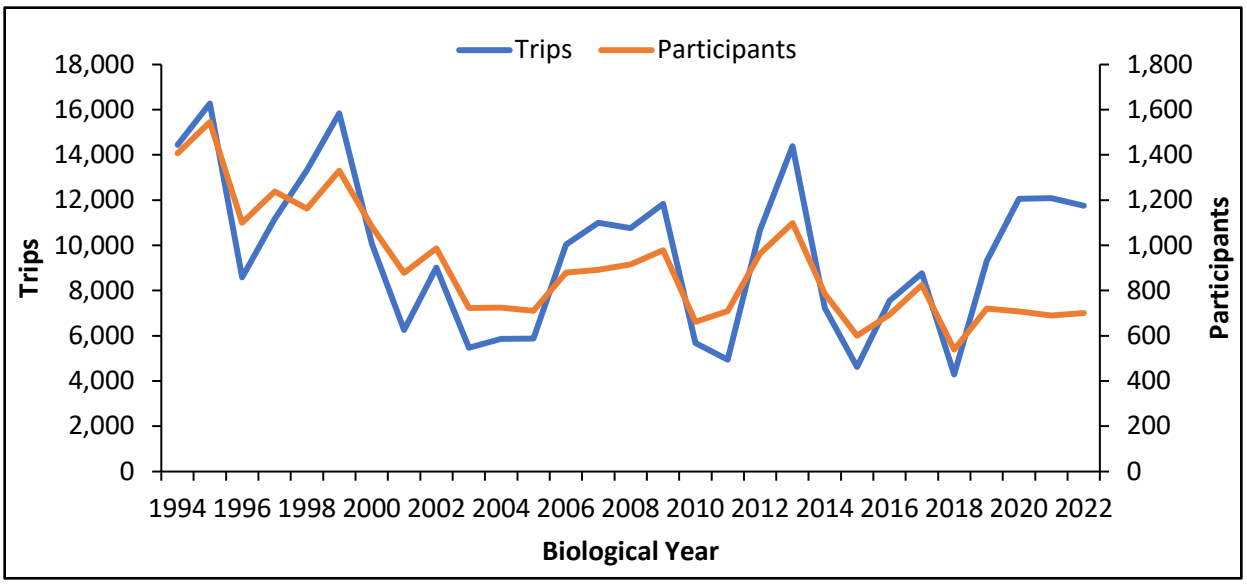

Figure 3. Annual number of trips and participants for the North Carolina Spotted Seatrout fishery from 1994 to 2022.

Annual Landings and Value

In recent years (2012 to 2022), total landings averaged 361,656 pounds per year (Figure 4). The lowest landings during this period were 115,547 pounds in 2015 and the highest were 654,327 pounds in 2021. Spotted Seatrout landings have increased in recent years, exceeding 650,000 pounds in 2020 and 2021. Annual dockside value of Spotted Seatrout commercial landings averaged $891,180 from 2012 to 2022. Annual dockside value was lowest in 2015 at $290,709 and reached a high of just under $1.7 million in 2021.

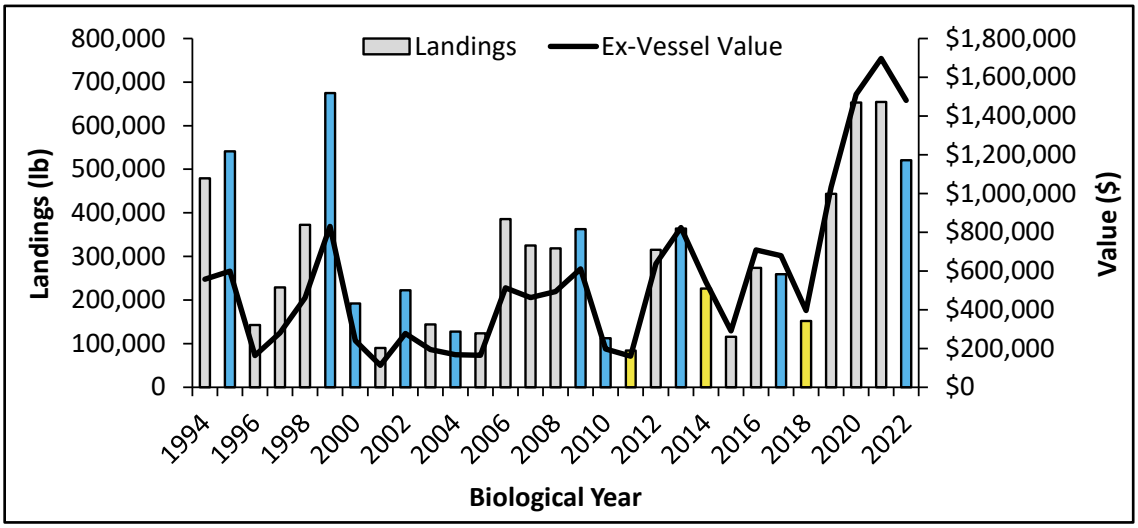

Figure 4. North Carolina annual Spotted Seatrout commercial landings and ex-vessel value, 1994–2022. Values include all market grades and are not adjusted for inflation. The biological year begins in March and ends in February the following year (e.g., biological year 1994 begins in March 1994 and ends in February 1995). Gray bars indicate years without a cold stun or cold stun closure, blue bars indicate years with a confirmed cold stun event, and yellow bars indicate years with a cold stun closure.

Landings by Month

Spotted Seatrout are harvested year-round but there are distinct seasonal peaks (Figure 5). From 1994 through 2022, on average the largest harvest peak occurred from October through February, with a second smaller harvest plateau from April through May. The fall/winter harvest season accounted for 71% of the harvest and the shorter spring season has accounted for 12% of the harvest during 1994–2022. Harvest is typically highest in colder months as Spotted Seatrout aggregate in smaller waterbodies and can be caught in higher numbers. Harvest tends to taper off as waters warm and fish disperse in preparation for the summer spawning season.

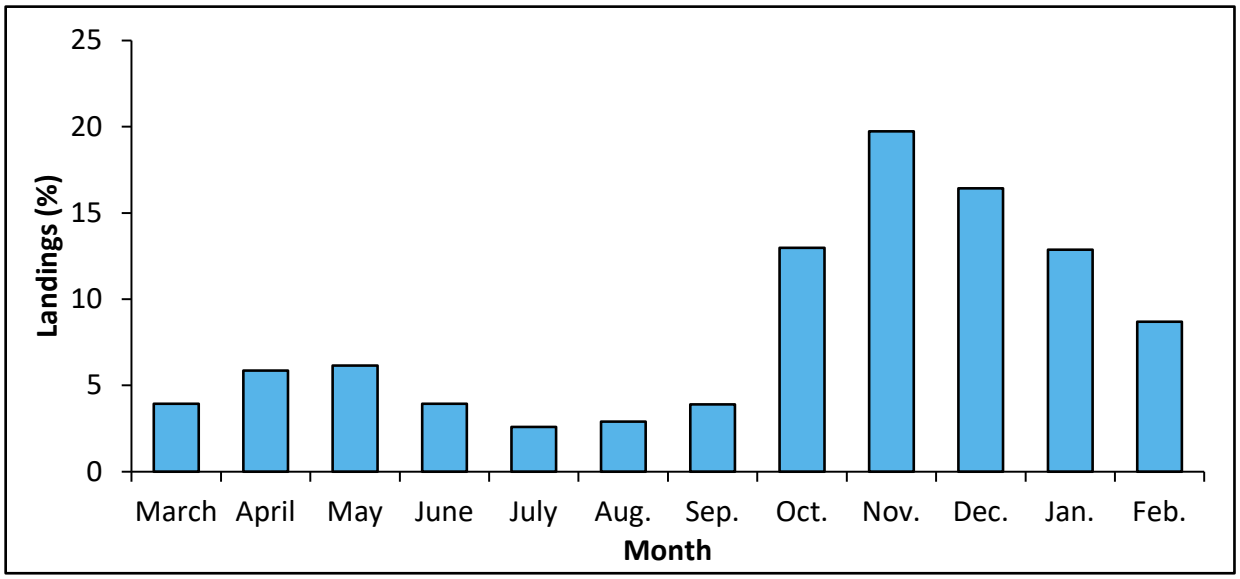

Figure 5. North Carolina Spotted Seatrout commercial landings proportion by month, 1994–2022. Months are ordered according to the biological year which begins in March and ends in February the following year.

Landings by Area

Spotted Seatrout are harvested statewide. The main harvest areas are typically Pamlico Sound, followed by the Neuse and Bay rivers and Central Sounds area (Core, Back, and Bogue sounds; Figure 6). Pamlico Sound accounted for 28% of the harvest from 2012 through 2022. Annual harvest from Pamlico Sound during this period ranged from 11,569 pounds in 2018 to 255,176 pounds in 2021. During this same period, the Neuse and Bay rivers accounted for 24%, the Central Sounds and Southern area each accounted for 13%, Albemarle Sound accounted for 11%, the Pamlico and Pungo rivers accounted for 9%, and the Ocean accounted for 2% of the harvest.

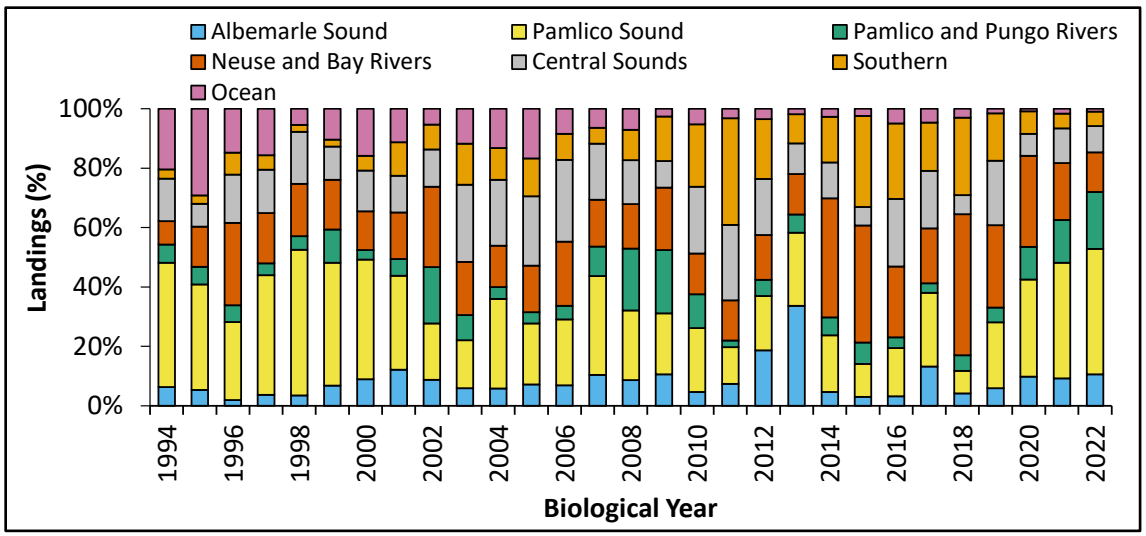

Figure 6. North Carolina annual Spotted Seatrout commercial landings proportion by area, 1994–2022. Albemarle Sound includes Albemarle, Currituck, Croatan, and Roanoke sounds and their tributaries. Pamlico Sound includes Pamlico Sound and its bays and tributaries. Central Sounds includes Core, Back, and Bogue Sounds and their tributaries. Southern includes the White Oak River and all waters south to the SC state line.

Landings by Gear Type

Spotted Seatrout are harvested with a variety of gears but anchored gill nets and runaround gill nets account for most of the harvest (Figure 7). Other gears used include haul seines, beach seines, and ocean gill nets. Since 2012, anchored gill nets have accounted for 43% of the harvest and runaround gill nets have accounted for 48% of the harvest.

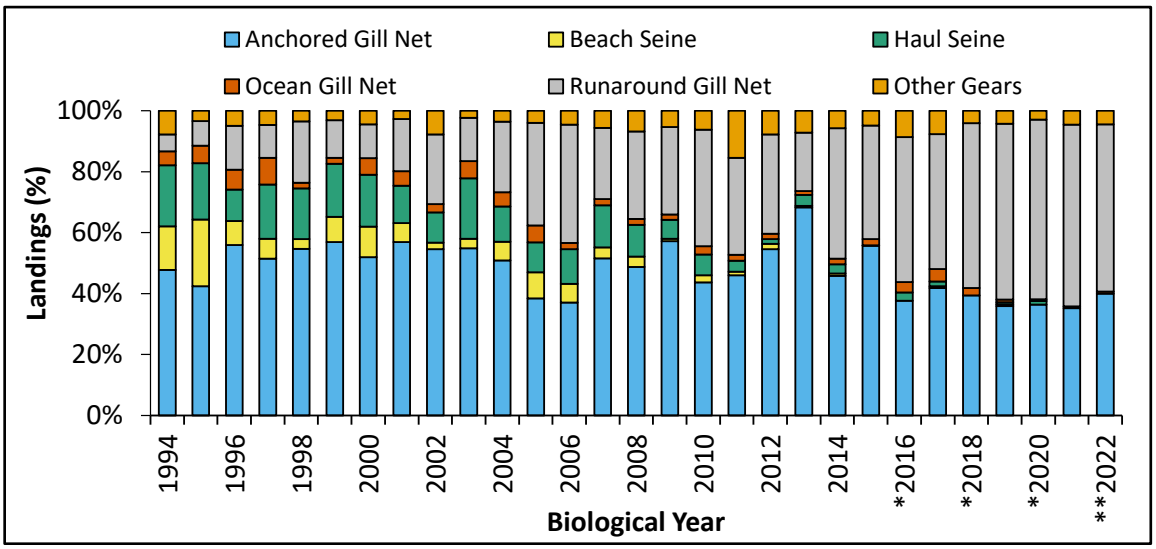

Figure 7. North Carolina annual Spotted Seatrout commercial landings proportion by gear type, 1994–2022. *Beach Seine landings combined with Other Gears due to data confidentiality. **Beach Seine and Haul Seine landings combined with Other Gears due to data confidentiality.

Commercial bycatch

Large-mesh (≥ 5 inches stretched mesh [ISM]) anchored gill nets target demersal fish such as flounder during the fall months and pelagic fish such as clupeids during the spring months. Small-mesh (<5 ISM) anchored gill-net trips occur consistently throughout the year dependent on the target species for that time of year. Spotted Seatrout are targeted primarily during fall and winter. The Spotted Seatrout small-mesh fishery would potentially interact with sea turtles and Atlantic sturgeon. Most sea turtle interactions occur in the late summer and fall months (Table 2). Sea turtle movement is typically influenced by water temperature. As soon as water temperatures start to decline within the estuaries, incidental takes significantly decline. Atlantic Sturgeon have the greatest abundance in spring but fall and winter make up 47% of estimated discards in the small-mesh fishery.

Table 2. Estimates for the number of green sea turtles, Kemp's ridley sea turtles, and Atlantic sturgeon caught incidentally in the small-mesh and large-mesh anchored gill-net fisheries from 2013–2022 by Management Unit (MU). A hyphen (-) represents values that could not be calculated based on available data.

		Green Sea Turtle discards		Kemp's Ridley Sea Turtle discards		Atlantic Sturgeon discards	
Seasons	MU	Large Mesh	Small Mesh	Large Mesh	Small Mesh	Large Mesh	Small Mesh
Spring	A	17	4	19	-	1,805	181
	B	66	125	13	-	18	478
	C	15	5	4	-	93	41
	Core	37	22	-	-	7	114
	D	4	1	1	-	1	1
	E	19	6	7	-	15	15
Summer	A	16	3	19	-	119	11
	B	313	62	66	-	8	64
	C	28	5	8	-	11	5
	Core	121	3	-	-	3	4
	D	21	2	4	-	1	1
	E	121	9	54	-	7	4
Fall	A	63	8	38	-	1,773	88
	B	1,050	206	143	-	96	249
	C	55	14	7	-	72	31
	Core	316	81	-	-	26	134
	D	110	24	8	-	5	1
	E	194	58	43	-	37	39
Winter	A	8	3	-	-	722	131
	B	11	30	-	-	4	125
	C	1	3	-	-	3	27
	Core	1	1	-	-	1	5
	D	1	1	-	-	1	1
	E	2	4	-	-	1	9
Total		2,590	680	434	-	4,829	1,759

Recreational Fishery

The Spotted Seatrout fishery in N.C. is predominately a recreational fishery. Since 2012, recreational landings have accounted for approximately 86% of total landings. Recreational harvest, release, and trip data are estimated from the Marine Recreational Information Program (MRIP), which is a series of surveys designed to estimate total recreational catch. Recreational estimates across all years have been updated and are now based on MRIP's new Fishing Effort Survey-based calibrated estimates. For more information on MRIP see NOAA's MRIP informational page.

Annual landings and releases

Between 1991 and 2022, landings increased sharply in 2019 and have remained high through 2022 (Figure 8). In recent years (2012 to 2022) landings averaged 2,212,806 pounds, but since 2019 (2019 to 2022) landings averaged 3,339,879 pounds. Landings have been below a million pounds in only two years since 2012 (2015, 339,436 pounds and 2018, 728,411 pounds) and both years follow documented cold stuns including a harvest closure in 2018 (Table 1). Landings from 2019–2022 represent the four highest landings values between 2012–2022 and four of the five highest landings since 1991.

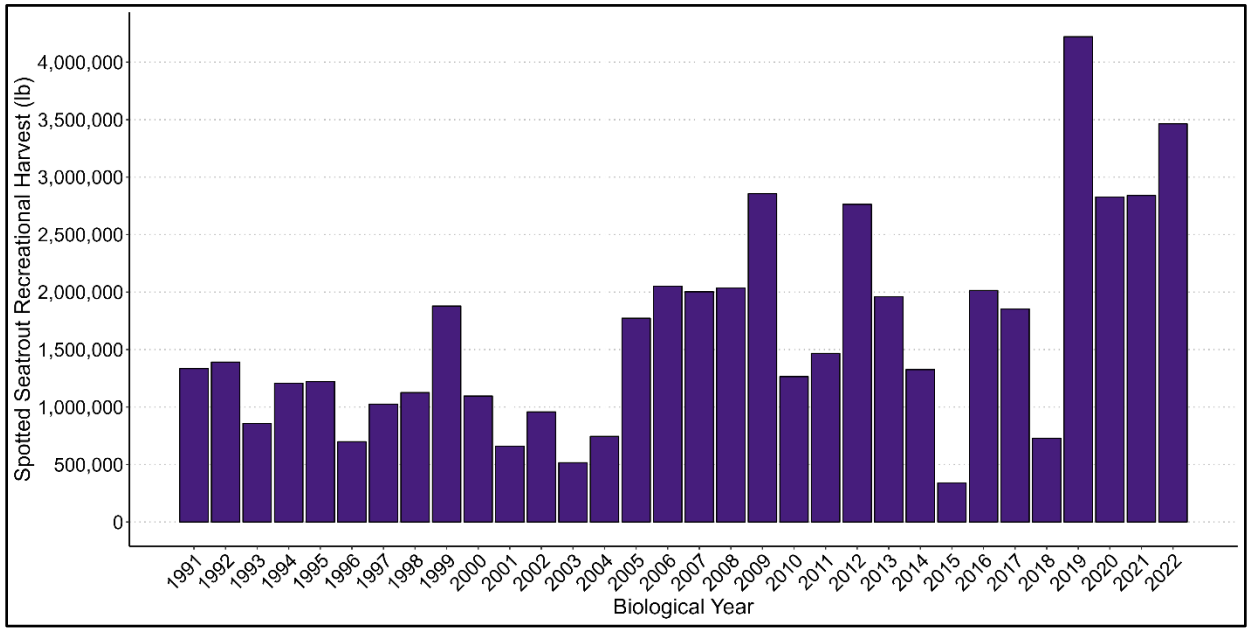

Figure 8. North Carolina Spotted Seatrout recreational landings biological years 1991–2022 (March–February).

There is a dedicated catch and release segment of the recreational fishery, though how anglers participate in this segment varies. Some anglers release all fish, some anglers release all larger fish (e.g., any fish over 20 inches TL), and some anglers continue to target Spotted Seatrout for catch and release fishing after harvesting their limit. Recreational releases vary annually but have generally increased since 2009 (Figure 9). The number of recreational releases in 2018 represents a large outlier for the time series (1991–2022) and should be viewed with caution due to Hurricane Florence impacting

MRIP surveys throughout most of North Carolina in late 2018. Excluding this outliner, anglers released an average of 6,150,931 fish annually from 2009–2022. Recreational releases may change seasonally as well because Spotted Seatrout growth rates and life history can lead to greater numbers of sublegal fish at times.

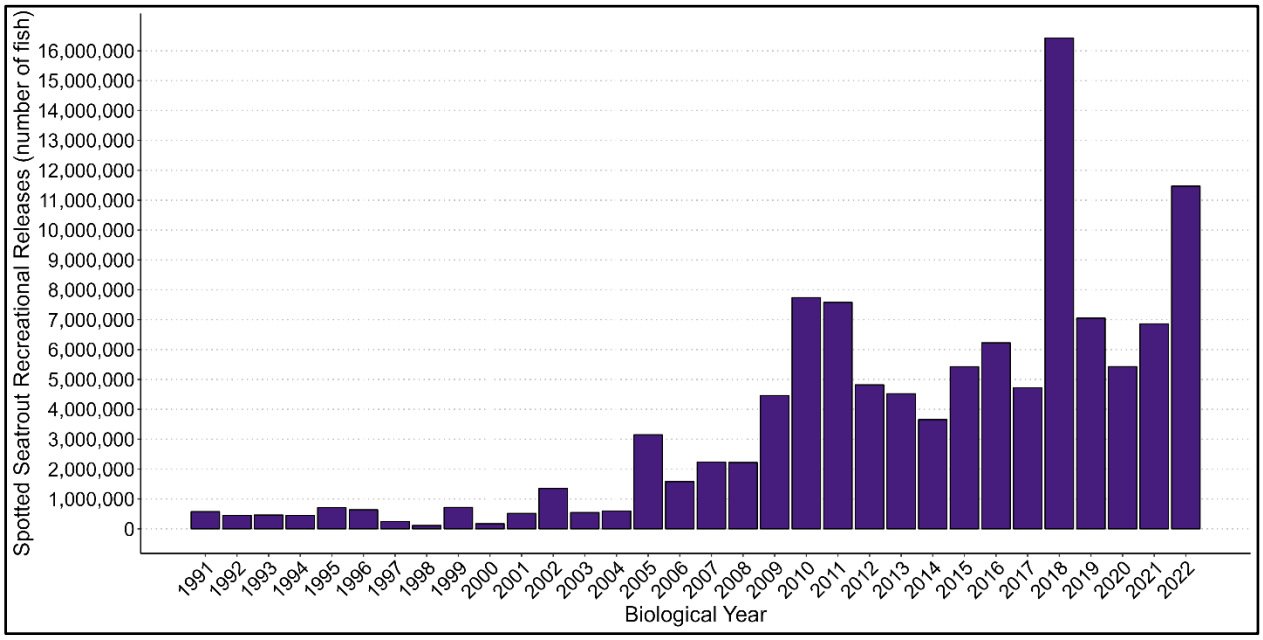

Figure 9. North Carolina Spotted Seatrout recreational releases biological years 1991–2022 (March–February). Hurricane Florence impacted MRIP sampling in most of North Carolina in late 2018. As such recreational releases from 2018 should be viewed with a high degree of caution.

Landings by month

Although recreational harvest occurs throughout the year, most harvest occurs in late fall and early winter. Harvest increases in October, peaks sharply in November, then decreases in winter but remains above average compared to the rest of the year in December, January, and February (Figure 10). A second, slight increase in landings occurs in June and July, likely driven by tourism. From 1991 to 2022 approximately 63% of harvest occurred during the primary harvest peak (October – February) while the slight increase in June and July encompassed about 11% of harvest. In recent years (2012–2022), the general harvest patterns remain, but winter months make up a larger proportion of harvest (Figure 11). Though minor regional variation in these seasonal patterns might exist, these patterns are broadly consistent across the state.

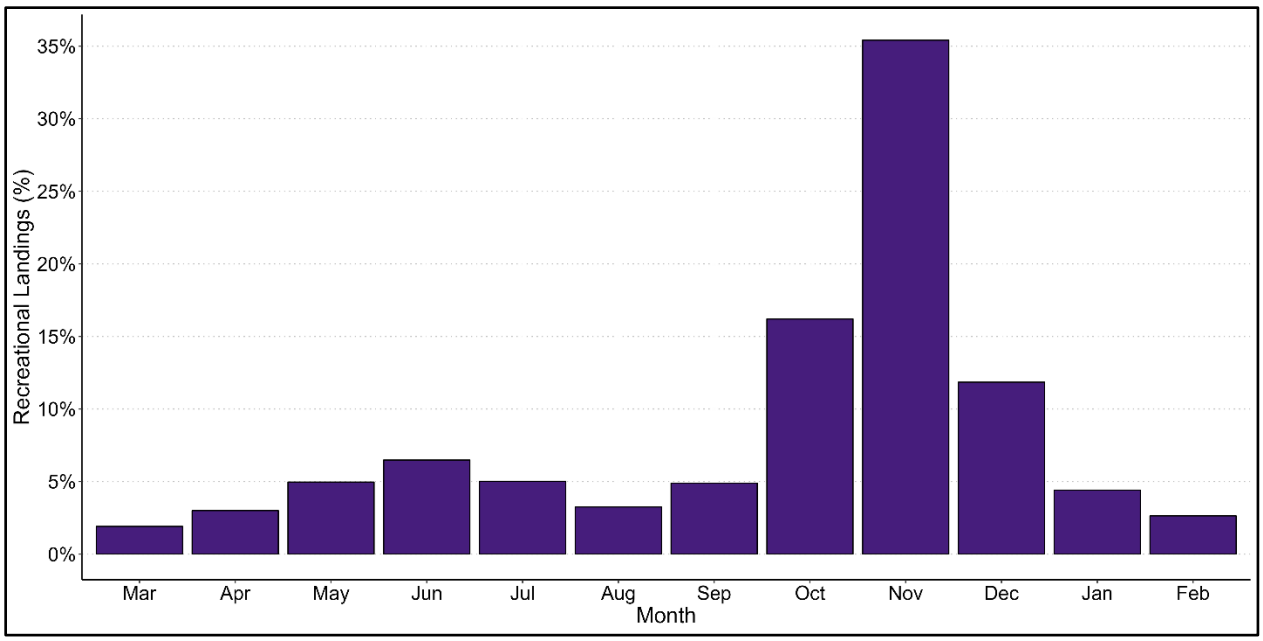

Figure 10. North Carolina average monthly Spotted Seatrout recreational landings proportion by month, 1991–2022. Months are ordered according to the biological year (March–February).

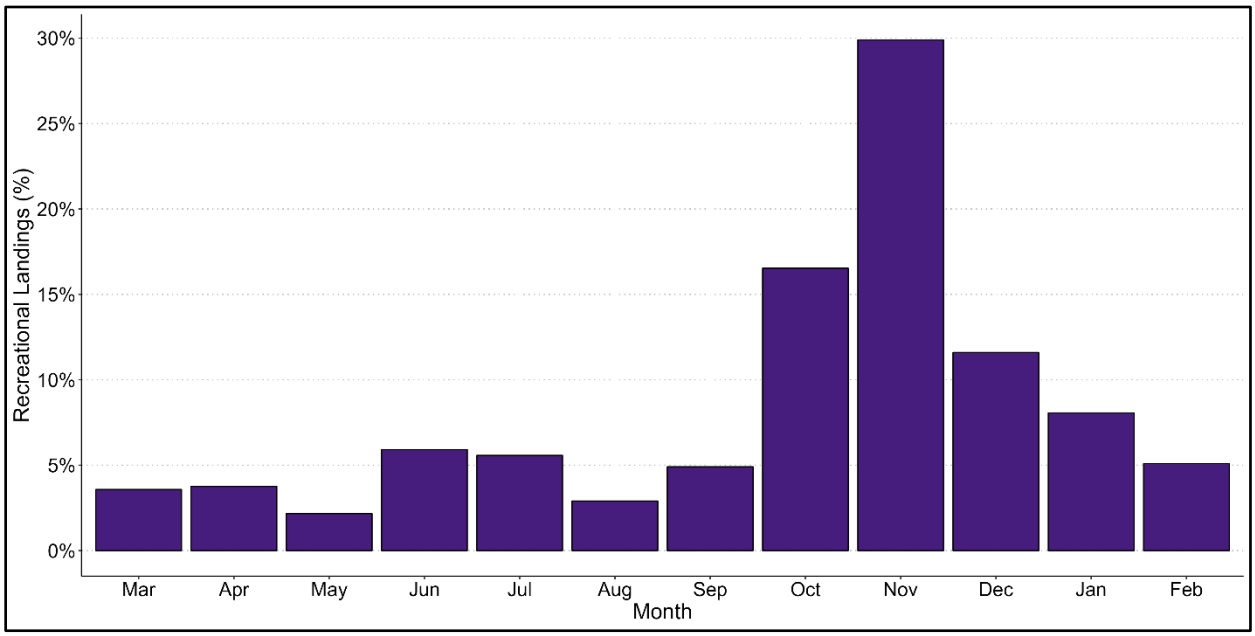

Figure 11. North Carolina average monthly Spotted Seatrout recreational landings proportion by month, 2012–2022. Months are ordered according to the biological year (March–February).

Recreational releases also occur throughout the year; however, releases are concentrated in October, November, and December. In recent years (2012–2022) a slightly larger proportion of fish are released in January compared to the rest of the year, but releases remain relatively consistent outside October, November, and December (Figure 12).

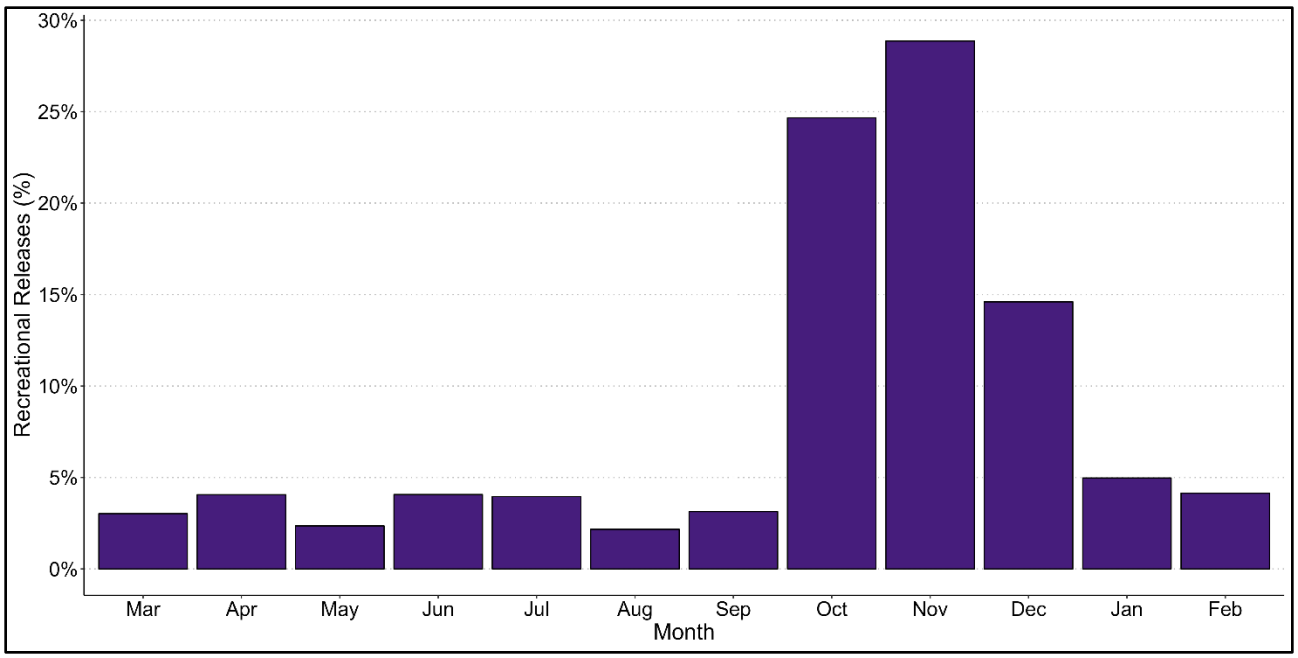

Figure 12. North Carolina average monthly Spotted Seatrout recreational releases proportion by month, 2012–2022. Months are ordered according to the biological year (March–February).

Summary of Economic Impact

Modeling software, IMPLAN, is used to estimate the economic impacts of an industry to the state at-large, accounting for revenues and participation. For a detailed explanation of the methodology used to estimate the economic impacts please refer to the North Carolina Division of Marine Fisheries (DMF) License and Statistics Section Annual Report. Due to the management options being considered, this analysis includes both the recreational and commercial industries.

Commercial

Commercial landings and effort data collected through the DMF Trip Ticket Program are used to estimate the economic impact of the commercial fishing industry. For commercial fishing output, total impacts are estimated by incorporating modifiers from NOAA's Fisheries Economics of the United States reports from 2012–2020, which account for proportional expenditures and spillover impacts from related industries. By assuming the Spotted Seatrout commercial fishery's economic contribution is a proportion equal to its contribution to total commercial ex-vessel values, we can generate an estimate of the economic contribution of the commercial Spotted Seatrout fishery statewide.

From 2012 to 2022 ex-vessel value of Spotted Seatrout has varied from a low of approximately $360,000 in 2015 to a high of $1.5 million dollars in 2022 and supports between 575 and 1,200 jobs annually (Table 3). Annual sales impacts have varied over the decade but have averaged $5.9 million from 2012 to 2022.

Table 3. Annual economic contributions from the Spotted Seatrout commercial fishery to the state of North Carolina from 2012 to 2022 reported in 2022 dollars.

Year	Pounds Landed	Ex-Vessel Value	Job Impacts	Income Impacts	Value Added Impacts	Sales Impacts
2022	520,994	$1,480,294	834	$3,413,446	$5,432,284	$7,819,923
2021	654,327	$1,833,146	846	$4,305,885	$6,767,404	$9,880,173
2020	653,093	$1,709,539	862	$4,296,534	$6,965,574	$9,646,212
2019	443,629	$1,182,385	822	$2,986,277	$4,369,883	$6,959,060
2018	151,708	$461,888	575	$1,044,323	$1,717,370	$2,371,747
2017	259,432	$810,368	898	$2,100,330	$3,132,230	$4,835,802
2016	273,848	$864,570	775	$2,281,480	$3,515,818	$5,204,455
2015	115,547	$358,921	633	$938,109	$1,450,039	$2,135,390
2014	226,394	$671,553	846	$1,631,567	$2,455,165	$3,761,647
2013	364,123	$1,035,645	1,194	$2,528,888	$3,938,648	$5,769,680
2012	315,128	$811,864	1,081	$2,858,981	$3,908,590	$6,278,522

Recreational

Recreational effort data are provided from the Marine Recreational Information Program, National Marine Fisheries Service (NMFS) as well as survey responses collected from North Carolina recreational fishing participants administered by the Fisheries Economics Program at DMF. For recreational fishing output, total impacts are estimated by incorporating modifiers from NOAA's Fisheries Economics of the United States reports from 2012 to 2020, which account for proportional recreational expenditures and spillover impacts from related industries. By assuming the Spotted Seatrout recreational fishery's contribution to expenditure categories is at a proportion equal to its contribution to total recreational trips and durable goods expenditure, we can generate an estimate of the total economic contribution of Spotted Seatrout in North Carolina.

From 2012 to 2022 Spotted Seatrout economic sales impacts have varied from a low of about $267 million in 2015 to a high of $581 million dollars in 2020 (Table 4). Similarly, job impacts span from approximately 2,700 to 5,500 jobs annually. Annual sales impacts have varied over the described time horizon but have averaged $438 million from 2012 to 2022.

Table 4. Annual economic contributions of the Spotted Seatrout recreational fishery to the state of North Carolina from 2012 to 2022 reported in 2022 dollars.

Year	Trips	Expenditure	Job Impacts	Income Impacts	Value Added Impacts	Sales Impacts
2022	2,952,725	$610,166,244	4556	$186,974,466	$287,883,774	$508,297,606
2021	2,254,224	$527,895,592	4318	$167,784,164	$253,959,746	$455,899,909
2020	2,719,670	$680,865,862	5486	$231,035,451	$328,868,972	$580,954,157
2019	2,528,247	$635,730,887	5252	$195,627,253	$296,435,669	$535,753,473
2018	1,773,091	$439,207,323	3185	$141,032,169	$213,419,087	$380,831,319
2017	1,555,087	$380,456,082	3573	$117,806,629	$177,609,593	$325,543,922
2016	2,091,731	$522,385,203	4526	$164,680,710	$244,974,745	$443,331,488
2015	1,295,843	$321,730,351	2709	$98,681,487	$160,541,925	$267,200,930
2014	1,510,415	$384,591,773	3635	$116,796,277	$173,912,242	$309,980,126
2013	2,065,210	$552,161,892	4451	$390,676,333	$248,904,256	$532,736,812
2012	2,112,138	$587,450,277	4679	$176,846,782	$263,358,908	$473,618,472

ECOSYSTEM PROTECTION AND IMPACT

Coastal Habitat Protection Plan

The Fishery Reform Act statutes require that a Coastal Habitat Protection Plan (CHPP) be drafted by the NCDEQ and reviewed every five years (G.S. 143B-279.8). The CHPP is intended as a resource and guide compiled by NCDEQ staff to assist the Marine Fisheries, Environmental Management, and Coastal Resources commissions in developing goals and recommendations for the continued protection and enhancement of fishery habitats in North Carolina. Habitat recommendations related to fishery management can be addressed directly by the North Carolina Marine Fisheries Commission (NCMFC). The NCMFC has passed rules that provide protection for Spotted Seatrout habitat including the prohibition of bottom-disturbing gear in specific areas, designation of sensitive fish habitat, such as nursery areas, and SAV beds, with applicable gear restrictions. Habitat recommendations not under NCMFC authority (e.g., water quality management, shoreline development) can be addressed by the other commissions through the CHPP process. The CHPP helps to ensure consistent actions among these commissions as well as their supporting NCDEQ divisions. The CHPP also summarizes the economic and ecological value of coastal habitats to North Carolina, their status, and potential threats to their sustainability (NCDEQ, 2016).

Spotted Seatrout make use of a variety of habitats during their life history with variations in habitat preference due to location, season, and ontogenetic stage. They are found most often in habitats identified in the CHPP including water column, wetlands, submerged aquatic vegetation (SAV), soft bottom, and shell bottom (NCDEQ, 2016). Spotted Seatrout are found throughout estuarine systems and can migrate offshore to deeper marine soft bottom areas and beaches in response to falling temperatures (ASMFC, 1984; Mercer, 1984). Spotted Seatrout do, however, show a strong preference for low-flow areas with SAV or soft bottom (Tabb, 1958; Moulton et al., 2017). Growth and survival of Spotted Seatrout within the habitats they use are maximized when water quality

parameters such as temperature, salinity, and dissolved oxygen are within optimal ranges. Maintenance and improvement of suitable estuarine habitat and water quality may be the most important factors in sustaining Spotted Seatrout stocks. Additional information on the habitats discussed below, threats to these habitats, water quality degradation, and how these topics relate to fisheries can be found in the CHPP (NCDEQ, 2016).

Threats and Alterations

Suitable habitat is a critical element in the ecology and productivity of estuarine systems. Degradation or improvement in one aspect of habitat may have a corresponding impact on water quality. All habitats used by Spotted Seatrout are threatened in some way.

Water Column

The water column habitat is defined as “the water covering a submerged surface and its physical, chemical, and biological characteristics” (NCDEQ, 2016). Spotted Seatrout spawning is generally limited to estuarine waters in the late summer and early fall in response to temperature and salinity but can also include inlets in North Carolina (ASMFC, 1984; Mercer, 1984; Saucier & Baltz, 1992, 1993; Holt and Holt, 2003; Kupschus, 2004; Stewart & Scharf, 2008; Ricci et al., 2017). Spawning sites have been noted to include tidal passes, channels, river mouths, and waters in the vicinity of inlets (Saucier & Baltz, 1992, 1993; Roumillat et al., 1997; Luczkovich et al., 1999; Stewart & Scharf, 2008; Lowerre-Barbieri et al., 2009; Boucek et al., 2017). For the portion of the Spotted Seatrout population that spawns inshore or offshore of inlets, they are a critical component of water column habitat for Spotted Seatrout and the larvae that must pass through inlets to reach estuarine nursery areas (Churchill et al., 1997; Hare et al., 1999; Luettich et al., 1999). Due to the importance of inlets to the movement of larval Spotted Seatrout into nursery areas and of adult Spotted Seatrout into oceanic waters while avoiding lower estuarine temperatures, terminal groins may threaten Spotted Seatrout stocks by impeding recruitment and preventing adults from avoiding cold stuns, since they can obstruct inlet passage (Kapolnai et al., 1996; Churchill et al., 1997; Blanton et al., 1999). Inlets are hydraulically dredged on a regular basis to ensure safe passage for vessels of all sizes. Though DMF recommends an in-water-work moratorium of April 1 to July 30 to minimize impacts during peak biological activity, most projects are given moratorium relief due to public safety. Large hydraulic dredge boats are used inside the inlets and have the highest potential to draw in fishes and invertebrates of all life stages. However, this type of dredge is most impactful to eggs and larval fish, as their reduced swimming ability means they are unable to actively avoid the suction field (Todd et al., 2015).

Soft Bottom

Soft bottom habitat plays an important role in estuarine system function, acting as both a source and sink (storage) for nutrients, chemicals, and microbes. Estuarine soft bottom habitats, especially those adjacent to wetlands, act as Spotted Seatrout nursery areas, provide key food sources for all life stages, and refuge from large predators (Ross & Epperly, 1985; Noble & Monroe, 1991; Powers, 2012). Soft bottom sediments support

algae and the benthic invertebrates that eat algae, which are important food sources for juvenile and adult Spotted Seatrout. Spotted Seatrout begin their lives eating primarily copepods and mysid shrimps before transitioning to penaeid and palaemonid shrimps (Peterson and Peterson 1979; Daniel 1988; McMichael and Peters 1989). Soft bottom habitat, along with SAV, are more heavily utilized by Spotted Seatrout than other habitat types (Tabb, 1958; Moulton et al., 2017). Dredging threatens soft bottom habitat, potentially affecting Spotted Seatrout food sources and water quality. Dredging removes all benthic infauna from the affected areas immediately, which reduces food availability temporarily to bottom feeding fish such as the Spotted Seatrout (NCDEQ, 2016).

In addition to estuarine soft bottom habitats, there are also surf zone and deeper marine soft bottom habitats used by adult Spotted Seatrout in North Carolina during late autumn temperature migrations (ASMFC, 1984; Mercer, 1984). The threats to ocean beaches and surf zone include beach nourishment and storm water outfalls.

Submerged Aquatic Vegetation

Submerged Aquatic Vegetation (SAV) is a fish habitat dominated by one or more species of underwater vascular plants and occurs in both subtidal and intertidal zones, sometimes over extensive areas (NCDEQ, 2016). SAV acts as a crucial structured habitat for fishes and invertebrates, providing refuge from predators and food sources such as epiphytic (living on the surface of vegetation) algae and animals. Spotted Seatrout use SAV as spawning sites, nurseries, forage areas, refuge areas, and for feeding on invertebrates on seagrasses and other structures. The Atlantic States Marine Fisheries Commission (ASMFC) lists SAV as a Habitat Area of Particular Concern (HAPC) for Spotted Seatrout (ASMFC, 1984). All life stages of Spotted Seatrout have been documented in mesohaline and polyhaline seagrass beds (Tabb, 1966; ASMFC, 1984; Mercer, 1984; Thayer, Kenworthy & Fonseca, 1984; McMichael & Peters, 1989; Rooker et al., 1998). Spotted Seatrout use SAV habitat as much, if not more, than other spawning sites (Ricci et al., 2017; Boucek et al., 2017). Juvenile Spotted Seatrout are abundant in high salinity SAV in both Pamlico and Core sounds (Purvis, 1976; Wolff, 1976) and juvenile abundances were found to be greater in SAV than soft bottom and oyster reef and were greater than or equivalent to abundances in wetland habitats (Minello, 1999; Minello et al., 2003). Seagrass beds are threatened by physical destruction from bottom disturbing fishing gear, dredging, and damage from boat use, as well as degradation of water quality. Declines in SAV, globally and in North Carolina, due to increased coastal development and decreased water quality, are also altering these ecosystems and their community structure.

Shell Bottom

Shell bottom is defined as estuarine intertidal or subtidal bottom made of surface shell concentrations of living or dead oysters, hard clams, and other shellfish (NCDEQ, 2016). This includes oyster beds and reefs and shell hash (a mixture of sediments and broken shell). Spawning aggregations of Spotted Seatrout have been documented over shell bottom areas in North Carolina including in the Neuse River (Barrios et al., 2006). Shell bottom habitats have been shown to provide an important forage base of invertebrates

and small finfish for juvenile and adult Spotted Seatrout (Coen et al. 1999; ASMFC, 2007). Oyster reefs and shell hash areas can be damaged by bottom-disturbing fishing gears, disease, and overfishing.

Wetlands

Wetlands are areas that are inundated or saturated by the accumulation of surface or groundwater, enough to support a prevalence of vegetation typically adapted for life in saturated soil conditions (NCDEQ, 2016). Estuarine wetlands are tidal and are found in bays, sounds, and rivers in brackish waters. Freshwater wetlands include freshwater marshes, bottomland, hardwood forests, and swamp forests in low salinity to freshwater areas of creeks, streams, and rivers. Wetlands are particularly valuable as juvenile Spotted Seatrout appear to use estuarine wetlands, particularly the marsh edge habitat of salt/brackish marshes, as nurseries (Tabb, 1966; ASMFC, 1984; Mercer, 1984; Hettler 1989; Rakocinski et al., 1992; Baltz et al., 1993; Peterson & Turner, 1994). Abundances of juveniles in wetlands were found to be less than or equal to abundances in SAV (Minello, 1999; Minello et al., 2003). Wetlands are threatened by many human activities, including dredging for marinas and channels, filling for development, ditching and draining for agriculture, silviculture, channelization, and shoreline stabilization. Wetland loss and decreasing vegetative buffers can hasten excessive nutrient loading impacts to the surrounding water and other habitat types (NCDWQ, 2000a).

Water Quality Degradation

Good water quality is essential, both for supporting the various life stages of Spotted Seatrout and for maintaining their habitats. Naturally occurring and anthropogenic activities can alter the salinity and temperature conditions or elevate levels of toxins, nutrients, and turbidity, as well as lower dissolved oxygen levels, which can degrade water quality and impact Spotted Seatrout survival. Water quality degradation through stormwater runoff, discharges, toxic chemicals, sedimentation, and changes in turbidity can threaten Spotted Seatrout survival. Salinity particularly affects the eggs of Spotted Seatrout which rely on high spawning salinities to remain positively buoyant allowing for wind and tidally driven distribution throughout the estuary (Churchill et al., 1999; Holt & Holt, 2003); however, sudden salinity reductions cause Spotted Seatrout eggs to sink, thus reducing dispersal and survival (Holt & Holt, 2003).

More detailed information on water quality degradation, including the topics of hypoxia, toxins, and temperature in North Carolina and the effect on fish stocks can be found in the NCDWQ guides on the NCDWQ website (NCDWQ, 2000b; NCDWQ, 2008) and in the CHPP (NCDEQ, 2016). More information about the water quality requirements for Spotted Seatrout can be found in the DESCRIPTION OF THE STOCK section of this FMP.

Gear Impacts on Habitat

Bottom disturbing fishing gear can impact ecosystem function through habitat degradation. Static (non-mobile) gears tend to have a lesser impact on habitat compared to mobile gears, as the amount of area affected by static gears tends to be insignificant

when compared to that of mobile gears (Rogers et al., 1998). Both bottom disturbing and static gears can have impacts of bycatch while in operation and can have negative impacts if the gear is abandoned or lost.

The primary gears used in the Spotted Seatrout commercial fishery are estuarine gill nets (runaround, strike, or set), long haul seines, beach seines, and ocean gill nets. In the recreational fishery, rod and reel is the primary gear. Other gears that may harvest Spotted Seatrout as incidental catch include pounds nets, crab pots, drift gill nets, and fyke nets. Many gears that interact with Spotted Seatrout are considered static gear (Barnette, 2001; NCDEQ, 2016) and generally have minimal impact on habitat.

Beach seines and runaround gill nets are both mobile and may disturb local habitats. Impacts from mobile bottom-disturbing fishing gears such as seines and runaround gill nets include changes in community composition from the removal of species and physical disruption of the habitat (Barnette, 2001). Gears may damage or uproot SAV as they are dragged across the seafloor, potentially reducing productivity and destroying structures that provide feeding surfaces and shelter for Spotted Seatrout (NCDEQ, 2016). Gears that drag across the seafloor may also suspend sediments, temporarily increasing turbidity (Corbett et al., 2004) and reducing clarity, SAV growth, productivity, and survival (NCDEQ, 2016). Sediment suspended by bottom disturbing fishing gears and boat propeller wash may also bury SAV (Thayer et al., 1984), degrading habitat quality and reducing productivity.

Extreme Weather Events

Extreme weather events have always occurred, but scientists anticipate that changes to North Carolina's climate in this century will be larger than anything experienced historically (Kunkel et al., 2020). It is predicted that average annual temperatures will continue to increase, sea level will continue to rise, the intensity of hurricanes will increase, total annual precipitation from hurricanes and severe thunderstorms will increase resulting in increased flooding events, while severe droughts will also likely increase due to higher temperatures (Kunkel et al., 2020). Flood events can flush contaminated nutrient-rich runoff into estuaries causing degraded water quality. Runoff from flood events can cause eutrophication resulting in fish kills due to hypoxia, algal blooms, and alteration of the salinity regime. Flood events can also cause erosion of shorelines resulting in loss of important coastal habitats, such as SAV, soft bottom, and wetlands, that are critical to Spotted Seatrout throughout their life history. Potential increases in extreme weather events could have an inverse effect on the recruitment and survival of Spotted Seatrout in the estuarine system.

Included in extreme weather events are winter storms. Spotted Seatrout display a greater sensitivity to sharp drops in water temperatures than many other species. Throughout their range, Spotted Seatrout are periodically exposed to water temperatures below their thermal tolerance (i.e., below temperatures they can tolerate without experiencing stress) because of prolonged cold air temperatures or from snow and ice melt after a winter storm. For more information on how Spotted Seatrout are affected by winter events, please see the Cold Stun Management issue paper in this FMP.

FINAL AMENDMENT ONE MANAGEMENT STRATEGY

The NCMFC selected management measures:

APPENDIX 2: ACHIEVING SUSTAINABLE HARVEST IN THE NORTH CAROLINA SPOTTED SEATROUT FISHERY

- Implement a recreational 14- to 20-inch slot limit with an allowance for one fish over 26 inches.
- Implement a recreational 3-fish bag limit.
- Implement a commercial Saturday through Sunday Spotted Seatrout harvest closure from January to September and a Saturday through Monday closure from October to December.
- Formalize the commercial stop net fishery management in the fishery management plan (Option 4.b).
- Adopt the adaptive management framework, with the caveat that adaptive management measures for sustainable harvest must be brought to the Commission for review prior to implementation.

APPENDIX 3: SUPPLEMENTAL MANAGEMENT OPTIONS IN THE NORTH CAROLINA SPOTTED SEATROUT FISHERY

- Status Quo

APPENDIX 4: COLD STUN MANAGEMENT

- Extend the harvest closure by 15 days, through June 30, following a cold stun.
- Adopt the cold stun adaptive management framework detailed in the plan.

MANAGEMENT CARRIED FORWARD

There are management measures from the original FMP to carry forward into Amendment 1 unless otherwise changed in Amendment 1. Management measures from the original Spotted Seatrout FMP that will be carried forward into Amendment 1 are:

- It is unlawful to set gill nets in Joint Fishing Waters from 12:01 A.M. on Saturday to 12:01 A.M. on Monday except in Albemarle and Currituck sounds.
- It is unlawful for a commercial fishing operation to possess more than the recreational bag limit of Spotted Seatrout per person per day taken by hook-and-line.
- It is unlawful to take more than the recreational bag limit of Spotted Seatrout per person per day for recreational purposes.
- 75-fish commercial trip limit (excluding for the stop net fishery and spotted seatrout taken by hook-and-line)

RESEARCH NEEDS

The research recommendations listed below are offered by the division to improve future management strategies of the Spotted Seatrout fishery. They are considered high priority as they will help to better understand the Spotted Seatrout fishery and meet the goal and objectives of the FMP. A more comprehensive list of research recommendations is provided in the Annual FMP Update and DMF Research Priorities documents.

- Integrate tagging data into stock assessment model so both tagging data and other data sources can work together to give a better picture of the population dynamics including estimates of survival and natural mortality.
- Conduct additional work to evaluate more fully the utility of the Program 120 survey and determine if alternative sampling methodologies or expanded sampling seasonality could provide a more robust index.
- Develop programs to incorporate information on size of recreational releases such as Citizen Science initiatives; Improve estimates of recreational discard mortality.
- Conduct a detailed analysis of the existing data (i.e., Program 915) to determine the extent to which late fall and spring provide insights into overwinter changes in abundance.
- Conduct research to generate accurate fecundity estimates for North Carolina Spotted Seatrout.

APPENDICES

Appendix 1: SMALL-MESH GILL NET CHARACTERIZATION IN THE NORTH CAROLINA SPOTTED SEATROUT FISHERY

ISSUE

The small-mesh (<5 ISM) gill-net fishery in North Carolina is managed and regulated by species-specific fishery management plans (FMPs), and numerous Marine Fisheries Commission (MFC) rules and Division of Marine Fisheries (DMF) proclamations. However, concerns about biological impacts from the use of small-mesh gill nets remain. The primary issues to be addressed concern greater flexibility with constraining harvest in the Spotted Seatrout fishery, reducing bycatch, and to the greatest extent practical reducing conflict between gill-net users and other stakeholders. Specific management options for gill-net regulations can be found in Appendix 2: Sustainable Harvest Issue Paper.

ORIGINATION

The North Carolina Marine Fisheries Commission.

BACKGROUND

At their August 2021 business meeting, the MFC passed a motion to not initiate rulemaking on small-mesh gill nets but refer the issue through the FMP process for each species, and any issues or rules coming out of the species-specific FMP to be addressed at that time. In North Carolina, small-mesh gill nets are the predominant gear used to harvest Spotted Seatrout. Most Spotted Seatrout are harvested commercially using set gill nets or runaround gill nets. Per direction from the MFC, small-mesh gill nets must be addressed during review of the Spotted Seatrout FMP.

North Carolina General Statutes authorize the MFC to adopt rules for the management, protection, preservation, and enhancement of the marine and estuarine resources within its jurisdiction (G.S. 113–134; G.S. 143B-289.52). The MFC has authority to adopt FMPs and the DMF is charged with preparing them (G.S. 113–182.1; G.S. 143B-289.52). Further, the MFC may delegate to the DMF director in its rules the authority to issue proclamations suspending or implementing MFC rules that may be affected by variable conditions (G.S. 113–221.1; G.S. 143B-289.52). Variable conditions include compliance with FMPs, biological impacts, bycatch issues, and user conflict, among others (MFC Rule 15A NCAC 03H .0103). The estuarine gill-net fishery in North Carolina is managed and regulated by FMPs and numerous MFC rules and DMF proclamations. Rules are periodically amended to implement changes in management goals and strategies for various fisheries and are the primary mechanism for implementing FMPs under the Fisheries Reform Act of 1997 (FRA).

In recent years, modifications to gill-net management resulting from the adoption of FMPs or other circumstances have largely been implemented through the DMF director's proclamation authority, not through rulemaking. This is primarily due to the need to

implement management changes in a timely fashion and to accommodate variable conditions. Over time, this has resulted in incongruent restrictions between rules and proclamations. Additionally, many of the rules related to small-mesh gill nets were first developed prior to the FRA and have not been thoroughly evaluated since the addition of more recent rules developed through the FMP process.

The Spotted Seatrout small-mesh gill-net fishery operates year-round, but the type of gill net used varies by season and area (NCDMF 2018). Multiple species may be landed during a single trip; however, the target species usually dominates the catch (NCDMF 2008). In North Carolina, gill nets are restricted to a minimum mesh size of 2.5 inches stretched mesh [ISM; MFC Rule 15A NCAC 03J .0103(a)]. The DMF categorizes gill nets from 2.5 to less than 5 ISM as small-mesh (Daniel 2013). Although the rule uses “mesh length” and not “mesh size”, their meanings are identical for the purpose of this document; this helps to demarcate the discussion of “mesh size” from “net length” throughout the document. Small-mesh gill nets are generally classified into three categories based on how the net is deployed and fished: set gill nets, runaround gill nets, and drift gill nets [Figure 1.1; Table 1.1; (Steve et al. 2001)]. For the purposes of this document, “set” gill nets, or “set nets”, include anchored, fixed, and stationary gill nets.

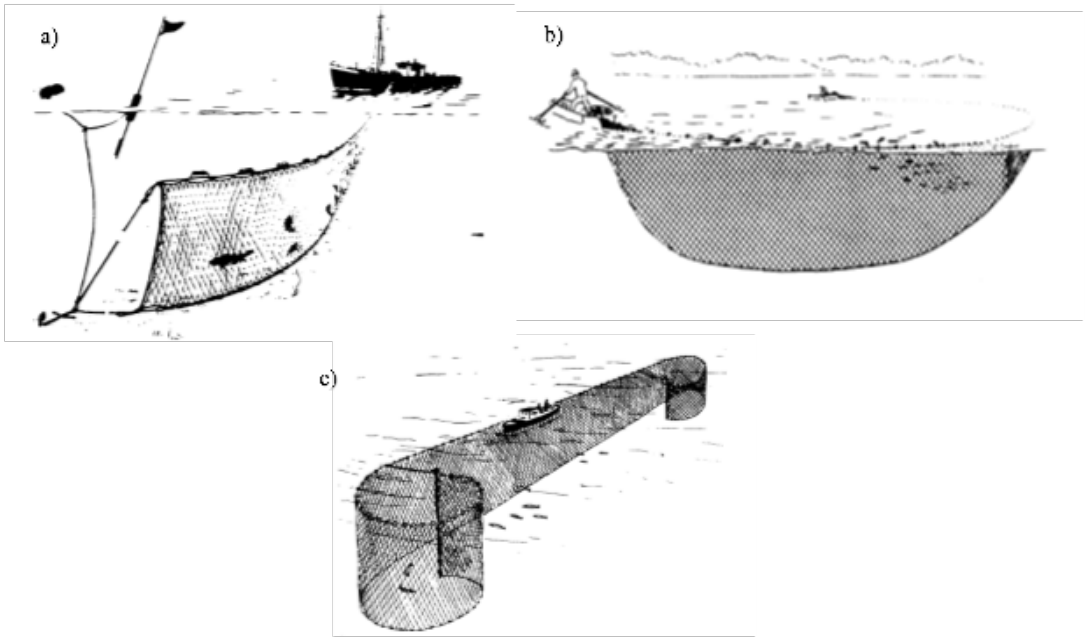

Figure 1.1 Illustrations of (a) set, (b) runaround, and (c) drift gill nets extracted from Steve et al. (2001).

Set nets (Figure 1.1a) are the second most common gill-net type used for commercial Spotted Seatrout harvest in North Carolina. They are kept stationary with the use of anchors or stakes attached to the bottom or attached to some other structure attached to the bottom, at both ends of the net (MFC Rule 15A NCAC 03I .0101). Set nets can be further classified as sink or float gill nets (Steve et al. 2001). A sink gill-net fishes from the bottom up into the water column a fixed distance by having a lead line (bottom line) heavy

enough to sink to the bottom. Depending on the height of the net and the depth of the water, the float line (top line) may or may not be submerged below the surface of the water. A float gill net may fish the entire water column by having the top line with buoys sufficient for floating on the surface of the water, or a portion of the water column depending on the depth of the net (number of meshes deep). Set nets are deployed by dropping one end of the net and running out the rest of the length of net usually in a line. Once deployed, soak times for fishing set nets vary depending on factors such as target species, water temperature, season, waterbody, and regulations (NCDMF 2018).

A runaround gill net is the most common gill-net method used for commercial Spotted Seatrout harvest in North Carolina. It is an actively fished gear used to encircle schools of fish (Figure 1.1b). They are deployed with a weight and a buoy at one end that enables the rest of the net to be fed out, creating a closed circle around the school of fish due to the vessel's path. Runaround gill nets tend to be deep nets capable of fishing the entire water column. Mesh sizes and net lengths vary depending on the target species (Steve et al. 2001). Another form of runaround gill net is the strike net or drop net. Rather than deploying the net in a circle, the net is set parallel to shore, often with one end anchored to the bank. Once the net is set, the boat is driven between the net and the shore to drive fish into the net (NCDMF 2018). Soak times for all types of runaround gill nets are almost always an hour or less.

Drift gill nets are unanchored, non-stationary gill nets that are actively attended (i.e., remain attached to the vessel or the fishing operation remains within 100 yards of the gear; Figure 1.1c) and tend to have shorter soak times than set gill nets. They are constructed with lighter lead lines to allow for the net to drift with the current. The small-mesh drift gill nets currently employed in North Carolina estuaries are primarily used to target Spanish Mackerel and Bluefish in Pamlico Sound. This gear can also be used to target Spot (as a sink net) and Striped Mullet (typically fishing the entire water column) in areas primarily from Core Sound and south (Steve et al. 2001). Drift gill nets typically account for less than 0.5% of annual Spotted Seatrout landings. However, from 2019 through 2022 drift gill nets accounted for 2.5% of Spotted Seatrout landings.

Table 1.1 Small-mesh gill net gear categories with descriptions and capture method descriptions.

Small-Mesh Gill Net Gear Categories	Sub-Categories	Gear Description	Capture Method
Anchored, Fixed, Stationary, Set	Sink	Attached to bottom or some other structure by anchors or stakes at both ends. Sink nets are fished from the bottom up into the water column	Passively Fished - For both sink and float set nets the gear is left in place for a period of time. Fish, if appropriately sized, swim into the net and are gilled.
	Float	Attached to bottom or some other structure by anchors or stakes at both ends. Float nets are fished from the top down into the water column. Depending on target species, nets fish part of the water column or the entire water column.	
Runaround	Circle	Attached to the bottom at one end. Once the end is set, the rest of the net is then fed out of a boat creating a circle and meeting back at the original set point. Generally, these nets fish the entire water column.	Actively Fished - Used to encircle a school of fish. Primary target species for this gear is Striped Mullet.
	Strike, Drop	Attached to the bottom at one end. Deployed along shore with the terminal end finishing at another point along the shore. The boat is driven into the blocked section to “drive” the fish into the net and are then retrieved.	Actively Fished - Used to corral or intercept a school of fish and then immediately retrieved. Primary target species for this gear is Striped Mullet, and Spotted Seatrout to a lesser extent.
Drift		Attached to boat or free-floating with close attendance. Lighter lead lines and no anchors allow the net to drift. Depending on target species and water depth, nets fish part of the water column or the entire water column. Primarily used in Pamlico Sound to target Spanish Mackerel and Bluefish.	Actively Fished - Drift with the water current with continuous attendance.

METHODS

Information specific to the North Carolina gill net fishery was gathered from the N.C. Trip Ticket Program and two DMF sampling programs briefly described below:

N.C. Trip Ticket Program

The N.C. Trip Ticket Program began in 1994. This program requires licensed commercial fishermen to sell their catch to licensed fish dealers, who are then required to complete a trip ticket for every transaction. Data collected on trip tickets include gear type, area fished, species harvested, and total weights of each species. Information recorded on trip tickets for gear type and characteristics is self-reported by the dealer. This information may be verified by DMF fish house staff after the fact, but the potential exists that some trips may be mischaracterized by dealers. In 2004, trip tickets included mesh size categories for gill nets: small-mesh < 5 ISM and large-mesh ≥ 5 ISM. However, the use of this new field was not prevalent until about 2008 because dealers were still using old trip tickets they had on hand.

Commercial Fish House Sampling

Commercial fishing activity is monitored through fishery-dependent (fish house) sampling. Sampling occurs dockside as fish are landed. Commercial fishermen and/or dealers are interviewed by DMF staff, and the catch is sampled. Samplers collect data on location fished, effort (soak time, net length, etc.), gear characteristics (net type, net depth, mesh size, etc.), and the size distribution of landed species.

Commercial Observer Program

On board observations of commercial estuarine gill nets, primarily set gill nets, occur through Program 466. Observers collect data on effort (soak time, net length, etc.), location fished, gear characteristics, size, and the fate (harvest, discard, etc.) of captured species. The Observer Program was born out of the need to estimate incidental takes of protected species such as sea turtles and Atlantic sturgeon in estuarine set gill nets per the Endangered Species Act Section 10 Incidental Take Permits (NMFS 2013, 2014). As a result, observations of runaround or drift gill nets are rare.

The following analysis and information presented are used to characterize the Spotted Seatrout small-mesh gill-net fishery in North Carolina relative to time, area, configuration, and species composition of the harvested and discarded catch. Data from biological years 2012 through 2022 for these three programs were used to characterize the current North Carolina Spotted Seatrout small-mesh gill-net fisheries.

Using trip ticket data, trips where Spotted Seatrout were the species of highest abundance in landings or the most abundant finfish species of those species typically targeted with small-mesh gill nets were considered targeted Spotted Seatrout trips. Basing analysis on trips where Spotted Seatrout are the presumed target species allows for results that describe the gear parameters associated with the directed Spotted Seatrout fishery (see NCDMF 2008 for further description of methodology). Once targeted Spotted Seatrout trips were identified, the method of fishing (set gill net or runaround gill net), mesh size, and net length were characterized based on available fish house sampling data from 2012 through 2022. Analysis of fish house sampling data was limited to samples where only one gear was used on the trip.

Regional analysis of the Spotted Seatrout small-mesh gill-net fishery was investigated by waterbody of landing. Waterbodies were grouped into seven regions using distinct area boundaries or clear differences in fishing practices (Figure 1.2).

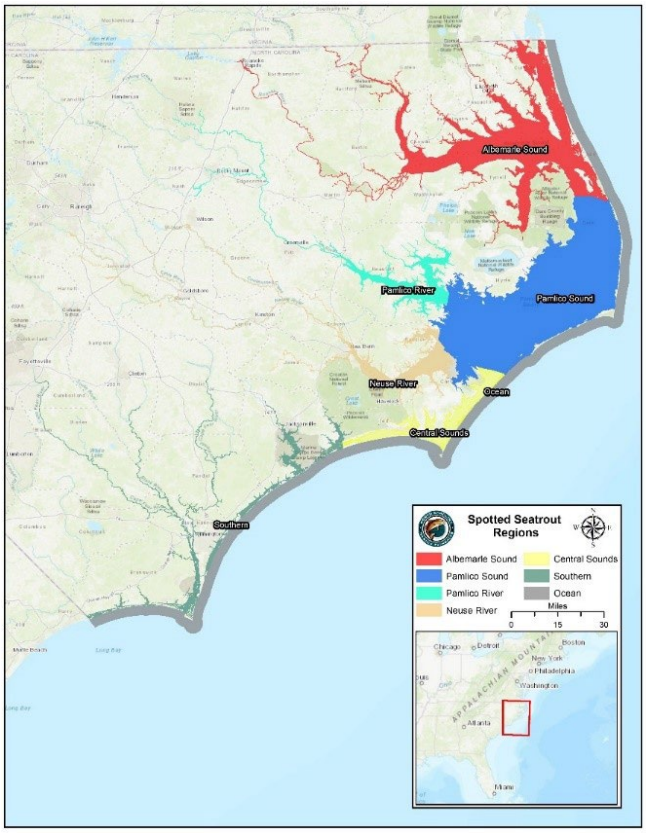

Figure 1.2. Map of defined regions used for regional characterization of the Spotted Seatrout small-mesh gill-net fishery.

RESULTS

For information regarding characterization of small-mesh gill nets across all fisheries in North Carolina please refer to the Small Mesh Gill Net Rule Modifications Information Paper presented to the MFC at its August 2021 business meeting.

Spotted Seatrout Fishery General Characterization

The commercial Spotted Seatrout fishery is currently managed with a 14” minimum size limit and 75-fish daily trip limit (except for the stop net fishery and spotted seatrout taken by hook-and-line). Since 2012, runaround gill nets have been the primary gear used to harvest Spotted Seatrout in the commercial fishery, followed by small-mesh set gill net (Figures 1.3 and 1.4). From April through October, most Spotted Seatrout harvest comes from small-mesh set gill nets. However, from November through March, commercial landings switch to runaround gill nets as Spotted Seatrout aggregate in the fall and winter and are more easily targeted by commercial fishermen (Figure 1.5).

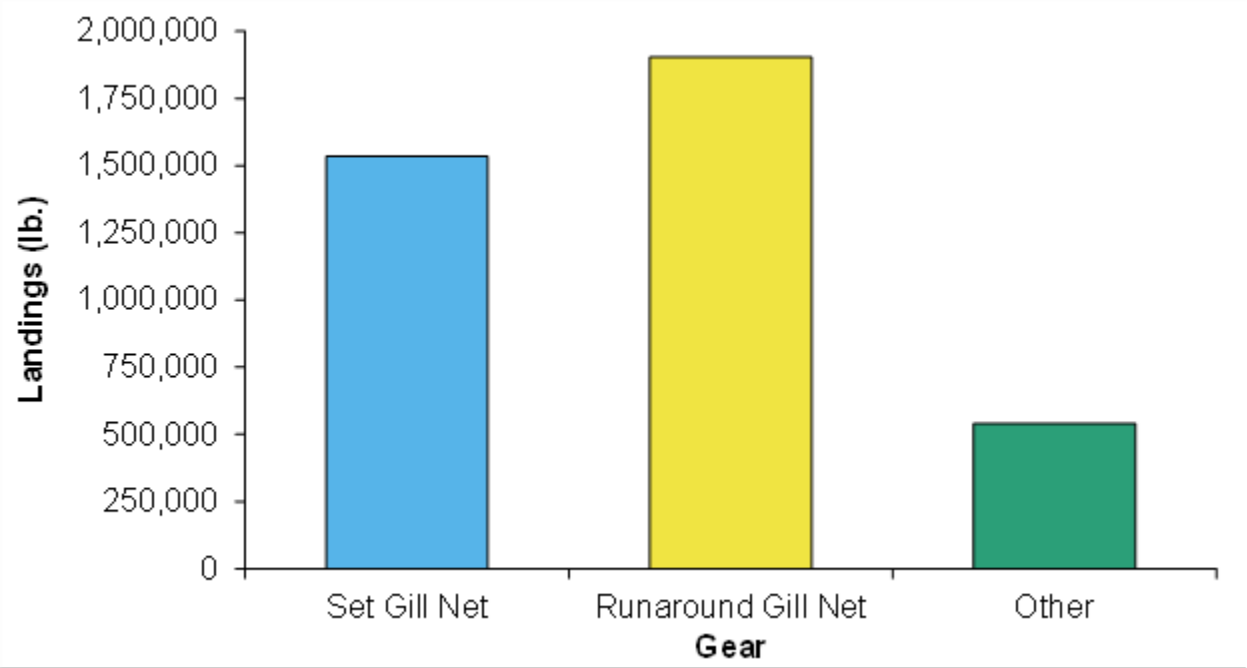

Figure 1.3. Spotted Seatrout commercial landings by gear reported through the North Carolina Trip Ticket Program, 2012–2022.

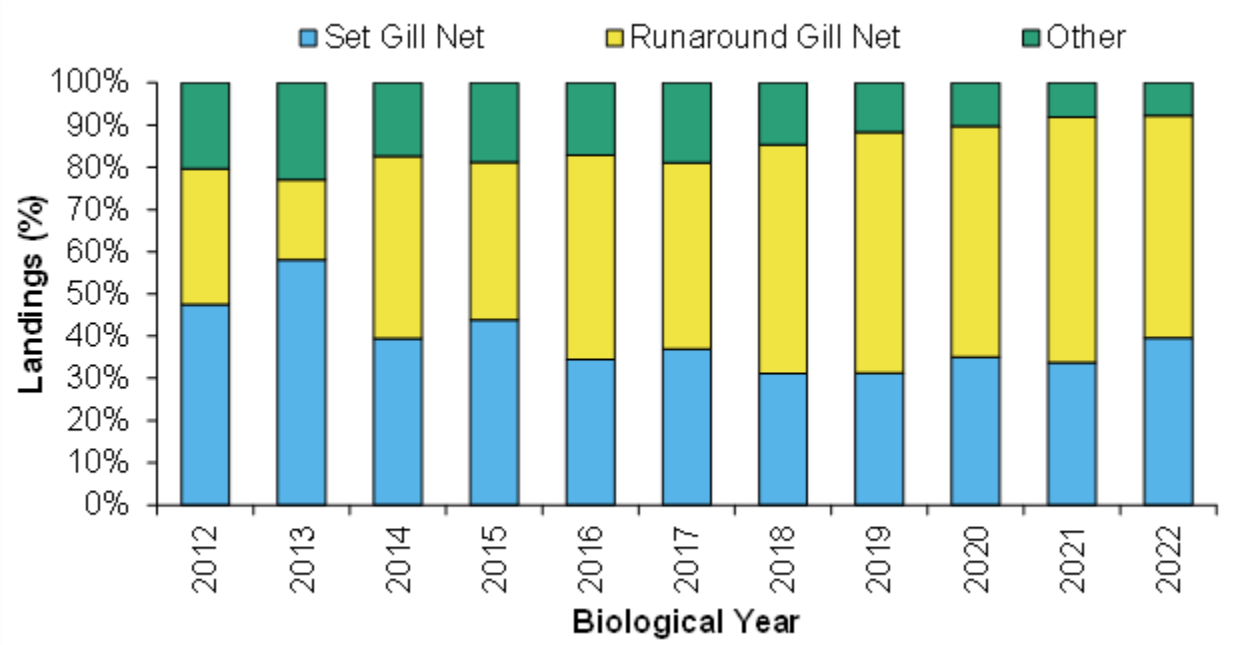

Figure 1.4. Percent of Spotted Seatrout commercial landings by year and gear reported through the North Carolina Trip Ticket Program, 2012–2022.

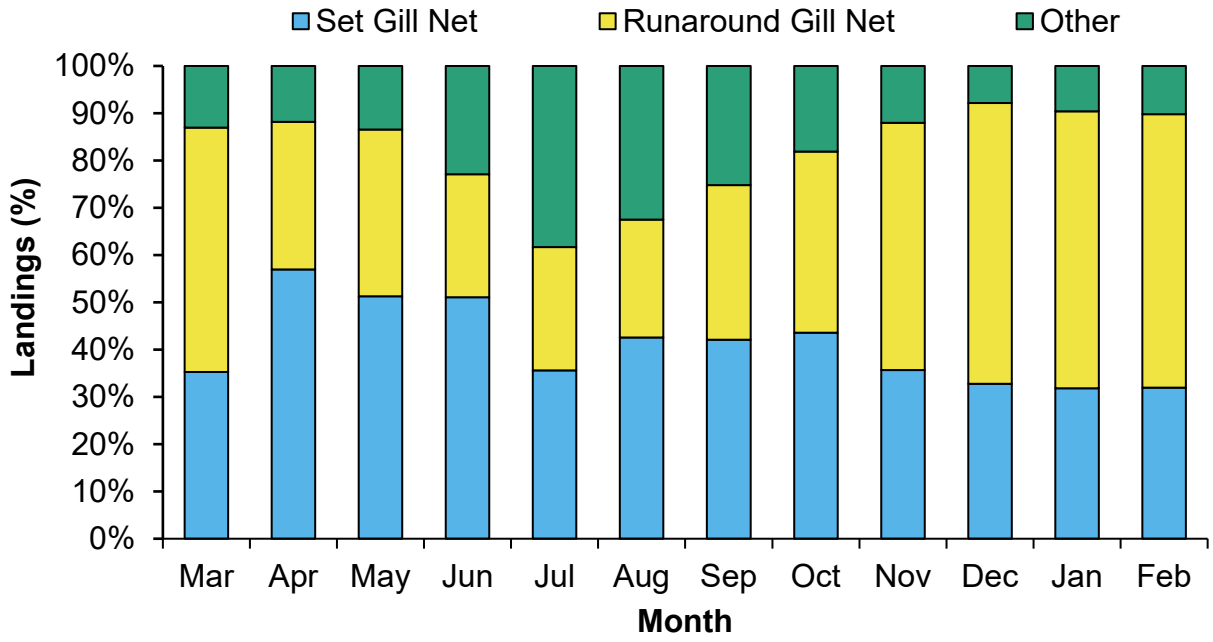

Figure 1 5. Percent of Spotted Seatrout commercial landings by month and gear reported through the North Carolina Trip Ticket Program, 2012–2022.

Spotted Seatrout are caught in small-mesh gill nets with stretched mesh sizes ranging from 2.5 ISM to 4.88 ISM. Mesh size does not appreciably affect the overall size range of Spotted Seatrout caught in small-mesh gill nets (set and runaround; Figure 1.6). As stretched mesh size increases, the minimum size of Spotted Seatrout harvested increases to some degree but there is a lot of overlap in the size of Spotted Seatrout caught with various mesh sizes. An R^2 value of 0.17 indicates a weak linear relationship between mesh size and the size of Spotted Seatrout harvested. The lack of a strong relationship between mesh size and the size of Spotted Seatrout captured makes it difficult to increase the minimum size limit or implement a slot limit without tight mesh size restrictions to protect or select for specific sizes of Spotted Seatrout. The lack of selectivity is likely due to Spotted Seatrout having a relatively soft body resulting in a wide size range of fish able to become lodged in a particular mesh size. Also, Spotted Seatrout frequently become entangled in gill nets around the mouth area either by their teeth or jaw, which results in larger Spotted Seatrout being captured than would typically become caught in the webbing of a gill net.

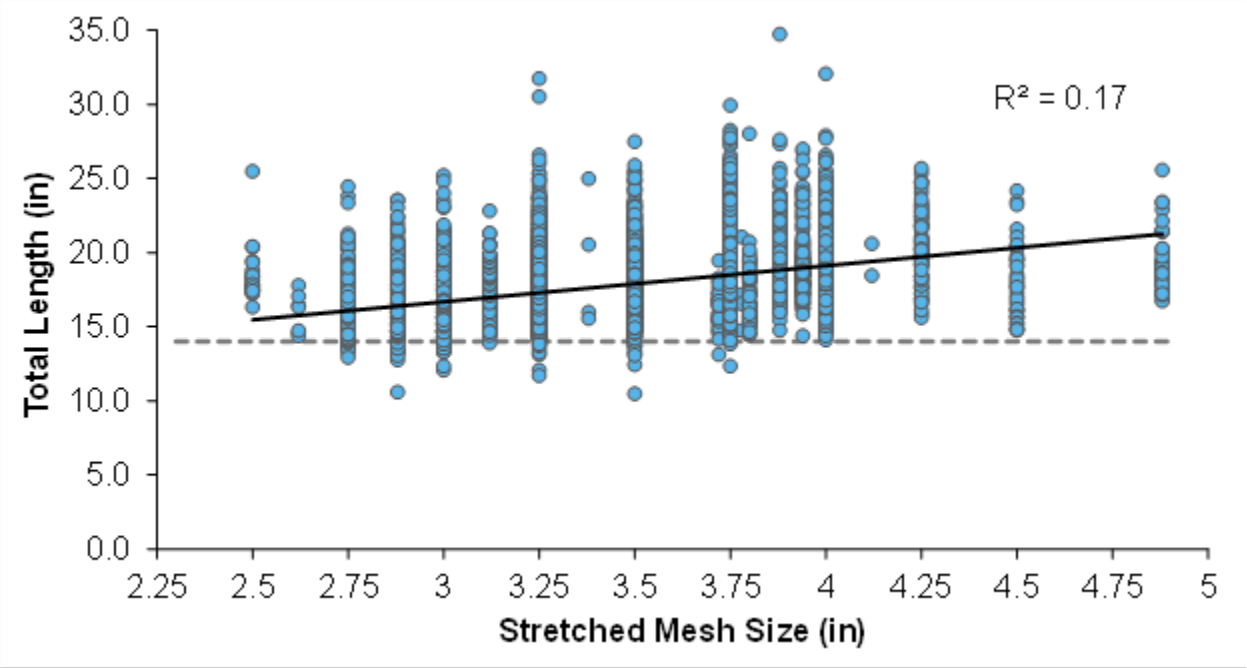

Figure 1.6. Relationship of stretched mesh size versus total length of Spotted Seatrout sampled from the commercial fish house sampling program (2012–2022). A trendline (black solid line) is provided for reference. The dashed gray line shows the current 14-inch TL minimum size limit.

An example of the impact of increasing the minimum size limit from 14 inches to 15 inches is shown in Figure 1.7. As mesh size increases, the percent of Spotted Seatrout under 15 inches (blue bars) that will be discarded decreases. From the Spotted Seatrout measured through division fish house sampling, approximately 22% of fish measured from 3 ISM gill nets are under 15 inches compared to 3% from 3.5 ISM gill nets. In this example, setting the minimum mesh size to harvest Spotted Seatrout at 3.5 ISM will result in a minimal increase in discards of sublegal fish and maximize the realized reduction if the minimum size limit is raised to 15 inches.

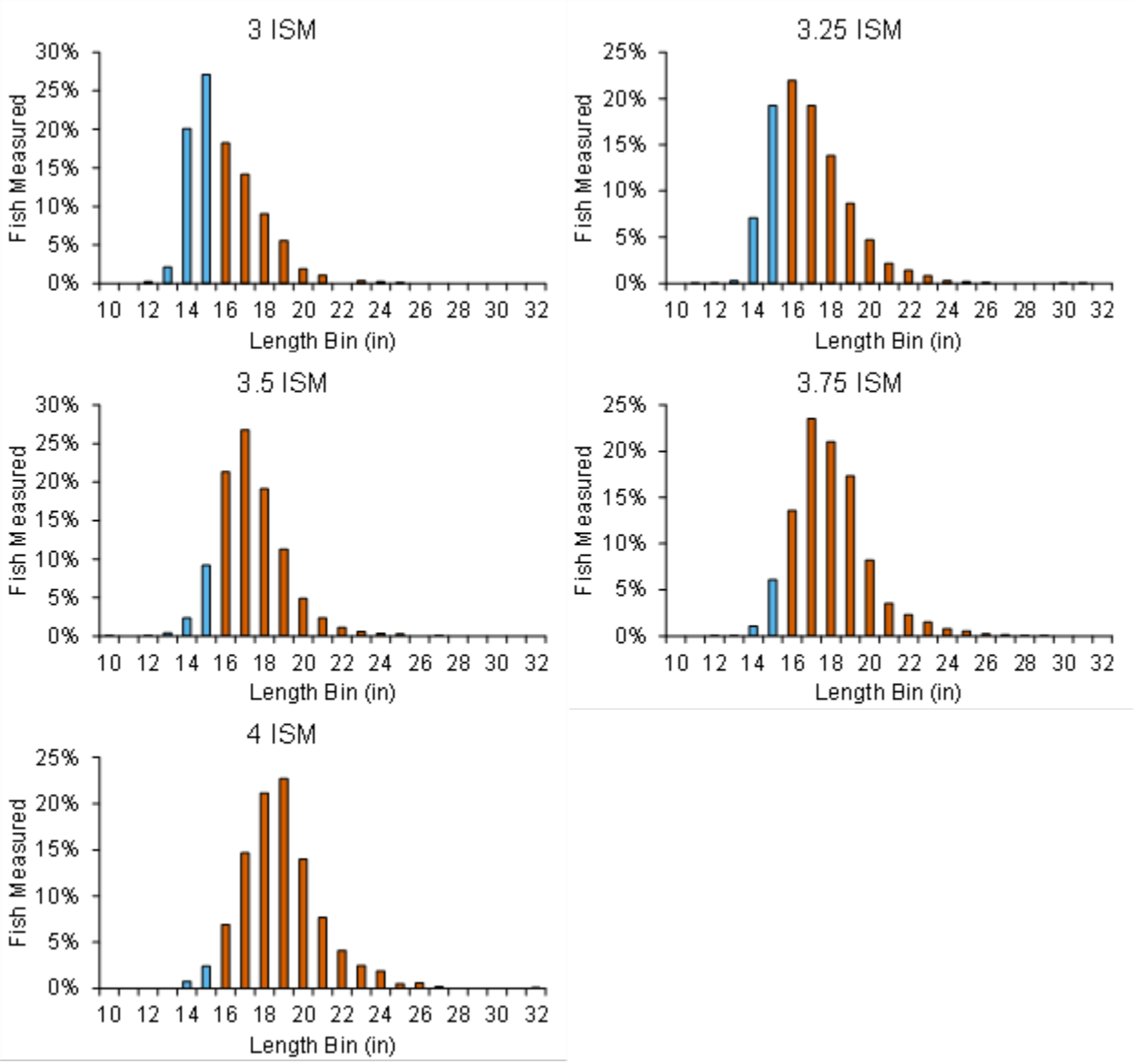

Figure 1.7. Length distribution of Spotted Seatrout measured from the division's commercial fish house sampling programs by mesh size. Blue bars indicate percent of Spotted Seatrout by size bin below the minimum size limit if it is raised to 15 inches. Orange bars indicate the percent of Spotted Seatrout by size bin above the minimum size limit if it is raised to 15 inches.

When looking at a narrow slot limit, the needed mesh size restrictions will be more severe. For example, Figure 1.8 shows the impact of a harvest slot limit of 16 inches to 20 inches (fish 20 inches and larger cannot be harvested). The difficulty in implementing mesh size restrictions for a slot limit comes when trying to balance and minimize discards of fish both below slot and above slot size (blue bars). From division fish house sampling, approximately 4% of Spotted Seatrout measured from 3 ISM gill nets are 20 inches or larger but 50% of Spotted Seatrout are below 16 inches. In comparison, approximately 31% of Spotted Seatrout measured from 4 ISM are 20 inches or larger but only 3% are below 16 inches. In this example, limiting the gill net mesh sizes used to harvest Spotted

Seatrout from 3.5 to 3.75 ISM will best minimize discards of below slot and above slot size Spotted Seatrout.

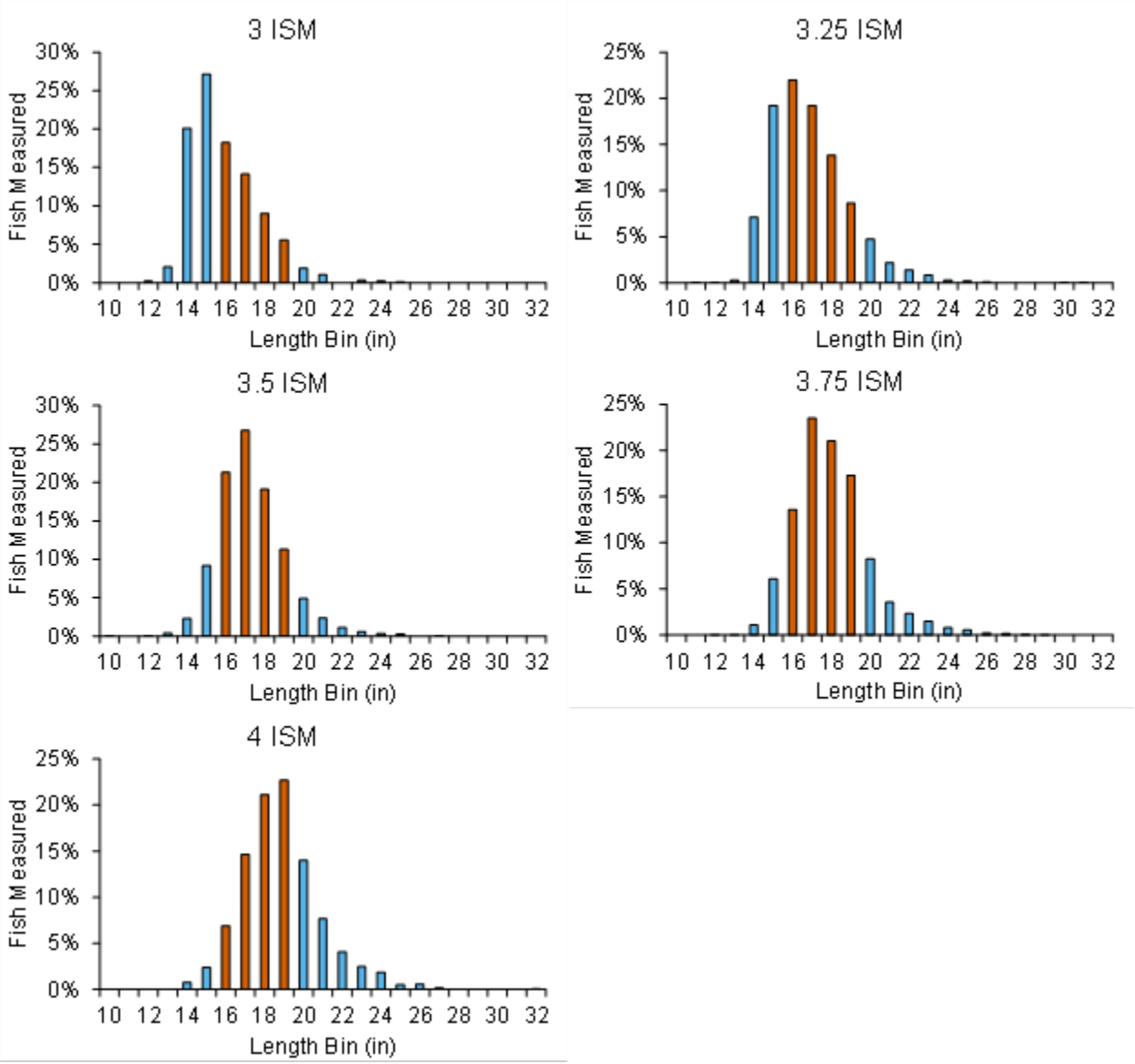

Figure 1.8. Length distribution of Spotted Seatrout measured from the division's commercial fish house sampling programs by mesh size. Blue bars indicate percent of Spotted Seatrout by size bin below the minimum size limit if it is raised to 16 inches and above the maximum size limit if it is set at 20 inches. Orange bars indicate the percent of Spotted Seatrout by size bin above the minimum size limit if it is raised to 16 inches and below the maximum size limit if it is set at 20 inches (i.e., 16–20 slot limit).

Most Spotted Seatrout harvest occurs in Pamlico Sound (28%) and the Neuse and Bay rivers (24%; Figure 1.9). These areas are followed by the Central Sounds (13%), Southern (13%), Albemarle Sound (11%), and Pamlico and Pungo rivers (9%). Runaround gill net is the primary gear used to harvest Spotted Seatrout in the Neuse and

Bay rivers and Central Sounds regions. Small-mesh set gill net is the dominant gear in the other regions. (Figure 1.10). The increase in commercial landings beginning in 2019 is largely driven by an expansion of the Spotted Seatrout fishery in the Pamlico Sound, Neuse and Bay rivers, and Pamlico and Pungo rivers regions.

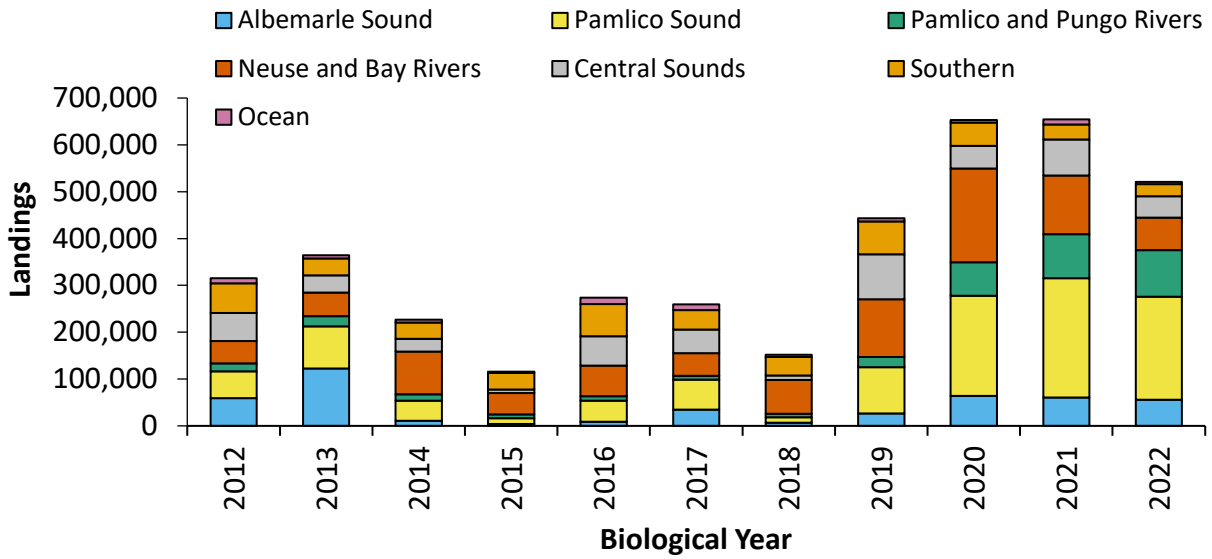

Figure 1.9. Annual commercial landings of Spotted Seatrout commercial landings by region reported through the North Carolina Trip Ticket Program, 2012–2022.

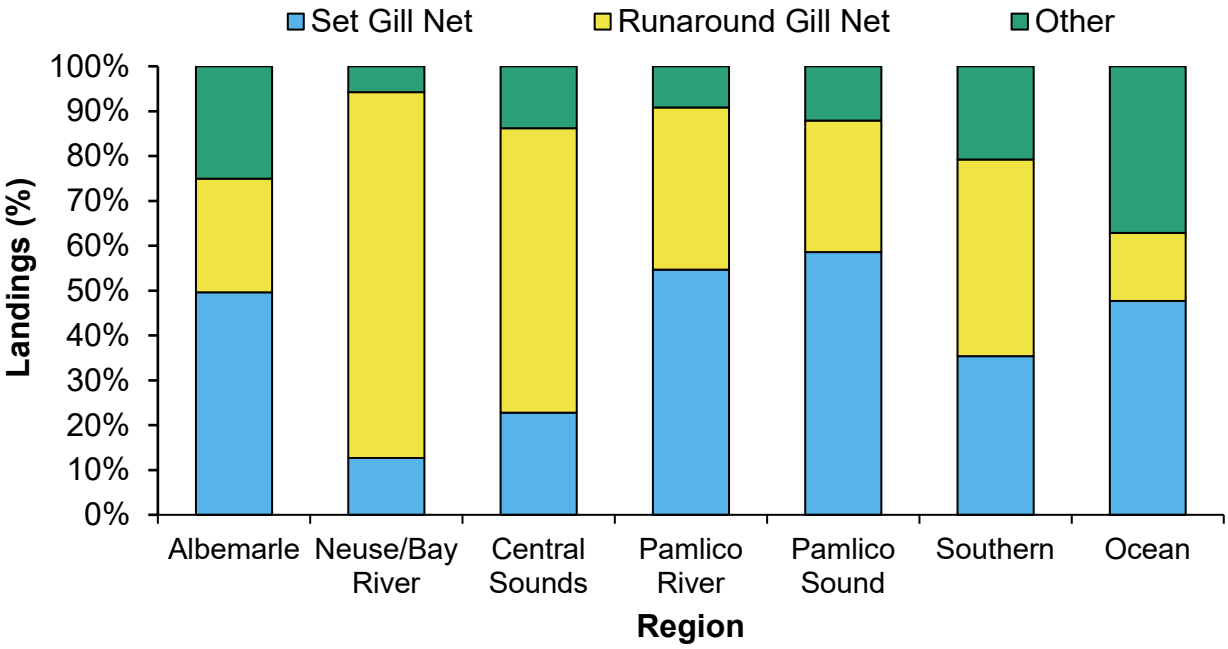

Figure 1.10. Percent of total Spotted Seatrout commercial landings by gear for each area reported through the North Carolina Trip Ticket Program, 2012–2022.

Due to the low contribution of ocean waters to the Spotted Seatrout small-mesh gill-net fishery (Figure 1.9) it is excluded from the analysis in the following gear-specific sections.

Set Gill Nets

Spotted Seatrout targeted small-mesh set gill-net trips were defined as trips where Spotted Seatrout were the species of highest abundance or the most abundant finfish species. Small-mesh set gill nets are the second most common gear used to capture Spotted Seatrout (Figures 1.3 - 1.4) in North Carolina and are the dominant gear in the Albemarle Sound, Pamlico River, Pamlico Sound, and Ocean regions (Figure 1.10). Spotted Seatrout are the third most important species targeted in the North Carolina small-mesh set gill-net fishery behind Bluefish and Spanish Mackerel (Figure 1.11). They make up the largest proportion of monthly small-mesh set gill-net trips in November, December, and January.

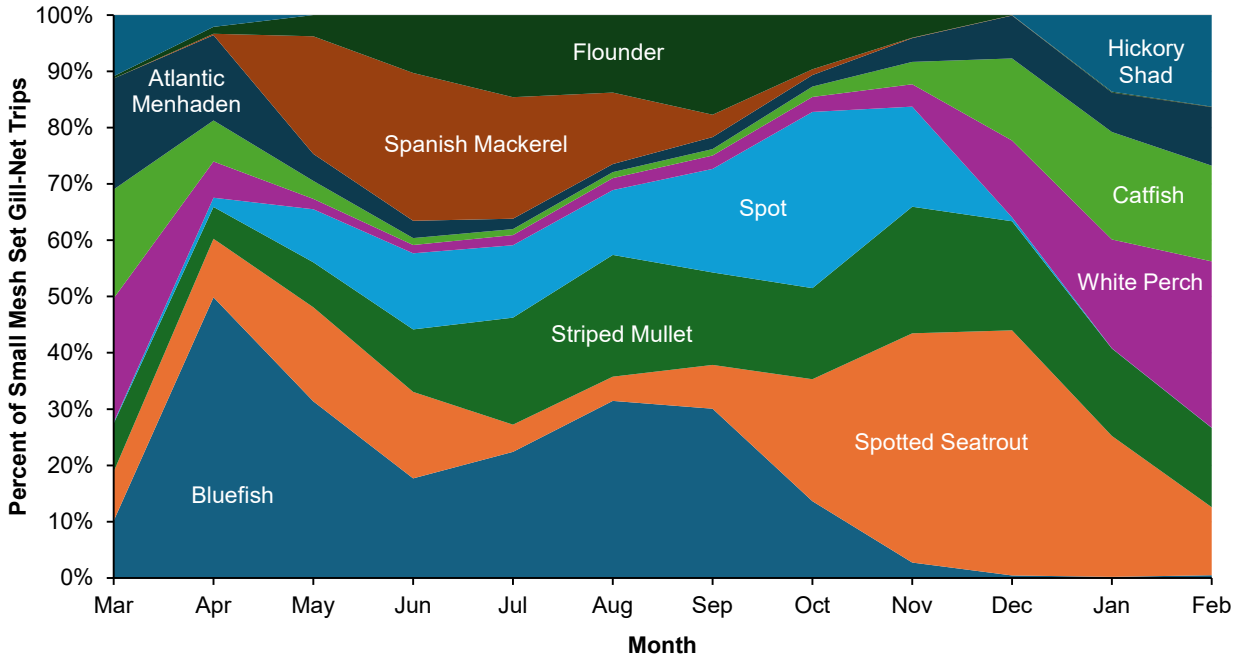

Figure 1.11. Percentage of total set gill-net trips for each of the 10 primary target species across months in N.C. waters, 2012–2022.

Spotted Seatrout are primarily landed incidentally in the set gill-net fishery during most of the year; however, they are targeted more in the fall and winter months as Spotted Seatrout aggregate in smaller waterbodies. From 2012 through 2018, the use of set gill nets to target Spotted Seatrout declined through 2018. Beginning in 2019, the number of trips increased and has remained high, although the number of participants has remained steady since 2015 (Figure 1.12). This increase in trips matches well with the increase in landings in the Spotted Seatrout fishery over the same period.

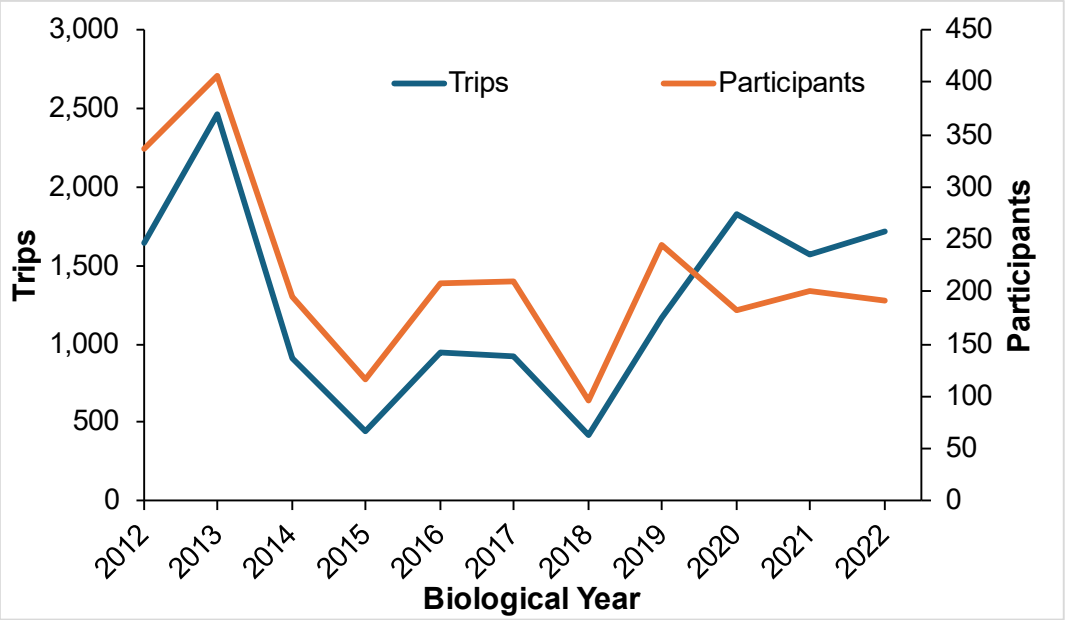

Figure 1.12 Targeted trips and participants in the set small-mesh gill-net Spotted Seatrout fishery by year reported through the North Carolina Trip Ticket Program, 2012–2022.

Approximately 50% of targeted Spotted Seatrout small-mesh set gill-net trips land 30 or less Spotted Seatrout (Figure 1.13). However, roughly 24% of trips land more than 60 Spotted Seatrout and about 16% of trips land 71–75 Spotted Seatrout per trip. Most of these trips, roughly 70%, occur from October through January (Figure 1.14). Although approximately 20% of the trips occurring each month from November through March land 71–75 Spotted Seatrout per trip (Figure 1.13). Trips landing 71–75 Spotted Seatrout per trip account for approximately 35% of small-mesh set gill-net landings from targeted Spotted Seatrout trips (Figure 1.16).

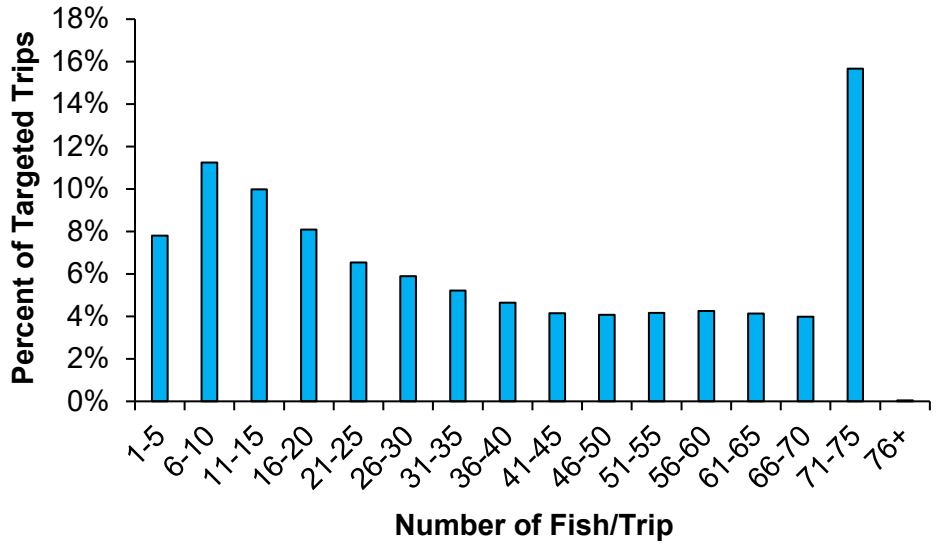

Figure 1.13. Percent of targeted Spotted Seatrout trips grouped by number of fish landed per trip in the small-mesh set gill-net fishery reported through the North Carolina Trip Ticket Program, 2012–2022.

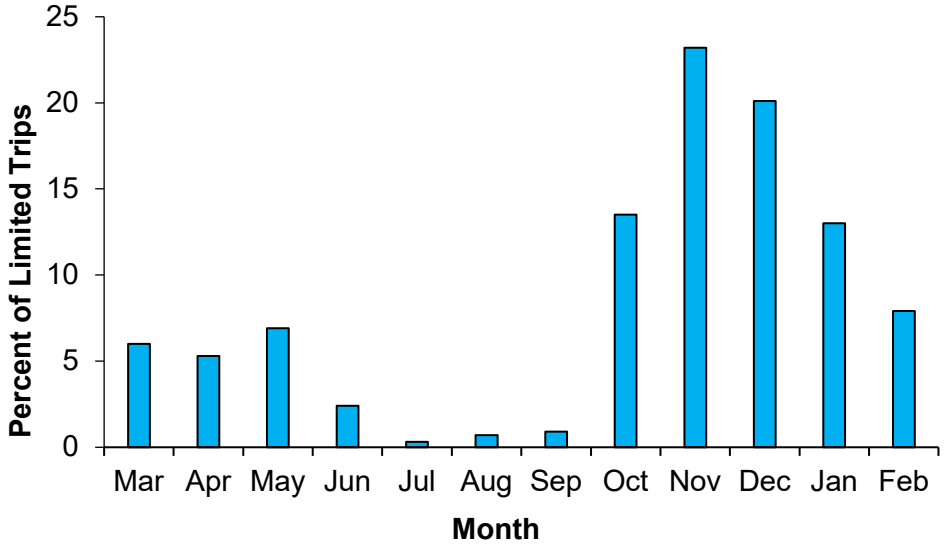

Figure 1.14. Monthly distribution of total trips reaching the trip limit (71–75 fish estimated to be landed) for targeted Spotted Seatrout trips in the small mesh set gill net fishery reported through the North Carolina Trip Ticket Program, 2012–2022. For example, if there are 100 trips in a year that reached the trip limit and 10 of those trips occurred in March, then the percent of annual trip limit trips in March will be 10%.

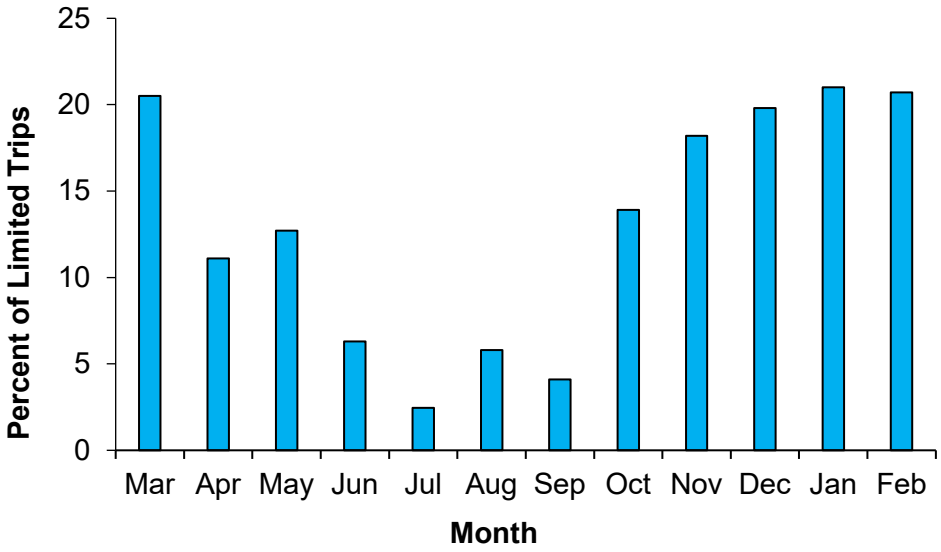

Figure 1.15. Percent of monthly trips reaching the trip limit (71–75 fish estimated to be landed) for targeted Spotted Seatrout trips in the small mesh set gill net fishery reported through the North Carolina Trip Ticket Program, 2012–2022. For example, if there are 100 trips in March and 10 of those trips reached the trip limit, then the percent of trip limit trips in March will be 10%.

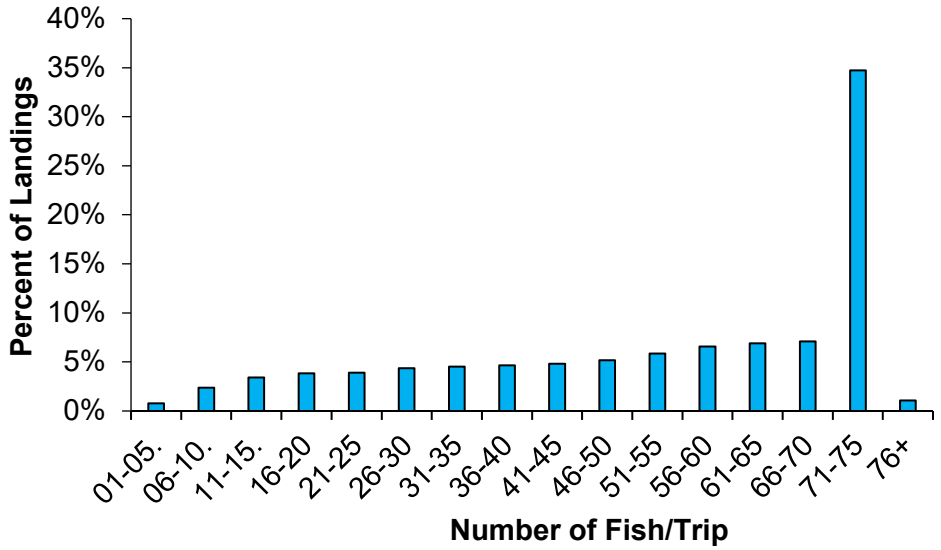

Figure 1.16. Percent of total pounds landed grouped by number of fish landed per targeted Spotted Seatrout trip in the small mesh set gill net fishery reported through the North Carolina Trip Ticket Program, 2012–2022.

The modal mesh size used to catch Spotted Seatrout in the set gill net fishery was 3.0 ISM (Table 1.2). Average total net length was 691 yards, with a maximum of 3,000 yards. Approximately 42% of all set gill net trips fished 500 yards or less of gill net (Figure 1.17). For reference, small-mesh gill nets are currently restricted to a maximum of 800 yards. Reducing the yardage fished could be a means to reduce harvest in this fishery. Yardage

restrictions would be best used in conjunction with trip limits to ensure minimal discards. For more information on possible management applications of set gill net yardage restrictions, see Appendix 2.

Table 1.2. Small-mesh (<5 inches stretched mesh) set gill net trips in North Carolina using data from the N.C. Trip Ticket Program with associated gear characteristics from commercial fish house sampling, 2012–2022.

Species	Trips	Avg Trips/Yr.	Modal Mesh	Avg Yds	Max Yds
Spotted Seatrout	14,224	1,293	3.0	696	3,000

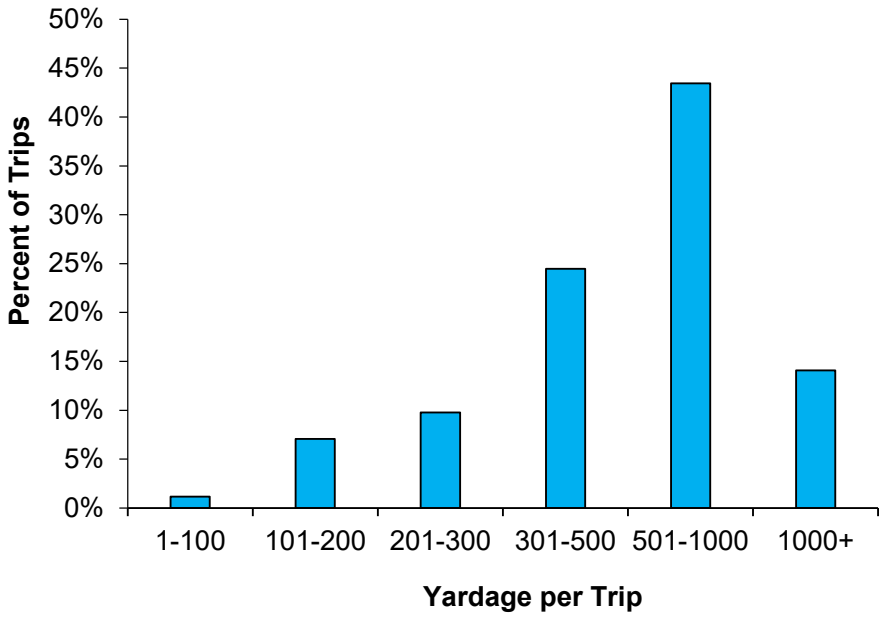

Figure 1.17. Percent of total trips sampled grouped by yards fished per trip in the Spotted Seatrout small-mesh set gill net fishery using data from the commercial fish house sampling program, 2012–2022.

When targeting Spotted Seatrout with small-mesh set gill nets, it is common to catch other species incidentally. The most common species landed incidentally when targeting Spotted Seatrout with set gill nets are Striped Mullet, Bluefish, Red Drum, White Perch, Black Drum, and Spot (Figure 1.18). Conversely, Spotted Seatrout are most commonly caught incidentally when set gill net fishermen are targeting Bluefish, Striped Mullet, and Spot (NC trip ticket data). This overlap between the Spotted Seatrout and Bluefish, Striped Mullet, and Spot set gill net fisheries could have management implications for these fisheries if gear restrictions are put in place to restrict Spotted Seatrout harvest.

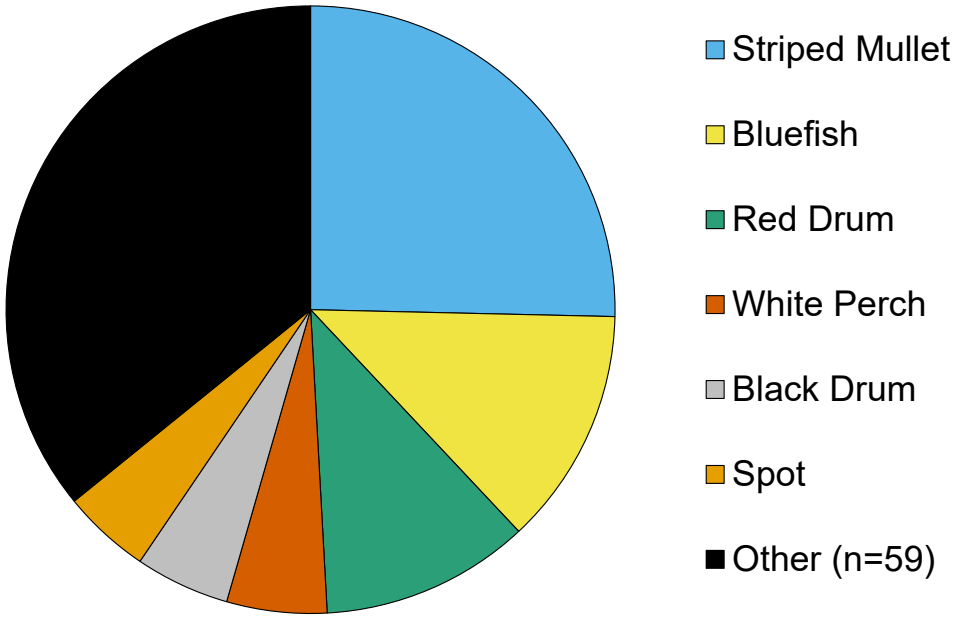

Figure 1.18. Proportion of incidental catch landed by species in the set small-mesh set gill-net Spotted Seatrout fishery reported through the North Carolina Trip Ticket Program, 2012–2022.

Spotted Seatrout discards in the set gill-net fishery are difficult to characterize due to limited data but appear to be minimal based on observations from the commercial observer program. Of the over 3,400 Spotted Seatrout observed in set small-mesh gill nets (2012–2022), 392 fish were discarded. A discard rate of 11.3%. The low rate of Spotted Seatrout discards in the set small-mesh fishery is likely due to there being an adequate trip limit for commercial harvest. Increased restrictions on Spotted Seatrout harvest could increase discards in this fishery. For more information on Spotted Seatrout bycatch in the set gill-net fishery, please refer to the Spotted Seatrout Bycatch section of the FMP.

Discards of other species from Spotted Seatrout targeted small-mesh set gill net trips could not be characterized due to limited data. Of the 1,044 observed small mesh set gill net trips observed from the observer program (2012–2022), only 114 Spotted Seatrout targeted trips have been observed. In those trips, 18 managed species were discarded, including Atlantic Menhaden, Red Drum, Black Drum, Blue Crab, and Southern Flounder.

Runaround Gill Nets

Spotted Seatrout targeted runaround gill-net trips were defined as trips where Spotted Seatrout were the species of highest abundance in landings or were the most abundant finfish species. Runaround gill nets are the predominant gear used to catch Spotted Seatrout in North Carolina (Figures 1.3 and 1.4) and the dominant gear in the Neuse and Bay rivers, Central Sounds, and Southern regions (Figure 1.10). The runaround gill-net fishery is more targeted than the set gill-net fishery and is the main gear used to catch Spotted Seatrout when they form aggregations in smaller waterbodies from November

through March (Figure 1.5). During this time, catches from runaround gill nets can be higher than other times of the year as fishermen target Spotted Seatrout after the fall Striped Mullet season. Spotted Seatrout is the second most targeted species in the North Carolina runaround gill-net fishery (Figure 1.19). Spotted Seatrout targeted trips make up the largest proportion of runaround gill-net trips from December through March.

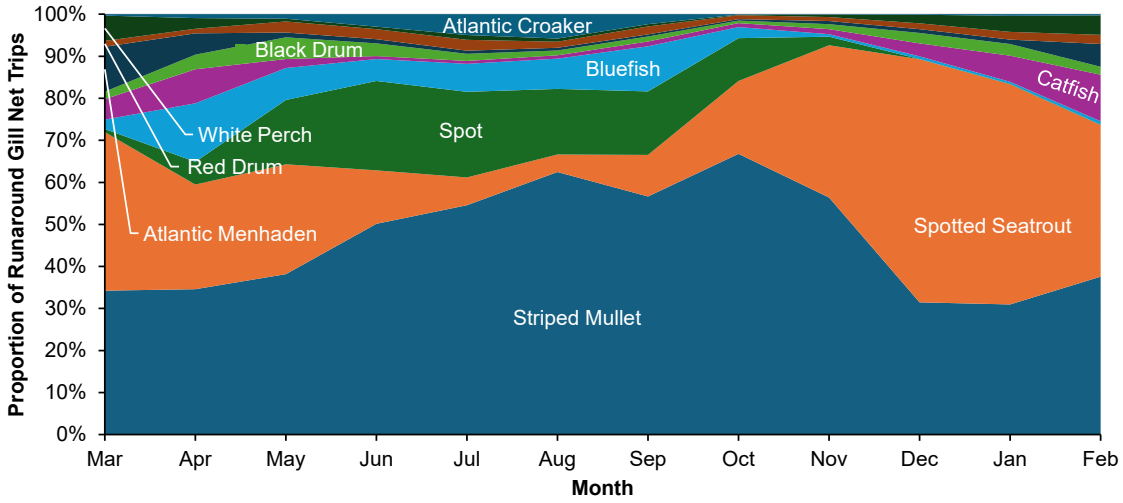

Figure 1.19. Percent of total runaround gill-net trips for each of the 10 primary target species across months in N.C. waters during 2012–2022.

From 2012 through 2018, effort and participation in this fishery remained relatively consistent, then increased sharply in 2019 and has remained high through 2022 (Figure 1.20). The increase in targeted Spotted Seatrout trips could be due to fishermen shifting to the fishery from other more restricted fisheries.

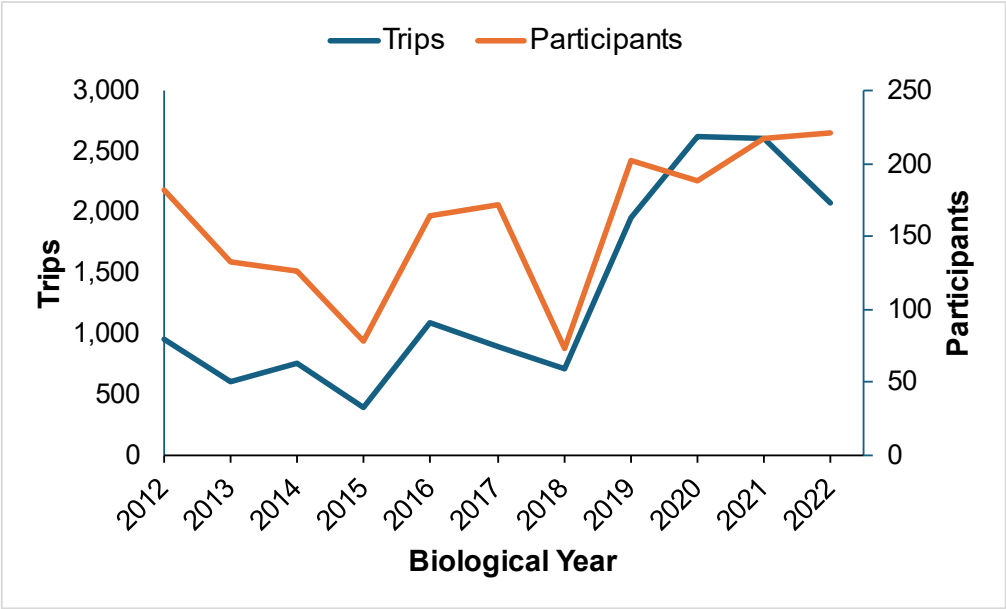

Figure 1.20. Targeted trips and participants in the runaround gill-net Spotted Seatrout fishery by year reported through the North Carolina Trip Ticket Program, 2012–2022.

Runaround gill nets tend to land more Spotted Seatrout per trip than set gill nets, with roughly 33% of trips landing 30 or less Spotted Seatrout. Approximately 38% of targeted Spotted Seatrout runaround gill-net trips land more than 60 Spotted Seatrout with 27% of targeted trips landing 71–75 Spotted Seatrout (Figure 1.21). This is likely due to runaround gill nets being able to better target Spotted Seatrout aggregation areas in the fall and winter months. Most of these trips, roughly 73%, occur from October through January (Figure 1.22). Approximately 30% of the trips occurring each month from November through March land 71–75 Spotted Seatrout per trip (Figure 1.23). Trips landing 71–75 Spotted Seatrout per trip account for approximately 47% of runaround gill-net landings from targeted Spotted Seatrout trips (Figure 1.24).

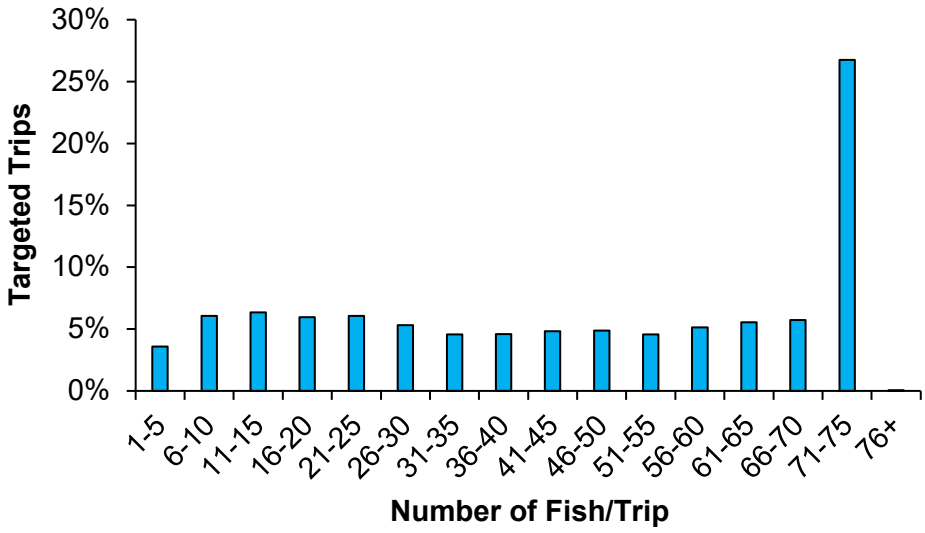

Figure 1.21. Percent of targeted Spotted Seatrout trips grouped by number of fish landed per trip in the runaround gill-net fishery reported through the North Carolina Trip Ticket Program, 2012–2022.

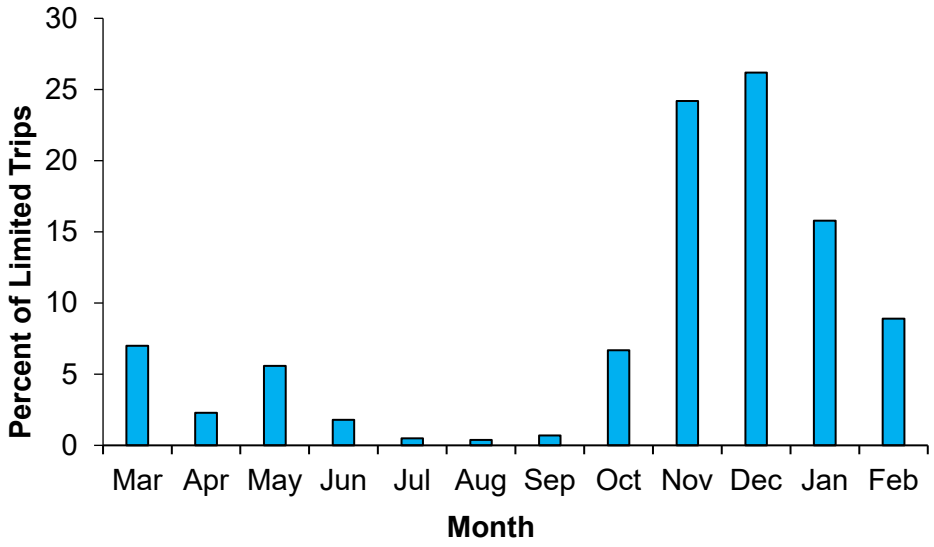

Figure 1.22. Monthly distribution of total trips reaching the trip limit (71–75 fish estimated to be landed) for targeted Spotted Seatrout trips in the runaround gill-net fishery reported through the North Carolina Trip Ticket Program, 2012–2022. For example, if there are 100 trips in a year that reached the trip limit and 10 of those trips occurred in March, then the percentage of annual trip limit trips in March will be 10%.

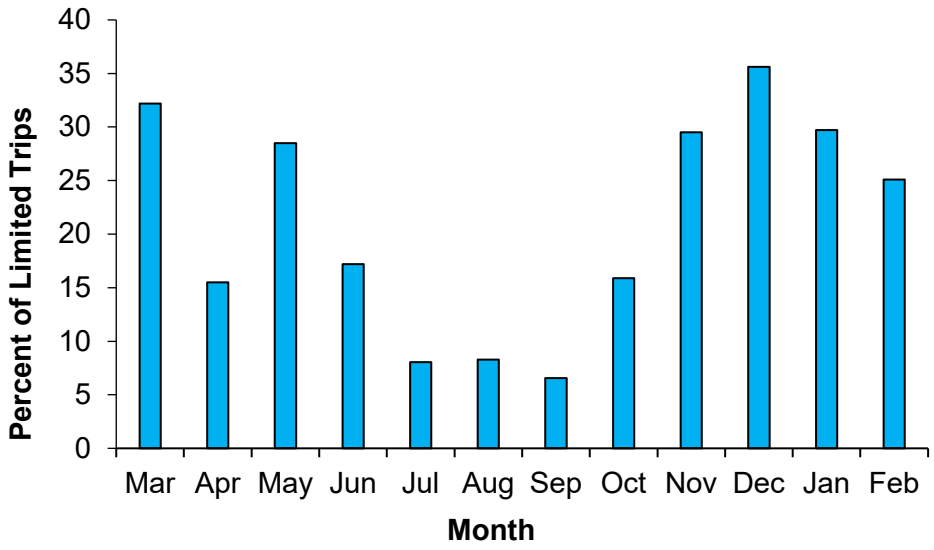

Figure 1.23. Percent of monthly trips reaching the trip limit (71–75 fish estimated to be landed) for targeted Spotted Seatrout trips in the runaround gill-net fishery reported through the North Carolina Trip Ticket Program, 2012–2022. For example, if there are 100 total trips in March and 10 of those trips reached the trip limit, then the percentage of trip limit trips in March will be 10%.

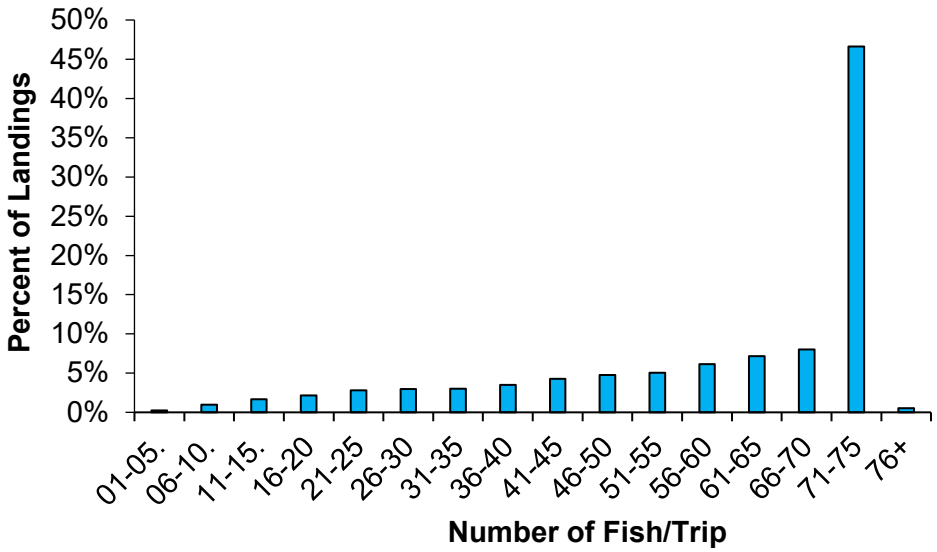

Figure 1.24. Percent of total pounds landed grouped by number of fish landed per targeted Spotted Seatrout trip in the runaround gill-net fishery reported through the North Carolina Trip Ticket Program, 2012–2022.

Runaround gill nets have a higher modal mesh size (3.75 ISM) than set small-mesh gill nets (3.0 ISM; Table 1.3). The average net length is 430 yards with a maximum of 3,000 yards, with 72% of trips fishing 500 yards (Figure 1.25). Runaround gill nets tend to be shorter than set gill nets because runaround gill nets are actively fished to encircle schools of fish. This allows for less yardage needed to catch the fish than the passively fished set gill nets. Since the runaround gill nets are already shorter than set gill nets, and can be fished several times consecutively, maximum yardage restrictions may not be effective in restricting harvest in this fishery. For more information on possible management applications of runaround gill net yardage restrictions, see Appendix 2.

Table 1.3. Small-mesh (<5 inches stretched mesh) runaround gill-net trips in North Carolina using data from the N.C. Trip Ticket Program with associated gear characteristics from fish house sampling, 2012–2022.

Species	Trips	Avg Trips/Yr.	Modal Mesh	Avg Yds	Max Yds
Spotted Seatrout	14,749	1,340	3.75	430	3,000

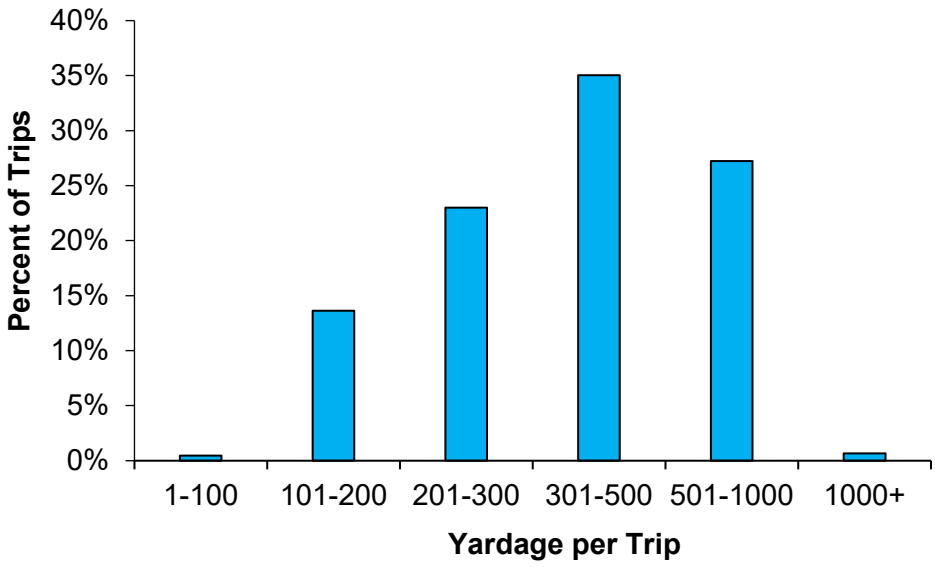

Figure 1.25. Percent of total trips sampled grouped by yards fished per trip in the Spotted Seatrout runaround gill net fishery using data from the commercial fish house sampling program, 2012–2022.

When targeting Spotted Seatrout with runaround gill nets, it is common to catch other species incidentally. The most common species landed incidentally when targeting Spotted Seatrout with runaround gill nets are Striped Mullet, Red Drum, Black Drum, Bluefish, White Perch, and Spot (Figure 1.26). Conversely, Spotted Seatrout are most commonly caught incidentally when runaround gill-net fishermen are targeting Striped Mullet, Spot, and Bluefish (NC trip ticket data). This overlap between the Spotted Seatrout and Striped Mullet, Spot, and Bluefish runaround gill-net fisheries could have management implications for these fisheries if gear restrictions are put in place to restrict Spotted Seatrout harvest.

No data is available to characterize discards in this fishery because the observer program does not prioritize observing runaround gill-net trips.

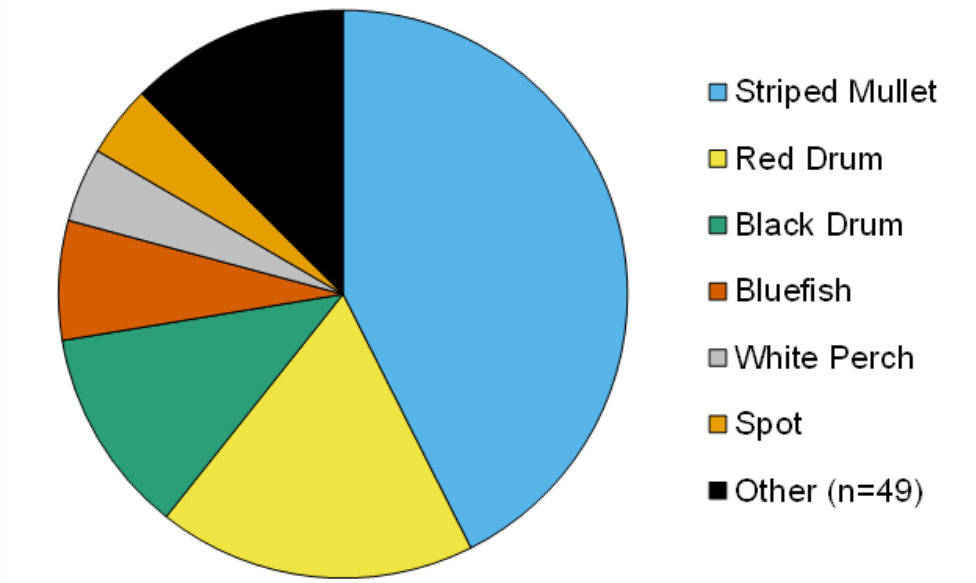

Figure 1.26. Proportion of incidental catch landed by species in the runaround gill-net Spotted Seatrout fishery reported through the North Carolina Trip Ticket Program, 2012–2022.

Appendix 2: ACHIEVING SUSTAINABLE HARVEST IN THE NORTH CAROLINA SPOTTED SEATROUT FISHERY

ISSUE

Implement management measures to end overfishing and achieve sustainable harvest in the North Carolina Spotted Seatrout fishery.

ORIGINATION

The North Carolina Division of Marine Fisheries (DMF).

BACKGROUND

North Carolina and Virginia tagging studies indicate Spotted Seatrout in North Carolina coastal waters are part of a combined North Carolina and Virginia stock (Ellis 2014). The 2022 North Carolina Spotted Seatrout benchmark stock assessment indicated the Spotted Seatrout stock in North Carolina and Virginia waters is not overfished; however, overfishing is occurring (NCDMF 2022). Reference point thresholds for the Spotted Seatrout stock status are based on a 20% spawning potential ratio which is the comparison of spawning stock biomass (SSB) under a specific fishing regime – i.e., 20% – to a hypothetical unfished SSB. If SSB is below this ratio, the stock is overfished. If fishing mortality (F) is above the level that would lead to this ratio, overfishing is occurring. Due to large uncertainty in the stock assessment terminal year (2019) and based on the recommendation of the external, independent peer review panel, a weighted average of F and SSB from 2017–2019 was used to represent the terminal year and to estimate the threshold and target reference points (NCDMF 2022). The SSB target ($SSB_{30\%}$) and SSB threshold ($SSB_{20\%}$) were estimated at 3,778,723 pounds and 2,519,884 pounds respectively and both were based on 2017–2019 averages. The estimated $SSB_{2019Avg}$ was 4,980,243 pounds which indicates the Spotted Seatrout stock is not overfished (Figure 1). The F target ($F_{30\%}$) and F threshold ($F_{20\%}$) were estimated at 0.38 and 0.60 respectively and were also based on 2017–2019 averages. $F_{2019Avg}$ was estimated at 0.75 which is above the threshold indicating overfishing is occurring (Figure 2.1).

The General Statutes of North Carolina require a Fishery Management Plan to specify a timeframe not to exceed two years from the date of adoption of the plan to end overfishing (G.S. 113–182.1). A harvest reduction of 19.9% is required to reach the $F_{20\%}$ threshold while a harvest reduction of 53.9% will reach the $F_{30\%}$ target. A harvest reduction of at least 19.9% meets the statutory requirement to end overfishing. In developing management measures in Amendment 1 to end overfishing, only harvest reductions from the North Carolina portion of Spotted Seatrout harvest were considered. The original Spotted Seatrout FMP and Supplement A management will remain in place until adoption of Amendment 1 to the Spotted Seatrout Fishery Management Plan.

Discussion of management measures focuses on quantifiable measures that meet the reductions necessary to comply with statutory requirements. Harvest of Spotted Seatrout primarily occurs in the recreational fishery, however; harvest in both the recreational and commercial fisheries increased sharply in 2019 and has remained high through 2022

(Figure 2.1). As such, discussion will focus on both sectors. Management measures considered include seasonal closures, size limits, trip/creel limits, and combinations of these management measures. For an in-depth characterization of the commercial and recreational fisheries as well as management measures intended to support sustainable harvest, please see Appendix 1: Small Mesh Gill Net Characterization in the North Carolina Spotted Seatrout Fishery and Appendix 3: Supplemental Management Options in the North Carolina Spotted Seatrout Fishery. Single solution management measures that do not meet the necessary reductions to comply with statutory requirements will still be discussed here. Such measures may be included in combination management options but will not be presented as single solution management options.

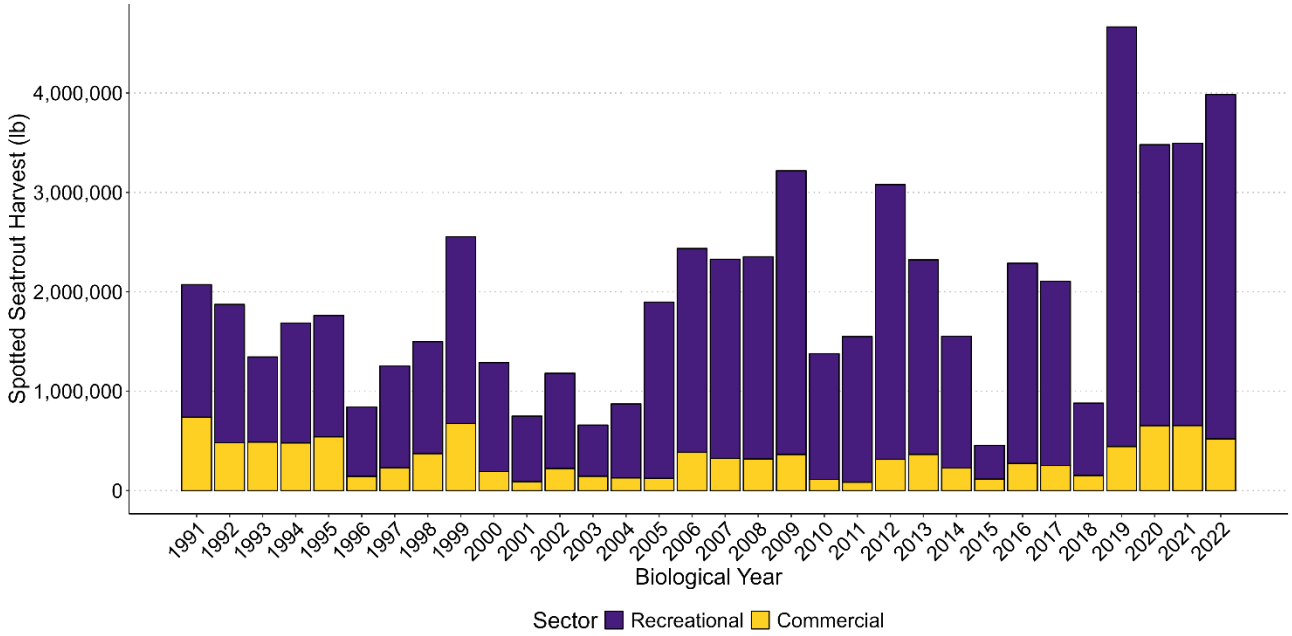

Figure 2.1. Annual harvest of Spotted Seatrout in pounds by biological year (March–February) and sector, 1991–2022. Bars are total annual harvest with commercial harvest as the yellow portion and recreational harvest as the purple portion of the total.

AUTHORITY

G.S. 113–134 RULES
G.S. 113–182 REGULATION 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
15A NCAC 03H .0103 PROCLAMATIONS, GENERAL
15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS
15A NCAC 03M .0522 SPOTTED SEATROUT

DISCUSSION

Management carried forward

There are management measures from the original FMP to carry forward into Amendment 1 unless otherwise changed in Amendment 1. Management measures from the original Spotted Seatrout FMP that will be carried forward into Amendment 1 are:

- It is unlawful to set gill nets in Joint Fishing Waters from 12:01 A.M. on Saturday to 12:01 A.M. on Monday except in Albemarle and Currituck sounds.
- It is unlawful for a commercial fishing operation to possess more than the recreational bag limit of Spotted Seatrout per person per day taken by hook-and-line.
- It is unlawful to take more than the recreational bag limit of Spotted Seatrout per person per day for recreational purposes.
- 75-fish commercial trip limit (excluding for the stop net fishery and spotted seatrout taken by hook-and-line)

Size Limits

Throughout this section, unless otherwise specified, all lengths refer to total length (TL), which is a measurement from the tip of the snout to the tip of the compressed tail.

Size limits are a common fisheries management tool designed to protect smaller, juvenile fish from harvest until at least a portion of these fish are large enough to spawn and thus contribute to sustaining the population. Size limits should be set based on management objectives and species life history as these factors influence the effectiveness of the management. For example, setting a size limit below the length at which 50% of females are mature (L_{50}) does not allow most females to be large enough to spawn prior to being harvested. The Atlantic States Marine Fisheries Commission (ASMFC) manages Spotted Seatrout in all Atlantic states that have a declared interest in the species under the Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout (ASMFC 2012). The Omnibus Amendment sets a minimum size limit of 12 inches. In North Carolina, female Spotted Seatrout L_{50} is estimated at 9.88 inches (NCDMF 2022) with nearly all female Spotted Seatrout mature by the time they are recruited to the fishery at 14 inches (Roumillat and Brouwer, 2004; Jensen, 2009).

Spotted Seatrout fecundity has been shown to increase with fish size as larger females produce more eggs and spawn more frequently (Brown-Peterson and Warren, 2001; Nieland et al., 2002; Roumillat and Brouwer, 2004; Murphy et al., 2010). In many species, due to their increased reproductive capacity, large, female fish are expected to have a disproportionately large contribution to populations (Froese 2004; Berkeley et al. 2004; Barneche et al. 2018). More recently however, the general impact of size-specific contributions of individual fish to populations has come into question with some evidence that the collective reproductive output of many, smaller, mature fish may contribute more to populations compared to the reproductive output of fewer, larger fish (Barneche et al.

2018; Lavin et al. 2021) indicating that simply protecting “BOFFFs” (big old fat fecund female fish) may not have the desired conservation effect.

Generally, recreational anglers and commercial fishers in North Carolina target any Spotted Seatrout of legal size. Fish harvested commercially tend to be slightly larger than those harvested recreationally (Table 2.1). There is a dedicated catch and release segment of the recreational fishery (see Recreational Fishery section for more detail). Spotted Seatrout are harvested for consumption regardless of sector.

Slot limits are a specific type of size limit where harvest is restricted to fish above a minimum size but below a maximum size. Sometimes slot limit management will include a trophy limit which allows limited harvest of fish above the maximum size. A slot limit for Spotted Seatrout could protect fish below the minimum size that are not large enough to spawn and fish above the maximum size that may spawn more often and produce more eggs per batch (Brown-Peterson and Warren, 2001; Nieland et al., 2002; Roumillat and Brouwer, 2004; Murphy et al., 2010). Slot limits can help balance various competing interests that may exist in a fishery and provide a path to achieve management goals (Ahrens et al. 2020). For example, the Spotted Seatrout fishery includes part-time and full-time commercial fishers and part-time and full-time charter guides interested in the economic benefits of the fishery and recreational anglers who may want a robust trophy fishery or to maximize harvest potential, among a variety of other interests (Ahrens et al., 2020).

Table 2.1 Mean, minimum, and maximum lengths (fork length, inches) of Spotted Seatrout measured from the commercial and recreational fisheries, calendar years 2012–2022.

Year	Commercial				Recreational			
	Mean Length	Min Length	Max Length	Total Number Measured	Mean Length	Min Length	Max Length	Total Number Measured
2012	16.5	7.4	31.1	4,822	16.5	13.0	24.1	939
2013	16.7	8.7	28.5	6,144	16.8	10.1	23.5	865
2014	17.3	5.5	28.3	3,321	17.6	13.1	26.0	381
2015	18.3	8.9	30.9	2,676	16.9	12.8	25.0	154
2016	17.3	9.4	31.7	3,025	16.8	13.0	25.2	647
2017	17.6	7.6	32.9	3,066	17.0	11.6	25.8	864
2018	17.2	10.5	28.0	1,180	15.7	9.3	23.3	274
2019	17.3	10.1	28.9	2,622	16.7	10.7	24.6	1,574
2020	17.5	10.9	33.4	2,851	17.0	12.1	26.8	1,119
2021	17.5	10.9	29.9	3,432	17.0	11.1	26.5	1,019
2022	17.9	13.2	28.3	3,314	17.4	12.6	28.0	632

As a standalone management measure, changes to the current Spotted Seatrout minimum size limit are unlikely to reach the necessary harvest reductions to meet statutory requirements. Reductions from increasing the minimum size limit are most likely to be achieved in the short term while long term harvest reductions are lower with some portion of harvest recouped. A delay in harvest could allow more fish to spawn prior to harvest, providing non-quantifiable benefits to the stock. However, Spotted Seatrout growth rates would likely minimize the non-quantifiable benefits from harvest delay as

sub-legal fish are recruited to the fishery within a spawning season. Increasing the minimum size limit to 15 inches appears to result in an 8.6% harvest reduction. On average, Spotted Seatrout grow 4.5 inches between year one and year two (Table 2.2) meaning a 14-inch fish at the beginning of the biological year (March) is likely to be well over a 15-inch minimum size during the spawning season (May-August). Most harvest occurs in October, November, and December which means fish well below a 15" minimum size will likely enter the fishery prior to the end of the fishing year but may have a chance to spawn prior to being subject to harvest in the fall. Fish of sub-legal size in the fall would probably not recruit to the fishery until the following spring allowing for some reduction in harvest. As females grow faster than males, sub-legal female fish will recruit to the fishery more rapidly diminishing any potential quantifiable or non-quantifiable benefits from a size limit increase. With the current minimum size at L_{100} and the growth rates of Spotted Seatrout, an increase in the minimum size may be less effective at reducing harvest than anticipated but may have unquantifiable benefits. Increasing the minimum size limit should be considered in conjunction with other measures as means to ensure sustainable harvest.

Table 2.2. Average length at age in inches for female and pooled (male and female) Spotted Seatrout calculated using von Bertalanffy growth parameters from 2022 stock assessment (NCDMF 2022).

Age	Mean Length (female)	Mean Length (pooled)
0	7.6	6.6
1	14.3	12.1
2	19.4	16.6
3	23.1	20.1
4	25.9	23.0
5	28.0	25.3
6	29.6	27.2
7	30.8	28.7
8	31.6	29.9
9	32.8	30.8

Implementing a slot limit alone will not reduce fishing mortality below the threshold unless the size range available for harvest is very limited (Table 2.3), but reductions from a slot limit are more likely to be realized over the long-term than reductions from increasing the minimum size. Rapid growth early in life means Spotted Seatrout recruit to the fishery quickly but will also quickly grow out of a narrow slot limit. The average length of a one-year-old female fish is 14.3 inches and average length increases to 19.4 inches and 23.1 inches by ages two and three respectively (Table 2.2). On average, a female Spotted Seatrout will be recruited to the fishery with a narrow slot range for about one or two years. The probability of a relatively short harvest window of each year class, particularly for female fish, makes a slot limit a potentially useful management measure especially when combined with other measures. Allowing the harvest of a "trophy", or over slot fish, should be considered with caution. Relatively few Spotted Seatrout over 24" are harvested meaning a trophy allowance of less than 24" will result in a minimal overall harvest reduction. Most of the reduction in harvest gained from a 14"–20" slot limit is from fish between 20" - 22" with almost all the harvest reduction coming from fish less than 26" (Table 2.3). A trophy limit with a higher minimum trophy size (e.g., allowing harvest of one

fish over 24” or over 33.5” which is the length of the current state record Spotted Seatrout) would maintain most of the harvest reductions gained from a traditional slot limit while still allowing for the harvest of “a fish of a lifetime” or the setting of a new Spotted Seatrout state record.

Anecdotally, the practice of “high grading” is common in the Spotted Seatrout fishery. High grading is where someone catches a legal limit of fish, keeps that limit in their possession, and continues fishing for larger or higher quality fish. Upon catching such a fish, the smaller or lower quality fish are discarded, and the larger or higher quality fish are kept. These discarded fish have higher than usual mortality rates (Nelson et al. 2021). “Possession” is defined in NCMFC rule as “actual or constructive holding whether under claim of ownership or not” [NCMFC Rule 15A NCAC 03I .0101 (2)(g)] making the practice of high grading illegal as it involves possessing more than a legal limit of Spotted Seatrout. For example, an angler who catches a four fish limit of Spotted Seatrout and keeps those fish in a live well, but continues fishing until catching a larger Spotted Seatrout, then discards one of the fish from the live well has possessed five fish or one fish more than the legal possession limit for Spotted Seatrout, even if only for a short period of time. Despite the illegality of high grading, enforcement is exceedingly difficult. A traditional slot limit would likely reduce instances of high grading, but a trophy limit could encourage more anglers to participate in this behavior and subsequently decrease potential reductions by increasing dead discards in the fishery though it is impossible to quantify by how much.

Table 2.3. Expected reductions in harvest from various size limits in the North Carolina Spotted Seatrout fishery. The only realistic size limit change that will end overfishing as a standalone measure is a narrow slot limit with no trophy allowance or a trophy allowance of 24” or longer. Rec Reduction (lb) is based on average recreational landings from 2019 to 2022. *Total % Reduction includes a 24,424lb (4.3%) reduction in commercial harvest for 15” minimum size and a 36,921lb (6.5%) reduction in commercial harvest for 16” minimum size based on average commercial landings from 2019 to 2022. Commercial harvest reduction is 0% in all other cases.

Size limit examples (inches Total Length)			
Size Limit	Recreational Reduction (lb)	Recreational Reduction (%)	Total % Reduction
15” minimum	183,693	5.5	5.3*
16” minimum	554,420	16.6	15.1*
14”–20”	617,878	18.5	15.8
14”–22”	240,471	7.2	6.2
14”–24”	106,876	3.2	2.7
14”-20” with one fish over 24”	507,662	15.2	13.0
14”–20” with one fish over 26”	601,178	18.0	15.4
14”–20” with one fish over 30”	617,878	18.5	15.8
15”–20” with one fish over 24”	731,433	21.9	18.7
16”–20” with one fish over 24”	1,102,159	33.0	28.2

A slot limit could be implemented either in the recreational sector or across both the recreational and commercial sectors. A recreational slot limit might lead to increased dead discards. Though the expected discard mortality rate for Spotted Seatrout caught with hook and line is low and the discard mortality rate for larger Spotted Seatrout may be lower than the average rate (Gearhart 2002), the already high number of discarded Spotted Seatrout underscores the importance of considering release mortality when exploring management options. Gear requirements (e.g., circle hooks when fishing live or natural bait) and continued ethical angling education could help minimize dead discards in the recreational fishery. Similarly, a commercial slot limit would likely lead to increased dead discards. North Carolina specific estimates for total mortality (at-net mortality plus delayed mortality) of discarded Spotted Seatrout only exist for the anchored small-mesh gill-net fishery and vary depending on mesh size with an average of 79% (Price and Gearhart 2002). Though anchored small-mesh gill nets have historically been the predominate gear in this fishery, recently runaround gill nets have become increasingly common. Data characterizing dead discards in the commercial fishery are limited though Observer Program data shows limited discards in the anchored gill-net fishery and about 84% of total trips land less than the 75 fish limit (Appendix 1). These data indicate dead discards are likely low under current management. However, it is unclear if dead discards will increase if management changes. Pairing a commercial slot limit with corresponding mesh size changes may not be effective in reducing discards due to the lack of size selectivity across various mesh sizes for Spotted Seatrout (see Appendix 1). Prohibiting commercial gear based on reducing dead discards in the Spotted Seatrout fishery would affect a variety of other fisheries. Since implementing a commercial slot limit would either broadly affect other fisheries or likely increase dead discards, thus reducing the effectiveness of management, a commercial slot limit is not the most effective management option to reduce commercial harvest. Implementing a slot limit for the recreational sector only may simply shift the harvest of large fish to the commercial fishery resulting in the projected harvest reduction not being realized, though quantifying this shift is not possible.

A narrow slot limit with a trophy allowance of one fish over 24” implemented just for the recreational sector could reduce total harvest below the level of harvest that would lead to $F_{Threshold}$ (total harvest reduction of 28.2%, Table 2.3). It is possible that reduction may be less than expected due to increased dead discards in the recreational sector and a portion of that reduction would be recouped by the commercial sector resulting in a realized reduction less than 28.2%. As such, more conservative management measures to buffer overall harvest reductions should be considered if a slot limit is implemented. For example, a recreational slot limit of 16”–20” with an allowance for one fish over 24” paired with a commercial minimum size of 16” would reduce total harvest by 29.1% which would reduce F below the threshold and minimize some of the recoupment potential in the commercial sector. If combined with changes to the allowable stretched mesh size for commercial harvest of Spotted Seatrout, it should be possible to reduce harvest and minimize dead discards in the commercial sector. However, such a measure would not address the potential for increased dead discards from the release of out of slot fish, the high recoupment in the commercial sector if commercial harvest significantly shifted toward larger fish, and the recent trend of increased effort in both sectors.

Option 1: Size Limit Options

a. *Status Quo – no change to the 14" minimum commercial size limit. Consider recreational size limit changes as a part of the overall management strategy to achieve sustainable harvest but not as a single solution option.*
b. *Recreational 16"–20" slot limit with allowance for one fish over 24" and commercial 16" minimum size limit*

Seasonal Closures

The Spotted Seatrout fishery in North Carolina predominantly occurs in fall across both the recreational and commercial sectors (Figure 2.2). For a more detailed description of seasonal harvest, see the Commercial and Recreational Fishery sections of Amendment 1. While there might be small regional variations in these seasonal patterns, broadly the patterns are consistent statewide.

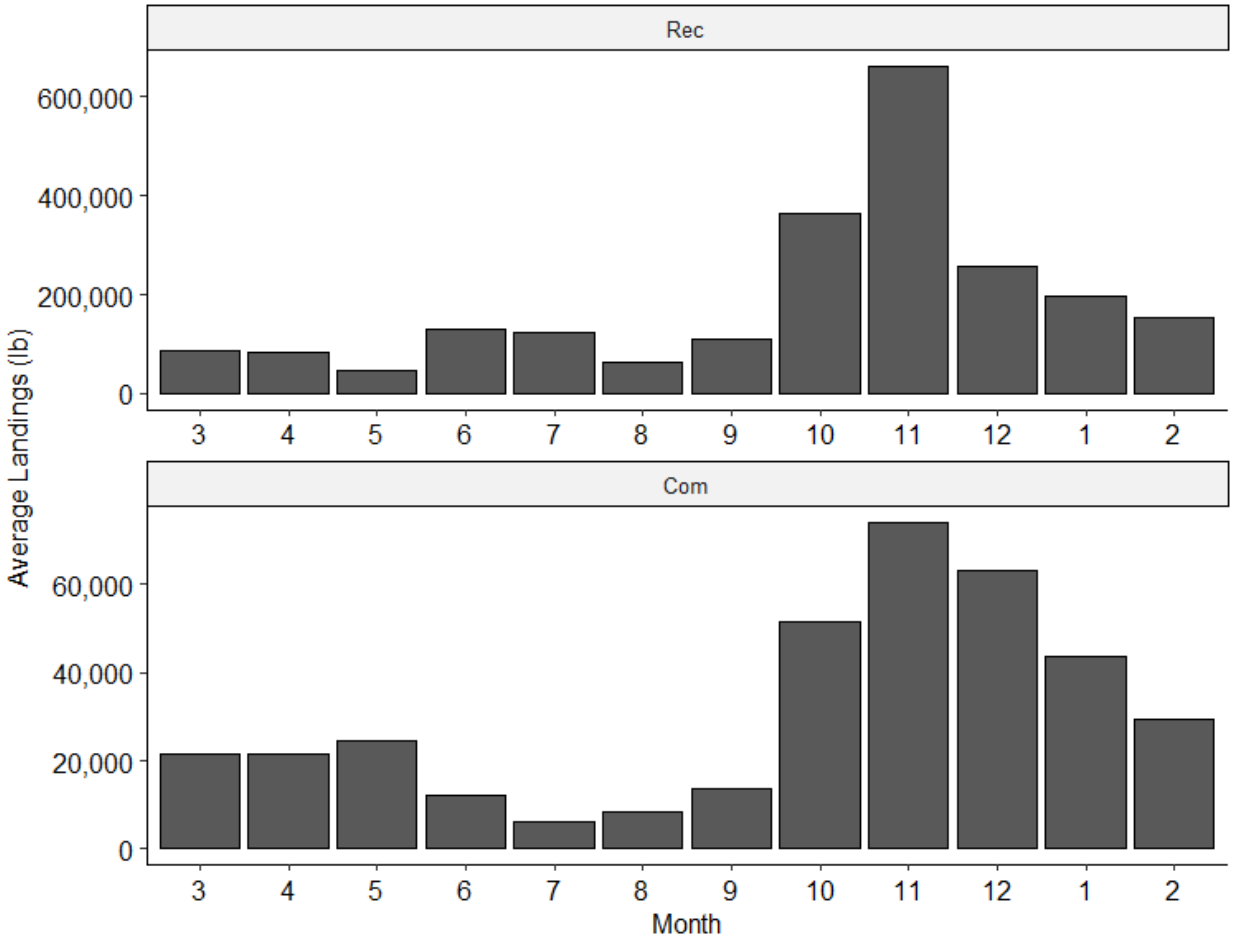

Figure 2.2 Average monthly harvest of Spotted Seatrout in pounds by sector from Biological Year 2012–2022. The top panel is recreational harvest, and the bottom panel is commercial harvest. Note: the vertical axis scale is different between panels to illustrate seasonal variation. The Biological Year is March – February.

Seasonal closures can be an effective way of limiting harvest, especially when closures are at the end of the fishing year to prevent recoupment of harvest. Closures prior to the end of the fishing year should include a buffer above the desired reduction to account for recoupment. It is possible to end overfishing in the Spotted Seatrout fishery through seasonal closures. In theory, a closure that spans the spawning season could reduce overall harvest enough to reach the threshold F (Table 2.4) and provide the added benefit of allowing more Spotted Seatrout to spawn each season. Though 2022 spawning stock biomass does not indicate the need for additional spawning protections, reducing harvest during the spawning season would have non-quantifiable benefits to the Spotted Seatrout stock. A spawning season closure, however, is not at the end of the fishing year therefore it is likely some amount of recoupment would occur after the season closure. A spawning season closure would also have to be longer than a winter closure to reduce harvest to a level that will meet management objectives (Table 2.4). Because recoupment is likely with a spawning season closure or closures that extend past the end of the biological year the closure should be extended, or other management options considered in tandem with the closure to ensure harvest reductions end overfishing. For example, during the AC Workshop there was discussion about a January–March commercial season closure (Table 2.4). While the bulk of reductions from such a closure come from January and February, the reductions gained in March are likely to be recouped throughout the year though some fish are likely to spawn prior to being harvested providing additional benefits to the stock. Extending the January–March closure or including additional management strategies should be considered to increase the likelihood of reaching management objectives. Input received during the public scoping period and from discussions with the Spotted Seatrout FMP Advisory Committee indicate that stakeholders would prefer a shorter season closure if possible. A winter closure at the end of the biological year could reach similar harvest reductions as a spawning season closure over a shorter timeframe with no recoupment of harvest.

A seasonal closure could be over the same timeframe for the commercial and recreational sectors or could vary depending on sector. A consistent season for both sectors is easier for recreational anglers and commercial fishers to understand, would ease the enforcement burden, and can decrease user group conflict. Ending overfishing in both sectors is more complicated with the same season across sectors as is ensuring a similar reduction for each sector. For example, if the Spotted Seatrout fishery is closed January 1 and does not reopen until the end of February, there would be a 21.6% reduction in commercial harvest (ends overfishing in the commercial sector), but only a 17.4% reduction in recreational harvest (does not end overfishing in the recreational sector). Different seasons for each sector could help ensure parity between sectors and that harvest is reduced enough to reach the threshold or target F but could cause confusion for stakeholders though there is precedent for different recreational and commercial seasons in multiple N.C. fisheries (e.g., Southern Flounder and Striped Bass).

Table 2.4. Expected reductions in harvest for each sector from seasonal closures in the North Carolina Spotted Seatrout fishery. Reduction in pounds are based on average harvest from 2019 to 2022. Unless otherwise noted, monthly closures are for the entire month and day of week closures begin at 11:59 p.m. the day prior to the beginning and end at 12:01 a.m. the day after the end (e.g., for a Sat-Sun closure, the fishery will close at 11:59 p.m. Friday and reopen at 12:01 a.m. Monday). A reduction of at least 19.9% (threshold) is needed to end overfishing. *Day of week closures are only calculated for commercial sector. **Reduction for period does not meet the harvest reduction necessary to meet the F threshold.

Season Closure Examples						
Month Closures	Day of Week Closures*	Recreational Reduction (lb)	Recreational Reduction (%)	Commercial Reduction (lb)	Commercial Reduction (%)	Total Reduction (%)
-	Jan–Sep, Sat–Sun; Oct–Dec, Sat–Mon	0.00**	0.0**	172,107	30.3	4.4**
Jan–Feb	-	581,139	17.4**	122,690	21.6	18.0**
Apr–Jul	Oct–Dec, Sat–Mon	584,479	17.5**	213,572	37.6	20.4
Jan–Mar	-	741,538	22.3	153,363	27.0	23.0
Dec 16–Feb	-	738,113	22.1	168,131	29.6	23.2
Jan–Feb	Oct–Dec, Sat–Mon	581,139	17.4**	228,340	40.2	28.2
Nov–Feb	-	1,843,613	55.2	323,198	56.9	55.4
May 16–Sep	-	714,734	21.4	80,657	14.2**	20.4

Though the general seasonal pattern of Spotted Seatrout harvest is consistent across the state, season closures could have unexpected outcomes due to small, regional differences in these broad patterns. For example, anecdotal reports from the for-hire industry indicate the importance of the small June and July harvest increase (Figure 2.2) to charter captains in the northern region of the state. A harvest closure during the spawning season could have a larger than expected impact on the northern for-hire fleet, though data to determine the extent of any impact is unavailable. A season closure outside the spawning season – e.g., a season closure at the end of the biological year – could mitigate the financial impact to the northern for-hire fleet while also reducing the potential for recoupment and length of a harvest closure.

It is also important to consider other potential target species during a proposed closed season. The most common species landed on commercial trips that land Spotted Seatrout is Striped Mullet (see Appendix 1). Similarly, Spotted Seatrout is the most common species landed on commercial trips that land Striped Mullet. Fishers in both fisheries use similar gear types with runaround gill nets becoming more common in recent years but anchored small mesh gill nets still common. The overlap in gear types and landings provides strong evidence that the Spotted Seatrout and Striped Mullet commercial fisheries operate alongside each other underscoring the importance of considering how management changes in the recently adopted Amendment 2 to the Striped Mullet FMP might affect Spotted Seatrout harvest and vice versa. The selected sustainable harvest management option in the Striped Mullet FMP is weekend

commercial harvest closures on Saturday and Sunday January through September and Saturday through Monday October through December. Mirroring these weekend closures for the Spotted Seatrout commercial fishery would simplify management, could theoretically end overfishing in the commercial sector (Table 2.4), and reduce the potential for dead discards in both fisheries. However, if commercial fishers increase effort during the week to compensate for lost weekend days harvest recoupment is likely. Striped Mullet offshore spawning migrations in the fall largely coincide with wind events providing an opportunity for large numbers of fish to avoid harvest when a “mullet blow” occurs during a closed weekend period. Spotted Seatrout do not have this same migratory behavior. In fact, Spotted Seatrout overwinter in sometimes large aggregations in the upper estuary and begin forming these aggregations in the fall. Such aggregations allow for easier targeting of large numbers of Spotted Seatrout and could lead to a much greater degree of harvest recoupment from a shift in fishing effort compared to Striped Mullet. Day of the week closures could be considered in tandem with other management measures to ensure overfishing is ended. For example, combining the weekend closures adopted in Amendment 2 to the Striped Mullet FMP with a January–February harvest closure would give an on paper commercial harvest reduction of around 47% (46.8%). Even though it is unlikely that full harvest reduction is reached, the January–February harvest closure would provide a buffer and increase the likelihood of ending overfishing. However, if the reduction in recreational harvest were less than 47%, the perception could exist of the commercial sector taking a larger harvest reduction despite the commercial sector accounting for a smaller proportion of overall landings even though the realized reduction would probably fall well below the on-paper reduction. Mirroring a portion of the Striped Mullet regulations could act to balance the benefits of similar management across FMPs and the perception of a lack of parity between sectors. For example, implementing the same management as the Striped Mullet FMP during the peak harvest for both species (Saturday–Monday harvest closure October–December) with an additional Spotted Seatrout harvest closure January–February would match management between FMPs during the timeframe when most harvest occurs and result in a 40.2% on paper reduction in Spotted Seatrout harvest. This would reduce dead discards in both fisheries and decrease possible confusion caused by different management measures for each fishery during peak harvest seasons while still providing additional Spotted Seatrout management beyond weekend closures to account for expected recoupment in that fishery. Even if recreational management is expected to result in a harvest reduction less than 40%, it is likely the realized reduction percentages would be closer offering less of a chance for perceived lack of parity between sectors.

The types of baits and gear used in the recreational fishery are also commonly used when targeting Red Drum, Striped Bass, Southern Flounder, and Black Drum. When open, Striped Bass and Southern Flounder are quota managed species, therefore harvest of these species could not increase if effort shifts occur. If recreational anglers unable to target Spotted Seatrout due to a seasonal closure instead targeted Red Drum or Black Drum, this could lead to an increase in harvest. It is not possible to predict how angler behavior might change when regulations change, however; the seasonality of the Red Drum and Black Drum fisheries could be considered when determining the timeframe for a Spotted Seatrout seasonal closure.

Option 2: Seasonal Closure Options

a. *Status Quo – manage fishery without seasonal harvest closure*
b. *Dec 16 – Feb 28/29 harvest closure (both sectors)*
c. *11:59 p.m. Friday–12:01 a.m. Tuesday commercial harvest closure October 1–December 31 and Jan 1–February commercial harvest closure.* Consider recreational seasonal closures as a part of the overall management strategy to achieve sustainable harvest but not as a single solution option.
d. *Nov 1 – Feb 28/29 harvest closure (both sectors)*

Bag and Trip Limits

The recreational bag limit for Spotted Seatrout is currently 4 fish per person per day. Most recreational anglers, however, harvest less than their limit of Spotted Seatrout. From 2019–2022 – just over 73% of anglers harvested two or fewer Spotted Seatrout and nearly 48% of anglers harvested just one Spotted Seatrout. Harvest reductions needed to reach the F threshold could be achieved in the recreational fishery through bag limit changes, but harvest reductions needed to reach the F target are not possible with bag limit changes as a standalone measure (Table 2.5). Reducing recreational harvest to reach the F threshold would require decreasing the recreational bag limit to two fish per person per day. Reducing the allowable bag limit to meet the minimum reduction necessary to end overfishing in the recreational sector would enact management that is easy to understand, easy to enforce, and straightforward. Even though a two fish bag limit would result in a 27.7% reduction (Table 2.5), the public could potentially conflate the number of fish an angler is theoretically allowed to harvest with the number of fish most anglers actually harvest leading to the misperception that a two fish bag limit is a 50% reduction (Figure 2.3).

Table 2.5. Expected reductions in recreational harvest and total harvest from bag limit changes. Reductions in pounds are based on average recreational harvest from 2019 to 2022. Total harvest reductions assume no other management is implemented. Reductions of at least 19.9% (threshold) up to 53.9% (target) are needed to end overfishing. *Reduction does not meet the 19.9% (3 fish bag limit) or 53.9% (1 fish bag limit) harvest reduction necessary to reach $F_{Threshold}$ or F_{Target}.

Bag Limit Reduction Examples			
Bag Limit	Recreational Reduction (lb)	Recreational Reduction (%)	Total Harvest Reduction
3	394,106	11.8*	10.1*
2	925,146	27.7	23.7
1	1,760,116	52.7*	45.0*

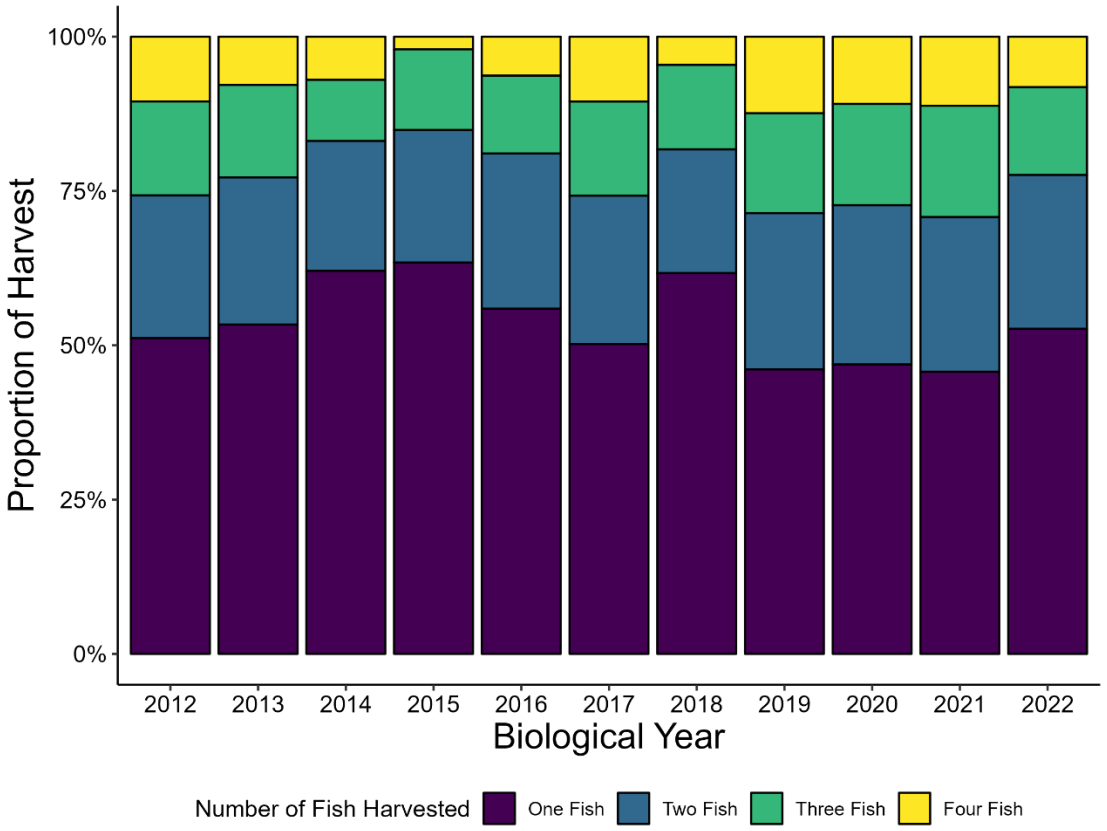

Figure 2.3. The proportion of total recreational Spotted Seatrout harvest where bar color refers to the number of fish harvested. Though the specific proportions of total harvest from each harvest bin vary year to year, approximately 75% of recreational anglers consistently harvest two or fewer Spotted Seatrout.

Currently there is a 75 fish commercial trip limit for Spotted Seatrout. Approximately 16% of commercial trips reach that limit with about half (52%) harvesting 30 or less Spotted Seatrout and over three quarters (84%) harvesting 70 or fewer fish. Reductions to the threshold in the commercial sector could be achieved through lowering the commercial trip limit as a standalone measure but, while technically possible, it is unlikely the necessary trip limit (<20 fish) to approach the target is realistic (Table 2.6). Regardless of whether commercial harvest is reduced to the threshold or the target level, management to reduce commercial harvest would not end overfishing in the combined Spotted Seatrout fishery. Like the recreational sector, there exists the potential for public misperception about harvest reductions stemming from changes to trip limits. For example, reducing the commercial trip limit to 45 fish results in a 21.5% reduction in commercial harvest (Table 2.6) but could be incorrectly perceived as a larger reduction if commercial fishers conflate the actual harvest reduction with the theoretical reduction in allowable harvest (40%).

Table 2.6. Expected reductions in commercial harvest from trip limit changes. Reductions in pounds are based on average commercial harvest from 2019 to 2022. Total harvest reductions assume no other management is implemented. Reductions of at least 19.9% (threshold) up to 53.9% (target) are needed to end overfishing. *Reduction does not meet the 19.9% (55 fish trip limit) or 53.9% (20 fish trip limit) harvest reduction necessary to reach $F_{Threshold}$ or F_{Target}.

Trip Limit Reduction Examples			
Trip Limit	Commercial Reduction (lb)	Commercial Reduction (%)	Total Harvest Reduction (%)
55	70,433	12.4*	1.8
45	122,122	21.5	3.1
20	301,046	53.0*	7.7

Lowering the Spotted Seatrout recreational bag limit or commercial trip limit would probably cause increased dead discards of Spotted Seatrout in both sectors of the fishery which can act to decrease the effectiveness of management changes. Changes to bag limits could be paired with gear requirements (see Appendix 3) and commercial trip limit changes could be accompanied by changes or limits to allowable gear (see Appendix 1) to mitigate dead discards in the fishery.

Option 3: Bag and Trip Limit Options

a. *Status Quo – manage commercial fishery with no changes to the 75 fish trip limit and consider recreational bag limit changes as a part of the overall management strategy to achieve sustainable harvest but not as a single solution option.*
b. *Reduce recreational bag limit to 2 fish and commercial trip limit to 45 fish*

Stop Nets

The stop net fishery is a modification of a traditional beach seine that primarily targets Striped Mullet and is unique to Bogue Banks. This fishery holds historic and cultural value in North Carolina and especially Carteret County (See Striped Mullet FMP and Amendment 1 for review of historical significance of stop net fishery). Where traditional beach seine fisheries involve setting and hauling a net from the beach, the stop net fishery adds a stationary "stop net" set perpendicular to the beach in an L-shape (see Spotted Seatrout FMP for more detail on the execution of the stop net fishery). The 2012 Spotted Seatrout FMP implemented a 75 fish commercial trip limit, but it was noted in the plan there was the potential for dead discards to exceed harvest in high-volume fisheries like the stop net fishery (NCDMF 2012). The MFC tasked the DMF Director with addressing the stop net fishery outside of the 2012 FMP. Since 2013, the stop net fishery has opened and closed by proclamation and operates under an annual Memorandum of Agreement (MOA) signed by a party of the combined fishing operation and the DMF Fisheries Management Section Chief. The MOA sets a 4,595 lb. Spotted Seatrout season quota, requires a party to the stop net fishery to alert the DMF prior to fishing the stop nets, and requires reporting of Spotted Seatrout landings in pounds the same day the stop nets are fished. In recent years the stop net fishery has opened around October 15 and closed on December 31. Additionally, stop nets are limited to a maximum of four stop nets between Beaufort Inlet and Bogue Inlet at any one time with each combined fishing operation allowed to set a maximum of two stop nets.

Since implementation of current management in 2013, the stop net fishery has never reached their 4,595 lb. quota. Stop net landings represent a very minor proportion of Spotted Seatrout commercial landings and an even smaller portion of total commercial and recreational landings. For example, the highest stop net landings from 2013 through 2022 were 3,700 lb. which accounted for 1.4% of commercial landings and 0.2% of total landings in that year. Most years the stop net fishery accounts for less than half a percent of commercial landings and less than a tenth of a percent of combined landings. Due to the strict existing management of the stop net fishery, the potential for additional harvest reductions from the recently adopted Amendment 2 to the Striped Mullet FMP, and the low contribution to Spotted Seatrout landings under the current stop net fishery management, additional harvest restrictions may not be necessary in the stop net fishery. However, formalizing current management of the stop net fishery should be considered in this amendment.

Option 4: Stop Net Management Options

a) *Status quo – 4,595 lb. season quota with terms and conditions of stop net fishery and responsibilities of the stop net crew outlined in Memorandum of Agreement.*
b) *Stop nets are restricted to the Atlantic Ocean on Bogue Banks with a 4,595 lb. Spotted Seatrout season quota. The season will open no sooner than October 15 and close when the Spotted Seatrout quota is reached or no later than December 31. Any weekend closures to commercial harvest implemented in Option 2 will also apply to the Bogue Banks stop net fishery. Stop net crews must contact N.C. DMF Marine Patrol Communication each time a stop net is set and at least two hours prior to each time a stop net is fished. The same day a stop net is fished and the catch is landed at the fish house, a representative of the stop net crew must contact DMF Fisheries Management Section to report the daily total of Spotted Seatrout in pounds as it appears on the trip ticket. Same day reporting is required even if zero Spotted Seatrout are harvested. Failure to follow reporting requirements will result in an immediate closure of the stop net fishery. The stop net fishery will be managed by proclamation consistent with but not limited to previous proclamations.*

Combination Management Measures

Combining multiple strategies to achieve management goals is common in fisheries management including in the original Spotted Seatrout Fishery Management Plan which combines size limits with trip and bag limits and weekend prohibitions on commercial harvest or possession of Spotted Seatrout in joint waters. Multiple management measures rather than a single, standalone management measure allow for more specific, targeted management to account for a variety of factors including species life history and biology, differences in the fishery (e.g., industry, regional, etc.), or competing interests in the fishery. As there are few standalone management measures to end overfishing in the Spotted Seatrout fishery, combination measures will help ensure management is realistic and management objectives are more likely to be achieved. Additionally, a management strategy comprised of more than one management measure can allow for increased or

more consistent access to the fishery (Tables 2.7 and 2.8). For example, implementing a slot limit along with a seasonal closure in the Spotted Seatrout recreational fishery would allow for a shortened closure period when compared to a seasonal closure as a standalone measure.

Table 2.7. Combination recreational management measures to end overfishing and achieve sustainable harvest. The Total % Reduction column shows the total percent reduction if no changes to commercial management are implemented. Unless otherwise noted, season closures or bag limit reductions include the entirety of the month. *Total reduction does not reduce F to the 19.9% threshold (options 1.a, and 1.b). Harvest reductions in pounds are based on 2019–2022 average recreational harvest.

Option #	Season Closure	Bag Limit (number of fish)	Size Limit	Recreational Reduction (lb)	Recreational Reduction (%)	Total % Reduction
5.a	Jan–Feb	Oct-Dec 3 fish	-	738,113	22.1	18.9*
5.b		Nov-Feb 3 fish	16” minimum	741,453	22.2	19.0*
5.c	-	Oct-Feb 3 fish	14–20”, 1 over 26”	824,950	24.7	21.1
5.d	Jan 16–Feb	-	14–20”, 1 over 26”	935,166	28.0	23.9
5.e	Dec 16–Feb	3 fish	-	1,015,323	30.4	26.0
5.f	Jan–Feb	-	14–20”, 1 over 26”	1,078,781	32.3	27.6
5.g	Jan–Feb	Oct-Dec 3 fish	14–20”, 1 over 26”	1,205,696	36.1	30.9
5.h	Apr–Jun	3 fish	14–20”, 1 over 26”	1,292,533	38.7	33.1
5.i	Jan–Feb	3 fish	14–20”, 1 over 26”	1,319,252	39.5	33.8
5.j	Dec 16–Feb	3 fish	14–20”, 1 over 26”	1,436,148	43.0	36.7
5.k	Apr–Jul	3 fish	14–20”, 1 over 26”	1,439,488	43.1	36.8
5.l	Dec–Feb	2 fish	14–20”, 1 over 26”	1,923,770	57.6	49.2

Table 2.8. Combination commercial management measures to end overfishing and achieve sustainable harvest. The Total % Reduction column shows the total percent reduction if no recreational management changes are implemented. No management options applied solely to the commercial sector reduce *total* harvest to a level where F meets the 19.9% threshold. Unless otherwise noted, seasonal closures include the entirety of the month. Harvest reductions in pounds are based on 2019–2022 average commercial harvest.

Option #	Season Closure	Trip Limit (number of fish)	Size Limit	Commercial Reduction (lb)	Commercial Reduction (%)	Total % Reduction
6.a	Jan 16-Feb	60	-	131,210	23.1	3.4
6.b	Jan-Feb	65	-	145,979	25.7	3.7
6.c	Jan-Feb	-	16” min	149,955	26.4	3.8
6.d	Feb	45	-	164,155	28.9	4.2
6.e	Jan 16-Feb	45	-	193,124	34.0	4.9
6.f	Jan-Feb	50	-	197,100	34.7	5.0
6.g	Dec 16-Feb	60	-	202,780	35.7	5.2
6.h	Dec-Feb	40	-	314,110	55.3	8.0

Multiple strategies to manage a fishery can be especially helpful when considering different and potentially competing stakeholder objectives as well as ensuring management objectives are realistic for different sectors and therefore more likely to be achieved. However, combining multiple strategies can also lead to more complex management potentially resulting in stakeholder confusion and enforcement difficulties. It is important to balance the increasing complexity of multiple management layers with stakeholder and management objectives.

Options 5/6: Combination Management Options

a) *Option 5.i with commercial management handled through seasonal closures as a standalone measure (see Option 2.c)*

Adaptive Management

The current Spotted Seatrout adaptive management framework needs to be updated. Adaptive management is a structured decision-making process when uncertainty exists, with the objective of reducing uncertainty through time with monitoring. Adaptive management provides flexibility to incorporate new information and accommodate alternative and/or additional actions. The original FMP included adaptive management to "achieve one half of the reductions necessary and to reassess after three years to evaluate the effectiveness of the measures to reduce harvest" and for the Director to "intervene in the event of a catastrophic" cold stun event (NCDMF 2012).

While success or failure of any given management strategy to sustain the stock is best determined through a quantitative stock assessment the ability to adjust management between stock assessments based on evidence of management strategies not sustaining the stock can be an important conservation tool. For example, by itself failure to achieve projected harvest reductions does not necessarily indicate failure of a management measure but could conversely indicate improving stock conditions. However, failure to achieve harvest reductions combined with warning signs in dependent or independent sampling (e.g., a decrease in independent sampling abundance or a truncation of age or length distributions in dependent or independent catch) could indicate a need to adjust management strategies. Peer reviewed stock assessments and stock assessment updates should continue to be used to guide management decisions for the Spotted Seatrout stock. The 2022 peer reviewed stock assessment (NCDMF 2022) should be updated, at least once between full reviews of the plan to gauge success in maintaining sustainable harvest and to monitor changes in *F.* The 2022 stock assessment had a terminal year of 2019 and Amendment 1 management measures will be implemented, at the earliest, in 2025. Given this timeline, the earliest a stock assessment update should be completed is during 2026 with the inclusion of data from 2025. The timing of a stock assessment update is at the discretion of the Division and will consider stock trends and the timing of prior management when determining the appropriate schedule. An assessment update will best determine if management goals are being met, but an adaptive management structure that allows for needed adjustments to management measures between stock assessment updates is an important tool for attaining management goals.

The existing Spotted Seatrout rule, 15A NCAC 03M .0522, provides the Fisheries Director proclamation authority pursuant to 15A NCAC 03H .0103 to impose any of the following restrictions on the taking of Spotted Seatrout:

1) Specify time;
2) Specify area;
3) Specify means and methods;
4) Specify season;
5) Specify size; and
6) Specify quantity.

Upon adoption of Amendment 1, the adaptive management framework will consist of the following:

Option 7: Adaptive Management Framework

1) The adaptive management framework allows for adjusting management measures outside of an updated stock assessment to ensure compliance with and effectiveness of management strategies adopted in Amendment 1 and is a tool to respond to concerns with stock conditions and fishery trends. Upon evaluation by the division, if the management strategy implemented to achieve sustainable harvest (either through Amendment 1 or a subsequent revision) is not achieving the intended purpose, management measures may be revised or removed and replaced using adaptive management; provided it conforms to part 2.
2) Management measures that may be adjusted using adaptive management include:
    a. Season closures
    b. Day of week closures
    c. Trip or vessel limits
    d. Size limits
    e. Bag or vessel limits
    f. Gear restrictions in support of the measures listed in a-e

MANAGEMENT OPTIONS

Table 2.9. Management options to achieve sustainable harvest in the Spotted Seatrout fishery.

Topic	Option	Description
Size limits	1.a	Status quo – no change to commercial size limit. Consider recreational size limit changes as a part of the overall management strategy to achieve sustainable harvest but not as a single solution option.
	1.b	Recreational 16”–20” slot limit with allowance for one fish over 24” and commercial 16” minimum size limit
Season closure	2.a	Status quo – no season closure as standalone measure
	2.b	Statewide season closure Dec 16 – Feb 28/29 (both sectors)
	2.c	11:59 p.m. Friday-12:01 a.m. Tuesday statewide commercial harvest closure Oct-Dec and Jan-Feb commercial harvest closure. Consider recreational season closures as a part of the overall management strategy to achieve sustainable harvest but not as a single solution option.
	2.d	Statewide season closure Nov 1 – Feb (both sectors)
Bag and trip limits	3.a	Status quo – no change to commercial trip limit. Consider recreational bag limit changes as a part of the overall management strategy to achieve sustainable harvest but not as a single solution option.
	3.b	Reduce recreational bag limit to 2 fish and commercial trip limit to 45 fish
Stop net	4.a	Status quo – no change
	4.b	No change to quota but formalize management in FMP
Combinations	5.a-j & 6.a-h	See tables 2.7 and 2.8
Adaptive management	7	

Table 2.10. Expected reduction in recreational and commercial harvest from management examples organized by single solution ideas including size limit changes (SL.1–10), seasonal or day of the week closures (SC.1–11), commercial trip limit changes (TL.1–6), and recreational bag limit changes (BL.1–6) and combination management ideas including recreational combination management ideas (5.a–l) and commercial combination management ideas (6.a–h). These management examples can be found in Tables 2.3–2.8 but are included in this table for ease of reference. Reductions in pounds are based on average recreational or commercial harvest from 2019 to 2022. Total harvest reductions assume no other management is implemented. Reductions of at least 19.9% (threshold) up to 53.9% (target) are needed to end overfishing. Important table notes: Management examples presented here are not additive. In other words, an overall total expected harvest reduction for combinations of single solution ideas cannot be reached by adding together the Total % Reduction of each individual single solution ideas. **Management examples that do not reach *at least* a 19.9% reduction in harvest will not meet the statutory requirement of ending overfishing.** *Day of week harvest closures are only for commercial harvest, therefore any harvest reduction from day of week closures only includes reductions in commercial harvest.

Management Examples	Month Closure	Day of Week Closure	Bag Limit (number of fish)	Trip Limit (number of fish)	Size Limit	Recreational Reduction (lb)	Recreational Reduction (%)	Commercial Reduction (lb)	Commercial Reduction (%)	Total % Reduction
Single Solution Ideas										
SL.1	-	-	-	-	14”–24”	106,876	3.2	26,696	4.7	3.4
SL.2	-	-	-	-	15” minimum	183,693	5.5	24,424	4.3	5.3
SL.3	-	-	-	-	16” minimum	554,420	16.6	39,921	6.5	6.2
SL.4	-	-	-	-	14”–22”	240,471	7.2	65,321	11.5	7.8
SL.5	-	-	-	-	14”–20”, 1 >24”	507,662	15.2	0	0	13.0
SL.6	-	-	-	-	14”–20”, 1 >26”	601,178	18.0	0	0	15.4
SL.7	-	-	-	-	14”–20”, 1 >30”	617,878	18.5	0	0	15.8
SL.8	-	-	-	-	15”–20”, 1 >24”	731,433	21.9	0	0	18.7
SL.9	-	-	-	-	14”–20”	617,878	18.5	202,212	35.6	21.0
SL.10	-	-	-	-	16”–20”, 1 >24”	1,102,159	33.0	0	0	28.2
SC.1	-	Jan–Sep, Sat–Sun; Oct–Dec, Sat–Mon	-	-	-	0	0	172,107	30.3	4.4
SC.2	Apr–Jun	-	-	-	-	407,465	12.2	99,970	17.6	13.0
SC.3	Apr–Jun	Oct–Dec, Sat–Mon*	-	-	-	407,465	12.2	213,572	37.6	15.7
SC.4	Apr–Jul	-	-	-	-	584,478	17.5	107,922	19.0	17.7
SC.5	Jan–Feb	-	-	-	-	581,139	17.4	122,690	21.6	18.0
SC.6	Apr–Jul	Oct–Dec, Sat–Mon*	-	-	-	584,479	17.5	213,572	37.6	20.4
SC.7	May 16–Sep	-	-	-	-	714,734	21.4	80,657	14.2	20.4

Management Examples	Month Closure	Day of Week Closure	Bag Limit (number of fish)	Trip Limit (number of fish)	Size Limit	Recreational Reduction (lb)	Recreational Reduction (%)	Commercial Reduction (lb)	Commercial Reduction (%)	Total % Reduction
SC.8	Jan–Mar	-	-	-	-	741,453	22.2	153,363	27.0	22.9
SC.9	Dec 16–Feb	-	-	-	-	738,113	22.1	168,131	29.6	23.2
SC.10	Jan–Feb	Oct–Dec, Sat–Mon*	-	-	-	581,139	17.4	228,340	40.2	28.2
SC.11	Nov–Feb	-	-	-	-	1,843,613	55.2	323,198	56.9	55.4
TL.1	-	-	-	65	-	0	0	29,537	5.2	0.8
TL.2	-	-	-	60	-	0	0	48,849	8.6	1.3
TL.3	-	-	-	55	-	0	0	70,433	12.4	1.8
TL.4	-	-	-	45	-	0	0	122,122	21.5	3.1
TL.5	-	-	-	40	-	0	0	151,659	26.7	3.9
TL.6	-	-	-	20	-	0	0	301,046	53.0	7.7
BL.1	-	-	Oct–Dec 3 fish	-	-	190,373	5.7	0	0	4.9
BL.2	-	-	Nov–Feb 3 fish	-	-	223,772	6.7	0	0	5.7
BL.3	-	-	Oct–Feb 3 fish	-	-	273,870	8.2	0	0	7.0
BL.4	-	-	3 fish	-	-	394,106	11.8	0	0	10.1
BL.5	-	-	2 fish	-	-	925,146	27.7	0	0	32.7
BL.6	-	-	1 fish	-	-	1,1760,116	52.7	0	0	45.0
Rec Combo Ideas										
5.a	Jan–Feb	-	Oct–Dec 3 fish	-	-	738,113	22.1	0	0	18.9
5.b	-	-	Nov–Feb 3 fish	-	16” minimum	741,453	22.2	0	0	19.0
5.c	-	-	Oct–Feb 3 fish	-	14”–20”, 1 >26”	824,950	24.7	0	0	21.1
5.d	Jan 16–Feb	-	-	-	14”–20”, 1 >26”	935,166	28.0	0	0	23.9
5.e	Dec 16–Feb	-	3 fish	-	-	1,015,323	30.4	0	0	26.0
5.f	Jan–Feb	-	-	-	14”–20”, 1 >26”	1,078,781	32.3	0	0	27.6
5.g	Jan–Feb	-	Oct–Dec 3 fish	-	14”–20”, 1 >26”	1,205,696	36.1	0	0	30.9
5.h	Apr–Jun	-	3 fish	-	14”–20”, 1 >26”	1,292,533	38.7	0	0	33.1

Management Examples	Month Closure	Day of Week Closure	Bag Limit (number of fish)	Trip Limit (number of fish)	Size Limit	Recreational Reduction (lb)	Recreational Reduction (%)	Commercial Reduction (lb)	Commercial Reduction (%)	Total % Reduction
5.i	Jan–Feb	-	3 fish	-	14”–20”, 1 >26”	1,319,252	39.5	0	0	33.8
5.j	Dec 16–Feb		3 fish		14”–20”, 1 >26”	1,436,148	43.0	0	0	36.7
5.k	Apr–Jul	-	3 fish	-	14”–20”, 1 >26”	1,439,488	43.1	0	0	36.8
5.l	Dec–Feb	-	2 fish	-	14”–20”, 1 >26”	1,923,770	57.6	0	0	49.2
Com Combo Ideas										
6.a	Jan 16–Feb	-	-	60	-	0	0	131,210	23.1	3.4
6.b	Jan–Feb	-	-	65	-	0	0	145,979	25.7	3.7
6.c	Jan–Feb	-	-	-	16” min	0	0	149,955	26.4	3.8
6.d	Feb	-	-	45	-	0	0	164,155	28.9	4.2
6.e	Jan 16–Feb	-	-	45	-	0	0	193,124	34.0	4.9
6.f	Jan–Feb	-	-	50	-	0	0	197,100	34.7	5.0
6.g	Dec 16–Feb	-	-	60	-	0	0	202,780	35.7	5.2
6.h	Dec–Feb	-	-	40	-	0	0	314,110	55.3	8.0

RECOMMENDATIONS

Division Recommendation (estimated to result in an approximately 40.0% recreational harvest reduction, 40.0% commercial harvest reduction, 40.0% overall harvest reduction):

The DMF recommends the following options that are projected to end overfishing with a greater than 70% probability of keeping SSB above the target:

Option 1.a Size Limits

- *No change to commercial size limit.*

Option 2.c Seasonal Closures

- *Oct–Dec, 11:59 p.m. Friday to 12:01 a.m. Tuesday statewide commercial harvest closure*
- *Jan–Feb statewide commercial harvest closure*

Option 3.a Bag and Trip Limit

- *No change to commercial trip limit.*

Option 4.b Stop Net Management

- *Stop nets are restricted to the Atlantic Ocean on Bogue Banks and maintain a 4,595 lb. Spotted Seatrout season quota.*
- *The season will open no sooner than October 15 and close when the Spotted Seatrout quota is reached or no later than December 31.*
- *Stop net crews must contact N.C. DMF Marine Patrol Communication each time a stop net is set and two hours prior to each time a stop net is fished.*
- *The same day a stop net is fished and the catch is landed at the fish house, a representative of the stop net crew must contact DMF Fisheries Management Section to report the daily total of Spotted Seatrout in pounds as it appears on the trip ticket. Same day reporting is required even if zero Spotted Seatrout are harvested.*
- *Failure to follow reporting requirements will result in an immediate closure of the stop net fishery.*
- *The Bogue Banks stop net fishery will be managed by proclamation consistent with but not limited to prior proclamations.*

Option 5.i Combination Management Measures

- *3 fish recreational bag limit*
- *14”–20” recreational slot limit with allowance for one fish >26”*
- *Jan–Feb statewide recreational harvest closure*

Option 7 Adaptive Management Framework

Advisory Committee Recommendations and Public Comment: see Appendix 8

NCMFC Selected Management Options (estimated to result in an approximately 27% overall harvest reduction):

Recreational (estimated to result in an approximately 27% harvest reduction):

- 14- to 20- inch slot limit with an allowance for one fish over 26 inches.
- 3-fish bag limit

Commercial (estimated to result in an approximately 30% harvest reduction):

- Maintain current size limit (replaced the NCMFC's November 2024 preferred management option of a 14- to 22-inch slot limit)
- Oct–Dec, 11:59 p.m. Friday to 12:01 a.m. Tuesday and Jan-Sept, 11:59 p.m. Friday to 12:01 a.m. Monday statewide commercial harvest closure
- Formalize the commercial stop net fishery management in the fishery management plan (Option 4.b)

Both sectors

- Adopt the adaptive management framework, with the caveat that adaptive management measures must be brought to the Commission for review prior to implementation.

NCMFC Summary

An estimated 19.9% harvest reduction is needed to end overfishing of the spotted seatrout stock in two years. After committee recommendations and public comment, the NCMFC selected a preferred management strategy at their November 2024 meeting that contained all measures adopted in March 2025 (see above) but also included a commercial 14- to 22-inch slot limit. It was estimated this recommendation would result in an approximately 28% harvest reduction, ending overfishing.

After legislative review, the NCMFC voted to adopt Amendment 1 to the Spotted Seatrout FMP at their March 2025 meeting. Commissioners discussed concerns about increased commercial dead discards because of the commercial slot limit. To address these concerns, Amendment 1 was adopted without the 14- to 22-inch commercial slot limit. The selected management strategy is estimated to result in an approximately 27% harvest reduction, ending overfishing.

See Appendix 7 for summary of comments from the Spotted Seatrout FMP Advisory Committee and Appendix 8 for a summary of all NCDMF and NCMFC Advisory committee comments and recommendations.

Appendix 3: SUPPLEMENTAL MANAGEMENT OPTIONS IN THE NORTH CAROLINA SPOTTED SEATROUT FISHERY

ISSUE

The results of qualitative management measures on the North Carolina Spotted Seatrout stock cannot be quantified but implementing these management measures may serve to reduce dead discards, reduce harvest by an unknown amount, and improve the overall Spotted Seatrout stock.

ORIGINATION

The North Carolina Division of Marine Fisheries (DMF).

BACKGROUND

As outlined in Appendix 2, total Spotted Seatrout harvest increased sharply in 2019 and has remained high in the ensuing years through 2022. Most harvest occurs October – December each year. The recreational fishery includes a robust catch and release segment. Since 2012 the recreational sector has accounted for, on average, approximately 85% of Spotted Seatrout harvest (Appendix 2) and the number of recreational trips targeting Spotted Seatrout increased in recent years with biological years 2019 through 2022 representing the four highest numbers of trips since 2012 (Figure 3.1). The proportion of trips that are successful (i.e., anglers are targeting Spotted Seatrout and catch Spotted Seatrout) has remained relatively steady since 2012. The high number of trips targeting Spotted Seatrout has led to not only increased harvest, but also increased dead discards – or fish that are released alive but ultimately die because of the fishing interaction – though on an individual basis discard mortality depends on a variety of factors and is likely low (Gearhart 2002; James et al. 2007; NCDMF 2022). Though the commercial fishery has only accounted for about 15% of total harvest since 2012, commercial landings have also increased in recent years. While commercial dead discards are likely minimal, changes to commercial management (e.g., decreasing trip limits) could cause an unintended increase in dead discards.

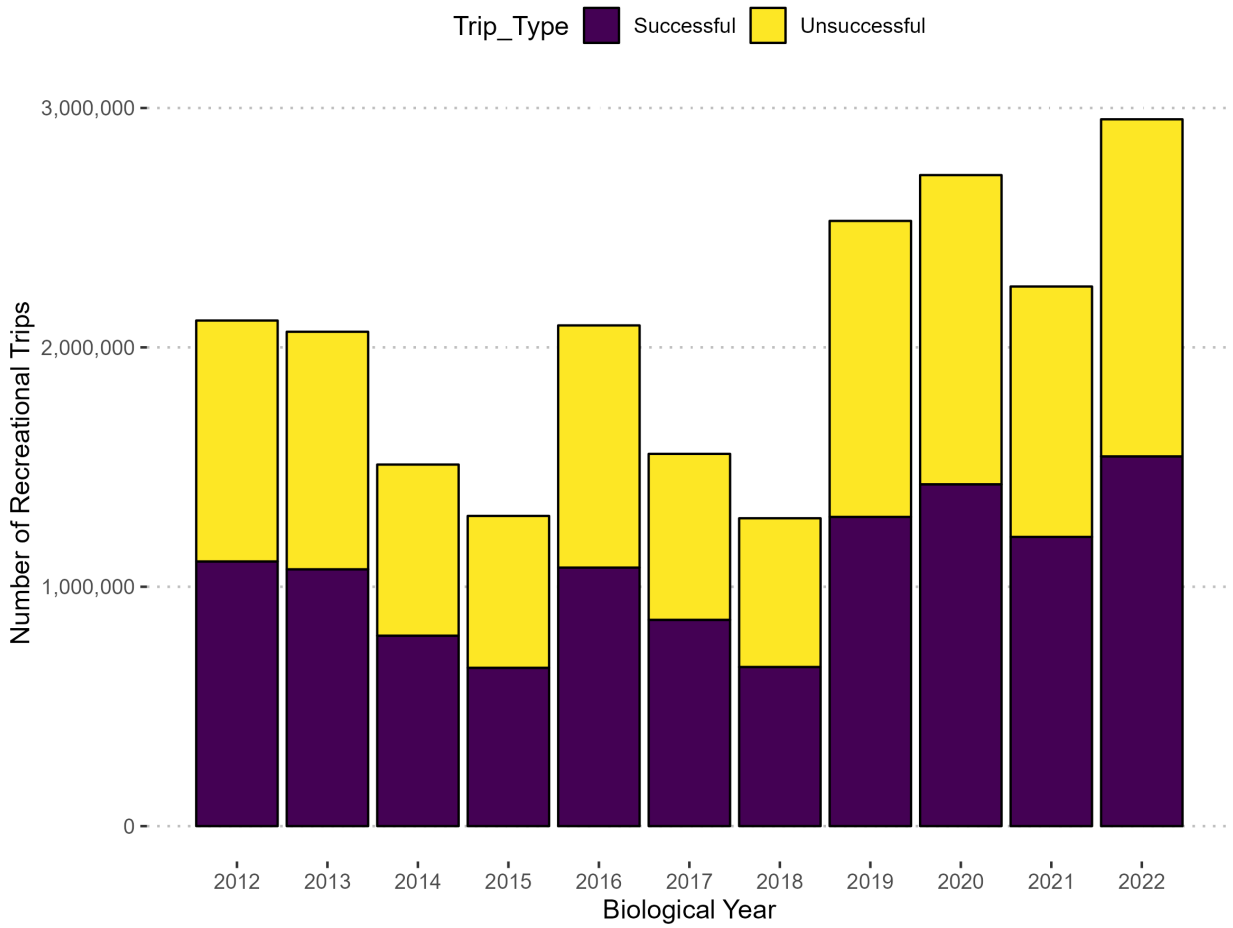

Figure 3.1. Annual MRIP trips where Spotted Seatrout were reported as the primary or secondary target by Biological Year (March–February). Bars are total annual trips with "successful" trips (i.e., a Spotted Seatrout was either harvested or released on the trip) as the purple portion and "unsuccessful" trips (i.e., no Spotted Seatrout were caught) as the yellow portion of the total.

As a result of the popularity of Spotted Seatrout as a targeted species; Marine Fisheries Commission (MFC) commissioners, MFC Advisory Committee members, and the public have mentioned a wide variety of potential recreational and commercial management strategies that could benefit the Spotted Seatrout stock but the scope of which are not immediately quantifiable. The increase in recreational trips targeting Spotted Seatrout and increased total Spotted Seatrout harvest in recent years combined with the presence of a dedicated catch and release segment of the recreational fishery suggest that even management measures lacking immediately quantifiable benefits are worth exploring. Additionally, there are management measures that could provide supplementary benefits when paired with sustainable harvest measures discussed in Appendix 2. For example, gear requirements designed to reduce recreational discard mortality would not provide a quantifiable benefit to the Spotted Seatrout stock, but when paired with a seasonal harvest closure could help prevent an increase in dead discards during the closed season. Discussion will focus on measures specific to the Spotted Seatrout recreational

fishery, those more broadly affecting multiple recreational fisheries, and measures specific to the commercial fishery not discussed in Appendix 1.

AUTHORITY

G.S. 113–134 RULES
G.S. 113–182 REGULATION 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
15A NCAC 03H .0103 PROCLAMATIONS, GENERAL
15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS
15A NCAC 03M .0522 SPOTTED SEATROUT

DISCUSSION

Spotted Seatrout Specific Recreational Management

Recreational Vessel limits

Limiting the harvest of fish through a vessel limit less than the sum of individual bag limits when multiple anglers are on a vessel is a common practice in many state and federal fisheries. Spotted Seatrout recreational harvest is limited to four fish per person per day. When multiple anglers are fishing from the same vessel, the anglers may keep the individual bag limit for each angler on board. For example, eight anglers fishing from one boat could harvest eight times the individual bag limit or 32 Spotted Seatrout. Similarly, charter captains and any crew are allowed to harvest their own recreational limit of Spotted Seatrout while running charter trips. The prevalence of multiple anglers on private or for-hire boats harvesting multiple individual limits is unknown but implementing a boat limit and/or eliminating the charter captain and crew allowance should aid in meeting sustainability goals. During the Spotted Seatrout public scoping period, Division staff received public comments suggesting vessel limits and suggesting eliminating the captain/crew allowance. Conversely, during the Spotted Seatrout Advisory Committee Workshop, committee members generally spoke out against vessel limits in the fishery but indicated input members had received from the for-hire industry was generally supportive of eliminating the captain/crew allowance for Spotted Seatrout.

There are anecdotal reports of charter captains and crew harvesting multiple bag limits when running more than one trip in a day (DMF Staff, personal communication) though it is not clear how prevalent this behavior is nor is it possible to assess the impact such behavior has on managed fish stocks. Harvesting multiple charter captain/crew allowances in a day is not legal and leads to unreported harvest of managed fish species. However, enforcement to ensure a single charter captain/crew allowance is difficult as it would require proof that a captain or crew harvested their personal bag limit on a trip previously taken that same day. During the Spotted Seatrout Public Scoping period there was support voiced for eliminating the captain/crew allowance for Spotted Seatrout, but Spotted Seatrout are not the only species in North Carolina where a charter captain/crew allowance is permitted. Changes to the captain/crew allowance in the Spotted Seatrout

fishery could lead to confusion about when a captain/crew allowance is permitted, but there is a precedent for eliminating the captain/crew allowance for a single species in other states. The Louisiana Department of Wildlife and Fisheries included a ban on charter captains/crew harvesting Spotted Seatrout while on a for-hire trip in their November 2023 regulation changes. In its most recent Spotted Seatrout regulation changes, the Florida Fish and Wildlife Conservation Commission implemented similar regulations prohibiting captain/crew harvest while engaged in a for-hire trip. Since addressing the charter captain/crew allowance for multiple species is outside the scope of this amendment, management options here will deal specifically with the Spotted Seatrout fishery.

Option 1: Recreational Vessel Limit Options

a) *Status Quo – Manage fishery without changes to vessel limit or for-hire captain/crew allowance*
b) *Eliminate captain/crew allowance for Spotted Seatrout on for-hire trips with no broader vessel limit*
c) *Implement 8 fish Spotted Seatrout vessel limit with captain/crew allowance on for-hire trips counted as part of vessel limit.*

Effort Controls

One way to reduce harvest in a fishery is to limit those able to participate in the fishery. There are a multitude of ways to limit entry to a fishery and measures to limit recreational participation in the Spotted Seatrout fishery would reduce harvest pressure and would probably reduce fishing effort. G.S. 113–182.1(g) gives authority to the MFC to limit entry into a fishery, however; the authority granted by this statute is limited only to cases where "the Commission determines that sustainable harvest cannot otherwise be achieved." Participation in the fishery increased markedly in biological year 2019 and has remained high since, but Spotted Seatrout life history allows this species to readily recover from periods of high mortality (e.g., cold stuns). Furthermore, Appendix 2 presents multiple options with an at least 50% chance of ending overfishing within a two-year timeframe of plan implementation (G.S. 113–182 .1). The combination of current stock status, species life history, and other available options expected to end overfishing make the Spotted Seatrout fishery unlikely to meet the level required for the MFC to limit entry.

Recreational management beyond Spotted Seatrout

Gear Requirements

Recreational catch and release fishing for Spotted Seatrout has increased in popularity in recent years whether from anglers switching to catch and release fishing after harvesting their limit or from dedicated catch and release anglers. Released Spotted Seatrout have far outpaced harvested fish. From 2017–2019, recreational anglers released almost six times as many fish as were harvested (Table 3.1). Delayed mortality, or discard mortality, is the measure of how many fish released alive ultimately die because of the fishing interaction and, on an individual basis, is likely low for Spotted Seatrout (Murphy et al. 1995; Gearhart 2002; James et al. 2007). Conversely, delayed mortality

for throat or gut hooked fish is quite high. Delayed mortality is also dependent on factors such as salinity, dissolved oxygen levels, and length or health of fish (Gearhart 2002; James et al. 2007). Spotted Seatrout aggregations in the small creeks and bays of the upper estuary during winter months could potentially have a larger than expected impact on dead discards in the fishery as anglers are able to fish more efficiently on schools at smaller spatial scales than other times of the year, though any such effects could be mitigated by lower water temperatures and higher dissolved oxygen levels during the winter months. Even with low individual discard mortality rates, the sheer number of releases in recent years makes the cumulative number of dead discards impactful and management to reduce the delayed mortality rate worth discussing.

Table 3.1. Harvest and releases of Spotted Seatrout in numbers of fish for biological years 2017–2022.

Biological Year	Harvest	Release
2017	1,054,500	4,725,746
2018	499,560	16,426,444
2019	2,415,394	7,050,238
2020	1,605,723	5,428,133
2021	1,495,385	6,859,777
2022	1,852,135	11,468,873

Studies of gear requirements that could reduce recreational discard mortality are severely lacking outside of those studies examining the differences in discard mortality when using circle hooks or “J” hooks. Although there are not specific studies exploring differences in circle and J hook mortality rates for Spotted Seatrout, hooking location and the severity of injuries related to hooking are important factors impacting Spotted Seatrout delayed mortality (Murphy et al. 1995; Gearhart 2002; Stunz and McKee 2006; James et al. 2007) and generally studies show circle hooks reduce hooking injuries compared to J hooks in marine species (Skomal et al. 2002; Cooke et al. 2003; Millard et al. 2005; Vecchio and Wenner 2007). In theory, other gear requirements such as eliminating the use of treble hooks with natural baits, using barbless treble hooks or inline hooks on artificial baits, and requiring rubberized landing nets when handling fish should help reduce discard mortality as well, however; there are few studies that attempt to quantify the benefits of these measures.

Implementing gear requirements in the Spotted Seatrout fishery to reduce mortality of released fish would benefit the stock, but single species gear requirements in multi-species fisheries like the Spotted Seatrout fishery can introduce difficulties in enforcement and decrease compliance with the requirements. Enforcement is difficult because it requires proof of an angler’s intent to fish for Spotted Seatrout and the enforcement difficulty provides a built-in loophole for anglers to avoid gear requirements. For example, requiring circle hooks when fishing with natural or artificial baits in the Spotted Seatrout fishery could also affect other robust recreational fisheries like Sheepshead, Red Drum, Estuarine Striped Bass, Summer Flounder, and Kingfishes regardless of whether anglers in these fisheries target Spotted Seatrout as well. If anglers follow Spotted Seatrout gear requirements when fishing for these other species, there could be decreases in recreational discard mortality across multiple fisheries. However, if anglers use these other fisheries to avoid Spotted Seatrout gear requirements, the discard mortality benefit

in the Spotted Seatrout fishery would be reduced. Regardless of angler behavior, enforcement remains difficult. Implementing gear requirements such as requiring circle hooks across multiple fisheries could be a way to improve angler compliance, simplify enforcement, and gain the benefit of reduced discard mortality in these fisheries. Circle hooks could be required when fishing with any natural or artificial bait, when using natural or artificial baits in certain areas (e.g., the sounds or rivers), when using natural or artificial baits in combination with hooks of a certain size, or when using natural or artificial baits where the fishing method is similar. The latter two examples could help provide exceptions for instances where circle hooks could significantly affect angler efficiency such as when anglers are targeting Sheepshead or offshore trolling. Gear requirements are likely better discussed outside of species-specific FMPs because of the wide-ranging effects of requirements across multiple fisheries and species-specific FMPs.

Tournaments

Spotted Seatrout are either directly or indirectly a popular target for many saltwater fishing tournaments in North Carolina. The DMF does not formally track or register saltwater fishing tournaments though if tournaments wish to sell their catch – common with billfish or King Mackerel tournaments – they must obtain a license from DMF. Additionally, DMF does obtain age samples from some tournaments, mostly billfish or King Mackerel tournaments. The last time DMF staff attempted to generate a list of saltwater fishing tournaments was 2021 and staff learned of 154 tournaments, however Division staff did not consider the list exhaustive. Of the 154 tournaments, 49 either directly targeted Spotted Seatrout or had categories specifically for Spotted Seatrout and 32 tournaments took place where Spotted Seatrout were likely to be encountered even if it was unclear whether a Spotted Seatrout category existed. In other words, over half of the saltwater tournaments the DMF was aware of in 2021 either targeted or had a high likelihood of encountering Spotted Seatrout.

Understanding the impact of fishing tournaments on Spotted Seatrout or other marine and estuarine fish species would require a catalogue of North Carolina saltwater fishing tournaments that does not exist at this time, an idea of the number of participants in each tournament, information on the type of tournament (e.g., catch and release or harvest), data on the number and species of fish caught in each tournament, and additional research. Most existing research exploring the effects of tournaments on fish populations, fish behavior, immediate mortality, and post release mortality have focused on freshwater systems though there have been some recent attempts to understand the impacts of saltwater tournaments on estuarine fish species. Specifically in Texas and Alabama, studies examining initial and post-release mortality of Spotted Seatrout from live-release tournaments found mortality rates well above recent estimates of recreational release mortality (James et al. 2007; Nelson et al. 2021). The same study in Alabama found similar mortality rates as recent estimates of recreational release mortality for Red Drum (Nelson et al. 2021) implying that the effect of tournaments may vary by species. Requiring a license or some sort of registration process with DMF in order to hold a saltwater fishing tournament in North Carolina could help in gathering these necessary data.

However, the 81 saltwater fishing tournaments known to the Division in 2021 targeting or likely to encounter Spotted Seatrout directly targeted or were also likely to encounter other fish species regularly found in similar habitats such as Red Drum, Striped Bass, Black Drum, flounder, Bluefish, Weakfish, and Sheepshead among many other fish species. The other 73 tournaments were predominately King Mackerel, billfish, or Dolphin/Wahoo tournaments which also target regulated species. The diversity of target species and broad spatial range of saltwater fishing tournaments – from many miles up local creeks to many miles offshore – make the potential effects of these tournaments much further reaching than just the Spotted Seatrout fishery. The effects of any attempt to manage saltwater tournaments based on the Spotted Seatrout fishery could have unforeseen influence on other fisheries. For example, if tournaments could not target Spotted Seatrout as a reward category or had to register to do so, this could potentially cause tournament organizers to focus on a different species thus increasing the impact of saltwater tournaments on that species. In order to better understand the current effect saltwater tournaments have on a variety of North Carolina fishes and to better predict how a system of tournament registration or licensing would affect tournaments, this issue should be examined on a broader basis across multiple fisheries. A separate information paper – rather than this amendment – may be the appropriate place for that exploration.

Spotted Seatrout Specific Commercial Management

Hook and Line Harvest

During the Spotted Seatrout Public Scoping Period recreational anglers and commercial fishers regularly expressed interest in a commercial hook and line fishery. The context of interest in a commercial hook and line fishery varied from making the trip limit the same regardless of gear to making the hook and line trip limit consistent with the broader commercial trip limit but prohibiting gill nets as a legal harvest gear to prohibiting gill nets as a legal harvest gear but keeping the hook and line trip limit consistent with the recreational bag limit and other variations on these ideas. Spotted Seatrout Advisory Committee members also discussed commercial hook and line harvest and generally expressed support for the idea with a similar range of context for that support. There is precedent in other states for allowing increased harvest of Spotted Seatrout by hook and line. Some states combine their hook and line allowance with gill net prohibitions (e.g., Florida and Louisiana) while other states allow both hook and line and gill net harvest (e.g., Mississippi). Commercial harvest in other states is minimal, however, and there does not appear to be a directed Spotted Seatrout fishery outside of North Carolina.

Ultimately, it is unclear how changes to the commercial hook and line trip limit would affect the sustainability of Spotted Seatrout harvest. It is likely the benefits or detriments resulting from changes would largely depend on fisher behavior and the specific implementation of such changes. A decrease to the general trip limit would increase dead discards making management less effective, but if a general trip limit decrease were paired with an exclusively hook and line fishery, the potential increase in dead discards could be greatly mitigated (see Appendix 2 for a more detailed discussion on anchored gill net and hook and line discard mortality). Raising the hook and line trip limit in the absence of other gear limitations should be considered with caution since it is unclear the

effect such a change would have on current commercial fisher behavior. In theory, consistent trip limits regardless of gear could increase the number of participants in the fishery as fishers with the expertise to fish gill nets would likely continue doing so, fishers without that expertise would no longer be held to the recreational bag limit when fishing with hook and line, and generally increase the areas accessible for commercial harvest (e.g., areas currently closed to gill net harvest or where fishers cannot set gill nets because of environmental conditions such as heavy tides). A hook and line trip limit consistent with other commercial gears could encourage recreational anglers to obtain a commercial license to keep the commercial limit of Spotted Seatrout. A higher hook and line commercial trip limit could also encourage for-hire captains who currently hold a commercial license to use it to allow their clients to keep a commercial limit. Similarly, for-hire captains who do not currently hold a commercial license could be encouraged to obtain one for the same reasons. These scenarios could increase commercial harvest, though if and how much would depend on other management implemented. For example, a hook and line fishery combined with a decreased trip limit could discourage some of this behavior. Changes to the commercial hook and line limit should be preceded by further outreach and stakeholder engagement to help determine the logistics and sustainability of a commercial hook and line fishery.

The potential issues and benefits of a hook and line commercial fishery are not unique to the Spotted Seatrout fishery. The benefits to other species would likely be similar and, depending on the management conditions (e.g., a mismatch of bag and trip limits or open and closed season between the recreational and commercial sectors), the concerns with developing hook and line fisheries are also the same. There are anecdotal reports of recreational anglers using commercial licenses to harvest commercial limits in the cobia and flounder fisheries though the extent of this practice is unclear. Since the issues surrounding hook and line commercial fisheries are the same across the span of multiple species, it may make more sense to discuss commercial hook and line harvest more broadly outside of species-specific FMPs.

Commercial Vessel Limits

At their April 2014 meeting, the MFC Finfish Advisory Committee, while acting as the Striped Mullet Advisory Committee, passed a motion to recommend allowing two commercial fishing license holders fishing from the same vessel using one set of gear to harvest two commercial limits of Spotted Seatrout. Discussion around this recommendation centered on increased safety – especially in the winter – as well as decreasing the amount of gear in the water. The Finfish recommendation was presented to the MFC at their May 2014 business meeting; however, as addressing this recommendation immediately would have required reopening the Spotted Seatrout FMP for an amendment, the MFC instead voted to include discussion of the Finfish Advisory Committee recommendation in the next scheduled Spotted Seatrout FMP update. At their October 2024 meeting, the MFC Southern Advisory Committee voted to recommend the 2014 Finfish Advisory Committee recommendation (hereafter the Southern AC recommendation). Throughout the Spotted Seatrout FMP update process, this issue was raised by one stakeholder in public comment.

Adopting the Southern AC recommendation would likely reduce the amount of gear in the water somewhat and increase boater safety. However, it is unclear how much the Southern AC recommendation would reduce gear in the water because it is not clear how many participants in the fishery currently fish with only one license holder on the boat. It is also not possible to know how many of this unknown number of commercial fishers would change their behavior if the Southern AC recommendation were adopted. While fisher safety is a very real concern, it is similarly unclear how much safer the Southern AC recommendation would make the Spotted Seatrout fishery for the same reasons: it is unknown how many commercial fishers already fish with two people onboard and it is unknown how behavior would change.

It is very likely the Southern AC recommendation would increase harvest though the amount of that increase cannot be quantified. Anecdotal reports from commercial stakeholders indicate few commercial trips reach their limit of Spotted Seatrout primarily because commercial fishers approaching their limit are unlikely to continue fishing for Spotted Seatrout (personal communication). Adopting the Southern AC recommendation would double the number of Sotted Seatrout that could be harvested prior to approaching the trip limit. It is highly likely this would increase harvest even though it is not possible to quantify exactly how much. There are other fisheries where multiple trip limits are allowed with multiple license holders onboard (e.g., Striped Bass), but these are predominantly quota managed species where the quota already caps allowable harvest. Additionally, there are anecdotal reports of commercial fishers participating in the Striped Bass fishery obtaining licenses for family members as a way of increasing allowable harvest per trip (NCDMF, personal communication). While the effects of any individual trip are limited by the Striped Bass quota, there is no quota in the Spotted Seatrout fishery, therefore, such behavior in the Spotted Seatrout fishery would increase harvest would. As overfishing is occurring in the Spotted Seatrout fishery, management that has a chance of increasing harvest, even if that increase cannot be quantified, should not be considered. As such, the Division does not recommend adopting the 2014 Finfish Advisory Committee and 2024 Southern Advisory Committee recommendations in Amendment 1.

Option 2: Commercial Vessel Limit Options

a) *Status Quo – Maintain current management of one 75 fish trip limit per vessel per day.*
b) *Allow two commercial license holders fishing on one boat with one set of gear to harvest two commercial limits of Spotted Seatrout.*

MANAGEMENT OPTIONS

Table 3.2. Supplemental management options for the Spotted Seatrout fishery. Options would likely provide benefits to the stock but are not able to be quantified.

Topic	Option	Description
Recreational Boat limits and captain/crew allowance	1.a	Status quo – no boat limit, continue captain/crew allowance
	1.b	Eliminate captain/crew allowance on for-hire trips with no broader vessel limit.
	1.c	Implement 8 fish vessel limit with captain/crew allowance on for-hire trips counted as part of vessel limit.
Commercial vessel limits	2.a	Status quo – no change to commercial trip limits
	2.b	Allow two commercial license holders fishing on one boat with one set of gear to harvest two commercial limits of Spotted Seatrout.

RECOMMENDATION

Division Recommendation:

Option 1.b Eliminate the captain/crew allowance on for-hire trips with no broader vessel limit.

Option 2.a Status quo – Maintain current management of one 75 fish trip limit per vessel per day.

Advisory Committee Recommendations and Public Comment: see Appendix 8

NCMFC Selected Management Options:

Status Quo (Replaced the NCMFC's November 2024 preferred management Option 1.b Eliminate the captain/crew allowance for Spotted Seatrout on for-hire trips with no broader vessel limit).

Appendix 4: COLD STUN MANAGEMENT

ISSUE

Implement additional management measures to protect Spotted Seatrout spawning stock biomass after periodic cold stun events.

ORIGINATION

The North Carolina Division of Marine Fisheries (DMF).

BACKGROUND

Spotted Seatrout (*Cynoscion nebulosus)* and other finfish that over-winter in estuarine environments in North Carolina are susceptible to periodic cold stun events. Cold stun events occur when water temperatures drop below a fish's metabolic minimum, impairing their physiological functions and rendering them lethargic or immobile. These events are associated with rapid weather changes that disrupt the thermal balance of coastal waters. In North Carolina, cold stuns can be triggered by snow and ice melt following a winter storm or by sudden and-or prolonged periods of cooler temperatures from cold fronts. Cold stun events can be localized to individual tributaries, or they can be widespread across multiple estuaries. Mass mortality events can occur in these periods of sub-optimal water temperatures because the impaired function of the fish makes them unable to move to warmer waters. Cold stuns are not always lethal, but if water temperatures drop too low or remain low for too long and fish are unable to move to find thermal refuge, they are unlikely to survive. Fish in a stunned state are also easy targets for scavengers, predators, and can be susceptible to harvest with methods like dip nets.

Cold Tolerance

To better understand environmental conditions that lead to Spotted Seatrout cold stuns, several studies have investigated the temperatures at which Spotted Seatrout become stunned and experience mortality. In North Carolina, laboratory experiments suggest the temperatures in which Spotted Seatrout become stunned, or experience a complete loss of equilibrium, range from 2 to 4°C (Ellis et al. 2017). However, Spotted Seatrout begin showing signs of stress at temperatures as high as 7°C. An adult Spotted Seatrout's critical thermal minimum, or the lowest temperature Spotted Seatrout can be exposed to for a short time and still survive, was found to be approximately between 2–3°C. When adult Spotted Seatrout were acclimated and exposed over time to low water temperatures, a water temperature of 3°C was found to be 100% lethal after less than 2 days (Ellis et al. 2017). At 5°C, 93% were still alive after 5 days, but only 15% survived after 10 days. There was high survival (83%) after 10 days at 7°C. Based on this research, we have learned that Spotted Seatrout's survival of cold stun events is not only related to water temperature, but also the length of time they are exposed to these stressful conditions. Similar studies from South Carolina and Texas conducted on Spotted Seatrout saw comparable temperatures leading to Spotted Seatrout loss of equilibrium and mortality (Anweiler et al. 2014; McDonald et al. 2010), although lower temperatures were

required to induce mortality in adults (~2°C) than juvenile (~3°C) Spotted Seatrout, indicating the possibility of size-dependent mortality (McDonald et al. 2010).

For Spotted Seatrout, cold water temperatures disrupt cellular processes, making it difficult to maintain osmotic balance of ion concentrations within their body (Hurst 2007). If temperatures drop below a threshold for long enough, and the fish is unable to leave the area, the imbalance will impact their central nervous system and result in loss of equilibrium, causing the "stunned" response where fish float on top of the water or lay along the bottom.

Population Impacts of Cold Stuns

Spotted Seatrout mature quickly, with most able to reproduce by age one. Spotted Seatrout are also highly fecund, meaning they can produce many offspring within a spawning season and over an individual's lifetime. Females spawn multiple times throughout a season and can produce 3–20 million eggs per year (Murphy et al., 2010; Nieland et al., 2002; Roumillat & Brouwer, 2004). Though Spotted Seatrout have a high capacity to replenish spawning stock biomass (SSB), they are also especially susceptible to cold stuns due to their limited tolerance for abrupt temperature shifts, particularly when these shifts occur outside of their preferred thermal range (Ellis, 2014). North Carolina Spotted Seatrout are more so susceptible to being impacted by cold stuns because they are near the northern extent of their geographical range.

Cold stun mortality has been shown to have population-level effects on Spotted Seatrout in North Carolina (NCDMF 2012; Ellis 2014; Ellis et al. 2018) by reducing stock size and annual cohort strength (Hurst 2007). Overall, the rate of mortality due to fishing activity or natural causes like cold stuns vary seasonally and annually. Using tag return data, Spotted Seatrout natural mortality has been estimated to be higher than fishing mortality during winters in which cold stuns occurred (Ellis et al. 2018; Loeffler et al. 2019; Bauer and Flowers 2019). The division does not have a method to quantify the severity of a cold stun on Spotted Seatrout SSB in real-time, or as the cold temperatures are occurring. However, eliminating or reducing harvest after a cold stun event protects the remaining SSB by ensuring surviving adults have a chance to spawn.

Compared to other commercially and recreationally important fish species in North Carolina, Spotted Seatrout are more likely to experience population-level impacts from cold stun events. Spotted Seatrout are a subtropical fish species, with North Carolina being one of the northernmost points of their range. Consequently, Spotted Seatrout are not as well adapted as other species to withstand winters with below average temperatures and winter storms that occur every few years. In addition, Spotted Seatrout in North Carolina overwinter in shallow estuarine creeks and bays which makes them more susceptible to being stunned or dying compared to other species that overwinter offshore, like weakfish, adult Red Drum, and mature southern flounder (Ellis 2014; Ellis et al. 2017b; McGrath and Hilton 2017; Bacheler et al. 2008; Krause et al. 2020). By overwintering in shallow creeks and bays, Spotted Seatrout have an increased risk of exposure to rapid declines in water temperature, usually due to runoff following snow or

ice melt from a winter storm. Spotted Seatrout can also become trapped in estuarine creeks due to rapid water temperature drops making escape difficult and mortality likely.

North Carolina Cold Stun Response

In 2015, the DMF started a comprehensive, statewide water quality monitoring program (Program 909) and deployed an array of continuous water temperature loggers. A total of 80 loggers at 55 stations measure the water temperature every 15 minutes. Station locations are distributed throughout coastal North Carolina with specific locations that staff determined were either representative of the riverine and estuarine systems they were in and-or locations of historic cold stuns (Figure 4.1). At depths greater than 2 meters, two loggers were placed to monitor temperatures at the surface and bottom to help managers identify water column stratification and turnover events.

Combining known Spotted Seatrout temperature tolerances and available water temperature data allows for more quantitative information that can be used in determining the necessity of a potential harvest closure. Quantitative temperature triggers that incorporate estimated probabilities of mortality could inform Spotted Seatrout harvest closure decisions.

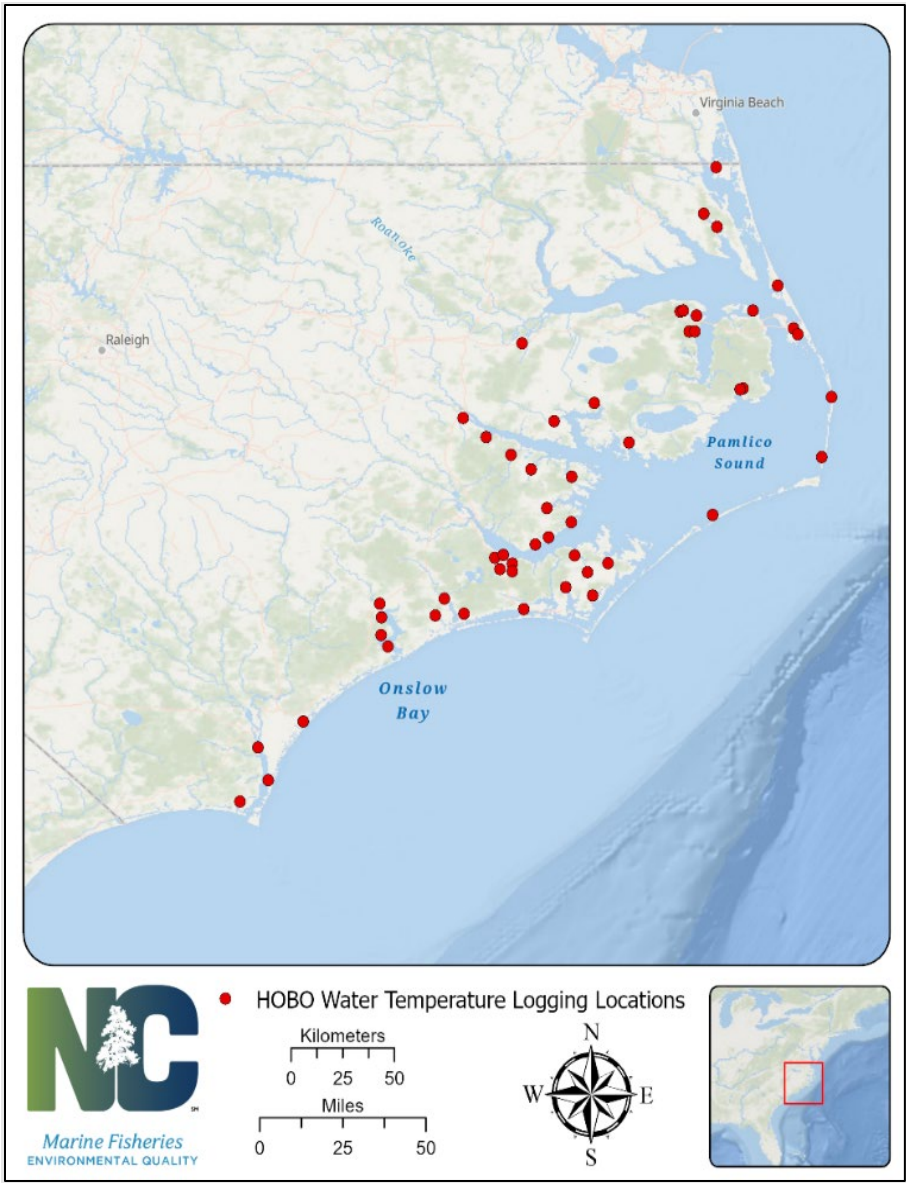

Figure 4.1. Locations of DMF water temperature loggers in coastal North Carolina.

Mortality due to cold stuns is recognized in the 2012 Spotted Seatrout Fishery Management Plan (FMP) as a factor impacting the abundance of Spotted Seatrout in North Carolina (NCDMF 2012). At their February 2012 business meeting, the Marine Fisheries Commission (MFC) directed the division to remain status quo regarding Spotted Seatrout management, with the assumption that in the event of a "catastrophic" cold stun the director would use proclamation authority to enact a temporary closure (NCDMF 2012). The objective of a Spotted Seatrout harvest closure after a cold stun event is to allow surviving fish an opportunity to spawn during their spring spawning season, potentially increasing recruitment the following year.

Spotted Seatrout have a long history of cold stuns and winter mortality in North Carolina. Spotted Seatrout cold stuns have been recorded in North Carolina as far back as over

300 years, and have occurred as recently as the winters of 2000, 2002, 2004, 2009, 2010, 2013, 2014, 2017, and 2022.

AUTHORITY

G.S. 113–134 RULES
G.S. 113–182 REGULATION 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
15A NCAC 03H .0103 PROCLAMATIONS, GENERAL
15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS
15A NCAC 03M .0522 SPOTTED SEATROUT

DISCUSSION

Several management strategies can be used to further protect Spotted Seatrout SSB after periodic cold stun events. These strategies may include temporary slot limits, harvest closures, spatial (area) closures, or some combination of these options. Management strategies also include the need for the use of adaptive management. Given the inherent difficulty in quantifying the severity of cold stun events as they occur, subsequent management strategies also lack precise quantification methods to determine effectiveness. The proposed management strategies are therefore grounded in a pragmatic, common-sense approach to protect SSB.

Seasonal Closures

The spawning season for Spotted Seatrout varies by location (Brown-Peterson et al., 2002; Nieland et al., 2002; Roumillat & Brouwer, 2004) and can occur with one or two peaks in spawning activity. In North Carolina, Spotted Seatrout have a protracted spawning season, usually lasting from April to October (Burns, 1996). Larger and older females are more developed at the beginning of the spawning season, will spawn sooner than smaller fish, and will spawn for a more protracted season. Smaller fish, that are virgin spawners at the beginning of the season, might enter the spawning stock and spawn later in the year through October.

Following a significant cold stun event, the Spotted Seatrout fishery has historically been closed until June 15th. North Carolina Spotted Seatrout have been observed to have a peak in spawning activity in May and June (Burns, 1996), with some individuals spawning later into the fall months. The option to maintain the status quo would continue to close the fishery until June 15th after a significant cold stun event. However, extending the standard closure to June 30th may ensure that more of the spawning peak is protected and would likely allow most of the larger, older fish to spawn at least once before the chance of significant harvest. Another option would be to extend the standard closure until October 15th, ensuring most surviving fish have the opportunity to spawn during the entire spawning season, but this would result in less fishing opportunities for anglers and likely have a diminishing return for the stock over protection during the peak spawn.

Size Limits

Size and slot limits are a common management strategy to limit harvest of specific size and-or age classes of fish in a stock. By setting a minimum size limit based on length at maturity, management can ensure a portion of the females in the stock have a chance to spawn at least once before harvest. The upper bound of a slot limit likewise helps protect larger females which have a greater reproductive capacity, meaning they can produce more eggs. Estimates of Spotted Seatrout fecundity range from 3 to 20 million eggs per year depending on age, length, and water temperature (Lowerre-Barbieri et al., 2009; Nieland et al., 2002; Roumillat & Brouwer, 2004). Spotted Seatrout are batch spawners, meaning they can spawn multiple times in one season. The number of eggs produced within each batch also depends on age and length (Figure 4.2). Spotted Seatrout fecundity estimates specific to North Carolina and Virginia are not available at this time.

Theoretically, the ability of the Spotted Seatrout stock to recover faster after significant cold stun event, would be enhanced if larger females are protected. For example, if a slot limit with a trophy fish allowance is adopted for sustainable harvest (Appendix 3, this amendment), the slot limit could be temporarily narrowed and-or the trophy fish allowance could be temporarily removed. Reducing or narrowing the slot limit following a closure, whether by increasing the lower bound or decreasing the upper bound, would ensure more mature fish are available to spawn. Because larger females are more fecund, it may be more important to focus on their protection after a cold stun event. This could be achieved by removing any prospective trophy fish allowance and-or by decreasing the upper bound of the slot limit in response to a severe cold stun event. This temporary slot limit could be put into place until after the peak spawning season (July) or until after most of the spawning season (October).

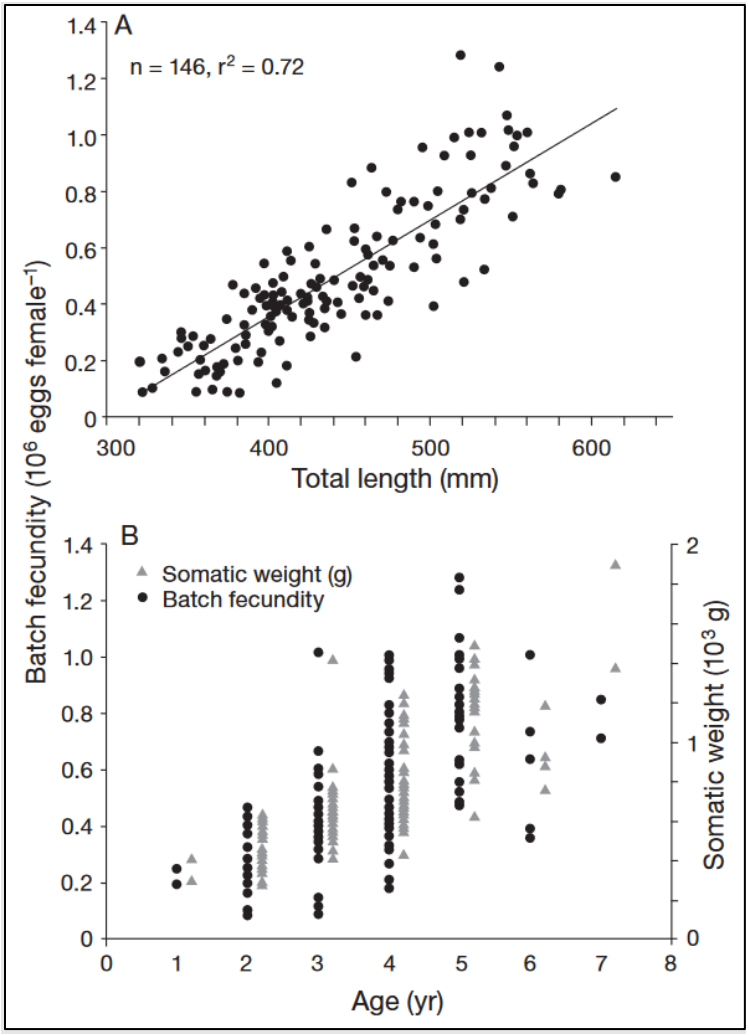

Figure 4.2. Taken from Lowerre-Barbieri et al. (Lowerre-Barbieri et al., 2009). Batch fecundity as it relates to size at age of Spotted Seatrout. (A) Batch fecundity to total length, with the predicted linear relationship, and (B) individual batch fecundities and somatic weights plotted by age.

Bag and Trip Limits

The current Spotted Seatrout daily recreational bag limit is 4 fish, and the daily commercial trip limit is 75 fish. In response to a severe cold stun, temporarily lowering these limits when harvest reopens could potentially reduce overall harvest. This approach aims to increase the Spotted Seatrout spawning stock biomass available through the end of the spawning season. The effectiveness of temporarily reducing bag and trip limits depends on the specific management measures adopted in Amendment 1. For example, if management to extend the cold stun closure through the majority of Spotted Seatrout spawning season is adopted in this Amendment (Appendix 4: Options 1.b or 1.c), temporarily reducing bag and trip limits would likely be less effective in rebuilding the stock as the majority of spawning would occur prior to harvest reopening and a portion of harvest reduced by temporary reductions would likely be recouped prior to the next spawning season. Most recreational and commercial fishers do not harvest their daily bag

or trip limit (see Appendix 2) so a modest temporary reduction of bag and trip limits likely would not impact overall harvest. To achieve a reduction in harvest, the temporary reduction in bag and trip limits may need to be more substantial.

Temporary adjustments to bag and trip limits may not be the most effective strategy when applied solely as part of the standard cold stun closure. Instead, they are likely to be more impactful when integrated into an adaptive management framework used in the event of an especially severe cold stun. The adaptive management framework would allow for a more tailored response to address specific conditions that may arise in the event of a severe cold stun.

Area Closures

Historically, cold stun events have varied in their spatial impacts and have ranged from a few isolated creeks in one river system to multiple riverine and estuarine systems. Cold stun events can also occur over large areas of the state, causing more significant losses in all major systems.

Previous cold stun closures have closed the Spotted Seatrout fishery statewide. Tagging and genetics data suggest that Spotted Seatrout exhibit high site fidelity to their natal estuary with periods of greater movement during the spawning season (Ellis, 2014; O'Donnell et al., 2014; Ward et al., 2007). This, coupled with limited movement in the winter months, supports the idea that effects of a cold stun may vary regionally. Using available information about Spotted Seatrout temperature tolerances, mortality probabilities to sub-optimal temperature exposure, and available continuous water temperature monitoring, the division could potentially identify areas of concern when freezing temperatures are predicted to occur. However, the division does not have the ability to quantify or predict the severity of a cold stun event so selecting specific areas for closures would be difficult and may minimize the overall desired impact of maximizing spawning potential following a significant cold stun event.

A statewide closure encompasses all estuarine and riverine systems where Spotted Seatrout overwinter, protecting all Spotted Seatrout in North Carolina from fishing pressure. This ensures areas without documented kills or continuous water temperature monitoring are still protected and that remaining Spotted Seatrout will have the opportunity to spawn before being subject to harvest. However, this strategy will cause fishing opportunities to be lost in areas that may not be affected by cold stun conditions. However, a tradeoff would be that a statewide closure protects fish that may migrate into open areas during more active movement periods during the onset of the spawning period. A statewide closure will also aide Marine Patrol in enforcement of the closure and not burden fisherman with changing boundaries. Further, Spotted Seatrout are assessed and managed as a single stock in North Carolina. Simply closing a small area or region where a cold stun is observed will shift effort to surviving portions of the stock and potentially amplify the negative effects of a cold stun event.

Adaptive Management

The current adaptive management framework for cold stun events allows the Director to close the Spotted Seatrout fishery through June 15th following a significant cold stun event. Since the adoption of the original FMP in 2012 the Spotted Seatrout fishery has been closed twice due to cold stun events (2014 and 2018). The adaptive management framework for cold stun event closures can be refined to further aid in stock recovery following a cold stun event. Adaptive management may be used to temporarily adjust management measures such as size or slot limits, season closures, trip limits, bag limits, and gear requirements if it is determined that additional protections for the stock are needed after a significant cold stun event. Management needed will take into consideration factors such as the size and scope of the cold stun event, the rate of air and water temperature change, and the length of exposure to extreme temperatures. Below is an example of a revised adaptive management framework for cold stun events for consideration.

1) If a significant cold stun event occurs the Director will close the Spotted Seatrout fishery statewide through the date adopted in this amendment.
2) Temporary measures that may be implemented through adaptive management to aid in stock recovery after the standard closure period following a cold stun event include:
    a. recreational bag limit
    b. commercial trip limit
    c. size limit changes
    d. seasonal closure
    e. gill net yardage restrictions
    f. Use of adaptive management to further aid in stock recovery once the fishery reopens following a cold stun event is contingent on approval by the Marine Fisheries Commission.

MANAGEMENT OPTIONS

Table 4.1. Cold stun management options for the Spotted Seatrout fishery. Options would likely provide benefits to the stock but are not able to be quantified.

Topic	Option	Description
Season closure	1.a	Status quo – fishery closed until June 15th following a cold stun
	1.b	Extend harvest closure until June 30th following a cold stun
	1.c	Extend harvest closure until October 15th following a cold stun
Size limits	2.a	Status quo – no size limit change following a cold stun
	2.b	Temporary adjustment of size and or slot limits following a cold stun
Bag and trip limits	3.a	Status quo – no bag/trip limit changes
	3.b	Temporary adjustment of bag and trip limits following a cold stun
Adaptive management	4	

RECOMMENDATIONS

Division Recommendation:

Option 1.b Extend harvest closure until June 30 following a cold stun

Option 4 Cold Stun Adaptive Management Framework

Advisory Committee Recommendations and Public Comment: see Appendix 8

NCMFC Selected Management Options:

Option 1.b Extend harvest closure until June 30 following a cold stun.

Option 4 Adopt Cold Stun Adaptive Management Framework.

Appendix 5: SPOTTED SEATROUT MANAGEMENT AND STOCK STATUS IN OTHER STATES

Table 5.1 Spotted Seatrout recreational regulations on the Atlantic coast and Gulf of Mexico coast by state as of March 2023. In Florida, Spotted Seatrout are managed separately across five Management Regions (Northeast, Central East, South, Big Bend, and Western Panhandle).

State	Size Limit	Daily Bag Limit	Season	Supplemental Management
VA	14"-24" one >24"	5 fish	Open year round	
SC	14"	10 fish	Open year round	Hook/line & gig only
GA	14"	15 fish	Open year round	
FL				No captain/crew allowance, no trebles w/ live/natural bait
Northeast	15"-19" one >19"	5 fish	Open year round	
Central East	15"-19" one >19"	2 fish	Closed Nov 1-Dec 31	
South	15"-19" one >19"	3 fish	Open year round	
Big Bend	15"-19" one >19"	5 fish	Open year round	
W. Panhandle	15"-19" one >19"	3 fish	Closed Feb	
AL	15"-22" one >22"	6 fish	Open year round	
MS	15"	15 fish	Open year round	
LA	12"-20" two >20"	15 fish	Open year round	No captain/crew allowance
TX	15"-20" one >30"	3 fish	Open year round	

Table 5.2 Spotted Seatrout commercial regulations on the Atlantic coast and Gulf of Mexico coast by state as of March 2023. In Florida, Spotted Seatrout are managed separately across five Management Regions (Northeast, Central East, South, Big Bend, and Western Panhandle).

State	Size Limit	Commercial Trip Limit/Quota	Season	Supplemental Management
VA	14"	51,104 lb annual quota	Sep 1-Aug 31 of following year	A daily incidental catch limit of 50 pounds per licensee aboard a vessel with a max limit of 100 pounds per vessel takes effect once the annual quota is caught.
SC	NA	NA	NA	Closed to commercial harvest
GA	14"	15 fish	Open year round	
FL				
Northeast	15"-24"	50 fish	Open Jun 1-Nov 30	Hook/line or cast net only
Central East	15"-24"	50 fish	Open May 1-Sep 30	Hook/line or cast net only
South	15"-24"	50 fish	Open Jun 1 – Oct 31	Hook/line or cast net only
Big Bend	15"-24"	50 fish	Open Jun 1 – Oct 31	Hook/line or cast net only
W. Panhandle	15"-24"	50 fish	Open Jun 1 – Oct 31	Hook/line or cast net only
AL	NA	NA	NA	Closed to commercial harvest
MS	15"	50,000 lb annual quota	Open year round until quota is met	
LA	14"	15	Jan 2-Dec 31 or until quota is met	No harvest on weekends, hook/line only
TX	NA	NA	NA	Closed to commercial harvest

Table 5.3 The stock status of Spotted Seatrout on the Atlantic coast and Gulf of Mexico coast by state as of March 2023. Not all states manage their Spotted Seatrout stock using stock assessments, therefore a stock status is not available for all states. In FL Spotted Seatrout stocks are assessed separately across five Management Regions (Northeast, Central East, South, Big Bend, and Western Panhandle).

State	Stock Assessment – Year	Stock Status
VA	Yes - 2020	Overfishing occurring, not overfished
SC	No	Unknown
GA	No	Unknown
FL	Yes - 2017	
Northeast		Overfishing occurring, overfished status unclear
Central East		Overfishing occurring, overfished status unclear
South		Not overfishing, not overfished
Big Bend		Overfishing occurring, overfished status unclear
W. Panhandle		Overfishing occurring, overfished status unclear
AL	Yes - 2017	At 20% SPR: overfishing occurring, not overfished At 30% SPR: overfishing occurring, stock overfished
MS	Yes – 2019	Overfishing status unclear, stock overfished
LA	Yes - 2021	Overfishing occurring, stock overfished
TX	No	Stock status unknown but independent sampling indicates depleted stock

Appendix 6: RESEARCH RECOMMENDATIONS

1. Develop a juvenile abundance index to gain a better understanding of a stock recruitment relationship.

2. Research the feasibility of including measures of temperature or salinity into the stock recruitment relationship.

3. Determine batch fecundity estimates for North Carolina Spotted Seatrout.

4. Size specific fecundity estimates for North Carolina Spotted Seatrout.

5. Investigation of the relationship of temperature with both adult and juvenile mortality.

6. Incorporate cold stun event information into the modeling of the population.

7. Estimate or develop a model to predict the impact of cold stun events on local and statewide Spotted Seatrout abundance.

8. Integrate tagging data into stock assessment model so both tagging data and other data sources can work together to give a better picture of the population.

9. Obtain samples (length, age, weight, quantification) of the cold stun events as they occur.

10. Define overwintering habitat requirements of Spotted Seatrout.

11. Determine factors that are most likely to influence the severity of cold stun events in North Carolina and separate into low and high salinity areas.

12. Investigate the distribution of Spotted Seatrout in nursery and non-nursery areas.

13. Further research on the possible influences of salinity on release mortality of Spotted Seatrout.

14. Survey of fishing effort in creeks with conflict complaints.

15. Determine targeted species in nursery areas and creeks with conflict complaints.

16. Microchemistry, genetic, or tagging studies are needed to verify migration patterns, mixing rates, or origins of Spotted Seatrout between North Carolina and Virginia.

17. Tagging studies to verify estimates of natural and fishing mortality.

18. Tagging studies to determine if there are localized populations within the state of North Carolina (e.g., a southern and northern stock).

19. A longer time series and additional sources of fishery-independent information.

20. Increased observer coverage in a variety of commercial fisheries over a wider area.

21. Expand nursery sampling to include SAV bed sampling in high and low salinity areas during the months of July through September.

22. Evaluate the role of shell hash and shell bottom in Spotted Seatrout recruitment and survival, particularly where SAV is absent.

23. Evaluate the role of SAV in the spawning success of Spotted Seatrout.

24. Develop estimates of commercial discards for runaround nets.

25. Conduct a detailed analysis of the existing Program 915 data to determine the extent to which late fall and spring provide insights into overwinter changes in abundance; this analysis could also provide insights into the magnitude of cold-stun events, which could explain differences in the effects observed in tagging and telemetry studies versus survey and fishery monitoring.

26. Improve estimates of recreational discard mortality.

Appendix 7: SPOTTED SEATROUT FISHERY MANAGEMENT PLAN ADVISORY COMMITTEE WORKSHOP SUMMARY

ISSUE

Summarize input received from stakeholders from Spotted Seatrout Fishery Management Plan Advisory Committee Workshop.

ORIGINATION

The North Carolina Division of Marine Fisheries (DMF).

BACKGROUND

The Spotted Seatrout Fishery Management Plan (FMP) Advisory Committee (AC) met for a three-day workshop April 22, 23, and 24 at the N.C. Cooperative Extension – Craven County Center in New Bern. The purpose of the workshop was for the AC to assist DMF staff in evaluating management issues and options included in draft Amendment 1 to the Spotted Seatrout FMP and informing the public on the issues contained in draft Amendment 1, solicit comments from peers and bring comments back to the AC, and evaluate the impacts of management options on the resource and user groups. It is important to note the purpose of the AC Workshop was to receive input from committee members based on their various experiences, expertise, and sector relationships, not to build a consensus among committee members or to recommended specific management strategies.

Division staff presented overviews of the stock assessment, life history, and fishery characterization portions of draft Amendment 1, including the Small Mesh Gill Net Information Paper and the Cold Stun Management, Sustainable Harvest, and Supplemental Management issue papers. Each presentation was followed by an opportunity for the AC to ask clarifying questions and discuss the content and management options included in each paper or section of draft Amendment 1. The AC did not have any suggestions regarding the content or clarity of the informational sections of draft Amendment 1. A summary of the management options and ideas discussed for information and issue papers in draft Amendment 1 are included below. Discussion points are organized by information and issue paper and topic. These points represent the discussion that occurred and the management options or combinations of options the AC suggested the division explore. Division staff explored these options and incorporated them directly into the relevant information and issue paper as appropriate.

DISCUSSION

Small-Mesh Gill-Net Fishery

The AC suggested looking at the data further to see if there is a mesh size(s) that might work with a slot limit in the gill-net fishery. The AC also suggested adding a research recommendation to look at discard mortality from runaround gill nets and other commercial gears.

Sustainable Harvest

Generally, the AC asked the division to prioritize access to the fishery when considering management measures and preferred raising the minimum size limit to reducing the bag/trip limit and season closures. The AC asked the division to consider a 15” or 16” to 20” slot limit, with or without a trophy fish allowance. There was discussion about implementing a commercial harvest cap either at 350,000 or 600,000 lb, similar to how the commercial Red Drum fishery is managed. If a season closure is considered by the division, the AC wanted it to be as short as possible and to consider the number of trips affected by a season closure. The AC gave some ideas for possible winter and spawning season closure options and urged for any closure to be less than 90 days. The AC suggested the division consider several combination options that included raising the minimum size limit, with and without a slot, paired with either a season closure or reducing the bag limit. The AC advised there is a need to build adaptive management into the FMP related to sustainable harvest.

Supplemental Management

The AC did not like the idea of a vessel limit for Spotted Seatrout. AC members relayed there was some support among charter captains to remove the captain and crew limit for Spotted Seatrout but not for species with lower bag limits (e.g., Red Drum, southern flounder).

The AC discussed the possibility of a commercial hook-and-line fishery. Discussion largely centered on the need to limit participation (e.g., exclude recreational fishermen with commercial licenses, commercial fishermen with no history of harvesting Spotted Seatrout) and the need for commercial license reforms prior to allowing a fishery. There was discussion concerning whether the fishery should be allowed with or without gill nets as an allowable gear. They also noted that further outreach and feedback is needed from the public prior to allowing a commercial hook-and-line fishery.

The AC discussed gear requirements in the Spotted Seatrout recreational fishery. Discussion included requiring circle hooks when using natural bait, prohibiting the use of treble hooks when using natural bait, and prohibiting treble hooks on artificial lures. The AC advised that increased outreach regarding ethical angling practices will be needed before any gear changes are required.

The AC brought up the issue of live release fishing tournaments and their potential impact on Spotted Seatrout, particularly the perceived increase in the number of tournaments. There was discussion concerning recent research suggesting the mortality of Spotted Seatrout from live release tournaments is roughly three times higher than recreational release mortality. The AC advised that more information needs to be collected from fishing tournaments.

Cold Stun Management Issue Paper

The AC was receptive to extending the standard cold stun closure period through June 30 (inclusive). The AC did not like the idea of instituting size limit restrictions as part of

the standard cold stun management response. Instead, the AC preferred to use adaptive management to implement additional temporary management measures (e.g., size limit, bag limit, trip limit, closed season), with a defined end date, based on the severity of a cold stun. There was a general preference for reducing the bag/trip limit instead of extending the season closure beyond the standard cold stun closure period.

Appendix 8: SUMMARY OF MANAGEMENT RECCOMMENDATIONS AND COMMENT

Table 8.1 Summary of management recommendations from NC DMF, the Northern, Southern, and Finfish Advisory Committees (AC).

	DMF	Northern AC	Southern AC	Finfish AC
Appendix 2: Sustainable Harvest				
Recreational	Option 5.i: 3-fish bag limit 14”-20” slot limit with allowance for one fish >26” January-February harvest closure *39.5% harvest reduction*	No quorum	Option 5.i: 3-fish bag limit 14”-20” slot limit with allowance for one fish > 26” January-February harvest closure *39.5% harvest reduction*	16”-20” slot limit with allowance for one fish > 24” Maintain 4-fish bag limit *33% harvest reduction*
Commercial	Option 2.c: Saturday-Monday harvest closure October-December, & January-February harvest closure 1.a no changes to commercial size limit Option 3.a: Maintain 75-fish trip limit (does not apply to stop nets and hook and line fisheries) *40.2% harvest reduction*	No quorum	January-February closure Option 3.a: Maintain 75-fish trip limit (does not apply to stop nets and hook and line fisheries) *21.6% harvest reduction*	Saturday-Monday closure October-December, & Saturday-Sunday harvest closure January-September *30.3% harvest reduction*
Stop Net	Option 4.b: Formalize management in FMP	No quorum	Option 4.a: Maintain status quo	Option 4.a: Maintain status quo
Adaptive Management	Adopt Adaptive Management Framework	No quorum	Adopt Adaptive Management Framework	
Appendix 3: Supplemental Management				
	Option 1.b: Eliminate captain/crew limit on for-hire trips	No quorum	Allow two trip limits on one boat with one set of gear and two license holders Option 1.b: Eliminate captain/crew limit on for-hire trips	Option 1.b: Eliminate captain/crew limit on for-hire trips
Appendix 4: Cold Stun Management				

	Option 1.b: Extend harvest closure until June 30th following a cold stun Adopt Cold Stun Adaptive Management Framework	No quorum	Option 1.b: Extend harvest closure until June 30th following a cold stun	Adopt Cold Stun Adaptive Management Framework

Online Spotted Seatrout Public Questionnaire

The online Spotted Seatrout Public Questionnaire opened on September 27, 2024, and closed October 16, 2024. In total, the questionnaire had 201 participants, 153 of which left comments in addition to their responses.

Of the open response comments received, 47 were generally negative toward commercial fishing with many of these comments explicitly advocating for an outright ban or additional limitations (e.g., slot limit) on inshore gill nets. Additionally, most comments advocating against gill nets also advocated for a ban on inshore trawling. It is important to note that many of these comments either overstated the contribution of commercial harvest to total Spotted Seatrout harvest (e.g., “netting is the problem”) or incorrectly blamed inshore trawling.

Twenty-four responders mentioned slot limits with several of these supporting a slot limit with no trophy allowance and one supporting a 25” trophy allowance. Of the suggested slot limits, there was nearly equal support between a 14–20” and a 16–20” slot limit.

Sixteen comments addressed season closures; however, the scope of these comments ranged from not supporting any season closure to supporting extending the winter closure into spring to supporting a spawning season closure. Two responders expressed support for an early spring to June or July season closure as opposed to a wintertime closure.

Eleven responders emphasized the need for stronger enforcement of existing regulations, noting that violations like over-limit trips go unchecked.

Additional responders commented on the importance of equitable management between sectors, the desire for no additional management, or were generally negative toward the entire amendment. Three comments discussed discard rates, suggesting the discard estimates are too high in the recreational fishery.

Two responders mentioned and suggested the elimination of tournaments, citing that too many are being held and that the practice of high grading puts too much pressure on larger fish.

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