

**North Carolina
Southern Flounder (*Paralichthys lethostigma*)
Fishery Management Plan**

Amendment 4

By

North Carolina Division of Marine Fisheries



North Carolina Department of Environmental Quality
North Carolina Division of Marine Fisheries
3441 Arendell Street
P.O. Box 769
Morehead City, NC 28557

This document may be cited as:

NCDMF (North Carolina Division of Marine Fisheries). 2025. North Carolina Southern Flounder Fishery Management Plan Amendment 4. North Carolina Division of Marine Fisheries, Morehead City, North Carolina. 33 p.

DRAFT

Disclaimer: Data in this Fishery Management Plan may have changed since publication based on updates to source documents.

ACKNOWLEDGMENTS

Amendment 4 to the North Carolina (NC) Fishery Management Plan (FMP) was developed by the NC Department of Environmental Quality (NCDEQ), Division of Marine Fisheries (NCDMF) under the auspices of the NC Marine Fisheries Commission (NCMFC) with the advice of the Finfish Advisory Committee acting as the Southern Flounder Advisory Committee (AC). Deserving special recognition are the members of the Finfish AC and the NCDMF Plan Development Team (PDT) who contributed their time and knowledge to this effort.

Advisory Committee

Jeff Buckel
Lewis Dunn
Jake Griffin
Jesse Mock III
Randy Proctor
William Tarplee
Sammy Corbett
Tom Roller

Southern Flounder Plan Development Team

Anne Markwith (co-lead)	Michael Binkley
Holly White (co-lead)	Kevin Aman
Charlton Godwin	Brian Deanes
Chris Stewart	Jonathan Weaver
Jeffrey Dobbs	Kristina Flanigan
Christina Bland	Alan Bianchi
Todd Mathes	Brad Johnson
Brenton Griffin	Jason Walsh
Tina Moore (mentor)	

The following division staff were also invaluable in assisting with the development of this document: Barbie Byrd, Daniel Zapf, Jason Rock, Kathy Rawls, Jesse Bissette, Catherine Blum, and the many reviewers of the multiple drafts of this plan. Also grateful for the administrative support from Deborah Manley, Hope Wade, and Patricia Smith.

Table of Contents

ACKNOWLEDGMENTS.....	2
EXECUTIVE SUMMARY	6
INTRODUCTION	1
Fishery Management Plan History	1
Management Unit.....	1
Goal and Objectives.....	1
DESCRIPTION OF THE STOCK	2
Biological Profile	2
Assessment Methodology	3
Stock Status.....	3
DESCRIPTION OF THE FISHERY	5
Commercial Fishery	5
Recreational Fishery	7
SUMMARY OF ECONOMIC IMPACT	9
Commercial Fishery	9
Recreational Fishery	10
ECOSYSTEM PROTECTION AND IMPACT	10
Coastal Habitat Protection Plan.....	11
FINAL AMENDMENT 4 MANAGEMENT STRATEGY	11
RESEARCH NEEDS.....	11
MANAGEMENT FROM PREVIOUS PLANS	12
APPENDICES.....	14
Appendix 1: Increasing Recreational Access to Southern Flounder Through Sector Allocation Parity.....	14
Issue	14
Origination.....	14
Background.....	14
Authority.....	21
Discussion.....	21
Management Options.....	23
Recommendations	23
REFERENCES	24

List of Tables

Table 1.	Number of days the Southern Flounder commercial fishery was open in 2022-2024 by gear type and management area: mobile gear, northern and southern management areas; pound nets, northern, central, and southern management areas.	6
Table 1.1.	Allocation in pounds for commercial and recreational fisheries for the North Carolina Southern Flounder Fishery that maintains overall reductions of 72%. An asterisk (*) indicates that Recreational Commercial Gear License (RCGL) gear removals are not included in the Total Allowable Landings.	15
Table 1.2.	Allocation in pounds for the North Carolina Southern Flounder commercial and recreational fisheries and associated sub-allocations for each sector that maintains overall reductions of 72% but maintains the current level of sub-allocation for the pound net fishery. An asterisk (*) indicates that RCGL gear removals are not included in the Total Allowable Landings. .	15
Table 1.3.	Total allowable landings (in pounds) for the North Carolina Southern Flounder commercial fishery and associated sub-allocations for each gear management area adopted in Amendment 3.	16
Table 1.4.	Catch estimates with target and actual reductions from the North Carolina Southern Flounder fishery, 2017-2023. (North Carolina Trip Ticket Program and MRIP). *Target reductions under Amendment 2.	18
Table 1.5.	Recreational Total Allowable Catch (TAC) and catch estimates in pounds with adjusted TAC based on overage reductions, 2022-2024. Estimates are based on data from the Marine Recreational Information Program (MRIP) and recreational gig survey. An asterisk (*) indicates that the value is estimated from the previous year.	18
Table 1.6.	Commercial Southern Flounder economic contribution estimates from 2023-2014 reported in 2023 dollars.	19
Table 1.7.	Recreational flounder economic contribution estimates from 2023-2014 reported in 2023 dollars.	20
Table 1.8.	Recreational harvest estimates during 2022 and 2023 from the Marine Recreational Information Program (MRIP) and recreational gig survey. An asterisk (*) indicates the 2022 estimate was used because data from 2023 were not available.	22
Table 1.9.	Commercial Southern Flounder pounds landed, number of trips landing southern flounder, and number of commercial participants and dealers participating in the fishery.	23

List of Figures

Figure 1.	Estimated spawning stock biomass compared to established reference points, 1989-2017 (Flowers et al. 2019).....	4
Figure 2.	Estimated fishing mortality rates (numbers-weighted, ages 2-4) compared to established reference points, 1989-2017 (Flowers et al. 2019).	4
Figure 3.	Southern Flounder landings (pounds) for total commercial fishery and top two gears (gill nets and pound nets) from the NC Trip Ticket Program 1972-2023 with major fishery regulation changes noted. Noted regulation changes do not represent a comprehensive list. For additional regulation changes see Lee et al. (2018).	6
Figure 4.	Southern Flounder commercial trips (numbers) and landings (pounds) from NC Trip Ticket Program, 1994-2023.	7
Figure 5.	MRIP estimates of recreational hook-and-line Southern Flounder harvest (pounds) and major fishery regulation changes, 1989-2023. Noted regulation changes do not represent a comprehensive list. For additional regulation changes see Lee et al. (2018).....	8
Figure 6.	MRIP estimates of recreational hook-and-line harvest (pounds) and all trips that harvested or released Paralichthid flounder species, 1989-2023. Data prior to 2004 were calibrated to align with MRIP estimates post-2004.....	9
Figure 7.	Effects of threats and alterations on water quality and coastal habitats and their ultimate impact on the growth and survival of Southern Flounder.....	11
Figure 1.1.	Boundary descriptions for the two mobile gear (left) and three pound net (right) management areas adopted in Amendment 3.	16
Figure 1.2.	Pounds of Southern Flounder landed as a percent of total commercial finfish landed in North Carolina from 2014-2023.....	19
Figure 1.3.	Number of flounder trips as a percent of total recreational fishing trips in North Carolina from 2014-2023.	21

DRAFT

EXECUTIVE SUMMARY

*** This section is completed prior to final approval***

DRAFT

INTRODUCTION

This is Amendment 4 to the Southern Flounder Fishery Management Plan (FMP). By law, each FMP must be reviewed at least once every five years (G.S. 113-182.1). The NC Division of Marine Fisheries (DMF) reviews each FMP annually and a comprehensive review is undertaken about every five years. The last comprehensive review of the plan (Amendment 3; NCDMF 2022) was approved by the NC Marine Fisheries Commission (NCMFC) in 2022. FMPs are the ultimate product that brings all information and management considerations into one document. The DMF prepares FMPs for all commercially and recreationally significant species or fisheries that comprise state marine or estuarine resources adopted by the NC Marine Fisheries Commission (NCMFC). The goal of these plans is to ensure long-term viability of these fisheries. All management authority for the North Carolina Southern Flounder fishery is vested in the State of North Carolina. The NCMFC adopts rules and policies and implements management measures for the Southern Flounder fishery in Coastal Fishing Waters in accordance with 113-182.1. Until Amendment 4 is approved for management, Southern Flounder are managed under Amendment 3 (NCDMF 2022).

Fishery Management Plan History

Original FMP Adoption:	February 2005
Amendments:	Amendment 1 February 2013 Amendment 2 August 2019 Amendment 3 May 2022
Revisions:	None
Supplements:	Supplement A to the FMP February 2011 Supplement A to Amendment 1 August 2017
Information Updates:	None
Schedule Changes:	Scheduled review was moved up from 2027 to begin concurrent development of Amendments 4 and 5 in 2024
Comprehensive Review:	Five years after adoption of Amendment 5

Past versions of the Southern Flounder FMP (NCDMF 2005, 2011, 2013, 2017, 2019, 2022) are available on the [DMF website](#).

Management Unit

The management unit of this FMP includes all Southern Flounder inhabiting North Carolina coastal and joint fishing waters including the Atlantic Ocean.

Goal and Objectives

The goal of Amendment 4 is to manage the Southern Flounder fishery to achieve a self-sustaining population that provides sustainable harvest using science-based decision-making processes. The following objectives will be used to achieve this goal:

- Implement management strategies within North Carolina and encourage interjurisdictional management strategies that maintain/restore the Southern Flounder spawning stock with expansion of age structure of the stock and adequate abundance to prevent overfishing.
- Restore, enhance, and protect habitat and environmental quality necessary to maintain or increase growth, survival, and reproduction of the Southern Flounder population.

- Use biological, environmental, habitat, fishery, social, and economic data needed to effectively monitor and manage the Southern Flounder fishery and its ecosystem impacts.
- Promote stewardship of the resource through increased public outreach and interjurisdictional cooperation throughout the species range regarding the status and management of the Southern Flounder fishery, including practices that minimize bycatch and discard mortality.
- Promote the restoration, enhancement, and protection of habitat and environmental quality in a manner consistent with the Coastal Habitat Protection Plan.

DESCRIPTION OF THE STOCK

Biological Profile

Southern Flounder (*Paralichthys lethostigma*) is a bottom dwelling species of left eyed flounder found in the Atlantic Ocean, Gulf of Mexico, and estuaries from Virginia to northern Mexico (Blandon et al. 2001). This species is one of three commonly caught left eyed flounder in North Carolina; Southern Flounder, Gulf Flounder (*P. albigutta*), and Summer Flounder (*P. dentatus*). Southern Flounder supports important commercial and recreational fisheries along the U.S. South Atlantic and Gulf coasts and is particularly important to fisheries in North Carolina. Based on tagging, genetic, and age structure morphology data, the biological unit stock for Southern Flounder includes fish from North Carolina to the east coast of Florida. Evidence also suggests some adult Southern Flounder return to the estuaries after spawning in the ocean, while others remain in the ocean (Watterson and Alexander 2004; Taylor et al. 2008; NCDMF 2024a). Tagged fish are typically recaptured south of original tagging locations and often in other states once in the ocean (Craig et al. 2015; Loeffler et al. 2019). Limited data from South Carolina and Georgia tagging programs suggest a low probability of adult movement from South Carolina or Georgia to North Carolina waters (Wenner et al. 1990; SCDNR Inshore Fisheries Section, unpublished data; Flowers et al. 2019).

DMF data indicates with the onset of maturity in the fall, females migrate to ocean waters to spawn. Spawning locations in the Atlantic Ocean are unknown; however, Benson (1982) observed the pelagic larval stage over the continental shelf where spawning is reported to occur. Data from satellite tagged Southern Flounder indicate a potential suite of migratory behaviors and habitat uses ranging from inshore estuarine environments to offshore outer continental shelf habitats (NCDMF 2024a). Southern Flounder can produce approximately 3 million eggs per female during multiple spawning events in a season, and spawning is thought to take place between November and April (Gunther 1945; Hettler and Barker 1993; Watanabe et al. 2001; Midway and Scharf 2012; Hollensead 2018). Larval Southern Flounder pass through inlets within 30 to 45 days of hatching and settle throughout the sounds and rivers in the winter and early spring (Burke et al. 1991; Miller et al. 1991; Daniels 2000; Glass et al. 2008; Taylor et al. 2010; Lowe et al. 2011). Juveniles likely spend at least one year in inshore waters before migrating to the ocean (McKenna and Camp 1992; Hannah and Hannah 2000; Watterson and Alexander 2004; Taylor et al. 2008).

Nearly half of female Southern Flounder are mature by ages 1 and 2 (at approximately 16 inches TL; Monaghan, Jr. and Armstrong 2000; Midway and Scharf 2012). Females grow larger than males and Southern Flounder collected in the ocean tend to be larger and older than fish caught in estuarine waters. The largest female Southern Flounder observed in North Carolina was 33-inches TL and the largest male was 20-inches TL (Lee et al. 2018; Flowers et al. 2019; Schlick et al. 2024). The maximum observed age was 9 years for females and 6 years for males. Southern Flounder captured in North Carolina represent the oldest ages observed throughout the range (Lee et al. 2018; Flowers et al. 2019; Schlick et al. 2024).

For additional information about Southern Flounder life history and biology see [NCDMF \(2019\)](#) and [NCDMF \(2022\)](#).

Assessment Methodology

For additional assessment history see [Lee et al. \(2018\)](#) and [Flowers et al. \(2019\)](#).

Commercial and recreational landings and dead discards and data from eight fishery-independent surveys, were incorporated from all states across the biological unit stock (North Carolina south to the east coast of Florida). When considering population size and long-term viability, stock assessments most often use a measure of female spawning stock biomass (SSB) to determine the population's health. Female spawning stock biomass includes mature female fish capable of producing offspring. Fishing mortality (F) is a measure of how fast fish are removed from the population by fishing activities. Removals include fish that are kept, discarded dead, or die after release.

The stock assessment estimates of female SSB and F were compared to levels, or reference points, that are considered sustainable. Reference points include a target and threshold. The threshold is the minimum level required for sustainability and when that level is achieved, the stock is considered healthy. The target is a level that minimizes risk and increases the probability of rebuilding or maintaining stock. If female SSB is less than the biomass threshold ($SSB_{25\%}$), the stock is overfished. If the harvest rate is greater than the F threshold ($F_{25\%}$), the rate of removals is too high, and overfishing is occurring. Overfishing is the removal of fish at an unsustainable rate that will ultimately reduce female SSB and result in an overfished stock.

Stock Status

The South Atlantic Southern Flounder stock is overfished, and overfishing is occurring as of 2017, the terminal year of the 2019 coastwide stock assessment update (Flowers et al. 2019). Results indicate SSB has decreased since 2006 and recruitment, while variable, has generally declined. Fishing mortality is less variable and decreased slightly in 2017.

The model estimated a value of 0.35 for $F_{35\%}$ (F target) and a value of 0.53 for $F_{25\%}$ (F threshold). The estimate of $SSB_{35\%}$ (target) was 5,452 metric tons and the estimate of $SSB_{25\%}$ (threshold) was 3,900 metric tons.

The female SSB that represents the minimum level of sustainability for Southern Flounder was estimated at 8.6 million pounds. The stock assessment estimate of female SSB in 2017 was 2.3 million pounds (Figure 1). Because the 2017 estimate of female SSB is below the threshold reference point, the stock is considered overfished. The probability the 2017 estimate of SSB is below the threshold is 100%.

A second update to the ASAP model, with data through 2022, was completed in 2024. The update continued to show declining trends in SSB and recruitment since 2006; however, F decreased significantly in the last two years of the assessment ([Schlick et al. 2024](#)). Several trends and diagnostics from the model raised concerns, and division staff and partners from the other states decided to not use the new update for management. A new benchmark assessment is recommended no sooner than 2026.

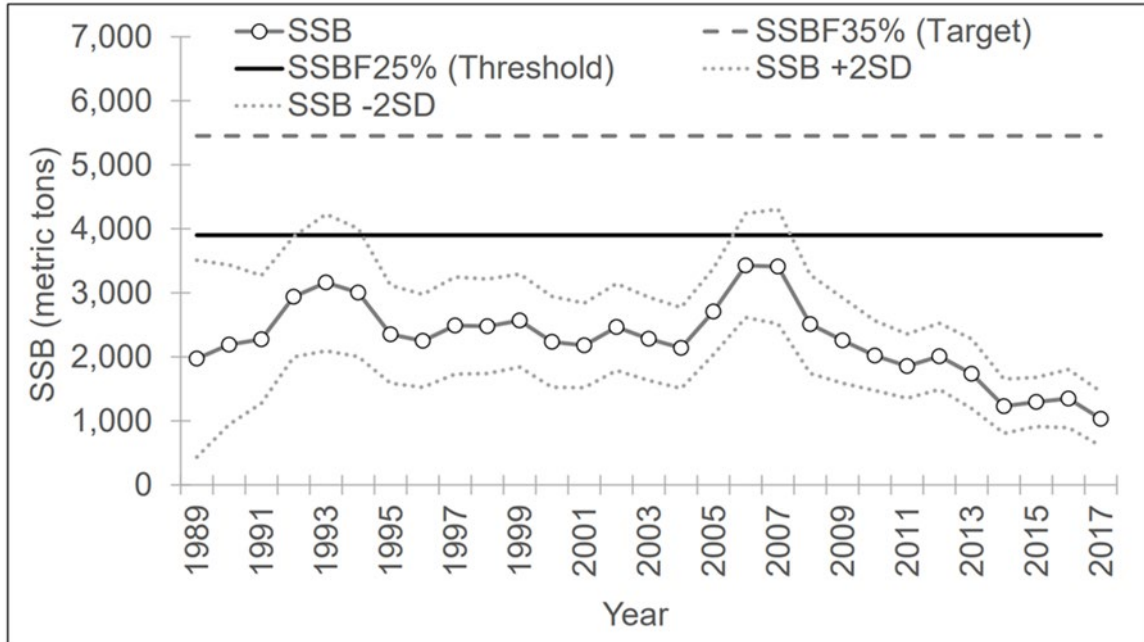


Figure 1. Estimated spawning stock biomass compared to established reference points, 1989-2017 (Flowers et al. 2019).

The assessment model estimated the F threshold at 0.53 (Figure 2). The 2017 F estimate was 0.91, which is above the F threshold. Because the 2017 F estimate is above the threshold, overfishing is occurring. The probability the 2017 F estimate is above the threshold is 96%. For additional information about the 2019 coastwide stock assessment see [NCDMF \(2019\)](#).

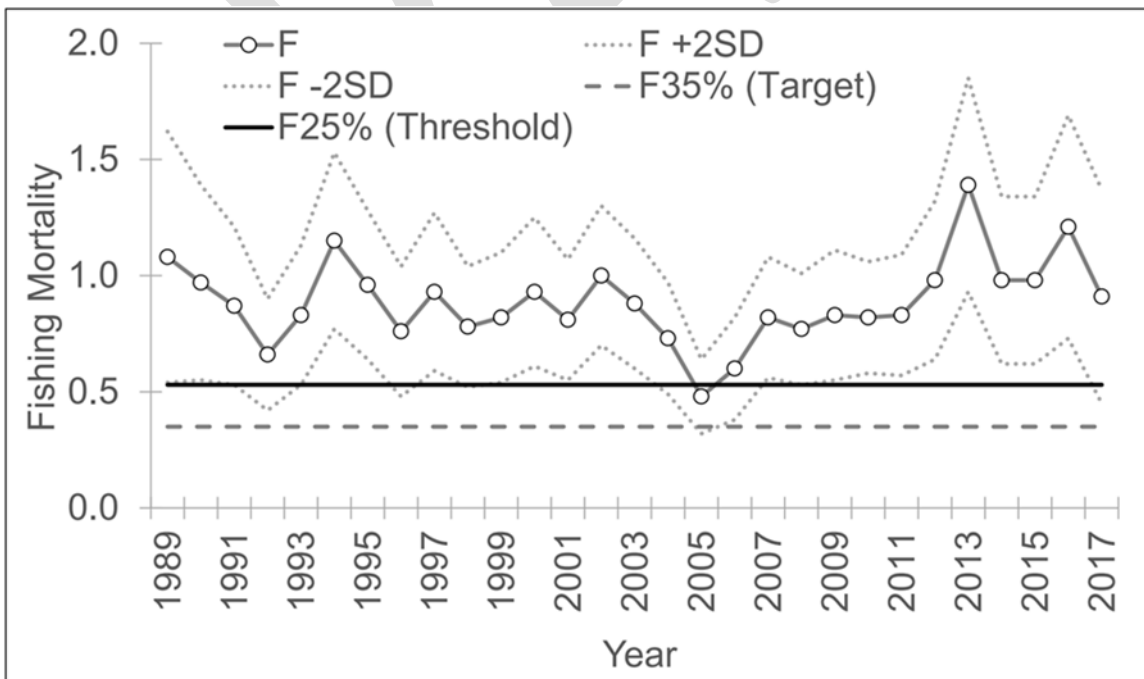


Figure 2. Estimated fishing mortality rates (numbers-weighted, ages 2-4) compared to established reference points, 1989-2017 (Flowers et al. 2019).

DESCRIPTION OF THE FISHERY

Additional in-depth analyses and discussion of North Carolina's historical commercial and recreational Southern Flounder fisheries can be found in previous versions of the Southern Flounder FMP ([NCDMF 2005](#), [NCDMF 2019](#), [NCDMF 2022](#)). Commercial and recreational landings can be found in the [License and Statistics Annual Report](#) (NCDMF 2024b).

Discussion of socio-economic information in the License and Statistics Annual Report describes the fishery as of 2023 and is not intended to be used to predict potential impacts from management changes. This and other information are legislatively mandated and included to help inform decision-making regarding the long-term viability of the state's commercial and recreationally significant species and fisheries. For a detailed explanation of methodology used to estimate economic impacts, refer to the [License and Statistics Section Annual Report](#) (NCDMF 2023).

For additional discussion of commercial and recreational Southern Flounder fishery landings trends see Appendix 1: Increasing Recreational Access to Southern Flounder Through Sector Allocation Parody.

Commercial Fishery

All flounder landings reported as caught in inshore waters are considered Southern Flounder by the DMF Trip Ticket Program. Data from fishery-dependent sampling indicate Summer Flounder and Gulf Flounder account for approximately two percent or less of the flounder harvested from internal waters, while Southern Flounder make up less than one percent of the catch from ocean waters (NCDMF, unpublished data).

Most Southern Flounder commercial landings are from gill nets and pound nets, although gigs and other inshore gears (e.g., trawls) land flounder in smaller numbers. Between 1972 and 2022, peak commercial landings occurred in 1994 (Figure 3). Over this timeframe, there have been fluctuations in whether pound nets or gill nets were the dominant gear in terms of pounds landed (Figure 3). Historically, pound nets were the dominant gear, but gill nets became the dominant gear from 1994 to 2013 (Figure 3). The dominant gear switched back to pound nets from 2014 through 2020. Declining landings trends since 2010 were due, in part, to gill net regulations implemented to reduce the number of sea turtle and Atlantic Sturgeon interactions in this gear (78 FR 57132¹, 79 FR 43716²). Though less harvest overall comes from the gig fishery, harvest from this gear has generally increased over time, especially since 2010. Harvest by other commercial inshore gears decreased to its lowest point in 2023.

¹ <https://www.federalregister.gov/documents/2013/09/17/2013-22592/endangered-species-file-no-16230>

² <https://www.federalregister.gov/documents/2014/07/28/2014-17645/endangered-species-file-no-18102>

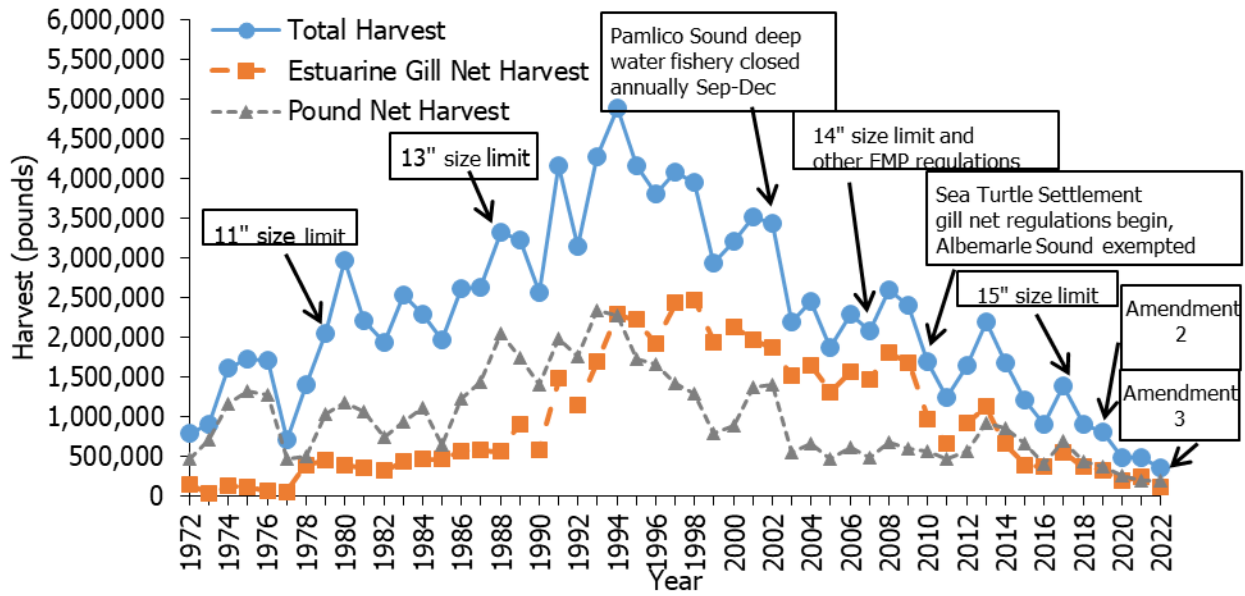


Figure 3. Southern Flounder landings (pounds) for total commercial fishery and top two gears (gill nets and pound nets) from the NC Trip Ticket Program 1972-2023 with major fishery regulation changes noted. Noted regulation changes do not represent a comprehensive list. For additional regulation changes see [Lee et al. \(2018\)](#).

Commercial harvest from 2019 to 2023 was impacted by regulations implemented through Amendments 2 and 3 to the NC Southern Flounder FMP. Amendment 2 implemented seasons in the commercial Southern Flounder fishery for the first time, and Amendment 3 introduced quota management of the fishery. Under Amendment 2, the commercial fishing season was open for a maximum of 33 days in 2020 ([Proclamation FF-25-2020](#)) and 21 days in 2021 ([Proclamation FF-40-2021](#)) depending on management area. Under Amendment 3 the commercial fishery was separated into two mobile gear management areas (northern and southern) and three-pound net management areas. During 2022 - 2024, the commercial fishery was open between six and 28 days, depending on management areas and gear type. For mobile gears, however, gill nets were not necessarily open all of those days.

Table 1. Number of days the Southern Flounder commercial fishery was open in 2022-2024 by gear type and management area: mobile gear, northern and southern management areas; pound nets, northern, central, and southern management areas.

Year	Mobile Gear		Pound Nets		
	Northern Days open	Southern Days open	Northern Days open	Central Days open	Southern Days open
2022	28	11	23	21	6
2023	21	21	21	24	8
2024	11	10	28	19	12

Trends in commercial trips reported between 1994 and 2023 have generally followed landings trends (Figure 4). Trips include the number of trip ticket records with landings reported; some trips may represent more than one day of fishing. The number of trips for all gears targeting Southern

Flounder has decreased since regulatory changes due to Amendment 2 (seasonal management) and Amendment 3 (quota management) were implemented limiting the number of days flounder could be harvested.

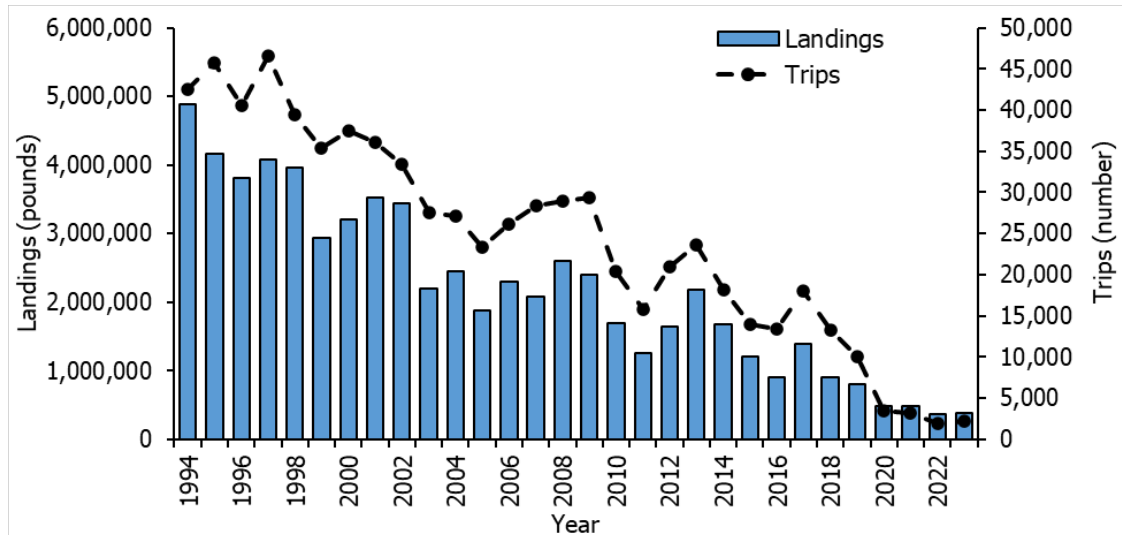


Figure 4. Southern Flounder commercial trips (numbers) and landings (pounds) from NC Trip Ticket Program, 1994-2023.

Recreational Fishery

Recreational harvest of Southern Flounder is mainly by hook-and-line and [gigs](#), with a small amount of harvest by spearfishing or Recreational Commercial Gear License (RCGL) gears (prior to 2022).

Hook-and-line harvest can be split into ocean and inshore harvest, with most Southern Flounder harvested inshore. Between 1989 and 2023, hook-and-line harvest peaked in 2010 (Figure 5). Seasonal closures implemented through Amendment 2 to the NC Southern Flounder FMP impacted recreational harvest in 2020 and 2021. The season was shortened from 45 days in 2020 to 14 consecutive days in 2021 due to excessive overages that occurred during the 2020 season. Amendment 3 implemented fishing seasons to maintain recreational harvest within a quota and added paybacks to the following year for overages. The season in 2022 was 30 days and the 2023 season was shortened to 14 days. Due to overages in 2022, the 2023 TAC (landings plus dead discards) was adjusted from 170,655 pounds to 114,315 pounds. In 2023, 192,168 pounds of Southern Flounder were caught recreationally by hook-and-line, exceeding the expected catch by 127,294 pounds. Because of these overages, there was no recreational flounder season in 2024.

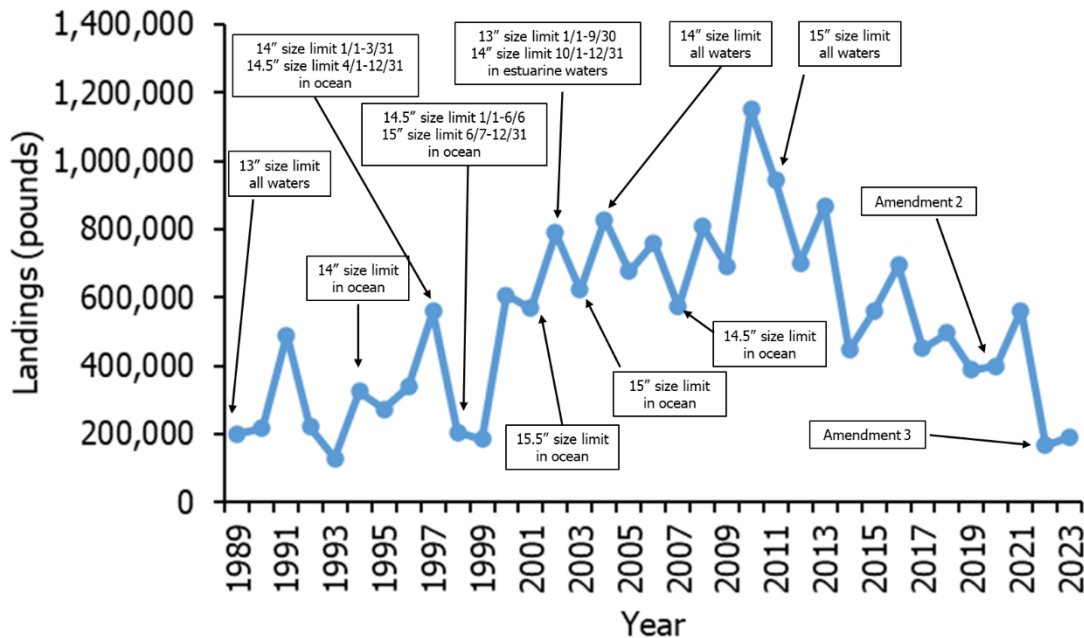


Figure 5. MRIP estimates of recreational hook-and-line Southern Flounder harvest (pounds) and major fishery regulation changes, 1989-2023. Noted regulation changes do not represent a comprehensive list. For additional regulation changes see [Lee et al. \(2018\)](#).

Trends in recreational trips are difficult to interpret because they represent all recreationally important Paralichthyid flounder species commonly caught in North Carolina (Southern, Summer, and Gulf flounder). This is because anglers only report targeting ‘flounder’ rather than a particular flounder species. Trips can be defined in several ways, but in this document all trips that harvested or released any Paralichthyid flounder species were included. Trends in trips and harvest are similar throughout the time-series, but trips have declined since 2014 while harvest has varied (Figure 6). Recreational estimates across all years have been updated and are now based on the 2018 MRIP Fishing Effort Survey-based calibrated estimates. For more information on MRIP see <https://www.fisheries.noaa.gov/topic/recreational-fishing-data>.

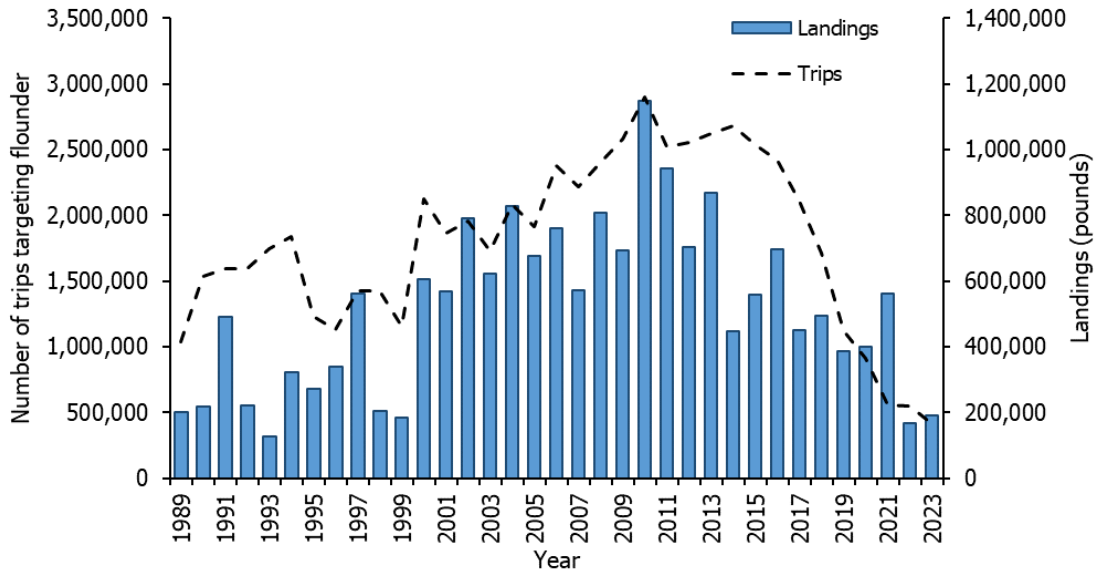


Figure 6. MRIP estimates of recreational hook-and-line harvest (pounds) and all trips that harvested or released Paralichthyid flounder species, 1989-2023. Data prior to 2004 were calibrated to align with MRIP estimates post-2004.

SUMMARY OF ECONOMIC IMPACT

For detailed discussion of economic impacts of the commercial and recreational Southern Flounder fisheries see Appendix 1. For additional information see [NCDMF \(2022\)](#).

Commercial Fishery

Historically, the Southern Flounder commercial fishery has been a strong economic driver for the state and one of its largest fisheries. Within the direct impacts effort and production have on the value of the commercial flounder industry, there are several factors that can dictate total economic impact of this fishery on a broader market level and individual product level. As a popular seafood across the country, the value of flounder in North Carolina is influenced by broader trends of supply and demand. There is a wide range of competitive substitutes for North Carolina caught flounder, including flounder caught in other states, as well as seafood products with comparatively similar properties, such as halibut (*Hippoglossus* spp.) or sole (*Solea* spp.). Because of this, the value of flounder in North Carolina is not only influenced by in-state product availability but also regulations, seasons, and effort for the harvest of flounder and substitute products worldwide. However, as flounder is a popular fish with several available substitutes, it is difficult to accurately track how supply of other products directly influences in state prices.

In addition to broader dynamics of supply and demand that influence North Carolina's flounder market, there are specific factors that can adjust product value on different time scales. Method of catch often influences price, as consumers seek product caught with gears perceived to be more environmentally friendly, or gears that produce higher-quality flounder (Asche and Guillen 2011). This can lead to increased prices on flounder caught with certain gears.

Additionally, enterprise level marketing can impact product value. Fishermen and dealers market their business and product as they wish. When marketing strategies are successful, prices and value can increase, though this is on an individual level and demonstrates the volatility within the market. Such changes in value are demonstrated by the positive effects local product branding

and direct-to-consumer strategies have produced in North Carolina (NCREDC 2013; Stoll et al. 2015). While these are just two examples of the variety of factors influencing value of North Carolina's flounder industry, they demonstrate the complicated dynamics at play, as many factors driving the price of flounder are not dictated by fishery managers, but by consumers and producers within the market.

Recreational Fishery

The top industries impacted by recreational Southern Flounder fishing in terms of output sales and employment are retail gasoline stores, retail sporting goods stores, retail food and beverage stores, real estate, and wholesale trade businesses. Due to the magnitude and popularity of the recreational flounder fishery in North Carolina, changes in access may lead to tangible, yet unquantifiable impacts to the value of other sport fisheries (Scheld et al. 2020). Broadly, participants target or catch flounder more than any other recreational species due to higher personal satisfaction gained from fishing for this species over others. However, it is unknown whether this benefit from flounder fishing would transfer to other fisheries if effort restrictions were put in place. There is a possibility that when faced with reduced access to flounder fishing, some anglers may choose not to fish, rather than seek out new target species, while others may target other species more frequently or switch to catch-and-release flounder fishing.

Through this complicated dynamic, the value and economic impact of other recreationally important species may increase or decrease. However, while it is important to acknowledge how flounder management may economically impact other fisheries, this interaction is not fully understood, and therefore, it cannot be determined how the value of other recreational species would shift with changes in access to flounder.

ECOSYSTEM PROTECTION AND IMPACT

Habitat use patterns of Southern Flounder vary by life stage over time and space. Growth and survival of Southern Flounder within the habitats they use is maximized when water quality parameters, such as temperature, salinity, and dissolved oxygen, are within optimal ranges. Good water quality is essential for supporting the various life stages of Southern Flounder (Figure 7) and maintaining their habitats. Natural processes and human activities can alter salinity or temperature conditions, elevate toxins, nutrients, turbidity, as well as lower dissolved oxygen levels which can degrade water quality.

For additional information about habitat use by life stage and optimal water quality parameters, see the Description of the Stock section of this FMP, [NCDMF \(2019\)](#), or [NCDMF \(2022\)](#). For a comprehensive review of ecosystem impacts from the Southern Flounder fishery, including habitat degradation and loss, water quality degradation, gear impacts on habitat, bycatch and discards of non-target species, protected species, climate change and resiliency, and habitat protection, see [NCDMF \(2022\)](#).

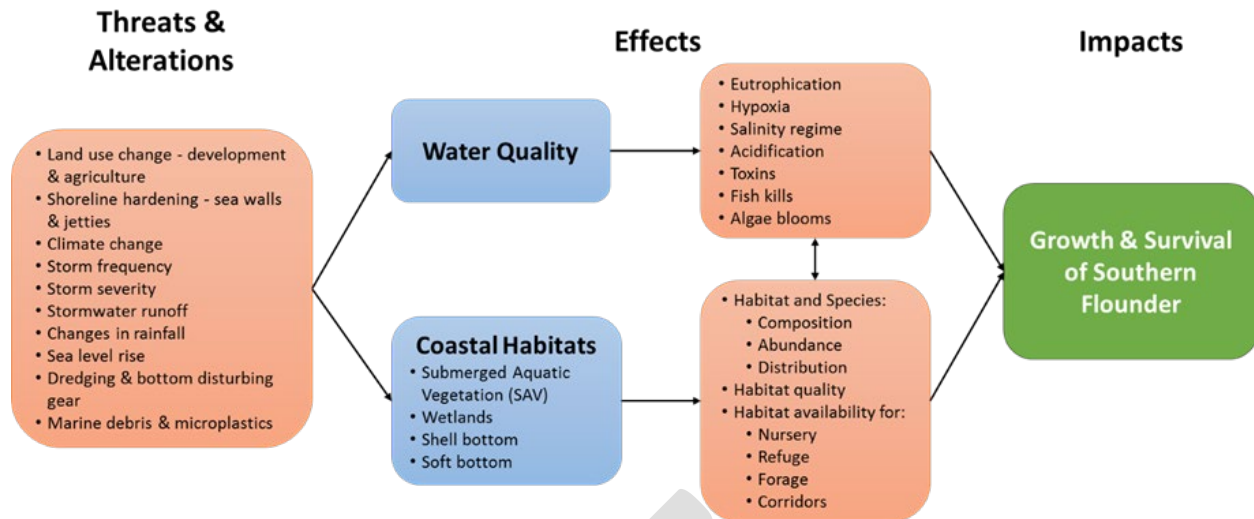


Figure 7. Effects of threats and alterations on water quality and coastal habitats and their ultimate impact on the growth and survival of Southern Flounder.

Coastal Habitat Protection Plan

The Fisheries Reform Act statutes require a CHPP be drafted by the NCDEQ and reviewed every five years (G.S. 143B-279.8). The CHPP is a resource and guide compiled by NCDEQ staff to assist the NCMFC, Environmental Management (EMC), and Coastal Resources commissions (CRC) in developing goals and recommendations for the continued protection and enhancement of fishery habitats in North Carolina. These commissions are required by state law (G.S. 143B-279.8) to adopt and implement management strategies specified in the CHPP as part of a coordinated management approach. Habitat recommendations related to fishery management can be addressed directly by the NCMFC. The NCMFC has passed rules providing protection for Southern Flounder habitat including the prohibition of bottom-disturbing gear in specific areas, and designation of sensitive fish habitat such as nursery areas and submerged aquatic vegetation (SAV) beds with applicable gear restrictions. Habitat recommendations not under NCMFC authority (e.g., water quality management and 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](#)).

FINAL AMENDMENT 4 MANAGEMENT STRATEGY

****Section will be completed when the MFC selects preferred management and prior to DEQ secretary and legislative committees review****

RESEARCH NEEDS

The research recommendations listed below are offered by the DMF to improve future management strategies of the southern fishery. They are considered high priority as they will help to better understand the Southern Flounder fishery and meet the goal and objectives of the FMP. A more comprehensive list of research recommendations is provided in the [Annual FMP Review](#) and DMF Research Priorities documents.

- Conduct studies to quantify fecundity and fecundity-size/age relationships in Atlantic Southern Flounder.
- Improve estimates of the discard (B2) component (catches, lengths, and ages) for Southern Flounder from MRIP.
- Expand, improve, or add fisheries-independent surveys of the ocean component of the stock.
- Determine locations of spawning aggregations of Southern Flounder.
- Complete and age validation study using known age fish.

MANAGEMENT FROM PREVIOUS PLANS

There are several management measures from Amendment 3 to carry forward in Amendment 4 that address fishing behavior and potential changes in effort to minimize the possibility of catching Southern Flounder in greater volume than predicted.

Unless otherwise stated, all Southern Flounder Amendment 3 management measures will be carried forward in Amendment 4 and remain in effect including, but not limited to, the following:

- A commercial and recreational minimum size limit of 15 inches TL;
- A minimum mesh size of 6.0-inch stretched mesh (ISM) for anchored large-mesh gill nets used in the taking of flounder;
- A minimum mesh size of 5.75-ISM for pound net escape panels;
- Reduced commercial anchored large-mesh gill-net soak times to single overnight soaks where nets may be set no sooner than one hour before sunset and must be retrieved no later than one hour after sunrise the next morning;
- For anchored large-mesh gill nets with a 4.0 through 6.5 ISM, maintain a maximum of 1,500-yards in Management Units A, B, and C and a maximum of 750-yards in Management Units D1, D2, and E unless more restrictive yardage is specified through adaptive management or through the sea turtle or sturgeon Incidental Take Permit (ITP);
- Removal of all commercial gears targeting Southern Flounder from the water (e.g., commercial and RCGL anchored large-mesh gill nets and gigs) or make them inoperable (flounder pound nets) in areas and during times outside of an open season with exceptions for commercial large-mesh gill-net fisheries that target American shad (*Alosa sapidissima*), hickory shad (*A. mediocris*) and catfish species if these fisheries are only allowed to operate during times of the year and locations where bycatch of Southern Flounder is unlikely.
- Unlawful to use any method of retrieving live flounder from pound nets that causes injury to released fish (e.g., picks, gigs, spears, etc.);
- Unlawful for commercial fishery to possess any species of flounder harvested from the internal waters of the state during the closed Southern Flounder season;
- Combine mobile gears (gill nets, gigs, and “other” gears) into one gear category and maintain pound nets as their own separate commercial fishery;
- Divide mobile gears into two areas using the ITP boundary line for management sub-units Northern D1 and Southern D1, maintaining consistency with Amendment 2 and Amendment 3 boundary line;
- Divide the pound net fishery into three areas maintaining consistency with areas in Amendment 2 and 3;
- Maintain 72% reduction and current sub-allocation for the pound net fishery.
- Implement trip limits for pound nets, gigs, and hook and line only to maximize reopening after reaching division closure threshold;

- Implement a single season for the recreational gig and hook-and-line fisheries to constrain them to an annual quota;
- Maintain the recreational bag limit of flounder at one fish per person per day;
- Do not allow harvest of Southern Flounder using RCGL;
- Should landings be available, allow potential for spring ocellated flounder season to occur from March 1-April 1 in ocean waters only using hook-and-line gear with one-fish ocellated only bag limit;
- Maintain the adaptive management framework based on the peer-reviewed and approved stock assessment;

DRAFT

APPENDICES

Appendix 1: Increasing Recreational Access to Southern Flounder Through Sector Allocation Parity

Issue

Provide the North Carolina Marine Fisheries Commission (NCMFC) with an option to increase recreational access to the Southern Flounder fishery by accelerating the shift to sector allocation parity in 2025 rather than in 2026 as originally scheduled in the Southern Flounder Fishery Management Plan (FMP) Amendment 3.

Origination

At the August 2024 NCMFC business meeting, the NCMFC passed a motion “to ask the DMF Director to ask the DEQ Secretary to modify the Annual FMP Review Schedule to amend the Southern Flounder FMP for the review of the plan to begin in 2024. The intent is to allow for more recreational access while maintaining the rebuilding requirements of the North Carolina Southern Flounder FMP Amendment 3 (Amendment 3)”.

Background

A coast-wide stock assessment update of Southern Flounder completed in 2019 concluded the stock was overfished and overfishing was occurring (Flowers et al. 2019). To rebuild the spawning stock biomass (SSB) to the target by 2028, a 72% coast-wide reduction in Total Allowable Catch (landings and dead discards; TAC), measured in pounds, was adopted.

Amendment 3 was adopted in May 2022 and implemented a quota-based approach to reduce North Carolina’s portion of the catch from the terminal year (2017) of the assessment by 72% to help rebuild the stock to the target SSB (NCDMF 2022). The quota was set so the Total Allowable Landings (TAL) that establishes annual maximum fishing limits (in pounds) for all participants does not exceed a pre-determined amount. Quota management includes paybacks for more precise management and to account for quota overages. The quota that met the required reductions and the NCMFC allocation motion was 548,034 pounds of TAC, which results in 532,352 pounds of TAL. This TAL was further divided into commercial and recreational sector allocations. The allocation was set to 70% commercial and 30% recreational for 2021 through 2024, moving to 60% commercial and 40% recreational in 2025, and 50% commercial and 50% recreational beginning in 2026 (Table 1.1).

Commercial Fisheries

The TAL allocated to the commercial sector from the overall quota are 372,646 pounds of southern flounder for 2021 through 2024, 319,411 pounds in 2025, and 266,176 pounds beginning in 2026 (Table 1.1).

Table 1.2. Allocation in pounds for commercial and recreational fisheries for the North Carolina Southern Flounder Fishery that maintains overall reductions of 72%. An asterisk (*) indicates that Recreational Commercial Gear License (RCGL) gear removals are not included in the Total Allowable Landings.

Year	Allocation	Total Allowable Catch	Dead Discards	Total Allowable Landings	Commercial Fisheries	Recreational Fisheries*
					Total Allowable Commercial Landings	Total Allowable Recreational Landings
2021	70/30	548,034	15,682	532,352	372,646	159,706
2022	70/30	548,034	15,682	532,352	372,646	159,706
2023	70/30	548,034	15,682	532,352	372,646	159,706
2024	70/30	548,034	15,682	532,352	372,646	159,706
2025	60/40	548,034	15,682	532,352	319,411	212,941
2026	50/50	548,034	15,682	532,352	266,176	266,176

Commercial Gear Sub-Allocations

Given the large reduction needed to achieve sustainable harvest and the importance of maintaining each sector within its allowed landings, it was most practical to separate the commercial gears into two categories: pound nets and mobile gears. Mobile gears include those that target Southern Flounder, primarily gigs and gill nets, and “other” gears that do not target Southern Flounder such as shrimp trawls, crab pots, and fyke nets.

Allowed landings in the commercial sector were sub-allocated into the two commercial gear categories. Due to the scheduled shift in allocation between commercial and recreational sectors, it was prudent to evaluate the sub-allocations for the commercial fishery. Amendment 3 adopted sub-allocations so the pound net fishery could maintain its 2017 harvest of 186,458 pounds because of the increased monetary investment of operating and maintaining pound net gear (Table 1.2).

Table 1.3. Allocation in pounds for the North Carolina Southern Flounder commercial and recreational fisheries and associated sub-allocations for each sector that maintains overall reductions of 72% but maintains the current level of sub-allocation for the pound net fishery. An asterisk (*) indicates that RCGL gear removals are not included in the Total Allowable Landings.

Year	Allocation	Total Allowable Catch	Dead Discards	Total Allowable Landings	Total Allowable Commercial Landings	Commercial Gear		Total Allowable Recreational Landings	Recreational Gear*	
						Mobile Gears	Pound Nets		Hook-and-line	Gigs
2021	70/30	548,034	15,682	532,352	372,646	186,188	186,458	159,706	142,206	17,500
2022	70/30	548,034	15,682	532,352	372,646	186,188	186,458	159,706	142,206	17,500
2023	70/30	548,034	15,682	532,352	372,646	186,188	186,458	159,706	142,206	17,500
2024	70/30	548,034	15,682	532,352	372,646	186,188	186,458	159,706	142,206	17,500
2025	60/40	548,034	15,682	532,352	319,411	132,953	186,458	212,941	189,608	23,333
2026	50/50	548,034	15,682	532,352	266,176	79,718	186,458	266,176	237,010	29,166

Commercial Areas Allocation

Because of the migratory nature of Southern Flounder, management areas were established in Amendment 3 to allow more equitable access by fishermen across the state with seasonal openings varying by area (Figure 1.1). After investigating North Carolina Trip Ticket data by waterbody, the fishery was split into two areas for mobile gears and three areas for pound nets. Management area sub-allocations were determined by 2017 landings (Table 1.3)

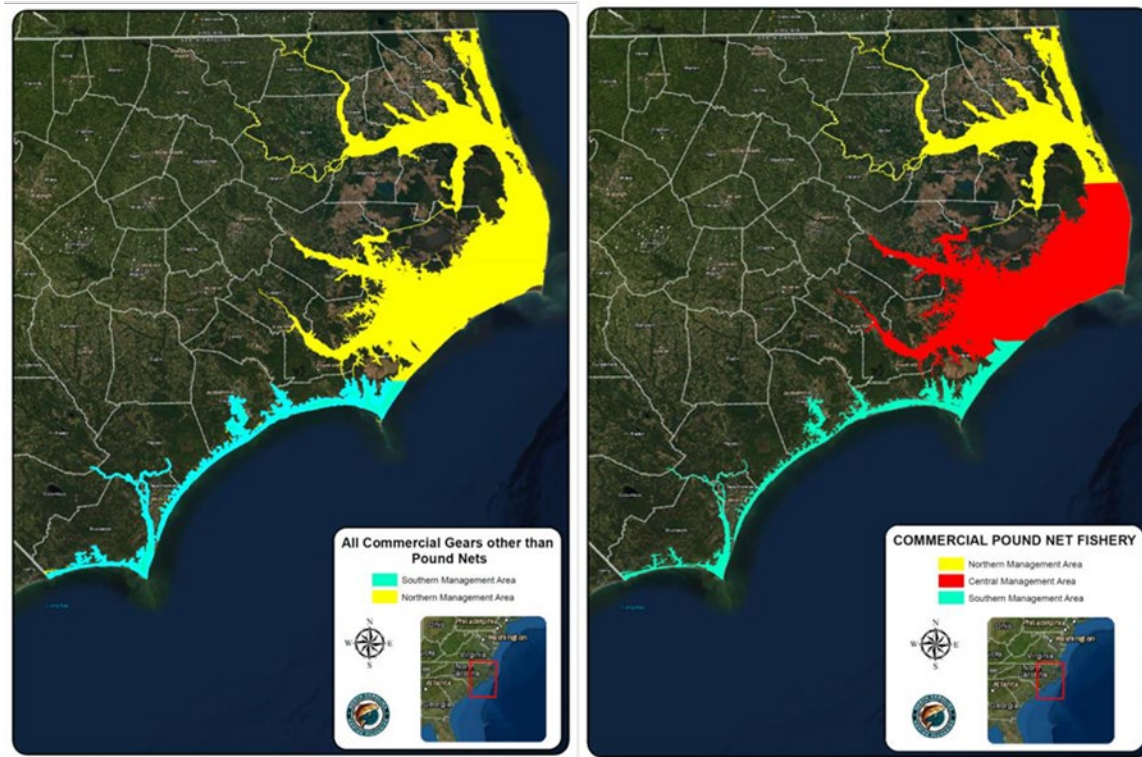


Figure 1.8. Boundary descriptions for the two mobile gear (left) and three pound net (right) management areas adopted in Amendment 3.

Table 1.4. Total allowable landings (in pounds) for the North Carolina Southern Flounder commercial fishery and associated sub-allocations for each gear management area adopted in Amendment 3.

Commercial Gear Sector	Allocation %	Management Area/Total Allowable Landings			Total Allowable Landings
		Northern	Central	Southern	
Mobile Gears	70	123,879	-	62,309	186,188
	60	88,460	-	44,493	132,953
	50	53,040	-	26,678	79,718
Pound Nets	70	39,700	121,756	25,002	186,458
	60	39,700	121,756	25,002	186,458
	50	39,700	121,756	25,002	186,458

Recreational Fisheries

The TAL allocated to the recreational sector, including hook-and-line and gigs, from the overall quota will change from 159,706 pounds in 2021 through 2024, to 212,941 pounds in 2025, and from 2026 onward the TAL will be 266,176 pounds (Table 1.1).

The recreational allocation was further refined to allow an annual harvest of 89% of the recreational TAL for the hook-and-line fishery and 11% of the recreational TAL for the recreational gig fishery. However, it was determined that concurrent seasons for the recreational hook-and-line and gig fisheries be maintained to keep from undermining the success of achieving necessary reductions.

Landings and Reductions

Under Amendment 3, commercial landings have been closely monitored by the Trip Ticket Program to maintain total landings near the quota in near real-time for each gear and management area sub-allocation. This approach is not realistic for the recreational sector; thus, a one-fish bag limit and restricted harvest seasons have been used to constrain recreational landings. Total recreational landings are estimated through the Marine Recreational Information Program (MRIP) and the DMF Gig Mail surveys and those data are not available until after the fishing season. A restructuring of the license database in 2023 disrupted the division's ability to establish a sampling of eligible anglers for mail surveys. As a result, the mail surveys could not be administered, and survey estimates are not available for 2023. Since the mail survey estimates are used in determining if the recreational fishery exceeded their TAC, recreational gig data from 2022 was used as a proxy for 2023. Dead discards for both sectors are not available until after the fisheries close but are added to make sure that the sector's total allowable catch is not exceeded each year. Management under Amendment 3 achieved a 59% harvest reduction in 2022, and 68% in 2023 (Table 1.4). However, the 72% target reduction has not been met through 2023 due to overages in the recreational fishery (Table 1.5).

In 2022, total removals from the recreational fishery (226,995 pounds) exceeded its TAC by an estimated 56,340 pounds (Table 1.5). This overage was deducted from the 2023 recreational TAC and the season was reduced to two weeks ([Proclamation FF-31-2023](#)). Despite this adjustment, recreational removals increased to 241,609 pounds in 2023, resulting in an overage of 127,294 pounds. The overage was deducted from the 2024 recreational TAC (170,655 pounds), leaving 43,361 pounds in adjusted TAC which was less than the predicted recreational dead discards (47,291 pounds), causing the DMF to not open the recreational season in 2024. A major contributor to recreational overages has been the higher than expected dead discards in the hook-and-line fishery, which have remained at or above the level observed in 2017 (39,080 pounds) despite shortened seasons. Regardless of the closed season in 2024, estimated dead discards and landings that were allowed by the NC Wildlife Resources Commission in internal waters will be used to adjust the TAC for the 2025 season.

Table 1.5. Catch estimates with target and actual reductions from the North Carolina Southern Flounder fishery, 2017-2023. (North Carolina Trip Ticket Program and MRIP). *Target reductions under Amendment 2.

Year	Total Landings	Dead Discards	Total Removals	2017 Total Removals	Target reduction	Actual reduction
2017	1,901,256	56,008	1,957,264	1,957,264	.	.
2018	1,452,590	36,670	1,489,259	1,957,264	.	.
2019	1,233,695	41,309	1,275,003	1,957,264	62%*	34.9%
2020	905,149	45,266	950,415	1,957,264	72%*	51.4%
2021	1,071,541	52,132	1,123,673	1,957,264	72%*	42.6%
2022	540,494	62,668	603,162	1,957,264	72%	69.2%
2023	576,013	48,457	624,470	1,957,264	72%	68.1%

Table 1.6. Recreational Total Allowable Catch (TAC) and catch estimates in pounds with adjusted TAC based on overage reductions, 2022-2024. Estimates are based on data from the Marine Recreational Information Program (MRIP) and recreational gig survey. An asterisk (*) indicates that the value is estimated from the previous year.

Year	TAC	Adjusted TAC	MRIP Landings	Gig Landings	Total Landings	MRIP Dead Discard	Gig Dead Discard	Total Dead Discard	Total Removals	Overage deducted from next year's TAC
2022	170,655	170,655	166,091	7,882	173,973	52,771	251	53,022	226,995	56,340
2023	170,655	114,315	192,168	7,882*	200,050	41,308	251*	41,559	241,609	127,294
2024	170,655	43,361	not yet available							

In response to the closed recreational season in 2024, at the August 2024 NCMFC business meeting, the NCMFC passed a motion to request modification of the Annual FMP Review Schedule to amend the Southern Flounder FMP for the review of the plan to begin in 2024 to allow more recreational access to the fishery while maintaining Amendment 3 rebuilding requirements.

Socioeconomic Analysis

Commercial

Southern Flounder has historically been one of the top harvested species by the commercial fleet in North Carolina. From 2014 until 2021 Southern Flounder was in the top five species ranked by ex-vessel value (point of sale value). In 2022 and 2023 the ex-vessel value dropped below one million dollars from a high of over seven million dollars in 2017 (Table 1.6). Participation in the fishery decreased from 1,759 participants in 2014 to 492 in 2023.

Using IMPLAN modelling software and expenditure estimates from NOAA's Fisheries Economics of the U.S. (FEUS) report, the indirect impacts of the Southern Flounder fishery to the state economy at-large can also be estimated. By assuming the flounder industry contributes to these expenditure categories at a proportion equal to their contribution to total commercial ex-vessel values, estimates of the total economic impact of flounder harvest can be generated. For a detailed explanation of the methodology used to estimate the economic impacts please refer to the NCDMF's [License and Statistics Section Annual Report](#).

Overall, the large economic impact of Southern Flounder to the state’s commercial fishing industry is reflected in its effect on the state economy. Total impacts vary slightly year-over-year, though these values remain relatively consistent from a state-impact perspective until 2020. The ex-vessel value has declined significantly since 2014, with a precipitous decline in 2020 due to restrictive management and high supply of Summer Flounder. This reduced value has persisted through 2022 and 2023. These years had the lowest landings and ex-vessel value of Southern Flounder in the last ten years.

Flounder landings as a proportion of total commercial catch has decreased from a peak of 7% in 2017 to the current low of 2% (Figure 1.2).

Table 1.7. Commercial Southern Flounder economic contribution estimates from 2023-2014 reported in 2023 dollars.

Year	Pounds Landed	Ex-Vessel Value	Job Impacts	Income Impacts	Value Added Impacts	Sales Impacts
2023	375,963	\$837,570	492	\$1,633,087	\$2,854,513	\$3,665,223
2022	366,510	\$979,684	568	\$2,190,945	\$3,699,221	\$4,939,489
2021	485,024	\$1,626,653	674	\$3,820,854	\$6,005,097	\$8,767,231
2020	479,905	\$1,244,878	630	\$3,128,717	\$5,072,299	\$7,024,328
2019	800,080	\$3,669,245	1,086	\$9,300,809	\$13,624,054	\$21,729,471
2018	903,842	\$4,640,012	1,263	\$10,491,007	\$17,252,260	\$23,825,993
2017	1,396,384	\$7,039,608	1,662	\$18,245,416	\$27,209,451	\$42,008,243
2016	899,932	\$4,593,509	1,357	\$12,121,629	\$18,679,737	\$27,651,565
2015	1,202,952	\$4,916,044	1,463	\$12,849,015	\$19,860,767	\$29,247,840
2014	1,673,511	\$6,229,650	1,759	\$15,135,194	\$22,775,298	\$34,894,849

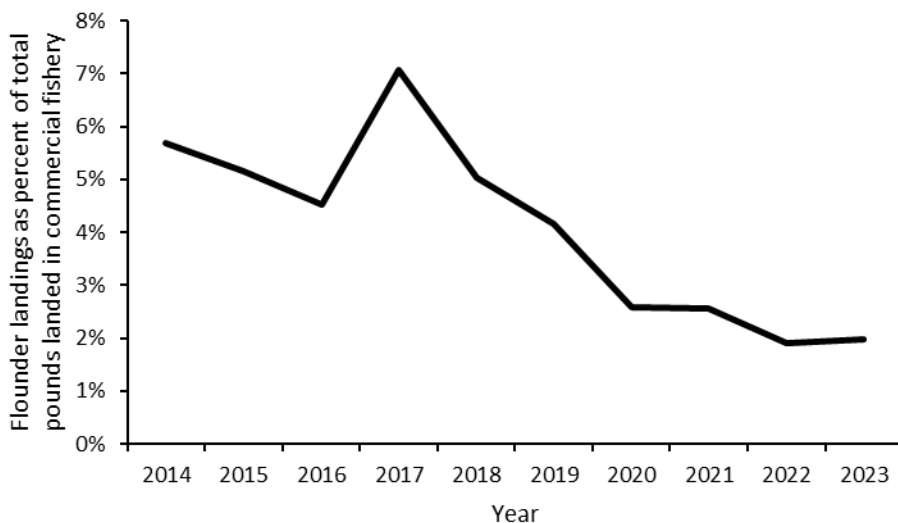


Figure 1.9. Pounds of Southern Flounder landed as a percent of total commercial finfish landed in North Carolina from 2014-2023.

Recreational

The economic impact estimates of Southern Flounder recreational fishing represent the economic activity generated from trip expenditures. These estimates are a product of annual trip estimations originating from the NOAA Fisheries Marine Recreational Information Program (MRIP) effort data by area and mode (i.e., shore, for-hire, private/rental vessel, and man-made), and trip expenditure estimates from the NCDMF economics program biennial socioeconomic survey of Coastal Recreational Fishing License holders (Dumas et al. 2009; Crosson 2010; Hadley 2012; Stemle 2018). The product of these estimates provides an annual estimate of trip expenditures made by all licensed anglers for a given year. For this analysis, a recreational flounder trip is defined as any trip in which flounder was the primary or secondary target species by the angler, or if Southern Flounder was caught during that trip.

Additionally, these data are used to generate state-level economic impact estimates of recreational flounder fishing in North Carolina. Using IMPLAN statistical software, these direct expenditure estimates for recreational flounder fishing produce indirect output impacts to the state economy across four categories: sales, labor income, value-added impacts, and employment. Additionally, all imputed expenditure estimates are adjusted for inflation based on 2023 prices, as this was the most recent year of expenditure survey data. For a detailed explanation of the methodology used to estimate the economic impacts please refer to the NCDMF's [License and Statistics Section Annual Report](#).

Since 2020 trips have declined with 2023 having the lowest number of trips in the time series (Table 1.7). The number of flounder trips as a percentage of total recreational trips ranged from a high of 5% in 2015 to a low of 1% in 2022 (Figure 1.3). The relative number of flounder trips increased to 3% in 2023.

Table 1.8. Recreational flounder economic contribution estimates from 2023-2014 reported in 2023 dollars.

Year	Trips	Expenditure	Job Impacts	Income Impacts	Value Added Impacts	Sales Impacts
2023	414,322	\$107,560,907	736	\$33,825,714	\$52,588,610	\$91,413,988
2022	515,638	\$111,446,340	711	\$33,956,950	\$52,603,145	\$92,802,221
2021	518,636	\$124,895,817	736	\$37,060,764	\$57,416,999	\$103,850,738
2020	891,057	\$236,224,061	1,521	\$76,653,218	\$109,987,034	\$195,316,448
2019	1,118,505	\$291,045,600	1,880	\$88,935,317	\$135,155,036	\$244,036,124
2018	1,179,891	\$308,646,579	2,003	\$96,804,743	\$146,722,413	\$261,904,279
2017	1,234,219	\$313,229,181	2,066	\$97,779,917	\$147,510,316	\$270,355,489
2016	1,676,500	\$435,414,429	2,935	\$139,973,659	\$208,013,684	\$377,002,717
2015	1,723,014	\$446,698,257	2,901	\$138,075,359	\$224,369,794	\$373,979,472
2014	1,619,852	\$435,654,166	2,887	\$135,636,199	\$201,597,395	\$360,751,939

It should be noted that not included in these estimates, but presented in NCDMF overall recreational impacts models, are the durable good impacts from economic activity associated with the consumption of durable goods (e.g., rods and reels, other fishing related equipment, boats, vehicles, and second homes). Durable goods represent goods that have multi-year life spans and are not immediately consumable. Some equipment related to fishing are considered durable goods. However, we cannot estimate the durable good expense of anglers for a given species.

Durable good expenses and impacts are estimated on an annual basis and serve to supplement angler expenditures outside of trip-based estimates.

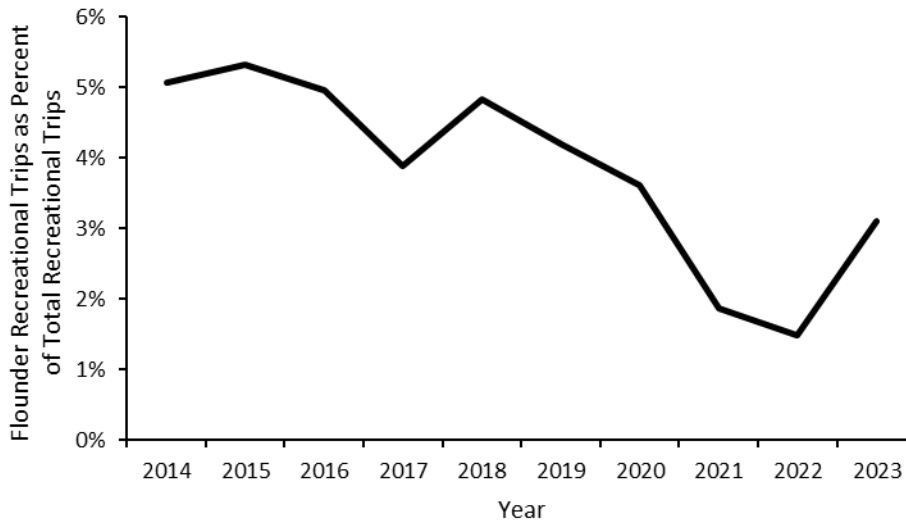


Figure 1.10. Number of flounder trips as a percent of total recreational fishing trips in North Carolina from 2014-2023.

Authority

North Carolina General Statutes

G.S. 113-134 RULES

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

G.S. 113-182.1 FISHERY MANAGEMENT PLANS

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

North Carolina Marine Fisheries Commission Rules

15A NCAC 03H .0103 PROCLAMATIONS, GENERAL

15A NCAC 03M .0503 FLOUNDER

15A NCAC 03M .0512 COMPLIANCE WITH FISHERY MANAGEMENT PLANS

Discussion

The most straightforward approach to immediately address recreational access in time for a 2025 recreational season is to expedite the sector (commercial/recreational) allocation transition to 50/50 in 2025 rather than 2026 as prescribed in Amendment 3 by amending the plan (Amendment 4). This would result in a 66.7% increase in recreational TAL by adding 106,470 pounds from the commercial sector to the recreational sector allocation in 2025 (Table 1.2). Under the Amendment 3 allocation shift schedule to 60/40 in 2025, there would likely be a short recreational season in 2025. Expediting the shift to 50/50 in 2025 reduces the possibility of recreational catch overages

that may mitigate the need for future season closures, though may not increase the length of the recreational season. However, maintaining Amendment 3 rebuilding requirements does not provide substantial harvest opportunities for any fishing sector regardless of allocation, and given recreational landings and discard levels in recent years, even with a shift to 50/50 allocation, season closures in 2026 and beyond remain a possibility due to overages. This allocation shift is a short-term approach to address recreational access. Long-term, more comprehensive approaches for recreational and commercial management will be addressed during subsequent development of Amendment 5.

Recreational Season

Estimated recreational landings from 2022 and 2023 indicate an increase in catch over shorter seasons (Tables 1.8). More successful trips are to be expected on a rebuilding stock that has taken such a large reduction. Angler reports to the DMF of seeing more flounder than ever are good signs the management is working. Even with a shift to 50/50 allocation, a recreational season that maintains the one fish bag limit from Amendment 3 would need to be brief (e.g., between two and four weeks) to maintain allowable landings (266,176 pounds; Table 1.2) while accounting for dead discards. The recreational catch estimates from 2024 will be available in 2025. These estimates will be used to determine if recreational catch estimates exceeded the adjusted TAC (43,361 pounds) in 2024. Any overages will be subtracted from the 2025 TAL.

Table 1.9. Recreational harvest estimates during 2022 and 2023 from the Marine Recreational Information Program (MRIP) and recreational gig survey. An asterisk (*) indicates the 2022 estimate was used because data from 2023 were not available.

Year	Hook-and-line Landings	Gig Landings	Total Landings	Hook-and-line Dead Discard	Gig Dead Discard	Total Dead Discard	Total Catch	Season length
2022	166,091	7,882	173,973	52,771	251	53,022	226,995	4 weeks
2023	192,168	7,882*	200,050	41,308	251*	41,559	241,609	2 weeks

Commercial Implications

The Amendment 3 management strategy provides guidance on the shift in landings from the commercial to the recreational sector. Per Amendment 3, the pound net TAL allocation will be maintained at 186,458 pounds and the poundage shifted to recreational landings will come from the commercial mobile gear TAL allocation (Tables 1.2; 1.3). This will leave 79,718 pounds of TAL for mobile gears, minus any overages that may have occurred in 2024. While the number of participants in the Southern Flounder commercial fishery declined precipitously following adoption of Amendment 2 (2019) and declined further following adoption of Amendment 3 (2022), participation remains relatively high considering the constrained season (Table 1.9). Based on recent mobile gear landings trends, the scheduled allocation shift will result in a mobile gear season that will likely last one or two days, which may be non-consecutive.

Table 1.10. Commercial Southern Flounder pounds landed, number of trips landing southern flounder, and number of commercial participants and dealers participating in the fishery.

Year	Pounds	Trips	Participants	Dealers
2018	903,842	13,320	912	186
2019	800,080	10,036	781	175
2020	479,905	3,485	522	144
2021	485,024	3,142	541	139
2022	366,510	1,927	485	125
2023	375,963	2,157	430	118

The 70% commercial, 30% recreational allocation (Tables 1.1; 1.2) from Amendment 3 is based on historical harvest for each sector through 2017. Different allocation scenarios have the potential to significantly reduce available harvest in a sector which may have ramifications for the viability of those sectors. Under the Amendment 3 allocation schedule, and the shift proposed in this Amendment, allocations for some sectors may be too low to viably prosecute.

Shifting allocation between sectors is within the authority of the MFC (G.S. 113-134, 113-182, 113-182.1, and 143B-289.52). Allocation changes may have positive or negative impacts on different sectors of the southern flounder fishery. Amendment 5 will further examine long-term management for both sectors.

Management Options

Status Quo

Status quo would maintain the allocation transition schedule from Amendment 3, moving to 60% commercial and 40% recreational in 2025, and 50% commercial and 50% recreational beginning in 2026. This does not immediately address the NCMFC motion to increase recreational access to the Southern Flounder fishery. The motion would be addressed by a more comprehensive amendment process.

Expedited Allocation Shift

Expedite the sector (commercial/recreational) allocation transition to 50/50 in 2025 rather than in 2026 as prescribed in Amendment 3. This option immediately addresses the NCMFC motion to increase recreational access to Southern Flounder. Long-term, more comprehensive approaches for recreational and commercial management will be addressed during subsequent development of Amendment 5 to the NC Southern Flounder FMP.

Recommendations

The DMF does not have a recommendation for this issue.

REFERENCES

- Asche, F., and J. Guillen. 2012. The importance of fishing method, gear and origin: The Spanish hake market. *Marine Policy* 36(2):365–369.
- Benson, N.G. (editor). 1982. Life history requirements of selected finfish and shellfish in Mississippi Sound and adjacent waters. U.S. Fish and Wildlife Service FWS/OBS-81/51. 97 p.
- Blandon, I. R., R. Ward, and T. L. King. 2001. Preliminary genetic population structure of southern flounder, *Paralichthys lethostigma*, along the Atlantic Coast and Gulf of Mexico. *Fisheries Bulletin* 99(4):671–678.
- Craig, J. K., W. E. Smith, F. S. Scharf, and J. P. Monaghan. 2015. Estuarine residency and migration of southern flounder inferred from conventional tag returns at multiple spatial scales. *Marine and Coastal Fisheries* 7:450–463.
- Crosson, S. 2010. A Social and Economic Survey of Recreational Saltwater Anglers in North Carolina. Department of Environment and Natural Resources, Division of Marine Fisheries.
- Daniels, H. V. 2000. Species profile: southern flounder. Southern Regional Aquaculture Center Publication No. 726. 4 p.
- Dumas, C., J. Whitehead, C. Landry, and J. Herstine. 2009. Economic Impacts and Recreational Value of the North Carolina For-Hire Fishing Fleet. North Carolina Sea Grant Fishery Resource Grant Report 07-FEG-05.
- Flowers, A. M., S. D. Allen, A. L. Markwith, and L. M. Lee (editors). 2019. Stock assessment of southern flounder (*Paralichthys lethostigma*) in the South Atlantic, 1989–2017. Joint report of the North Carolina Division of Marine Fisheries, South Carolina Department of Natural Resources, Georgia Coastal Resources Division, Florida Fish and Wildlife Research Institute, University of North Carolina at Wilmington, and Louisiana State University. NCDMF SAP-SAR-2019-01. 213 p.
- Glass, L. A., J. R. Rooker, R. T. Kraus, and G. J. Holt. 2008. Distribution, condition, and growth of newly settled southern flounder (*Paralichthys lethostigma*) in the Galveston Bay Estuary, TX. *Journal of Sea Research* 59(4):259–268.
- Gunther, G. 1945. Studies on marine fishes of Texas. Publications of the Institute for Marine Science, University of Texas 1:1–190.
- Hadley, J. 2012. A Social and Economic Profile of Ocean Fishing Piers in North Carolina. Department of Environment and Natural Resources, Division of Marine Fisheries.
- Hannah, T., and P. Hannah. 2000. Crab trawl tailbag testing. North Carolina Fisheries Resource Grant. FRG-98-10. North Carolina Sea Grant. Raleigh, NC 19 p.
- Hettler Jr., W. F., and D. L. Barker. 1993. Distribution and abundance of larval fishes at two North Carolina inlets. *Estuarine, Coastal and Shelf Science* 37:161–179.
- Hollensead, L. D. 2018. Multi-scale examination of habitat use and migration dynamics of southern flounder in a North Carolina estuary using acoustic telemetry techniques. Doctoral dissertation, University of North Carolina Wilmington, Wilmington, North Carolina.
- IMPLAN® model, [2024] Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 www.IMPLAN.com
- Lee, L. M., S. D. Allen, A. M. Flowers, and Y. Li (editors). 2018. Stock assessment of southern flounder (*Paralichthys lethostigma*) in the South Atlantic, 1989–2015. Joint report of the North Carolina Division of Marine Fisheries, South Carolina Department of Natural Resources, Georgia Coastal Resources Division, Florida Fish and Wildlife Research Institute, University of North Carolina at Wilmington, and Louisiana State University. NCDMF SAP-SAR-2018-01. 425 p.
- Loeffler, M. S., L. M. Paramore, S. P. Darsee, T. M. Mathes, A. M. Comer-Flowers, C. B. Stewart, S. J. Poland, T. C. Bauer, A. L. Markwith, and T. K. Scheffel. 2019. North Carolina multi-species tagging program. North Carolina Division of Marine Fisheries, CRFL Grant 2F40 F017, Morehead City, NC. 29 p.
- McClellan, C. M. 2001. Mesoscale habitat use of juvenile southern flounder, *Paralichthys lethostigma*: responses to environmental variability. Master's thesis. Duke University Nicholas School of the Environment, Durham, North Carolina. 116 p.
- McKenna, S. A., and J. T. Camp. 1992. An examination of the blue crab fishery in the Pamlico River Estuary. Albemarle-Pamlico Estuarine Study, No. 92-08. 101 p.

- Midway, S. R., and F. S. Scharf. 2012. Histological analysis reveals larger size at maturity for southern flounder with implications for biological reference points. *Marine and Coastal Fisheries* 4:628–638.
- Miller, J. M., J. S. Burke, and G. R. Fitzhugh. 1991. Early life history patterns of Atlantic North American flatfish: Likely (and unlikely) factors controlling recruitment. *Netherlands Journal of Sea Research* 27:261–275.
- Monaghan, J. P., and J. L. Armstrong. 2000. Reproductive ecology of selected marine recreational fishes in North Carolina: southern flounder, *Paralichthys lethostigma*. Completion Report Grant F-60. Segments 1-2. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina. 1.1-1.17.
- National Marine Fisheries Service. 2024. Fisheries Economics of the United States, 2022. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-248B, 28 p.
- NCDEQ (North Carolina Department of Environmental Quality). 2016. North Carolina Habitat Protection Plan: Source document. Division of Marine Fisheries, Morehead City, NC. 475 p.
- NCDEQ. 2020. North Carolina Climate Risk Assessment and Resiliency Plan. 1601 Mail Service Center, Raleigh, NC.
- NCDMF (North Carolina Division of Marine Fisheries). 2005. North Carolina southern flounder (*Paralichthys lethostigma*) fishery management plan. North Carolina Division of Marine Fisheries, Morehead City, NC. 260 p.
- NCDMF. 2011. Supplement A to the 2005 NC Southern Flounder Fishery Management Plan. North Carolina Division of Marine Fisheries, Morehead City, NC. 12 p.
- NCDMF. 2013. North Carolina southern flounder (*Paralichthys lethostigma*) fishery management plan: Amendment 1. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC. 380 p.
- NCDMF. 2017. North Carolina southern flounder (*Paralichthys lethostigma*) fishery management plan: Supplement A to Amendment 1. North Carolina Division of Marine Fisheries, Morehead City, NC. 83 p.
- NCDMF. 2019. North Carolina southern flounder (*Paralichthys lethostigma*) fishery management plan: Amendment 2. North Carolina Department of Environmental Quality, Division of Marine Fisheries, Morehead City, NC. 62 p.
- NCDMF. 2022. Amendment 3 to the North Carolina Southern Flounder (*Paralichthys lethostigma*) Fishery management Plan. North Carolina Department of Environmental Quality, North Carolina Division of Marine Fisheries, Morehead City, North Carolina. 176 p.
- NCDMF. 2024a. North Carolina Division of Marine Fisheries Southern Flounder satellite tagging study. North Carolina Commercial Fishing Resource Fund Grant #2358-0006. North Carolina Department of Environmental Quality, Division of Marine Fisheries, Morehead City, NC. 48 p.
- NCDMF. 2024b. North Carolina Division of Marine Fisheries License and Statistics Section Annual Report. North Carolina Department of Environmental Quality, Division of Marine Fisheries, Morehead City, NC.
- NCREDC (North Carolina Rural Economic Development Center). 2013. A Supply Chain Analysis of North Carolina's Commercial Fishing Industry.
- Scheld, A. M., W. M. Goldsmith, S. White, H. J. Small, and S. Musick. 2020. Quantifying the behavioral and economic effects of regulatory change in a recreational cobia fishery. *Fisheries Research* 224. [online serial].
- Schlick, C. J. C., L. M. Lee, S. D. Allen, A. L. Markwith, and H. White (editors). 2024. Stock Assessment of Southern Flounder (*Paralichthys lethostigma*) in the South Atlantic, 1989–2022. North Carolina Division of Marine Fisheries, NCDMF SAP-SAR-2024-01. Morehead City, North Carolina.
- Stemle, A., and M. Condon. 2018. Socioeconomic Survey of Recreational Saltwater Anglers in North Carolina 2016. Division of Marine Fisheries, Morehead City, NC
- Stoll, J. S., B. A. Dubik, and L. M. Campbell. 2015. Local seafood: rethinking the direct marketing paradigm. *Ecology and Society* 20(2):40. [online serial].
- Taylor, J. C., J. M. Miller, L. J. Pietrafesa, D. A. Dickey, and S. W. Ross. 2010. Winter winds and river discharge determine juvenile southern flounder (*Paralichthys lethostigma*) recruitment and distribution in North Carolina estuaries. *Journal of Sea Research* 64:15–25.
- Taylor, J. C., J. M. Miller, and D. Hilton. 2008. Inferring southern flounder migration from otolith microchemistry. Final Report Fishery resource Grant 05-FEG-06, Morehead City, NC.

- Watanabe, W. O., P. M. Carroll, and H. V. Daniels. 2001. Sustained, natural spawning of southern flounder *Paralichthys lethostigma* under an extended photothermal regime. *Journal of the World Aquaculture Society* 32(2):153–166.
- Watterson, J. C., and J. L. Alexander. 2004. Southern flounder escapement in North Carolina, July 2001–June 2004. Final Performance Report Grant F-73 Segments 1–3. North Carolina Department of Natural Resources, Division of Marine Fisheries. Morehead City, North Carolina. 41 p.
- Wenner, C. A., W. A. Roumillat, J. E. Moran Jr., M. B. Maddox, L. B. Daniel III, and J. W. Smith. 1990. Investigations on the life history and population dynamics of marine recreational fishes in South Carolina: Part 1. Marine Resources Research Institute, South Carolina Wildlife and Marine Resources Department, Charleston, SC. 180 p.

DRAFT