

Atlantic States Marine Fisheries Commission

Sciaenids Management Board

October 19, 2023

12:15 – 1:30 p.m.

Hybrid Meeting

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order (*C. Batsavage*) 12:15 p.m.
2. Board Consent 12:15 p.m.
 - Approval of Agenda
 - Approval of Proceedings from May 2023
3. Public Comment 12:20 p.m.
4. Review Annual Update to Black Drum Indicators (*H. Rickabaugh*) 12:30 p.m.
Possible Action
5. Consider Approval of Atlantic Croaker, Red Drum, and Spotted Seatrout Fishery Management Plan Reviews and State Compliance for the 2022 Fishing Year (*T. Bauer*) **Action** 12:55 p.m.
6. Progress Update on the 2024 Red Drum, Atlantic Croaker, and Spot Benchmark Stock Assessments (*J. Kipp*) **Action** 1:15 p.m.
 - Review and Consider Recommendation for Changes to the Timeline for the Spot and Atlantic Croaker Benchmark Stock Assessments
 - Review and Populate Atlantic Croaker and Spot Stock Assessment Subcommittee Membership
7. Other Business/Adjourn 1:30 p.m.

The meeting will be held at Beaufort Hotel (2440 Lennoxville Road, Beaufort, NC; 252.728.3000) and via webinar; click [here](#) for details

MEETING OVERVIEW

Sciaenids Management Board
October 19, 2023
12:15 p.m. – 1:30 p.m.
Hybrid Meeting

Chair: Chris Batsavage (NC) Assumed Chairmanship: 02/22	Technical Committee Chairs: Black Drum: Harry Rickabaugh (MD) Atlantic Croaker: Somers Smott (VA) Red Drum: Ethan Simpson (VA) Spot: Harry Rickabaugh (MD)	Law Enforcement Committee Representative: Col. Matthew Rogers (VA)
Vice Chair: Doug Haymans (GA)	Advisory Panel Chair: Craig Freeman (VA)	Previous Board Meeting: May 1, 2023
Voting Members: NJ, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS (10 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 2023

3. Public Comment – At the beginning of the meeting public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Review Annual Update to Black Drum Indicators (12:30-12:55 p.m.) Possible Action

Background

- Empirical stock indicators were developed as part of the 2023 black drum benchmark stock assessment, to be monitored annually to detect any concerning trends in the black drum stock. At their May 2023 meeting, the Sciaenids Board approved the indicators to be reviewed and presented annually by the Black Drum Technical Committee to inform the need for a new stock assessment.
- For this year’s annual update, the indicators were updated with two additional years of data, 2021 and 2022.
- The Black Drum Technical Committee (TC) met on September 26 to review the results of the data update to the indicators and make recommendations (**Briefing Materials**). Overall, indicators show mixed signs of stability and declines since the assessment. The TC did not believe the updated indicator values deviated far enough outside of the historical range to cause concern. The TC recommended no change to the current assessment schedule.

Presentations

- Presentation of Black Drum Indicators by H. Rickabaugh

Board actions for consideration at this meeting

- Consider management action (if necessary)

5. Consider Approval of Atlantic Croaker, Red Drum, and Spotted Seatrout Fishery Management Plan Reviews and State Compliance for the 2022 Fishing Year (12:55-1:15 p.m.)**Background**

- Red Drum state compliance reports are due on July 1. The Red Drum Plan Review Team (PRT) has reviewed state reports and compiled the annual FMP Review. New Jersey and Delaware have requested continued *de minimis* status (**Briefing Materials**).
- Atlantic Croaker state compliance reports are due on July 1. The Atlantic Croaker Plan Review Team (PRT) has reviewed state reports and compiled the annual FMP Review. New Jersey and Delaware requested *de minimis* status for both their recreational and commercial fisheries, and South Carolina and Georgia requested *de minimis* status for their commercial fisheries (**Briefing Materials**).
- Spotted Seatrout state compliance reports are due on September 1. The Spotted Seatrout Plan Review Team (PRT) has reviewed state compliance reports and compiled the annual FMP Review. New Jersey and Delaware have requested continued *de minimis* status (**Briefing Materials**).

Presentations

- 2022 FMP Reviews for Red Drum, Atlantic Croaker, and Spotted Seatrout by T. Bauer

Board actions for consideration at this meeting

- Consider approval of the 2022 FMP Review, state compliance reports, and New Jersey and Delaware's *de minimis* requests for Red Drum.
- Consider approval of the 2022 FMP Review, state compliance reports, and New Jersey, Delaware, South Carolina, and Georgia's *de minimis* requests for Atlantic Croaker.
- Consider approval of the 2022 FMP Review, state compliance reports, and New Jersey and Delaware's *de minimis* requests for Spotted Seatrout.

6. Progress Update on the 2024 Red Drum, Atlantic Croaker, and Spot Benchmark Stock Assessments (1:15-1:30 p.m.)**Background**

- Work on the red drum benchmark stock assessment was initiated in late 2022/early 2023. A Data Workshop was held virtually June 7-8, 14, 2023. An in-person Assessment Workshop will be held November 6-9, 2023. The assessment is scheduled for completion in the fall of 2024.
- Work on the Atlantic croaker and spot benchmark stock assessments was initiated in early 2023. A Data Workshop was held virtually May 15-18, 2023. An Assessment Workshop was held virtually September 11-14, 2023. The next Assessment Workshop is planned for February 2024.
- The lead modeler for Atlantic croaker and supporting modeler for spot, who was the SAS's expert in Stock Synthesis (SS), accepted a new position and will no longer be able to contribute to these two assessments. Due to the loss of this SAS member, the SAS is recommending to decouple the spot and croaker assessments, and focus on the croaker assessment first, to be peer reviewed in 2024. Work on the spot benchmark stock assessment would follow, to be peer reviewed in 2025.

Presentations

- Stock assessment update by J. Kipp

Board actions for consideration at this meeting

- Consider approval of Spot and Atlantic Croaker Stock Assessment Subcommittee nomination for Trey Mace.

6. Other Business/Adjourn

Sciaenids Management Board

Activity level: High

Committee Overlap Score: Moderate (American Eel TC, Cobia TC, Horseshoe Crab TC, Weakfish TC)

Committee Task List

- Red Drum SAS – Conduct Red Drum Benchmark Assessment
- Atlantic Croaker and Spot SAS – Conduct Atlantic Croaker and Spot Benchmark Assessments
- Black Drum TC – Update annual indicators
- Red Drum TC – Gather data and assist with the Red Drum Benchmark Assessment
- Atlantic Croaker TC – Gather data and assist with Atlantic Croaker Benchmark Assessment
- Spot TC – Gather data and assist with Spot Benchmark Assessment
- Atlantic Croaker TC/PRT – July 1: Compliance Reports Due
- Red Drum TC/PRT – July 1: Compliance Reports Due
- Black Drum TC/PRT – August 1: Compliance Reports Due
- Spotted Seatrout PRT – September 1: Compliance Reports Due
- Spot TC/PRT – November 1: Compliance Reports Due

TC Members:

Atlantic Croaker: Somers Smott (VA, Chair), Kristen Anstead (ASMFC), Tracey Bauer (ASMFC), Stacy VanMorter (NJ), Devon Scott (DE), Harry Rickabaugh (MD), Ingrid Braun (PRFC), Willow Patten (NC), Margaret Finch (SC), Dawn Franco (GA), Halie OFarrell (FL)

Black Drum: Harry Rickabaugh (MD, Chair), Jeff Kipp (ASMFC), Tracey Bauer (ASMFC), Craig Tomlin (NJ), Jordan Zimmerman (DE), Ethan Simpson (VA), Chris Stewart (NC), Chris McDonough (SC), Ryan Harrell (GA), Shanae Allen (FL)

Red Drum: Ethan Simpson (VA, Chair), Jeff Kipp (ASMFC), Tracey Bauer (ASMFC), Alissa Wilson (NJ), Matthew Jargowsky (MD), Cara Kowalchuk (NC, Vice-Chair), Joey Ballenger (SC), Chris Kalinowsky (GA), Sarah Burnsed (FL), Roger Pugliese (SAFMC)

Spot: Harry Rickabaugh (MD, Chair), Jeff Kipp (ASMFC), Tracey Bauer (ASMFC), Stacy VanMorter (NJ), Devon Scott (DE), Ingrid Braun (PRFC), Somers Smott (VA), Willow Patten (NC), Michelle Willis (SC), BJ Hilton (GA), Halie OFarrell (FL)

Plan Review Team Members:

Atlantic Croaker: Harry Rickabaugh (MD), Ingrid Braun (PRFC), Ethan Simpson (VA), Willow Patten (NC), Chris McDonough (SC), BJ Hilton (GA), Tracey Bauer (ASMFC)

Black Drum: Jordan Zimmerman (DE), Chris Stewart (NC), Chris McDonough (SC), Tracey Bauer (ASMFC)

Red Drum: Matthew Jargowsky (MD), Ethan Simpson (VA), Cara Kowalchuk (NC), Joey Ballenger (SC), Ray Rhodes (COFC), Matt Kenworthy (FL), Tracey Bauer (ASMFC)

Spot: Harry Rickabaugh (MD), Ethan Simpson (VA), Chris McDonough (SC), Dawn Franco (GA), Tracey Bauer (ASMFC)

Spotted Seatrout: Tracey Bauer (ASMFC), Samantha MacQuesten (NJ), Lucas Pensinger (NC), Brad Floyd (SC), Chris Kalinowsky (GA)

SAS Members:

Red Drum: Joey Ballenger (SC, Chair), Jeff Kipp (ASMFC), Tracey Bauer (ASMFC), Angela Giuliano (MD), CJ Schlick (NC), Jared Flowers (GA), Chris Swanson (FL), Ethan Simpson (VA)

Atlantic Croaker and Spot: Kristen Anstead (ASMFC), Jeff Kipp (ASMFC), Tracey Bauer (ASMFC), Linda Barry (NJ), Harry Rickabaugh (MD), Brooke Lowman (VA), Somers Smott (VA), Margaret Finch (SC)

**DRAFT PROCEEDINGS OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
SCIAENIDS MANAGEMENT BOARD**

**The Westin Crystal City
Arlington, Virginia
Hybrid Meeting
May 1, 2023**

These minutes are draft and subject to approval by the Sciaenids Management Board.
The Board will review the minutes during its next meeting.

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Adjournment 19

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1. **Approval of Agenda** by consent (Page 1).
2. **Approval of Proceedings** of August 4, 2022 by consent (Page 1).
3. **Main Motion**
Move to accept the 2023 Black Drum Stock Assessment and Peer Review Report for management use (Page 17). Motion by John Clark; second by Lynn Fegley. Motion approved by unanimous consent (Page 18).
4. **Main Motion**
Move to have the Technical Committee annually present the indicators, as described in the black drum 2023 Stock Assessment and Peer Review Report (Page 18). Motion by Jeff Brust; second by Shanna Madsen. Motion amended (Page 19).

Motion to Amend
Move to amend by adding to inform the need for a new stock assessment (Page 19). Motion by Erika Burgess; second by Mel Bell. Motion carried without objection (Page 19).

Main Motion as Amended
Move to have the Technical Committee annually present the indicators, as described in the black drum 2023 Stock Assessment and Peer Review Report to inform the need for a new stock assessment (Page 19). Motion approved by unanimous consent (Page 19).
5. **Move to adjourn** by consent (Page 20).

ATTENDANCE

Board Members

Jeff Brust, NJ, proxy for J. Cimino (AA)	Chad Thomas, NC, proxy for Rep. Wray (LA)
Tom Fote, NJ (GA)	Mel Bell, SC (AA)
John Clark, DE (AA)	Malcolm Rhodes, SC (GA)
Roy Miller, DE (GA)	Chris McDonough, SC, proxy for Sen. Cromer (LA)
Craig Pugh, DE, proxy for Rep. Carson (LA)	Spud Woodward, GA (GA)
Lynn Fegley, MD, Administrative proxy	Carolyn Belcher, GA, proxy for Rep. Rhodes (LA)
Russell Dize, MD (GA)	Erika Burgess, FL, proxy for J. McCawley (AA)
Dave Sikorski, MD, proxy for Del. Stein (LA)	Gary Jennings, FL (GA)
Pat Geer, VA, proxy for J. Green (AA)	Jack McGovern, NMFS
Chris Batsavage, NC, proxy for K. Rawls (AA)	

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Somers Smott, Chair, Atl. Croaker Technical Committee	Ethan Simpson, Chair, Red Drum Technical Committee
Harry Rickabaugh, Chair, Black Drum & Spot Technical Committees	Matthew Rogers, Law Enforcement Representative

Staff

Robert Beal	Lindsey Aubart	Chris Jacobs
Toni Kerns	Kurt Blanchard	Mike Rinaldi
Tina Berger	James Boyle	Chelsea Tuohy
Tracey Bauer	Emilie Franke	Anna-Mai Christmas Svajdlenka

Guests

Dennis Abbott, NH	Scott Curatolo-Wagemann	Angela Giuliano, MD DNR
Sydney Alhale, NOAA	Sarah Cvach, MD DNR	Kurt Gottschall, CT CEEP
Shanae Allen, FL FWC	Montgomery Deihl	Emerson Hasbrouck, NY (GA)
Steve Atkinson	Sam Duggan, NOAA	Jaclyn Higgins, TRCP
John Bello	Bill Dunn	Peter Himchak, Cooke Aqua
Alan Bianchi, NC DENR	Jacob Espittia, FL FWC	Harry Hornick, MD DNR
Andrew Button, VMRC	Julie Evans	Jesse Hornstein, NYS DEC
Debbie Campbell	Glen Fernandes	Todd Janeski, VCU
Benson Chiles	James Fletcher	Jeff Kaelin, Lund's Fisheries
Matt Cieri, ME DMR	Anthony Friedrich, SGA	TJ Karbowski
Haley Clinton, NC DENR	Erika Fuller, CLF	Keilin Gamboa-Salazar
Allison Colden, CBF	Alexa Galvan, VMRC	Blaik Keppler, SC DNR
Margaret Conroy, DE DFW	Matt Gates, CT DEEP	Adrienne Kotula, Ches. Bay Comm
Caitlin Craig, NYS DEC	Shaun Gehan, Gehan Law	Kris Kuhn, PA F&B
Robert Crockett	Lewis Gillingham, VMRC	Ben Landry, Omega Protein

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Guests (continued)

Wilson Laney
Tom Lilly, Forage Matters
Brooke Lowman, VMRC
Pam Lyons Gromen, Wild Oceans
Patrice McCarron, ME Lobstermen
Genine McClair, MD DNR
Joshua McGilly, VMRC
Jack McGovern, NOAA
Dan McKiernan, MA (AA)
Kevin McMenemy, Annapolis
Jason McNamee, RI (AA)
Nichola Meserve, MA DMF
Steve Meyers
Chris Moore, CBF
Thomas Newman

Thomas Newman
Jeff Nichols, ME DMR
Gerry O’Neill, CapeSeafoods
Nicole Pitts, NOAA
Marisa Ponte, NC DENR
Will Poston, SGA
Jill Ramsey, NYS DEC
Marcel Reichert, SC DNR
Jeff Renchen, FL FWC
Paul Risi, City Univ. NY
Tara Scott, NOAA
Alexei Sharov, MD DNR
Kyle Shreve
Melissa Smith, ME DMR
David Stormer, DE DFW

Mary Beth Tooley
Jim Uphoff, MD DNR
Beth Versak, MD DNR
Jessica Waller, ME DMR
Craig Weedon, MD DNR
Tim Wheeler, *Bay Journal*
Ritchie White
John Whiteside
Angel Willey, MD DNR
Chris Wright, NOAA
Erik Zlokovitz, MD DNR
Renee Zobel, NH F&G

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The Sciaenids Management Board of the Atlantic States Marine Fisheries Commission convened in the Jefferson Ballroom of the Westin Crystal City Hotel, Arlington, Virginia, a hybrid meeting, in-person and webinar; Monday, May 1, 2023, and was called to order at 4:50 p.m. by Chair Chris Batsavage.

CALL TO ORDER

CHAIR CHRIS BATSAVAGE: Welcome everyone. I'll go ahead and call the Sciaenids Management Board meeting to order. My name is Chris Batsavage; and I'm the Administrative Proxy from North Carolina, and I'll be serving as Chair.

APPROVAL OF AGENDA

CHAIR BATSAVAGE: We'll start off by approval of the agenda, just to see if there are any modifications or changes or additions to the agenda.

MS. TONI KERNS: There are no hands.

CHAIR BATSAVAGE: Great, okay we will consider the agenda approved.

APPROVAL OF PROCEEDINGS

CHAIR BATSAVAGE: Next is the approval of the proceedings from the August, 2022 Board meeting. Are there any changes, edits, modifications to the proceedings?

MS. KERNS: There are no hands.

CHAIR BATSAVAGE: Thanks, we will also consider those approved.

PUBLIC COMMENT

CHAIR BATSAVAGE: Next up is Public Comment. This is an opportunity for members of the public to provide any comments on items that are not on today's agenda. See if there are any members of the public in person or online that would like to comment.

MS. KERNS: We just have Jim Fletcher online.

CHAIR BATSAVAGE: James, we're running a little bit behind schedule, so if you can keep your comments to a minute, that would be great. The floor is yours.

MR. JAMES FLETCHER: As I mentioned earlier today, we need to be looking at the chemicals in the water. Camp Lejeune, North Carolina, the croakers that were down there and the trout that were down there are not in that area any longer, and we need to look at the chemicals in the water, not so much affecting the reproduction of the fish, and the eggs of the fish, the ability for them to grow, the protein around the outside of the egg. It's no good to manage the fish and not manage the reproduction. Thank you.

CHAIR BATSAVAGE: Thank you, James, I appreciate the comments. Any other comments from members of the public?

MS. KERNS: I have no hands.

CONSIDER 2023 BLACK DRUM BENCHMARK STOCK ASSESSMENT AND PEER REVIEW REPORT

CHAIR BATSAVAGE: All right, we will move on to the next item, which is Consider the 2023 Black Drum Benchmark Stock Assessment. This is an action item, and so a culmination of a lot of hard work by the Stock Assessment Subcommittee and the Technical Committee over the last, I guess year or two. We will start off, I think, with a presentation of the Stock Assessment Report by Chris McDonough. Chris, whenever you're ready, take it away.

MR. CHRIS McDONOUGH: I think, we were discussing this before, but I think we're going to hold questions until after both the assessment presentation as well as the peer review presentation, just so folks know.

PRESENTATION OF STOCK ASSESSMENT

MR. McDONOUGH: I want to start off first by acknowledging members of both the Stock Assessment Committee and the Technical Committee, without whom none of this stuff could have been done. It was quite a bit of work, as Chris mentioned.

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A little bit of life history on black drum, they are the largest member of the Sciaenid family. They are found along the Atlantic Coast of the U.S., primarily along the central coast from Florida up to New York, although they can be found all the way down to Argentina, as well as up into the Canadian Maritimes on occasion. But they are most common along that Mid-Atlantic coast.

The Black Drum management zone extends from New Jersey to Florida. Historically there has been considered three distinct populations of black drum in U.S. waters, one in the Atlantic and two in the Gulf. More recent evidence indicates genetically distinct populations in the Gulf of Mexico and Atlantic Coast of the U.S., which supports the management of black drum as a unified stock along the Atlantic Coast.

There is a weak but significant genetic divergence among the southern states from the Carolinas through Florida, but a lack of divergence with the Mid-Atlantic, and this is likely influenced by the migratory aspects of their life history. Tagging data has also shown movement of large adults from Florida through the Chesapeake, indicating mixing in the Atlantic Coast stock.

Age and growth. Black drum are considered fast growing, they reach 80 percent of their potential growth within 20 percent of their lifespan. The growth analysis did not detect any significant difference in growth between sexes and between regions. This again is supporting the use of a single growth function for the coast for black drum.

There was very little difference in the growth parameter estimates with a 2014 stock assessment, and the current assessment, even using the updated datasets. The growth was estimated using Von Bertalanffy growth curve, but because there wasn't a great deal of change in that, it was very similar to the previous assessment.

There was some differentiation in the length to weight models, basically the black drum in Virginia tended to be heavier, compared to comparably length fish in Florida. Reproduction at maturity, the estimated length at 50 percent maturity was 675

millimeters, with full maturity being reached typically by about 850 millimeters.

Both males and females reached 50 percent maturity at Age 4, and full maturity by Age 7. Given their age range, black drum mature relatively early in their life span, so they have a great deal of reproductive potential, given how long they can potentially live. Spawning in the Atlantic Coast ranges from November to June, depending on the region. Typically, South Atlantic is November through April, and Mid-Atlantic is April through June. Total fecundity has been estimated between 5.5 to a little over 26.5 million eggs per female, and that is a function of fish size, spawning season, spawning frequency and batch fecundity.

Natural mortality. In the 2015 assessment, natural mortality was estimated using Hoenig's 1983 estimated with a maximum age observed of 67 years. We had a natural mortality estimate of 0.63. For this assessment, the TC decided transition to the Then at al. model, which uses the non-linear least squares estimator of natural mortality. It's a much more robust dataset than what was used by Hoenig in his 1983 paper.

The Then at al. estimator resulted in a higher estimate of natural mortality, using the same maximum age, because we were still using this age data of 67 years old, but a natural mortality estimate of 0.104.

Black drum habitat. As I said, black drum spawning from April through June in the northern range. Typically, it's been documented in the mouth of the Chesapeake and the seaside inlets on the Eastern Shore. Evidence from Florida to Carolina suggests spawning occurs in deeper waters inshore or near inlets from November through April, with peaks in February and March. Larval black drum tend to settle in salt marshes and estuaries with a full range of estuarine salination 22 to 30 parts per thousand.

With juveniles and adults, juveniles are found throughout salt marshes in estuaries along the coast, as these areas serve as nurseries for the life stages through sub-adults. Juveniles tolerate a wide range

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of salinities and temperatures, and have been found often in low to medium salinities over mud bottoms, as well as near vertical structure.

Adults move between estuaries and nearshore shelf waters, although they do tend to move into deeper channel areas in estuaries as they mature and grow. Then evidence does support an age-specific migration in the Mid-Atlantic with a northward and inshore movement in the spring, and southward and offshore in the fall. Then they do move offshore as they are into deeper waters and offshore as they mature sexually.

For our datasets that we examined, we looked at 4 different datasets in the Mid-Atlantic for young of the year. Those were the two Delaware Trawl Surveys, the 16-foot trawl survey and the 30-foot trawl survey. The Maryland Seine Survey and the PSEG Survey, and that's all in that upper left-hand corner, very similar trends amongst most of those indices. The south, in the South Atlantic we examined the North Carolina gillnet survey and the South Carolina trammel net survey. Those showed variation year to year, with not a great deal of overall trends, other than annual peaks in abundance with larger year classes.

Also, we included in the upper right-hand corner the Georgia trammel index, which was the young of the year index. This was a lone young of the year index in the South Atlantic. It is included on a separate panel because the trend in this particular survey was very different from the others, showing a decline, and did not correlate at all with any Mid-Atlantic young of the year indices. Then finally, in the lower left-hand corner, we have the MRIP CPUE Index, which was a coastwide index. This was additional dataset, the New Jersey Trawl Survey. Although this was not considered for the model, it is included as a potential indicator dataset, as well as presenting potential evidence of a range expansion of black drum in the Mid-Atlantic in recent years, or basically since 2000.

The index shows some very highly variable values, but you see that steady incline in New Jersey. In the fishery dependent data, the recreational harvest in the Mid-Atlantic was relatively consistent across

time, with no clear trends except for the peaks in 2008, 2009. While the recreational harvest in the South Atlantic shows a steady increase over the four-year time series of 1982 to 2020.

For the released alive fish or the recreational released alive, it would be 2 fish, showed only a slight increase over time in the Mid-Atlantic, well at least compared to the South Atlantic, although we're using the same Y-axis scale. If you bump that up it would show a little bit more of a line going up.

However, in the South Atlantic we see a significant increase in released fish, but particularly after 2007. The main reason for this is likely due to increased regulation during the 2000s and the 2010s. Then we assumed a discard mortality rate of 0.08 on these recreationally released fish.

Commercial fishery, their landings were highly variable and typically highly seasonal, depending on the area of the coast. Landings in the Mid-Atlantic typically are adult fish, Age 4 or older, while the South Atlantic fishery is primarily sub-adults, age 3 or less.

Okay, now I'm going to go into our models and the different methods of models and what we looked at. The preferred model, which was the JABBA-Select model, incorporates abundance information and differentiates between exploitable biomass and spawning biomass.

Alternatively, we did consider some other models, two index models, the Itarget model, which was complicated by one-way trip datasets, and uncertainty in the appropriate multiplier, and then the Skate model which was also complicated by the one-way trip datasets, and uncertainty in the appropriate reference period used.

The DB-SRA, or the Depletion-Based Stock Recruitment Analysis, which was the preferred model in the previous assessment. That one does not incorporate abundance information from the index, and then Simple Stock Synthesis, which was basically a DB-SRA model in Stock Synthesis, did not also incorporate abundance information from that index.

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Then Stock Synthesis needs further development for use in future assessments, there's just not enough data with black drum to carry out that type of model.

The JABBA-Select was the preferred model, mainly due to the fact that it required one less assumption about biomass levels than DB-SRA and the Simple Stock Synthesis, does not require use of earlier uncertain catch data, as the DB-SRA used, and it counts for changes in fishery selectivity through time, and impacts the productivity. The JABBA-Select model was developed as an extension to the, Just Another Bayesian Biomass Assessment, which JABBA stands for, which is a surplus production modeling framework, as a means of incorporating life history data, fishery selectivity information, and an age-structured population type model. The JABBA is a state space Bayesian modeling framework. It is well suited to handle both observation and process error in the dynamics of the modeled stock through state space formulations, while incorporating existing information and uncertainty about the model parameters, through use of Bayesian prior distributions.

As far as the index methods went, you know as I've said, for the I_{target} there were concerns with setting the index multiplier. Typically, the index multiplier is at or near that 1.0 justified for stock near carrying capacity, and a higher index multiplier is justified by more depleted stock. The depletion on black drum stock was believed to range between 0.4 and 1, and higher multipliers setting that target catch levels at lower levels than landings were at within the last decade.

For the Skate method, catch advice using the full time series was actually lower than the landings for the last 14 years. This conflicts with the not overfishing determination, using comparisons of the previous and current index CVs. Catch advice using only the time period from 2000 to 2012, did yield advice more closely aligned with the catch history.

However, there was no real good explanation for the change in the exploitation rate after 1999, and exclusion of years before 2000 could be considered arbitrary. Both methods were ultimately rejected

due to uncertainties related to the lack of fisheries independent index of relative abundance, specification of the actual depletion status of the stock, defining the appropriate index multiplier for I_{target}, and then conflicting stock status between the index and the catch history for the Skate method.

For the DB-SRA model, which was used in the previous assessment and the Simple Stock Synthesis model, both assumed the black drum population started in an unexploited state in 1900, and abundance was at 70 percent on average of the unexploited state, at or near the end of the time series.

When combined with the increased removals, especially in the last 20 years, no information on abundance changes. This assumption and the structure of these two models resulted in a declining trend in abundance over time. For both models, the lowest abundance occurred in 2020, which is the final year of the current assessment.

Neither of those models incorporated abundance information from an index. The DB-SRA model produced a declining trend in abundance similar to the Stock Synthesis model, and would also have an opposite trend in abundance compared to that implied in the MRIP CPUE index. One of the primary differences between DB-SRA and the Stock Synthesis models, compared to the JABBA-Select, was the inclusion of that MRIP CPUE index.

When trying to include the MRIP CPUE in the Simple Stock Synthesis model, the fit to the MRIP index was poor, and there were opposing trends in abundance implied by the depletion assumed, compared to the MRIP CPUE index. For the JABBA model, the JABBA-Select model links age structure dynamics with per recruit models, and a Pella-Tomlinson surplus production model parameters. It uses the MRIP CPUE removal data, life history characteristics and selectivity information as inputs. It incorporates uncertainty through prior distributions on influential stock parameters, such as a stock recruitment relationship, steepness, and natural mortality. Then the JABBA model does not require the assumption

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that the model time series starts when the stock is unexploited.

We did not make an assumption about depletion at or near the end of the time series, but rather makes that assumption about depletion at the start of the time series, which in this case was 1982, with the use of the prior distribution. The MRIP CPUE index generally increased during that '82 to 2020 timeframe, which implies a black drum abundance increase during this time.

But also, during this time period there was an increase in removals. Given these inputs in the structure of the JABBA model, the abundance estimates for this model generally increased over time, so that abundance in 2020 is not the lowest, but was actually one of the highest of the estimates during the '82 to 2020 timeframe.

As part of our modeling decisions, the TC felt that the MRIP CPUE did generally track population abundances, and was the only index thought to really track closely the entire coastwide stock, and had a nondecreasing trend, similar to all the fishery independent indices. Therefore, the SAS had no reason not to exclude the MRIP CPUE index in this assessment, especially as inclusion of the index or of the abundance indices was one of the improvements suggested by the reviewers during the previous benchmark assessment.

The JABBA model differentiated between exploitable biomass and spawning biomass, which are different for black drum, due to life history and exploitation patterns, and accounted for this difference when estimating annual production as the ratio of these two biomasses as they change. It required one less assumption about biomass depletion than the DB-SRA and Simple Stock Synthesis, did not require the use of early uncertain catch data, and accounted for changes to fishery selectivity through time, and resultant impacts to productivity.

This is a procedure for linking the age structure dynamics with a per recruit models for the Pella-Tomlinson surplus production model parameters, essentially drawing those iterations of natural

mortality and steepness from the prior distributions, and it solves for MSY and MSY parameters using per recruit models calculating an additional spawning stock biomass, by setting that F equal to 0 in the per recruit models, and then uses these parameters to derive multivariant priors of surplus production parameters, the HMSY and M, then fits that surplus production model to the MRIP CPUE and removals.

The reference points that are generated are MSY generated reference points. Basically, spawning biomass and exploitation, as well as MSY. And model results. Spawning biomass, which is the top figure, was estimated to increase throughout the time series, though there were wide credible intervals indicating high uncertainty in the absolute biomass estimates.

Relative biomass was estimated with more certainty. The exploitation rate, the lower left, generally follows the removal time series with higher exploitation estimated during the mid-1980s, and since 2000, credible intervals of relative exploitation are also quite wide here. Most of the intervals through the time series indicate exploitation less than HMSY. But there are some low probability years of exploitation, where it could have exceeded HMSY during those high exploitation years. The base model is interpreting the increasing trend in both MRIP CPUE and the fishery removals, as indications that the stock was lightly exploited in earlier years, which allowed for surplus biomass to recruit to less vulnerable spawning stock, and build up over time.

Some positive anomalies in the biomass during the late 2000s and early 2010s were likely due to some strong year classes that were not fully exploited at the threshold level, and appeared to have offset the increased removals and a more drastic increase in exploitation, to allow for the trend to continue increasing, although that was a reduced rate. It starts to flatten out from the increased exploitation since about 2000.

There were 9 sensitivity runs that were made using low natural mortality, high steepness in the likelihood estimates, high and low, changes in MRIP selectivity, increasing the selectivity for the South

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Atlantic adults, as well as shifting the descending selectivity slightly to the right by about 100 millimeters. Then in the Mid-Atlantic early selectivity also shifting to the right. The uniform depletion priors were tested in a range from 0 to 1, and then the MRIP catchability coefficient change that occurred in 2016. These models change slightly, and the top is the original and then the base is the final one.

But there were some noticeable results. There was tighter distribution of estimates in the updated analysis, and all alternative configurations now estimate the exploitation time series remain below 1. The two configurations with the greatest relative exploitation in the updated analysis were the lower mortality rate, and then the change in the MRIP catchability coefficient.

Uniform depletion changed so much, because the model indicates a less depleted stock than in the original analysis, and therefore lower removals relative to the stock biomass and lower exploitation. The retrospective analysis was conducted with a five-year peel from the assessment terminal year.

Mohn's rho values were calculated according to the methodology of Hurtado-Ferro. The estimates of the Mohn's values range from negative 0.02 for relative biomass estimates to 0.74 for relative exploitation estimates, as the years were peeled from the timeseries. Magnitude of the Mohn's rho values indicate no significant retrospective bias according to the rule of thumb, proposed by Hurtado-Ferro, for long-lived species, which range from -0.15 to 0.2.

In conclusion, the JABBA model had shown a higher exploitation rate since 2000, increasing biomass followed by a stabilizing trend towards the end of the time series, high uncertainty in the absolute estimates, but much lower uncertainty in the relative estimates, with the majority of credible intervals concentrated in the final stock status region.

Okay, for stock status, the results indicated greater certainty that the stock has not been depleted to an overfished status in the terminal year of the assessment, while there is less certainty about the

exploitation status. The overfishing definition with spawning biomass in the terminal year, the ratio of spawning biomass in the terminal year to the spawning biomass in MSY has to be less than 1. The model estimated that at 2.99, so the stock is not overfished. Then the overfishing definition, the exploitation and the ratio of the exploitation rate the final year to exploitation rate for MSY greater than 1, with the calculated median being 0.28, so the stock is not experiencing overfishing.

All of the 95 percent credible interval is above the overfished threshold, while exploitation shows some low probability of exceeding the threshold within the 95 percent credible interval. However, this low risk of overfishing, according to the credible intervals, extends back from much of the last 20 years of the time series.

We would like to be clear that the MSY point estimates are not being recommended for catch targets, due to the uncertainty in the absolute quantities. There were some additional considerations, on the first, the empirical indicators did show increased fishery removals in the last 20 years and less frequent large recruitment events, particularly in the Mid-Atlantic in the last 10.

There were no clear indications of a declining trend in recruitment or exploitable abundance from abundance indicators, with the exception of the Georgia trammel index. There is a declining trend in the final two years of the recreational discard time series that may be reflective of abundance, in addition to other factors.

There is some indication of the northern range expansion as was shown in the New Jersey Trawl Survey. But overall, the stock indicators did not appear negative at this time. However, they should be monitored closely for any sign of change. The one-way trip increasing trend in both removals and the MRIP CPUE, the assessment time period may indicate the stock either had been lightly exploited in the 1980s, which allowed for the recent increase in exploitation and the predicted high biomass, or was overfished and rebuilding throughout the assessment time series.

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However, it is possible that the recruitment overfishing is occurring or could begin to occur prior to detection with the currently available data, due to sub-adult black drum accounting for the majority of the removals and the lack of an index that solely tracks mature biomass. The overfished scenario is contrary to the TCs expert opinion that the stock was not overfished at the beginning of the time period, and there were minimal regulation changes that were aimed specifically at black drum in the 1980s to induce rebuilding.

Then with over 30 cohorts contributing to spawning stock biomass, recruitment overfishing may not be evident within the current data streams for an extended number of years, leading to an overfished state being reached prior to removals and the MRIP CPUE index indicating a sustained downward trend.

The TC concurs with the model-derived stock status, but acknowledges the lack of contrast in both the removals and the MRIP CPUE, coupled with the model uncertainty. This will require close monitoring of stock indicators and a more conservative approach to managing the fishery. With that, we'll finish up with some research recommendations, I have one more slide. Just to start off, one thing, we actually had three items from the previous assessment that had been accomplished since the last one that we wanted to point out, the collection of genetic material to obtain information on movement and population structure. This study was actually published right towards the tail end of when we were finishing up the previous assessment. Attain better estimates of harvest from black drum recreational fishery, particularly in states with really short seasons. The MRIP changes that are discussed in the assessment showed some of this, though the exception remains, like the nighttime fishery in sampling identified as a moderate research recommendation.

I'm only actually talking about the high priority ones here, there were additional research recommendations in the document. Then, collection of information on the magnitude and sizes of commercial discards, attaining better estimates of bycatch of black drum in our fisheries. The ongoing

observer program now provides monitoring of the primary suspected commercial black drum discard fishery, and recent estimates have been relatively small, in comparison to the total fishery removals, but this source of catch should be continued to be monitored into the future for assessment purposes. For the research recommendations as I said, I'm going to pretty much just list the high priority ones. The first one was to evaluate use of MRIP site-use weighting factors to improve CPUE estimates.

Utilization of the Skate and Itarget models with their current data inputs should be evaluated as annual indicators, to show current relationships between the stocks and stock removals, which is Itarget, and the ongoing trend of relative F, which is the Skate model. A process should be developed for appropriately combining the MRIP supplemental recreational sampling program data, characterizing the size and/or age structure of the recreational harvest.

The process needs to consider spatial information, as there are likely spatial effects within the state supplemental sampling program, such as the VMRC Freezer Fish Program, which occurs primarily in Eastern Shore. Continue all current fishery independent surveys recommended as stock indicators for black drum, and continue to collect biological samples of black drum in these surveys.

Develop a fishery independent adult survey to target black drum, particularly for collecting age samples in states where the maximum size regulations preclude collection of those older fish. Conduct high reward tagging program or programs to obtain return rate estimates. Continue and expand current tagging programs to obtain additional mortality, catch and release mortality, and growth information and movement at size at age data.

Increase biological sampling in the commercial fisheries, particularly gillnet fishery in Virginia, to better characterize size and age composition of the commercial landings, and increased biological sampling in the recreational fisheries, particularly harvest in the Mid-Atlantic region, and releases coastwide that are characterized in the sizes and age

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composition of that recreational catch. With that I am finished my portion, and I will hand it off to Marcel, and then we will have questions afterwards.

PRESENTATION OF PEER REVIEW PANEL REPORT

DR. MARCEL REICHERT: Thank you, Chris, and I would like to thank the Board for the opportunity to present the Black Drum Stock Assessment Review today. Chris provided an excellent overview of the assessment, and the Review Workshop was conducted in January. The Review Panel focused on all aspects of the assessment, including the data and the model's uncertainty, and the resulting stock status. In my presentation I will highlight the Review Panel's conclusions and recommendations, and I will primarily focus on our main discussion points.

I would like to mention that further details can be found in our Review Report. But before I delve into the technical details, I should mention that the Review Panel consists of Ms. Maia Sosa Kapur, Dr. Gary Nelson, and myself. We brought to the table a combination of expertise that included black drum ecology, population dynamics, fisheries data, and various other aspects of stock assessment modeling.

Ms. Kapur and I were present at the Review Workshop, and I would like to specially acknowledge Maia for her contributions, in particular her detailed expertise on the JABBA-Select model was invaluable during the review. Unfortunately, Dr. Nelson was unable to attend the Workshop, but he provided detailed assessment feedback, and made significant contributions to the Review Report.

I also would like to extend a special thanks to the assessment team and the Commission staff. Their Review Panel much appreciated the extremely collegial atmosphere during the entire review process, as well as the timeliness in accommodating additional analyses and information. I also want to especially thank Jeff Kipp, who was responsible for a significant part of the assessment modeling, including our requests for additional sensitivities and model runs during the Review Workshop.

In terms of our overall findings, the Review Panel commended the Assessment Team for the detailed documentation of the assessment, exploitation, exploration and analysis of the data, and investigating the potential models. In the end, the Review Panel agreed with the assessment team that the JABBA-Select model was the most appropriate model, given the available data.

As Chris mentioned, so no spoiler alert, then it's good to present some good news. The good news is that the assessment indicated that the black drum stock was not overfished and overfishing was not occurring in 2020, the terminal year of the assessment. We felt that the Assessment Team did a great job exploring and describing the potential data sources, including characterizing the complex harvest picture, and also the available index data.

The Review Panel concluded that in general, the use and analysis of the data was appropriate. However, it is worth mentioning that black drum is still considered a relatively data poor species. In terms of our specific data highlights that were important for our review, as Chris indicated, the harvest is largely from bycatch, and mostly recreational, concentrated off the South Atlantic Coast, while the commercial harvest is dominated by landings in Virginia, North Carolina and Florida.

There is very little information on discards available, including discard mortality. What was available was used appropriately in the modeling efforts. Black drum life history aspects were also very well documented, and the Review Panel noted that relatively little age information was available, but that progress was definitely made since the last assessment. We also considered the assumption of a closed stock structure reasonable. But also noted that the possible recruitment from other areas, such as the Gulf of Mexico, may occur, and possibly contribute to uncertainty in the assessment. The Assessment Team's exploration of the available indices, including those based on various state surveys, was well done, but we know the lack of a coastwide or regionwide fishery independent index.

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As mentioned by Chris, the JABBA-Select model heavily relied on the MRIP data that provided the only coastwide fishery dependent index used in the model. The Review Panel also discussed that the Georgia trammel net index, the only young of the year index available in the South Atlantic area, conflicted with trends from the other indices, as Chris just mentioned.

This may be because the population in Georgia is following different patterns, but we also discussed that a change in the survey design, which was a 50 percent reduction in net length, may have affected this index. A gear comparison study by the Georgia DNR, using speckled trout, showed no difference in catchability between the different net lengths.

However, we noted that black drum behavior is likely different. We did recommend investigating a possible change in the black drum catchability in the survey, as it may, at least partially, explain the apparent conflict between the Georgia Trammel Net Index and other indices.

In evaluating data to monitor the black drum stock and fishery, the indices are important data sources. The Review Panel recommended monitoring trends in existing surveys for potential changes in the black drum population, especially in areas where the majority of the harvest occurs. Trends in harvest are also valuable in monitoring the stock, especially in the recreational sector, and in that respect MRIP data are important. Also, because MRIP was a critical data source in the JABBA-Select model.

When and where available, length and age information can be a good data source to monitor potential changes in population structure, including identifying strong or weak year classes, and the overall pressure on the black drum population as a whole.

Our third TOR was to evaluate the methods and models used to estimate population parameters and reference points. As you may expect, we spent considerable time discussing this TOR. The Review Panel felt that the Assessment Team explored the various models very well, and as Chris gave you a

good overview of the considered models, I will therefore concentrate on the model that was eventually used in the assessment.

Given the available data, we agreed with the Assessment Team to accept the JABBA-Select model as most appropriate for use in stock status determination, but also for management. In part, because the JABBA model provided the superior presentation of the overall uncertainty. We extensively discussed data inputs, parameter choices, priors and other model specifics.

We ended up focusing on three key considerations. One was the specification of the fishery fleets, the second one was the estimation of growth curve, and the third one was the treatment of error in the MRIP CPUE index. I would like to emphasize that the Review Panel did not feel that any of these issues were alarming enough to require a change in the base model, with the exception of one. It was related to the fleet specification. We had much discussion on the use of the specified fleets, including their use as proxies for geographic areas. This so-called area as fleet approach was not specifically mentioned in the assessment report.

The Assessment Team specified that the partitioning into South Atlantic and Mid-Atlantic fleets, and the use of the inverse in the maturity curve as the descending link of the selectivity curve for the South Atlantic, was chosen to mimic the hypothesis that fish might emigrate from the South Atlantic upon maturity.

However, as a result, the fleet selectivity is actually a combination of gear selectivity and species availability. These two are notoriously difficult to separate. The Review Panel also felt that the original assessment report had a fairly sparse description of how the selectivity curve was chosen. We were not entirely confident with some of the “eyeball approaches.”

The specified curves appear to be either disregarding the catch of small fish, as in the case of the Mid-Atlantic fleet, or overestimate the availability of larger fish, such as in the South Atlantic fleet. The

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Review Panel recommends a more rigorous approach for the next assessment. This is particularly important, because dome-shaped selectivity can introduce a considerable bias, if selectivity is actually different in shape.

In the original base model, as Chris mentioned, the Mid-Atlantic fleet was split into an early and a late component, corresponding to seasonal trends in availability. The Review Panel felt that this overcomplicated and potentially biased the model, as catches are modeled in a yearly time step. We felt that it was no good reason to account for seasonal dynamics in availability.

A sensitivity run showing that collapsing the Mid-Atlantic fleets into a single fleet, with a logistic selectivity curve, only slightly changed the reference points. This is likely because the Mid-Atlantic fleet accounts for a small part of the total annual harvest. The Review Panel and the Assessment Team agreed to incorporate a single Mid-Atlantic fleet into a new base model.

This resulted in a more parsimonious model, and is more in keeping with the model structure of a single year time step, with no seasonal dynamics. We also had extensive conversations about the growth functions, which were fit by sex to data from the entire region, but with outliers removed.

The removal of outliers before growth parameter estimation might mask differences across the region, and may also underestimate the overall uncertainty of fish growth in a population. Obtaining accurate estimates of the uncertainty in the growth parameters, when they were refitted to the individual length at age data that was done during the review, were unsuccessful.

Based on a visual inspection of the data, the Review Panel believes that in a future assessment sexual dimorphic growth should be further investigated. It's plausible there is not a strong sexual dimorphism in length at age for black drum, supporting the use of a singular growth curve for the entire stock. In addition, there is likely more variability in the length at age than is currently represented in the base

model and its related sensitivity runs. The Review Panel recommends exploring growth parameters estimation to individual length at age, observations by sex, without the removal of outliers, and without the averaging steps. Now regardless of the outcome, we recommend to determine whether and how the growth model uncertainty can be incorporated into the assessment. Again, that is for the next assessment.

The impact of these issues on the reference points could not be evaluated within the scope of this review. As I mentioned just now, that it is important to address this in the next assessment. In particular, because the growth parameterization explicitly informs the conversion of length at age to weight, and therefore, to the exploitable fish biomass.

As an example, this figure from the Stock Assessment Report Appendix shows the length at age data for the Mid-Atlantic Region, with the red circles identifying the removed outliers. It also demonstrates the considerable variability in the length at age data. The later, by the way, is not unique to black drum. Many other species also exhibit a considerable level of variability in the length at age, and thus in the growth parameters or in the overall growth of the species.

The third critical discussion point was related to the observation uncertainty in the MRIP CPUE index, here shown in the graph on the lower part of the slide. The MRIP index was the only index used in the JABBA-Select model, and we discussed at length how the error in this index was handled.

Our Review Report provides further details, but the Review Panel concluded that the methods used in the assessment to specify an input standard error for the MRIP CPUE may have inflated error in the index. We felt that perhaps alternative methods could have resulted in an improved fit to the index, and better-informed process error estimates.

We recommend that alternative methods to specify the error inputs for the index should be explored in the next assessment. The Assessment Team explored the impact of various parameters on the model behavior, and the so-called alternative states

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of nature very well, in a chosen suite of sensitivity runs, and Chris just went through the sensitivity runs.

After some discussion, and based on the conversations mentioned in my previous slides, we requested three additional runs. One was to enter the Mid-Atlantic early and late fleets as a single fleet. The second one was a run with no additive standard error in MRIP CPUE index, and the third one was one with a logistic selectivity for the South Atlantic fleets.

As I mentioned earlier, we much appreciated the responsiveness of the Assessment Team to these requests. The overall conclusion was that the result of the sensitivity runs generally did not significantly change the quality of the status of the stock. In addition, and again as Chris mentioned, the retrospective analysis did not show a significant pattern that raised concerns with the Review Panel.

As you know, in the end we recommend that the base model that combines the Mid-Atlantic early and late fleets. I will note that this model run and the related uncertainty analysis was completed after the Review Workshop. Upon completion, the Review Panel conducted the desk review, and we have no additional comments or concerns. The Review Panel concluded that the Assessment Team thoroughly explored uncertainty through sensitivity runs, Bayesian statistics and other diagnostics, and had provided critical information of the influence of parameter choice on model behavior and stock status. We were satisfied with the extent of the uncertainty characterization approaches, but I refer to my earlier slides in the report for specifics affecting the uncertainty in this assessment.

In terms of overall uncertainty, we felt that the specification of the shape and the parameterization of the selectivities is likely a chief component of the model uncertainty. The Review Panel concluded that given the available data the JABBA-Select model provides the best, most robust estimate for relative stock biomass and fishing mortality estimates, and is appropriate for use in management.

In terms of continuity, the JABBA-Select model also generally agreed with the qualitative stock status

results from the updated depletion-based stock reduction analysis, or DB-SRA used in the previous assessment. In our evaluation of the reference points as stock status determination, we concluded that the estimation methods were appropriate, given the data and the recommended model.

The updated base run indicated that black drum population is not overfished in the terminal year, and is not undergoing overfishing. The analysis indicated that the assessment is robust for overfishing status and robust, but with a higher uncertainty, for exploitation status. As a reminder, the figure on the lower right-hand side shows the face plot from the assessment report, indicating in the red circle the 2020 stock status, in the green not overfished and not overfishing box.

The accompanying uncertainty is indicated in the whitish and gray areas. The Review Panel concluded that the assessment results are appropriate for use in management, that uncertainties described in the assessment and review reports should be taken into account, in terms of management risk.

The Review Panel largely agreed with the Assessment Team's research recommendations, and we added three. One was investigating the reduction in large recruitment events, as it may affect the stock's resilience to harvest and other impacts that may affect the stock-recruitment relationship.

More region-specific reproductive information will also improve future stock assessments, including fecundity estimates and possible age-varying spawning frequency and batch fecundity, and a variability in the length of the spawning season. The third one is an investigation into possible change in catchability in the Georgia trammel net survey that I mentioned earlier, as this is the base for the only available young of the year index in the South Atlantic.

Furthermore, we emphasize the increase in biological sampling, especially acquiring more age samples. In spite of the progress made since the last assessment, the age information is still relatively sparse. Biological sampling can also aid in gathering

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reproductive information that I mentioned earlier. We realize that setting up a new comprehensive regionwide fishery independent survey for the black drum is likely cost prohibitive. But perhaps making slight adjustments to its existing surveys can improve useful data collection for black drum. As very little discard information was available, improving coastwide discard data, including biological data and discard mortality, will definitely benefit future assessments, especially the data for recreational fishery will be very valuable.

I would like to note that many of these research recommendations are not unique to black drum. For instance, fishery independent information is missing for many species, and discard data is lacking for numerous other fisheries also.

As far as the next assessment is concerned, based on the stock status, the uncertainty in the assessment and the life history aspects of black drum, such as the relatively high maximum age of 67 years, we recommended conducting the next assessment in about five years. But we also recommend monitoring the stock using the indicators that I mentioned before. If the monitoring information warrants, adjustments could be made to the stock assessment schedule. In closing, the Review Panel concluded that the black drum off southeastern U.S. remains relatively data poor.

Given the available data, the JABBA-Select was the most appropriate model in the assessment, but we requested the new base run with a combined Mid-Atlantic fleet. The assessment indicated that black drum, as I mentioned before, is not overfished and overfishing is not occurring in 2020, and this stock status determination is generally robust and appropriate for management.

Given the stock status, the model uncertainty, harvest trends, available abundant indices, and the nature of the fishery, the Review Panel feels that recent harvest levels are likely sustainable. However, harvest, abundance trends, and recruitment should be monitored for indications of disconcerting changes in the population. Finally, we recommend a new stock assessment in five years. With that, I

thank you, and I will be happy to answer any questions you may have.

CHAIR BATSAVAGE: Thank you, Chris and Marcel for the assessment report and peer review report, very thorough information. Again, as I mentioned earlier, a lot of great work was put into the assessment. With that I'll look for questions from the Board on either the assessment or peer review report.

MS. KERNS: We have Shanna Madsen.

CHAIR BATSAVAGE: Go ahead, Shanna.

MS. SHANNA MADSEN: Thank you both for incredibly thorough reports. I really enjoyed listening to them. You guys really covered a lot of bases here. Hopefully, my questions aren't repetitive to some of the things that you already covered. One of the things that you noted pretty strongly in the Review Panel report is that the shape and parameterization of the selectivities could be kind of leaning towards a chief component of some of the uncertainty in the models.

I was just curious to hear a little bit more. I know Chris, you went over some of the different sensitivity runs that you guys ran for the Review Panel, in addition to some of the things that they asked extra. I was just sort of curious as to how many of those sensitivity runs had to do with those selectivity patterns, and then additionally, am I correct in saying that even though you ran through a bunch of different sensitivity runs, all of those sensitivity runs still aligned with the exact same stock status that the base run came up with as well.

MR. McDONOUGH: I'll start. Yes, the various runs didn't really change the result very significantly. That really didn't, even when we changed the selectivity, it didn't change it that much. Then Jeff, I don't know, do you want to add anything specific on the changes that were made for those, for the retrospective?

MR. JEFF J. KIPP: If I could just note, I don't recall off the top of my head. I think there were maybe four or five of our original sensitivity runs or configurations that were identified on sort of the major

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uncertainties of selectivity in the assessment, and we put those towards the peer review. Then the peer review had further concerns.

They requested, I think three additional sensitivities, focused on selectivity and selectivity parameterization. Those were added during the Peer Review Workshop, and ultimately, though that the results of those sensitivities were fairly insensitive to some of those assumptions about selectivity.

DR. REICHERT: Yes, and to add to that, they showed some differences, but the qualitative stock assessment results did not change. I think where the most bang for the buck probably comes in the overall uncertainty. If you lower the overall uncertainty, that obviously provides a better model for management.

CHAIR BATSAVAGE: Any other questions?

MS. KERNS: Jeff Brust.

CHAIR BATSAVAGE: Go ahead, Jeff.

MR. JEFF BRUST: Thank you, Chris and Marcel, for your updates, very helpful summaries of the reports. I have a question that I think you touched on during your presentations, but I'm hoping you can sum it all up and tie it up with a bow for me. We have information that shows that harvest was increasing over time, and at the same time the biomass was increasing as well.

As they are increasing in concert, harvest rates were relatively flat. Could you explain what is going on that with harvest rates staying the same, how were we getting an increase in biomass, to the point that biomass is almost three times the BMSY?

DR. REICHERT: Yes, there may be processes in the population that they don't respond to harvest directly. The traditional idea is if you harvest you lower the biomass. If the productivity in the population is high enough, there may be potentially disconnect between harvest and the population biomass.

It's particular in species that grow fast, have a long lifespan. There are opportunities for the population to respond to harvest, and actually increase in biomass. Not respond to harvest but increase biomass, because there may be somewhat of a disconnect, especially if the harvest is relatively light. In addition, I would say that most patterns in the stock assessment were relatively level. There hasn't been a lot of contrast in, for instance, the indices or some of the other indicators. I'm not sure if, Jeff, do you have further comments to that?

MR. KIPP: I would just add that the nature of exploitation would believe that there is some reduced vulnerability on adults, and since there are so many age classes that contribute to that adult component of the population, there are some processes to think that you know if there is particularly lower exploitation on those first couple of year classes, that they can recruit to this spawning stock biomass, and that that could build up over time.

Things like some larger year classes at times, similarly exploited to low levels, since they do exit that more vulnerable component of the population early on in their life stage, that some of that biomass can recruit to that less vulnerable adult SSB, and build up over time, even with higher harvest on the subadults.

MR. McDONOUGH: I actually had one more thing on that. Typically, when you do get big year classes, they do not track well beyond a couple years, in terms of seeing them in the age distribution. That age distribution stays pretty consistent over time, has remained pretty consistent over time. Those really big year classes, and they definitely occur, will fade out after a couple of years. That is likely making an impact as well from the increasing biomass, but none of the surveys catch it.

DR. REICHERT: That reminds me, if I may. That was one of the reasons the Review Panel felt that looking into the lack of those larger recruitment pulses that were seen in the earlier timeseries we are not seeing in recent years. It may be important to take a look at that and why that may happen.

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CHAIR BATSAVAGE: Jeff, do you have a follow up, or did that answer your question?

MR. BRUST: No that was a very good answer, thank you very much.

CHAIR BATSAVAGE: Any other questions?

MS. KERNS: I don't see any hand online or in the room. I'm sorry, Roy Miller has a question.

CHAIR BATSAVAGE: Okay, great, Roy, go ahead.

MR. ROY W. MILLER: Just curious as to whether exploitation of the larger individuals in this population is suppressed by abundance of parasitic worms in the flesh. Is that a factor that was considered at all, even though it is well known among recreational anglers, and in fact a lot of large drum are turned loose as a result, rather than being fully exploited.

MR. McDONOUGH: Thanks for that question, Roy. Actually, that was something we had discussed in actually the previous assessment, as well as this one. But that was mostly a qualitative, those qualitative data. The areas, I know the South Atlantic it is very strong, you know the feeling that the parasitization in those larger fish is pretty common. But as I recall, and I can't remember, I think it was off, it may have been Delaware. But there were some fisheries where the black drum, the larger adults were actually utilized for eating, they just wouldn't use certain parts of the fish. But that was something that we definitely discussed, but there is really no really good information that we can incorporate in the assessment, unless Jeff has anything to add.

CHAIR BATSAVAGE: Great, any further questions from folks in the room? I don't see any online. Erika, go ahead.

MS. ERIKA BURGESS: Chris, I read the Stock Assessment Report, and I just want to confirm my understanding of it. The Florida fishery independent monitoring indices were rejected for use because of the inability for the power to detect changes in abundance. Is that correct?

MR. McDONOUGH: That is correct.

CHAIR BATSAVAGE: Any further questions from Board members? I had one, I'll jump in, if there is someone else in the queue, because I can't see them. It was suggested that a benchmark assessment be done in five years, for various reasons. Is that contingent on collecting more age information to do an age-based model next time around, or would a benchmark assessment be considered anyways, just to look at potentially other models that could be used, instead of the JABBA-Select model?

DR. REICHERT: I think that irrespective of the increase in age information, I think if there is more age information available, it shows that the model may change. If sufficient age information is available, perhaps the statistical catch at age model or similar models can be considered. But in terms of the Review Panel, we did not discuss the five-year being contingent on the availability of additional data, it's more the issues that we identified in our report that were used in our five-year recommendation. I hope that answered your question.

CHAIR BATSAVAGE: Yes, it did, thanks. I don't think the Board needs to consider ways to increase age samples today, but maybe just something for all of us to think about. Whether that is done through the black drum FMP or just through individual state efforts, just to try to get as much information as possible for future assessments, especially things like age data that do show up on the research recommendations. Anyways, thanks for that. Just one final check on any questions. Yes, go ahead.

MR. McDONOUGH: I would point out that the previous assessment, the timeframe between it was closer to what, about six or seven years, primarily because when we evaluated close to five. The stock indicators were still looking pretty good, and then COVID happened and everything got thrown in the fan.

That five-year recommendation, that is kind of our standard, but it's not tied to it. If there are indicators that the stock is still doing okay, and there are reasons, and other things are more important in the

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queue for assessments, you know they could potentially be put off. But it's certainly something that has got to warrant closer looks, at least at the five-year mark.

CHAIR BATSAVAGE: Thanks for that additional information on the assessment schedule and how that works. Yes, just final check on any questions from the Board on either the assessment or the peer review report.

MS. MADSEN: One more question, Shanna.

CHAIR BATSAVAGE: Go ahead, Shanna.

MS. MADSEN: I don't know if this is the appropriate time or not, but if we have questions about the indicators, should we hold those until after a motion is made?

CHAIR BATSAVAGE: We can go ahead and address that now. I'll look to Tracey, if she thinks it might be better to address that later.

MS. TRACEY BAUER: I think you are within the realm of the stock assessment, it's fair game now.

CHAIR BATSAVAGE: Go ahead, Shanna.

MS. MADSEN: My questions were, so there is quite a number of indicators laid out for us. Is the intent of the indicators to continue, like Chris was sort of saying we'll continue to look at the indicators and determine whether or not we need a benchmark sooner rather than later, or maybe we can save it for later if everything is still looking good on the indicators.

Then secondarily to that, when it said like yearly, we were going to look at those indicators, is that a heavy lift for the TC or the SAS to deal with, and do you intend on kind of reporting out to the Board yearly on that, or is it just you'll report out to the Board if things aren't looking so great, and we kind of need to know?

MR. McDONOUGH: I think if I remember correctly, our discussions about that were that we could

potentially look at that yearly, because black drum, coming from the previous assessment, really didn't have an annual, I mean we did the Plan Review and the compliance reports and stuff like that, but there was no year-to-year indicator or stock status indicator, like we have for things like croaker and spot with traffic light and some other things.

It was thought that some of these models like the Itarget and the Skate models could be something that potentially we reviewed annually. They are all indices that are included in most of the reports every year. However, it was my understanding that you know once we basically got through the assessment.

The next step for the TC would be to act, and Jeff, correct me and Tracey, correct me if I'm wrong. But was then we would go back and look at, okay, how would we use these specific indicators, and whether or not, you know maybe yearly. Could be every other year. But that is something that I think we actually, that would be the next step, we need further development.

MR. KIPP: I would just add to that that yes, when we discussed timeframe, we discussed and recommended annually reviewing these indicators. They were developed as simple empirical time series, so something relatively straightforward to put together on an annual basis, to keep closer tabs on this stock, because of some of the data limitations that we run into, and some of the uncertainties of the assessment.

The idea would be to review those annually. The question we had not resolved yet as a Technical Committee, was how would those be responded to by the Management Board, and so ultimately suggested a formal review of those, and keeping tabs on those as to whether it may suggest an expedited stock assessment.

But things like using them like spot and croaker, and any type of like management framework, that that would be something that would be pushed off from this discussion, if that was something that was desired on the board by the Management Board.

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CHAIR BATSAVAGE: Okay, any other questions on the assessment report or the stock indicators?

MS. BAUER: We have one hand from Lynn.

CHAIR BATSAVAGE: Yes, go ahead, Lynn.

MS. LYNN FEGLEY: Just to close the loop on that, and make sure that the Board is clear. It was my thought with an indicator that those would be something that would be reviewed annually, and that they would be used to determine whether we needed to go, as Shanna was saying, to a new stock assessment, they are not to be used for management response. I just guess it would be to be clear amongst the Board that that is the guidance for you. If that is true, make sure that that is on the record, annual review, not management response.

MR. McDONOUGH: Yes, that was essentially the intention.

CHAIR BATSAVAGE: Yes, thanks for that clarification. That is definitely an important one for all of us to understand at this point. Tracey, just checking again for any other questions from Board members.

MS. BAUER: No more questions at this time.

CONSIDER ACCEPTANCE OF BENCHMARK STOCK ASSESSMENT AND PEER REVIEW REPORT FOR MANAGEMENT USE

CHAIR BATSAVAGE: If there are no other questions, then I think we are at a point, I'll be looking for a motion to consider the acceptance of the benchmark stock assessment and peer review report for management use. Now Tracey, if there is a motion already ready for that we can just see who would want to make that motion.

MS. BAUER: Yes, it's on the board.

CHAIR BATSAVAGE: I'll just rely on you Tracey to see who wants to make the motion and to second it, since I can't see the folks in the room.

MS. BAUER: Motion made by John Clark, second by Lynn.

CHAIR BATSAVAGE: Okay great, so move to accept the 2023 Black Drum Stock Assessment and Peer Review Report for management use. Motion by John Clark, second by Lynn Fegley. Any discussion on the motion?

MS. KERNS: No hands.

CHAIR BATSAVAGE: I guess before I ask if there are any objection, Tracey, I guess, are we going to need to do a separate motion to consider adopting the stock indicators, or could we just fold that into this motion? What would be the best way to do that?

MS. BAUER: Right now, it's a separate motion.

CHAIR BATSAVAGE: Yes, let's keep it simple. We can just dispense with this, and I guess we still need to take action on the stock indicators, right, or not?

MS. BAUER: Yes.

CHAIR BATSAVAGE: If there is no discussion on this motion by the Board, I will just look to see if there are any objections to accepting the stock assessment and peer review report for management use.

MS. BAUER: There are no hands.

CONSIDER ADOPTING ANNUAL INDICATORS

CHAIR BATSAVAGE: All right, great, so now we will look for a motion to consider adopting the stock indicators that are recommended from the stock assessment. If there is a motion available, we'll get that up on the screen before looking for people to make the motion and second it.

MS. BAUER: Jeff Brust.

CHAIR BATSAVAGE: Motion by Jeff Brust, seconded by.

MS. KERNS: Chris, we need to have Jeff read it.

CHAIR BATSAVAGE: Yes, Jeff, if you could that would be great, thanks.

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MR. BRUST: Sure, move to have the TC annually present the indicators as described in the Black Drum 2023 Stock Assessment and Peer Review Report.

MS. KERNS: Shanna Madsen.

CHAIR BATSAVAGE: Second by Shanna, great. Any discussion on the motion?

MS. KERNS: Erika.

MS. BURGESS: Is there an interest among the Board to modify this motion to clarify that the indicators, to be very clear that the indicators would be to inform whether a stock assessment is necessary and not management action?

MS. KERNS: It's up to the Board.

MS. BURGESS: I'm looking around to the Board. I see heads nodding. Okay, so process question. Motion to amend: move to have the TC annually present the indicators as, okay, so at the end of the sentence, to inform the need for a new stock assessment, benchmark stock assessment.

CHAIR BATSAVAGE: The motion to amend was made by Erika and read into the record. Do we have a second?

MS. KERNS: Mel Bell.

CHAIR BATSAVAGE: Seconded by Mel, any discussion on the motion to amend?

MS. KERNS: Lynn Fegley.

CHAIR BATSAVAGE: Go ahead, Lynn.

MS. FEGLEY: Yes, I sort of blurted out benchmark, and I want to make sure that was the intent of what we were being told, that it would be a benchmark and not an update, if the indicators.

MS. KERNS: If you say benchmark then it has to be a benchmark, but if you just say stock assessment it could be a benchmark or an update.

MS. FEGLEY: Yes, process question. I think that is probably incorrect, it should just say stock assessment.

MS. KERNS: We'll go to the maker and the seconder.

MS. BURGESS: Well, technically it doesn't belong to the motion maker or the seconder anymore.

MS. KERNS: In interest of time, we will allow it at this moment.

CHAIR BATSAVAGE: Thanks for that.

MS. BURGESS: Can you please remove benchmark.

MS. KERNS: Erika, will you reread your motion please?

MS. BURGESS: Motion to amend by adding "to inform the need for a new stock assessment."

CHAIR BATSAVAGE: Mel, I guess you're okay with that friendly amendment to the amendment?

MR. MEL BELL: Yes.

CHAIR BATSAVAGE: Any further discussion on the motion to amend?

MS. BAUER: No hands.

CHAIR BATSAVAGE: Okay, are there any objections to the motion to amend?

MS. BAUER: No hands.

CHAIR BATSAVAGE: I guess then now that will be added to the other motion, and become the main motion. I don't have the one go quite right. I guess we need to add that.

MS. KERNS: Just give us one second.

CHAIR BATSAVAGE: Sure, okay. I'll just go ahead and read it into the record. What we have upon the screen is the way we almost want it. **Move to have the TC annually present the indicators, as described**

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in the black drum 2023 Stock Assessment and Peer Review Report to inform the need for a new stock assessment. That is property of the Board. **Is there any further discussion, actually in the interest of time, is there any objections to the motion?**

MS. BAUER: No hands.

CHAIR BATSAVAGE: Okay, the motion passes by unanimous consent. Thanks, I appreciate everyone working on this, and again my thanks again to the TC and the Stock Assessment Subcommittee, as well as the Peer Review Panel for all the work they've done on getting us to this point on having an approved benchmark stock assessment for black drum, so that is good news.

CONSIDER NOT CONDUCTING 2023 ATLANTIC CROAKER AND SPOT TRAFFIC LIGHT ANALYSES

CHAIR BATSAVAGE: Next item on the agenda is to consider not conducting the 2023 spot and Atlantic croaker Traffic Light Analyses. I'll turn to Tracey for more information on that for that for the Board. Tracey, whenever you're ready.

MS. BAUER: I'll be making this quick, it can just be a verbal update. A little background on this similar to what you heard for Atlantic menhaden. Due to a packed stock assessment schedule for the next couple of years, several proposals were put forward by science staff to reduce workload and TC staff activities, one of which was skipping the 2023 traffic light analysis for spot and Atlantic croaker.

That usually occurs in July/August to focus on the benchmark assessments for both the species that are ongoing right now. This will give staff, the TC and the SAS more time to focus on that assessment for those two species, and in addition it's still uncertain if the calibrated ChesMMA data will be available this year. If it is available, it won't be available until late summer, early fall potentially, and without the ChesMMA data the TLAs will not be very informative, similar to what we were looking at last year. The Assessment Science Committee looked at this, and they have no objection to not completing

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the spot and croaker TLA this year. As a reminder, the management measures that were put into place in 2021 for spot and croaker, from when the TLAs were tripped in 2020, were both due to be reevaluated this year for both species, and if the Board is in consensus with going this route, the TLAs will not be conducted this year, and the spot and croaker management measures will remain status quo, until TLAs can be reevaluated in 2024 with a benchmark assessment. I can hand this back over to Chris for any discussion on this item.

CHAIR BATSAVAGE: Any questions or concerns from the Board on this plan for not conducting the traffic light analyses for spot and croaker this year?

MS. BAUER: No hands raised.

CHAIR BATSAVAGE: Okay, great, with that then I guess there are no objections to moving forward with not conducting these and allowing the TC and other folks working on spot and croaker more time to work on the upcoming benchmark stock assessments. We can just wait until 2024 and really just be waiting for the stock assessment for both of these species.

OTHER BUSINESS

CHAIR BATSAVAGE: If there is nothing else on this item then we can just do a quick check to see if there is any other business that needs to come before the Sciaenids Board before we adjourn.

MS. BAUER: No hands in the room.

ADJOURNMENT

CHAIR BATSAVAGE: All right, great, so thanks everyone for sticking around a little later this evening than we originally planned, but I'm glad we were able to accomplish the work that we did this evening, so I will look for a motion to adjourn.

MS. BAUER: Motion by Mel Bell.

CHAIR BATSAVAGE: Do we have a second?

MS. BAUER: Second by Spud.

CHAIR BATSAVAGE: By Spud, great, thanks, we are adjourned. Thanks everyone.

(Whereupon the meeting adjourned at 6:20 p.m. on Monday, May 1, 2023)



Atlantic States Marine Fisheries Commission

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MEMORANDUM

TO: Sciaenids Management Board
FROM: Black Drum Technical Committee
DATE: October 2, 2023
SUBJECT: 2023 Black Drum Data Update

Background

The 2023 Black Drum Benchmark Stock Assessment determined the Atlantic coast stock was not overfished nor experiencing overfishing in the terminal year of the assessment (2020). However, the assessment acknowledged lack of contrast in black drum data sets coupled with high uncertainty in model-based estimates. To this end, the Black Drum Technical Committee (TC) recommended close monitoring of empirical stock indicators annually between stock assessments to identify any concerning trends in a timely manner. The next black drum stock assessment is tentatively scheduled for 2027. Should any concerning trends occur, the TC may recommend an expedited assessment.

Indicators developed during the stock assessment include abundance (young-of-year, age 0-1, subadult, and exploitable abundance), range expansion, recreational live releases and harvest, and commercial landings. Additional details on these indicators are available in Section 6 of the [2023 stock assessment report](#). At the conclusion of the assessment, indicators overall did not appear negative. The following provides updated indicator time series with two additional years of data through 2022.

Results

Overall, indicators show mixed signs of stability and declines since the assessment.

- Mid-Atlantic abundance indicators (all YOY) have varied around their time series means during the two update years (Figure 1).
- South Atlantic abundance indicators were mixed with declines measured by the SC Trammel survey (ages 0-1) and GA Trammel survey (YOY), while varying around the time series mean for the NC Gillnet survey (subadult, Figure 2).
- The MRIP CPUE (exploitable abundance indicator) declined below the time series mean for both update years (Figure 3).
- The range expansion indicator was not available for 2021 and declined below the time series mean in 2022 (Figure 4).
- Recreational live release indicators varied around the time series mean in the Mid-Atlantic and were both above the time series mean in South Atlantic during the update

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years (Figure 5). Live releases in the South Atlantic have continued to follow a declining trend in 2021 and 2022 that was observed at the end of the stock assessment time series.

- Recreational harvest has varied with both update years below the time series mean in the Mid-Atlantic and both update years above the time series mean in the South Atlantic (Figure 6).
- Commercial landings have shown a similar pattern to the recreational harvest with both update years below the time series mean in the Mid-Atlantic and both update years above the time series mean in the South Atlantic (Figure 7).

Recommendations

The Black Drum TC met on September 26, 2023 to discuss the data update to the indicators and make a recommendation to the Sciaenids Management Board for their October 2023 meeting. In their discussion, the Black Drum TC noted that, despite some observed declines in a few of the indicators, in each case the two additional years of data were still within the historical range of that indicator. In addition, the TC did not believe two additional years of data are enough to determine any definitive trend in the black drum stock. As a result, they do not believe there is cause for concern at this time. **The TC recommended no change to the current black drum stock assessment schedule, but did note it will be important to continue to monitor the indicators.**

The TC discussed potential reasons behind some of the declines observed in the indicators. The declines observed in the recreational live releases in the South Atlantic could potentially be attributed to declines in directed effort. It was also noted there may be less market demand for black drum now compared to 10 to 15 years ago in some areas of the Mid-Atlantic, such as Maryland and Delaware, which may account for the decline in commercial harvest observed in this region. Additionally, fewer fishermen may be harvesting black drum because they are no longer participating in other fisheries, such as striped bass, where black drum is a bycatch species.

The Black Drum TC also highlighted the continued need for a black drum fishery independent index for adults, which none of the existing fishery independent surveys currently target. Current indicators are highly sensitive to year class strength, which is variable for black drum, creating challenges for assessing trends of overall stock abundance. As noted in the research recommendations of the 2023 Black Drum Stock Assessment report, an adult fishery independent survey for black drum would likely consist of a purse seine or long-line gears with bait and sampling areas appropriate to target black drum.

Lastly, the Black Drum TC discussed, hypothetically, what trends in the indicators the TC believes would be of concern and likely cause the TC to recommend changes to the black drum stock assessment schedule. The TC would be concerned if young-of-year or sub-adult fishery independent index values were repeatedly lower than what's previously been observed for that index, over a longer period of time, such as four or five years. The Black Drum TC can refer back to this discussion in future years when discussing the annual update to the indicators.

Figures

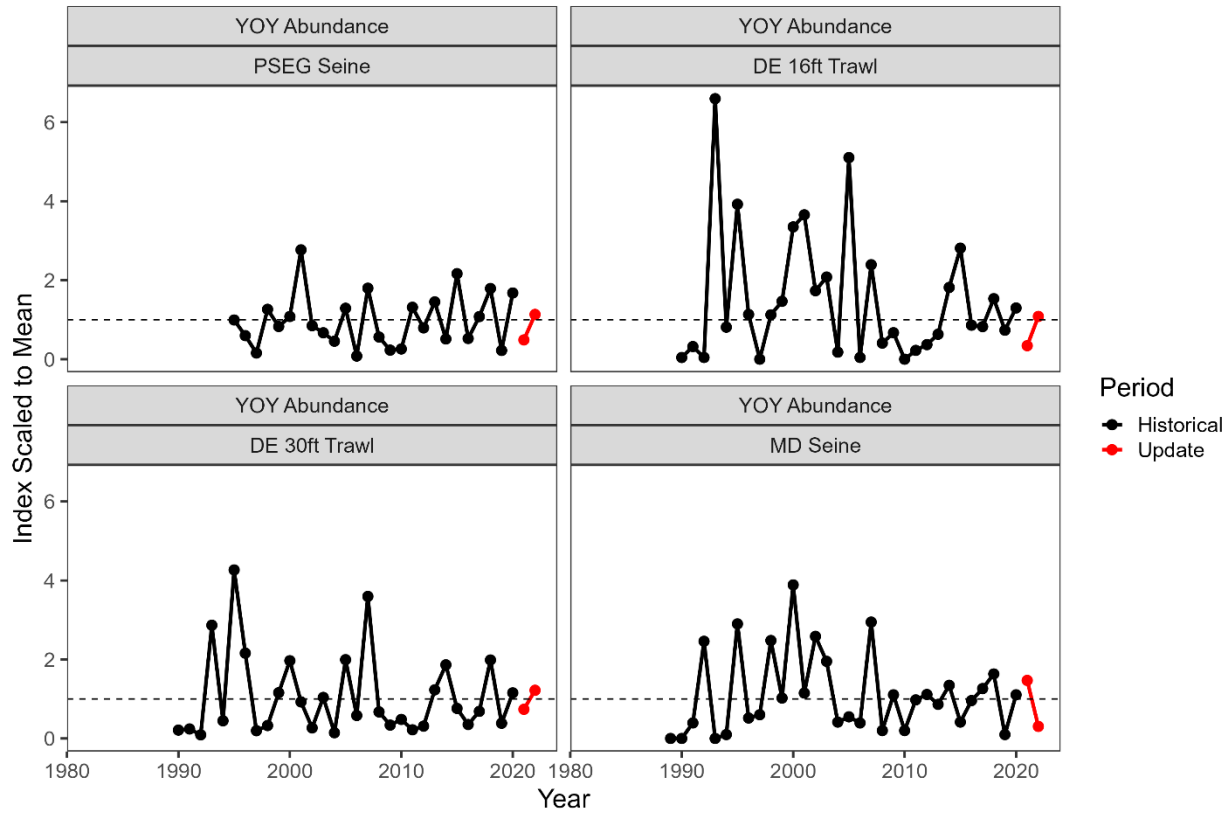


Figure 1. Mid-Atlantic abundance indicators. The dashed line is the time series mean.

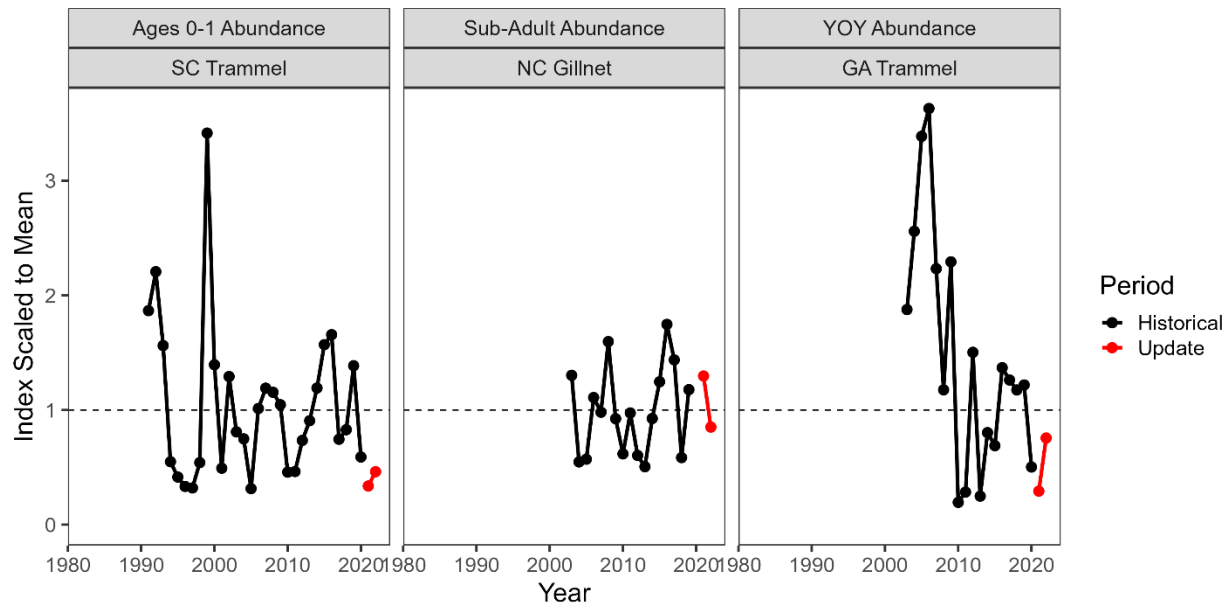


Figure 2. South Atlantic abundance indicators. The dashed line is the time series mean.

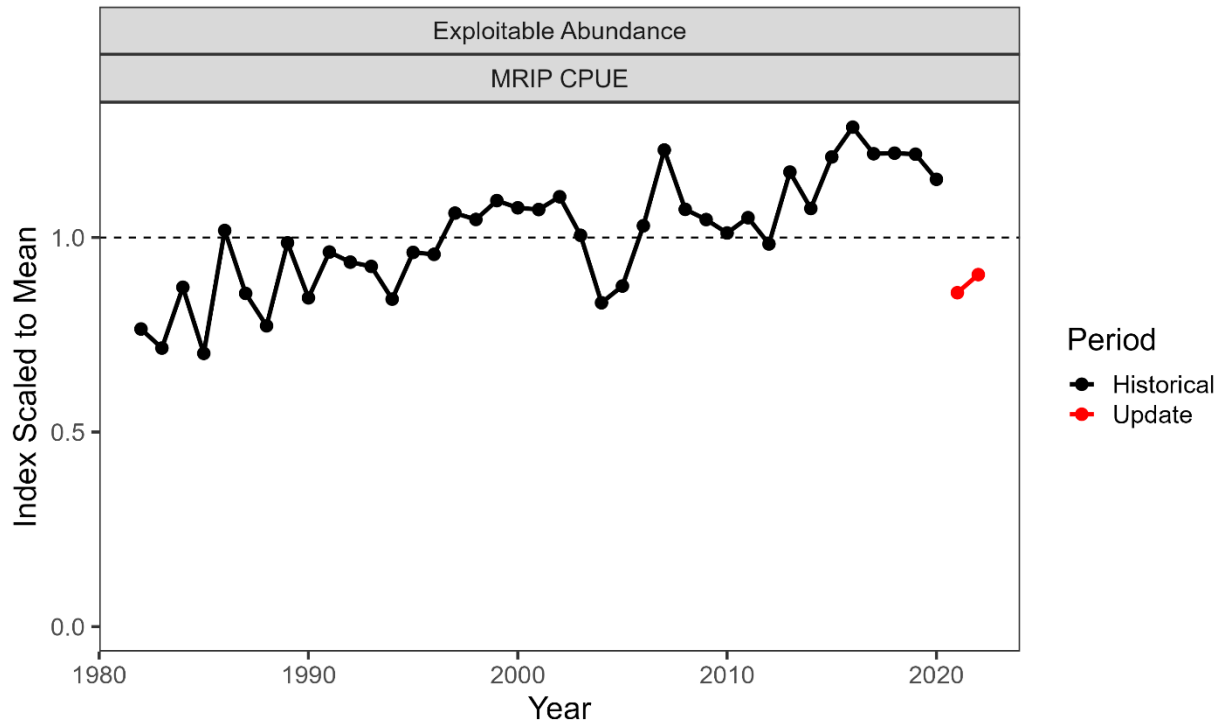


Figure 3. Coastwide abundance indicator. The dashed line is the time series mean.

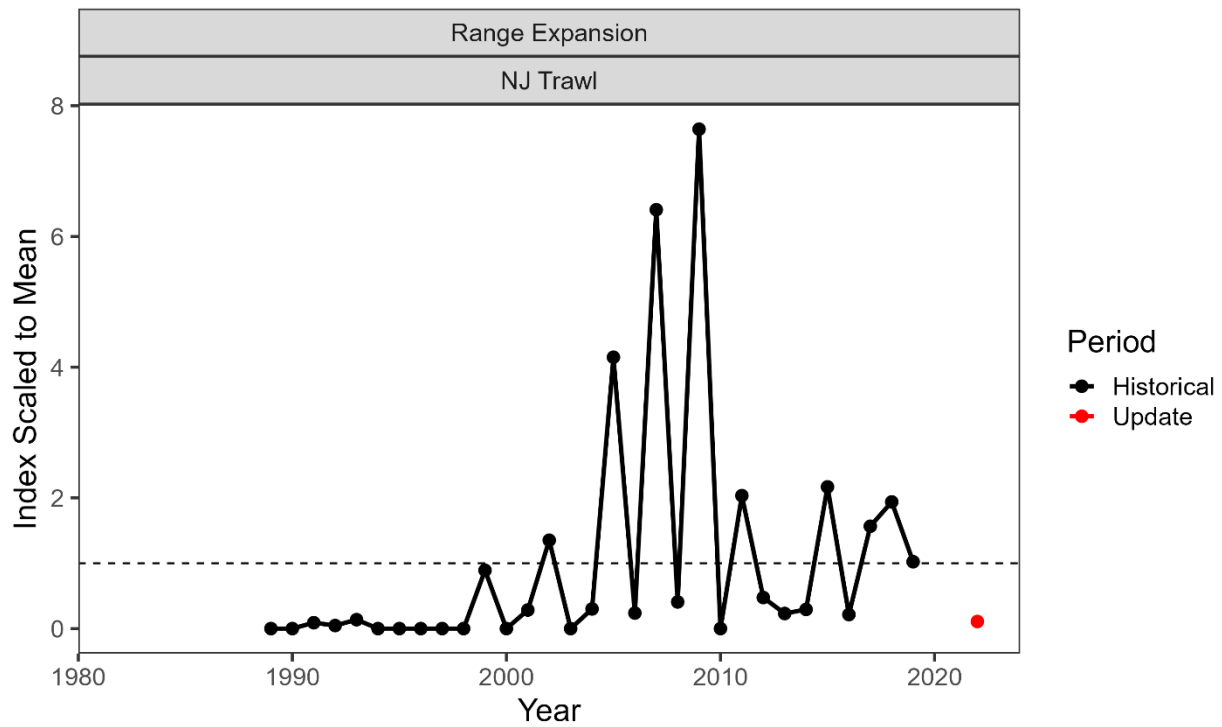


Figure 4. Range expansion indicator. The dashed line is the time series mean.

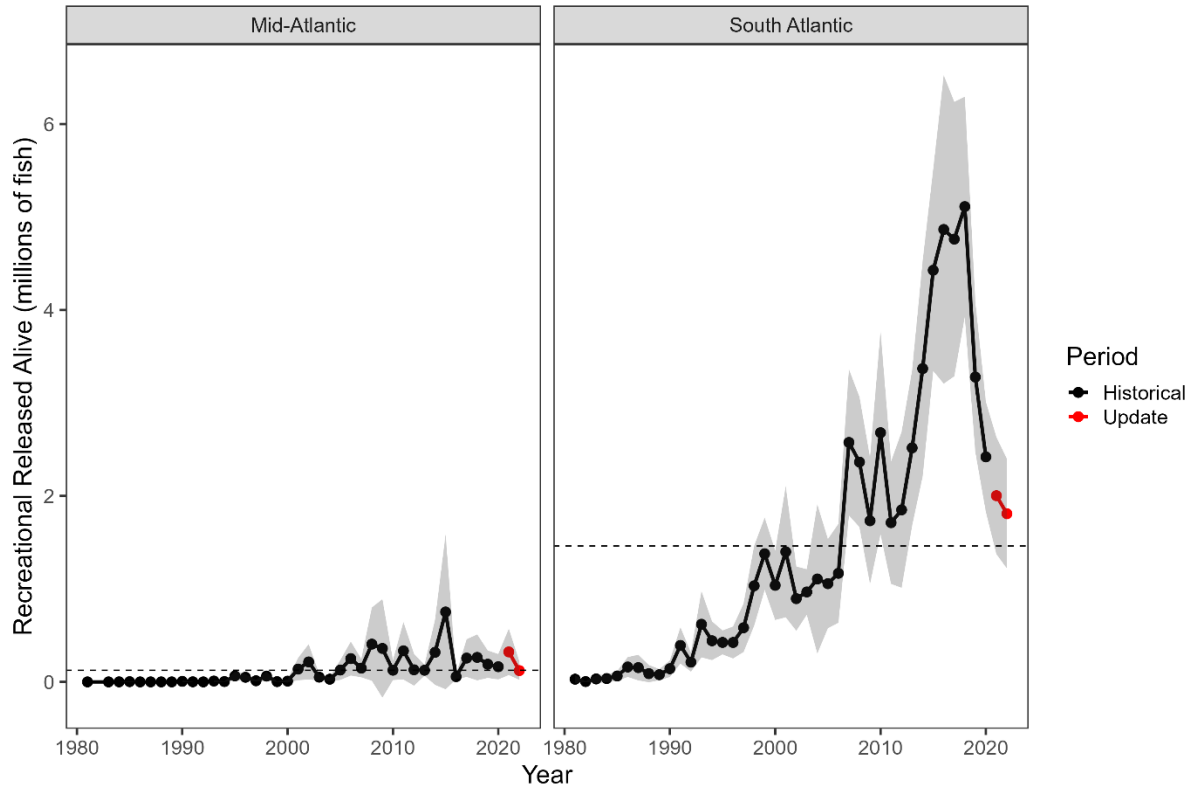


Figure 5. Recreational live release indicators. The dashed line is the time series mean.

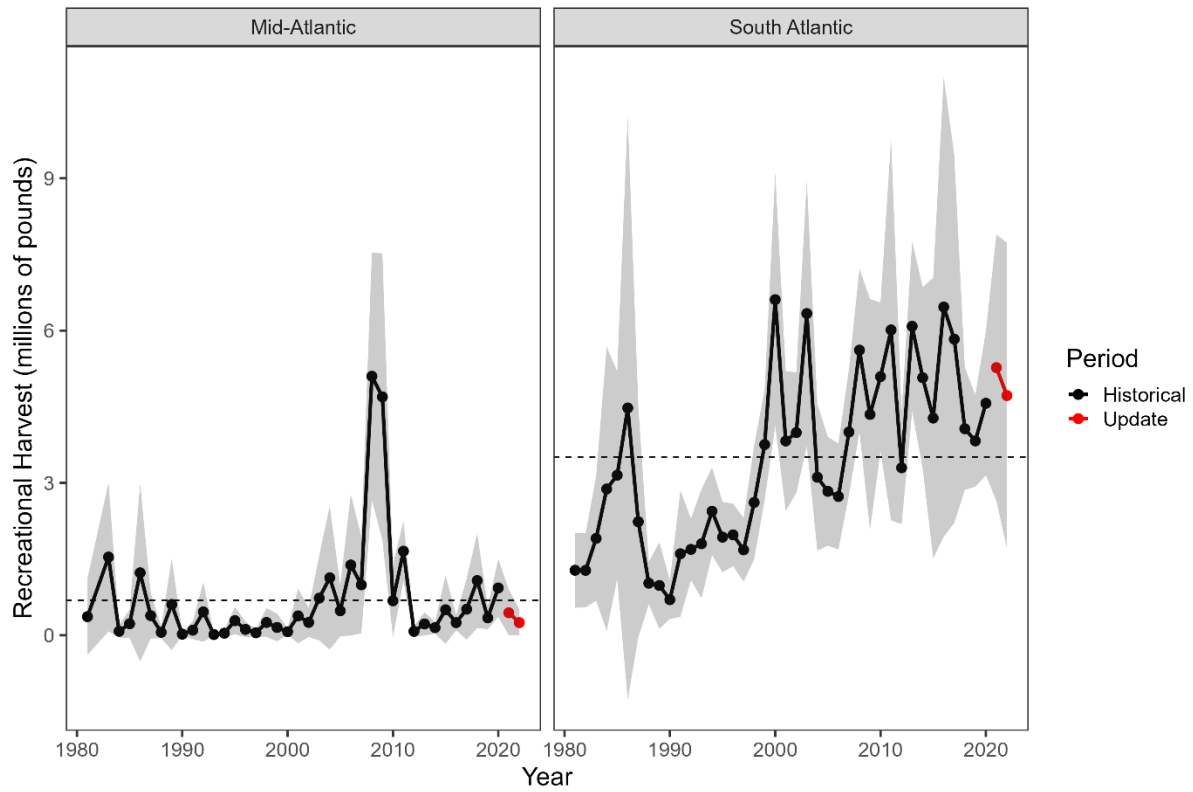


Figure 6. Recreational harvest indicators. The dashed line is the time series mean.

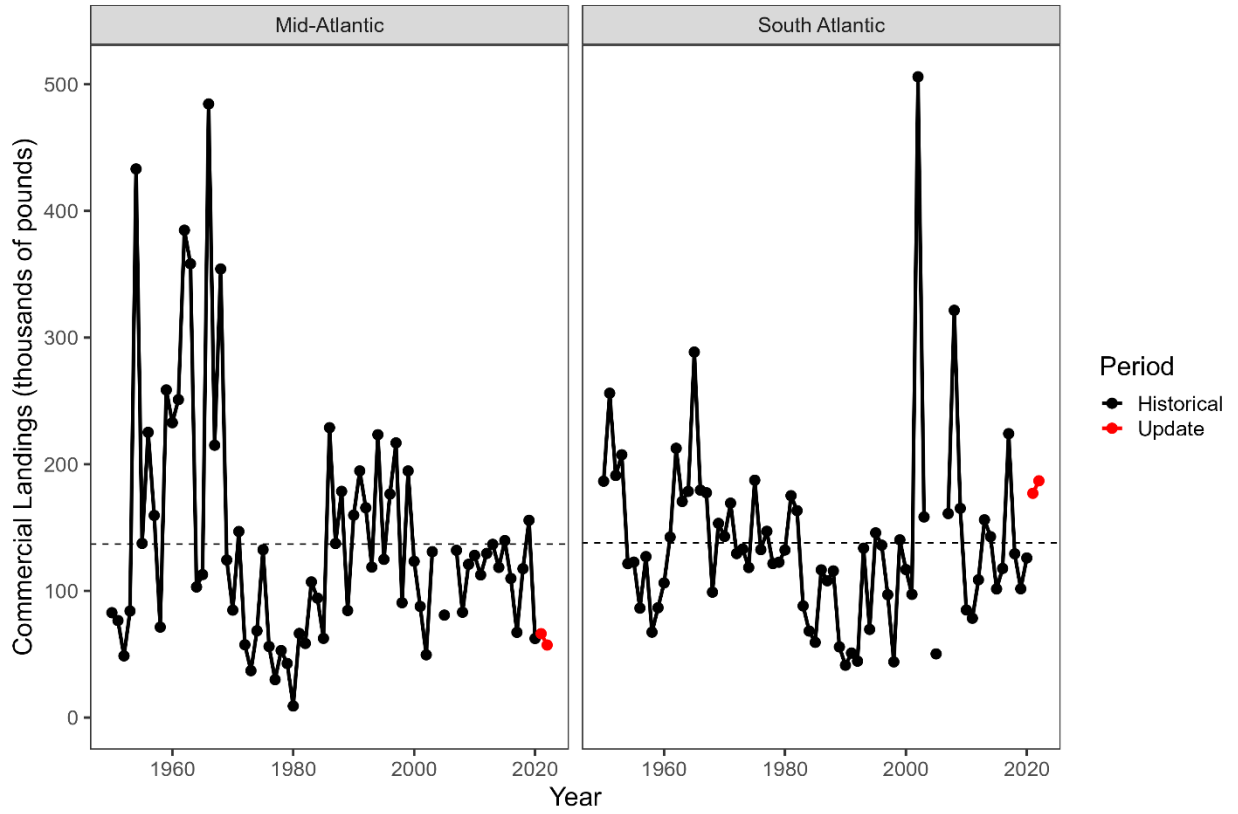


Figure 7. Commercial landings indicators. The dashed line is the time series mean.

DRAFT FOR BOARD REVIEW

ATLANTIC STATES MARINE FISHERIES COMMISSION REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR ATLANTIC CROAKER
(Micropogonias undulatus)

2022 FISHING YEAR



Prepared by the Plan Review Team
Drafted August 2023



Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	Original FMP – October 1987
<u>Amendments:</u>	Amendment 1 – November 2005 (implemented January 2006) Addendum I – March 2011 Addendum II – August 2014 Addendum III – February 2020
<u>Management Areas:</u>	The Atlantic coast distribution of the resource from New Jersey through Florida
<u>Active Boards/Committees:</u>	South Atlantic State/Federal Fisheries Management Board; Atlantic Croaker Technical Committee, Stock Assessment Subcommittee, and Plan Review Team; South Atlantic Species Advisory Panel

[The Fishery Management Plan \(FMP\) for Atlantic Croaker](#) was adopted in 1987 and included the states from Maryland through Florida (ASMFC 1987). In 2004, the South Atlantic State/Federal Fisheries Management Board (Board) found the recommendations in the FMP to be vague, and recommended that an amendment be prepared to define management measures necessary to achieve the goals of the FMP. The Interstate Fisheries Management Program Policy Board also adopted the finding that the original FMP did not contain any management measures that states were required to implement.

In 2002, the Board directed the Atlantic Croaker Technical Committee (TC) to conduct the first coastwide stock assessment of the species to prepare for developing an amendment. The Atlantic Croaker Stock Assessment Subcommittee developed a stock assessment in 2003, which was approved by a Southeast Data Assessment Review (SEDAR) panel for use in management in June 2004 (ASMFC 2005a). The Board quickly initiated development of an amendment and, in November 2005, approved [Amendment 1 to the Atlantic Croaker FMP](#) (ASMFC 2005b). The amendment was fully implemented by January 1, 2006.

The goal of Amendment 1 was to utilize interstate management to perpetuate the self-sustainable Atlantic croaker resource throughout its range and generate the greatest economic and social benefits from its commercial and recreational harvest and utilization over time. Amendment 1 contains four objectives:

- 1) Manage the fishing mortality rate for Atlantic croaker to provide adequate spawning potential to sustain long-term abundance of the Atlantic croaker population.
- 2) Manage the Atlantic croaker stock to maintain the spawning stock biomass above the target biomass levels and restrict fishing mortality to rates below the threshold.
- 3) Develop a management program for restoring and maintaining essential Atlantic croaker habitat.

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- 4) Develop research priorities that will further refine the Atlantic croaker management program to maximize the biological, social, and economic benefits derived from the Atlantic croaker population.

Amendment 1 expanded the management area to include the states from New Jersey through Florida. Consistent with the stock assessment completed in 2004, the amendment defined two Atlantic coast management regions: the south-Atlantic region, from Florida through South Carolina; and the mid-Atlantic region, from North Carolina through New Jersey.

Amendment 1 established biological reference points (BRPs) to define an overfished and overfishing stock status for the mid-Atlantic region only. Reliable stock estimates and BRPs for the South Atlantic region could not be developed during the 2004 stock assessment due to a lack of data. The BRPs were based on maximum sustainable yield (MSY), and included threshold and target levels of fishing mortality (F) and spawning stock biomass (SSB): F threshold = F_{MSY} (estimated to be 0.39); F target = $0.75 \times F_{MSY}$ (estimated to be 0.29); SSB threshold = $0.7 \times SSB_{MSY}$ (estimated to be 44.65 million pounds); and SSB target = SSB_{MSY} (estimated to be 63.78 million pounds). An SSB estimate below the SSB threshold resulted in an overfished status determination, and an F estimate above the F threshold resulted in an overfishing status determination. The Amendment established that the Board would take action, including a stock rebuilding schedule if necessary, should the BRPs indicate the stock is overfished or overfishing is occurring.

Amendment 1 did not require any specific measures restricting recreational or commercial harvest of Atlantic croaker. States that already had more conservative measures were encouraged to maintain those regulations (Table 1). The Board was able to revise Amendment 1 through adaptive management, including any regulatory and/or monitoring requirements in subsequent addenda, along with procedures for implementing alternative management programs via conservation equivalency.

The Board initiated [Addendum I to Amendment I](#) at its August 2010 meeting, following the updated stock assessment, in order to address the proposed reference points and management unit. The stock assessment evaluated the stock as a coastwide unit, rather than the two management units established within Amendment I. In approving Addendum I, the Board endorsed consolidating the stock into one management unit, as proposed by the stock assessment. In addition, Addendum I established a procedure, similar to other species, by which the Board may approve peer-reviewed BRPs without a full administrative process, such as an amendment or addendum.

In August 2014, the Board approved [Addendum II to the Atlantic Croaker FMP](#). The Addendum established the Traffic Light Approach (TLA) as the new precautionary management framework to evaluate fishery trends and develop management actions. The TLA was originally developed as a management tool for data poor fisheries. The name comes from assigning a color (red, yellow, or green) to categorize relative levels of population indicators. When a population characteristic improves, the proportion of green in the given year increases. Harvest and abundance thresholds of 30% and 60% were established in Addendum II, representing

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moderate and significant concern for the fishery. If thresholds for both population characteristics achieve or exceed a threshold for a three year period, then management action is enacted.

The TLA framework replaces the management triggers stipulated in Addendum I, which dictated that action should be taken if recreational and commercial landings dropped below 70% of the previous two-year average. Those triggers were limited in their ability to illustrate long-term declines or increases in stock abundance. In contrast, the TLA approach is capable of better illustrating trends in the fishery through changes in the proportion of green, yellow, and red coloring. A 2018 TC report recommended several updates to the current TLA approach (ASMFC 2018). The Board initiated an Addendum III to incorporate these updates.

In February 2020 the Board approved [Addendum III to Amendment 1](#) of the Atlantic Croaker FMP. This addendum adjusted the TLA to incorporate additional fishery-independent indices, age information, use of regional characteristics, and changes to the management triggering mechanisms. Management triggers and responses include bag limits for the recreational fishery and percentage harvest reductions from a 10-year average for the commercial fishery. The response will be defined by which percent threshold (30% or 60%) that was exceeded in any of the 3 out of 4 terminal years.

Addendum III did not add or change any management measures or requirements, unless management-triggering mechanisms are tripped. The only pre-existing requirement is for states to submit an annual compliance report by July 1st of each year that contains commercial and recreational landings as well as results from any monitoring programs that intercept Atlantic croaker.

II. Status of the Stock

The most recent stock assessment, conducted in 2017, was not recommended for management use upon peer review. Therefore, current stock status is unknown. The Peer Review Panel did not indicate problems in the Atlantic croaker fishery that would require immediate management action but did recommend continued evaluation of the fishery using the annual TLA.

The conclusions of the 2010 stock assessment (ASMFC 2010), which is the most recent assessment that was recommended by peer review for management use, were that Atlantic croaker was not experiencing overfishing and biomass had increased and fishing mortality decreased since the late 1980s. The 2010 assessment was unable to confidently determine stock status, particularly with regards to biomass, due to an inability to adequately estimate removals from discards of the South Atlantic shrimp trawl fishery. Improvements on estimation of these discards were made in the 2017 assessment, allowing the potential for shrimp trawl discards to be included as supplemental information with the annual TLA. Annual monitoring of shrimp trawl fishery discards is important because these discards represent a considerable proportion of Atlantic croaker removals, ranging from 7% to 78% annually during 1988-2008, according to the 2010 assessment (ASMFC 2010).

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One of the primary reasons that the 2017 stock assessment did not pass peer review was due to conflicting signals in harvest and abundance metrics. Theoretically, increases in adult abundance should result in more fish available to be caught by the fishery; thus, fishing would be more efficient (greater catch per unit effort) and harvest would increase in a pattern similar to adult abundance. However, several recent abundance indices have shown increases while harvest has declined to some of the lowest levels on record. One factor thought to contribute to overestimates of adult abundance is an increase in the number of juveniles misclassified as adults in surveys that historically have typically caught adults.

In response, the Atlantic Croaker TC recommended several changes to the annual TLA through [Addendum III](#). The addendum added indices from the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAAP) and the South Carolina Department of Natural Resources (SCDNR) Trammel Net Survey into the adult composite characteristic index. In addition, all surveys used revised adult abundance indices and now have an established reference period of 2002-2012. Regional metrics were also used to characterize the fisheries north and south of the Virginia-North Carolina state line. The ChesMMAAP and the Northeast Fisheries Science Center (NEFSC) surveys will be used to characterize abundance north of the state line, and SCDNR Trammel Net and Southeast Area Monitoring and Assessment Program (SEAMAP) surveys will be used to characterize abundance south of the state line.

III. Status of the Fishery

Total Atlantic croaker harvest (recreational and commercial) from New Jersey through the east coast of Florida in 2022 is estimated at 2.8 million pounds (Tables 2 and 3, Figure 1). This represents an 8% decrease in total harvest from 2021 (3.0 million pounds). The commercial and recreational fisheries harvested 25% and 75% of the 2022 total, respectively, which was similar to 2020 and 2021 when the recreational fishery also harvested a majority (84% and 68%, respectively) of the total Atlantic croaker harvest. This represents a large shift from the previous 10-year average split of recreational and commercial harvest, of 52% and 48%, respectively, from 2010 to 2019.

Atlantic coast commercial landings of Atlantic croaker exhibit a cyclical pattern, with low harvests in the 1960s to early 1970s and the 1980s to early 1990s, and high harvests in the mid-to-late 1970s and the mid-1990s to early 2000s (Figure 1). Commercial landings increased from a low of 3.7 million pounds in 1991 to 28.6 million pounds in 2001; however, landings have had a declining trend since then, from 47 million pounds in 2003 to 684,464 pounds in 2022, the lowest of the time series (1950-2022). Within the management unit, the majority of 2022 commercial landings came from North Carolina (52%), Virginia (28%), and Florida (17%).

From 1981-2022, recreational landings of Atlantic croaker from New Jersey through Florida have varied by count between 5.1 million fish in 2022 and 36.2 million fish in 1986 and by weight between 1.8 million pounds in 2019 and 18.9 million pounds in 2003 (Tables 4 and 5, Figure 2). Landings generally increased from 1990 until 2003, after which they showed a declining trend through 2022. The 2022 landings are estimated at 5.1 million fish and 2.1

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million pounds, similar to 2021's landings of 5.2 million fish and 2.0 million pounds. Virginia was responsible for 38% of the 2022 recreational landings, in numbers of fish, followed by North Carolina (21%) and Florida (18%).

The number of recreational releases generally increased over the time series until 2013 when releases steadily declined until reaching a low of 18.1 million fish released in 2018 (Table 5 and Figure 2). From 2018 through 2022, releases have overall been increasing again. In 2022, anglers released 30.5 million fish, an increase from the 27.4 million fish released in 2021. Anglers also released a greater percentage of the total recreational catch in 2022, compared to 2021. An estimated 85.5% of the total recreational croaker catch was released in 2022, the highest percentage on record for a second year in a row, compared to 84% in 2021 (Figure 2). The percentage of released recreational catch has shown an increasing trend from the 1990s through 2022.

IV. Status of Assessment Advice

A statistical catch-at-age (SCA) model was used in the 2010 Atlantic croaker stock assessment (ASMFC 2010). This model combines catch-at-age data from the commercial and recreational fisheries with information from fishery-independent surveys and biological information such as growth rates and natural mortality rates to estimate the size of each age class and the exploitation rate of the population. The assessment was peer reviewed by a panel of experts in conjunction with the Southeast Data, Assessment, and Review (SEDAR) process.

The benchmark stock assessment conducted in 2017 was not recommended for management use due to uncertainty in biomass estimates resulting from conflicting signals among abundance indices and catch time series as well as sensitivity of model results to assumptions and model inputs. Specifically, model-estimated values of stock size, fishing mortality, and biological reference points are too uncertain for use; however, the trends in model-estimated parameters and ratio-based fishing F reference points are considered reliable. Currently, a Traffic Light Approach (TLA) is used to monitor the stock and make management decisions in lieu of an approved stock assessment. The TLAs can be found [here](#). A benchmark stock assessment for Atlantic croaker is currently underway and is scheduled to be complete Fall 2024.

V. Status of Research and Monitoring

There are no research or monitoring programs required of the states except for the submission of an annual compliance report. New Jersey, Delaware, Maryland, Potomac River Fisheries Commission (PRFC), Virginia, North Carolina, South Carolina, and Georgia conduct fishery-dependent (other than catch and effort data) monitoring programs. All states and jurisdictions conduct fishery-independent monitoring programs along the Atlantic coast from New Jersey to Florida.

The NEFSC performs a randomly stratified groundfish survey from Cape Hatteras, North Carolina to Maine. Atlantic croaker are one of the main species caught throughout much of the

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survey area and, since the surveys started in 1972, it provides a long term data set. Since 1994, there has been an increase in annual catch variability. The NEFSC survey was not carried out in 2020 due to the COVID-19 pandemic, but was active again in 2021.

VI. Status of Management Measures and Issues

Fishery Management Plan

Amendment 1 was fully implemented by January 1, 2006, and provided the management plan for the 2009 fishing year. There are no interstate regulatory requirements for Atlantic croaker. Should regulatory requirements be implemented in the future, all state programs must include law enforcement capabilities adequate for successfully implementing the regulations.

Addendum I to Amendment 1 was initiated in August 2010 and approved in March 2011, in order to 1) revise the biological reference points to be ratio-based, and 2) remove the distinction of two regions within the management unit, based on the results of the 2010 stock assessment. Addendum II was approved August 2014 and established the TLA management framework for Atlantic croaker in order to better illustrate long-term trends in the fishery. Addendum III was approved February 2020 and adjusted management through the TLA by incorporating additional fishery-independent indices, age information, use of regional characteristics, and changes to the management-triggering mechanisms.

Traffic Light Approach

The Traffic Light Analysis was not conducted in 2023 so the TC could focus on working on the 2024 benchmark stock assessment. A summary of last year's TLA can be found in last year's FMP Review [here](#), or in the report [here](#).

De Minimis Requests

States are permitted to request *de minimis* status if, for the preceding three years for which data are available, their average commercial landings or recreational landings (by weight) constitute less than 1% of the coastwide commercial or recreational landings for the same three-year period. A state may qualify for *de minimis* in either its recreational or commercial sector, or both, but will only qualify for exemptions in the sector(s) that it qualifies for as *de minimis*. Amendment 1 does not include any compliance requirements other than annual state reporting, which is still required of *de minimis* states. Addendum III, depending on the level of management action triggered, has exemptions for *de minimis* states when measures are triggered at the 30% level (see above for the TLA description). If the TLA triggers at the 60% level, then all states, including *de minimis*, must implement management measures.

In the annual compliance reports, the following states requested *de minimis* status: New Jersey (commercial and recreational fisheries), Delaware (recreational and commercial fisheries), South Carolina (commercial fishery), and Georgia (commercial fishery). The commercial and recreational *de minimis* criteria for 2022 are based on 1% of the average coastwide 2020-2022 landings in each fishery. New Jersey, Delaware, South Carolina, and Georgia commercial fisheries all qualify for *de minimis* status, but landings are confidential. New Jersey and

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Delaware recreational fisheries both qualify for *de minimis* status, as the 3-year average of recreational landings for both states constitute less than 1% of the coastwide recreational landings.

Changes to State Regulations

In 2020, the TLA triggered management measures at the 30% level, or moderate concern. Non *de minimis* states were required to implement management measures that instituted a 50 fish recreational bag limit and reduce the commercial harvest by 1% of the average state commercial harvest from the previous 10 years. If the state had more restrictive measures in place, they did not need to make any changes. All proposed management changes were reviewed by the Technical Committee and approved by the Board. Below is a list of states that who implemented measures in 2021:

- Virginia: 50 fish bag limit, charter allowance, and commercial fishery season closure from January 1 to January 15. Approved on March 23, 2021.
- North Carolina: 50 fish bag limit and a commercial fishery season closure from December 16 to December 31. Proclamation authority published on April 15, 2021.
- Florida: 50 fish bag limit and a commercial vessel limit of 1,200 pounds in state waters. Rule published December 1, 2021.

The Potomac River Fisheries Commission implemented a season closure for the Atlantic croaker commercial fishery from September 30 to December 31. It was approved on December 2, 2021.

Atlantic Croaker Habitat

In 2017, the ASMFC Habitat Committee released *Atlantic Sciaenid Habitats: A Review of Utilization, Threats, and Recommendations for Conservation, Management, and Research*, which outlines the habitat needs of Atlantic croaker at different life stages (egg, larval, juvenile, adult). This report also highlights threats and uncertainties facing these ecological areas and identifies Habitat Areas of Particular Concern. It can be found online at:

http://www.asmfc.org/files/Habitat/HMS14_AtlanticSciaenidHabitats_Winter2017.pdf.

Bycatch Reduction

Atlantic croaker are subject to both direct and indirect fishing mortality. Historically, Atlantic croaker ranked as one of the most abundant bycatch species of the South Atlantic shrimp trawl fishery, resulting in the original FMP's recommendation that bycatch reduction devices (BRDs) be developed and required in the shrimp trawl fishery. Since then, the states of North Carolina through Florida have all enacted requirements for the use of BRDs in shrimp trawl nets in state waters, reducing croaker bycatch from this fishery (ASMFC 2010). However, bycatch and discard monitoring from the shrimp trawl fishery have historically been inadequate, resulting in a major source of uncertainty for assessing this stock, as well as other important Mid- and South Atlantic species. Most of the discarded croaker are age-0 and thus likely have not yet reached maturity (ASMFC 2010). The North Carolina Division of Marine Fisheries conducted a two-year study, published in 2015, to collect bycatch data from state shrimp trawlers. It found that Atlantic croaker represent between 34-49% of the total observed finfish bycatch by weight in estuarine waters and between 20-42% in ocean waters. The at-net mortality for Atlantic

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croaker was found to be 23% (Brown 2015). These data will be valuable for incorporating estimates of removals in future stock assessments.

Developed during the 2017 benchmark assessment, discard estimates of Atlantic croaker in the South Atlantic Shrimp Trawl Fishery are informed by catch rates observed during the SEAMAP survey and South Atlantic Shrimp Trawl Fishery Observer Program, and total effort of the South Atlantic Shrimp Trawl Fishery. Increases in discards could be an indicator of higher abundance of juveniles in the region, an increase in effort by the fishery, or a combination of both. Discard estimates of Atlantic croaker in the South Atlantic Shrimp Trawl Fishery were not calculated in 2023, so the TC could focus on working on the 2024 benchmark stock assessment. A summary of last year's analysis can be found in the [FMP Review](#) for fishing year 2021. For additional information on the South Atlantic Shrimp Trawl Fishery discard estimation, see Appendix 1 of the [2020 TLA Update Report](#).

Atlantic croaker are also discarded from other commercial fishing gears, primarily due to market pressures and few restrictions on croaker harvest at the state level. The National Oceanic and Atmospheric Administration (NOAA) Fisheries Pelagic Observer Program provides data to estimate these discards for use in assessments; however, the time series is limited and only discards from gill nets and otter trawls could be estimated for the 2010 assessment based on the available data. Since 1988, estimated discards have fluctuated between 94 and 15,176 mt without trend, averaging 2,503 mt (ASMFC 2010).

Atlantic croaker are also a major component of the scrap/bait fishery. Landings from this fishery are not reported at the species level, except in North Carolina, which has a continuous program in place to sample these landings and enable estimation of croaker scrap landings for use in the stock assessment. As part of the 2010 stock assessment, North Carolina estimated the scrap/bait landings, which have declined in recent years, from a high of 1,569 mt in 1989 to a low of 84 mt in 2008, primarily due to restrictions placed on fisheries producing the highest scrap/bait landings (ASMFC 2010). Regulations instituted by North Carolina include a ban on flynet fishing south of Cape Hatteras, incidental finfish limits for shrimp and crab trawls in inside waters, minimum mesh size restrictions in trawls, and culling panels in long haul seines.

South Carolina began a state monitoring program to account for bait landings in 2015. The state initiated a bait harvester trip ticket program for all commercial bait harvesters licensed in South Carolina. The impetus for this program is to track bait usage of small sciaenid species (croaker, spot, and whiting) as well as other important bait species.

Several states have implemented other commercial gear requirements that further reduce bycatch and bycatch mortality, while others continue to encourage the use of the BRD devices. NOAA Fisheries published a final rule with an effective date of April 1, 2021 requiring all skimmer trawls greater than 40 feet in length to use TEDs. For all other vessels, the net must be emptied of catch on the deck within a specified time (84 FR 70048). Continuing to reduce the quantity of sub-adult croaker harvested should increase spawning stock biomass and yield per recruit.

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Atlantic croaker are also subject to recreational discarding. The percentage of Atlantic croaker released alive by recreational anglers has generally increased over time. Discard mortality was estimated to be 10% for the 2010 stock assessment (ASMFC 2010). The use of circle hooks and appropriate handling techniques can help reduce mortality of released fish.

VII. Implementation of FMP Compliance Requirements for 2022

The PRT found no inconsistencies among states with regard to the requirements of Amendment 1 and Addendum III.

VIII. Recommendations

Management and Regulatory Recommendations

- Consider approval of the *de minimis* requests from New Jersey, Delaware, South Carolina, and Georgia for their commercial fisheries.
- Consider approval of the *de minimis* requests from New Jersey and Delaware for their recreational fisheries.
- Research into the impacts of climate change on the range of the species.
- Research into Atlantic croaker juvenile discard mortality for recreational and commercial fisheries by each gear type in regions where removals are highest.

Research and Monitoring Recommendations

Additional research and monitoring recommendations can be found in the 2016 Atlantic Croaker Stock Assessment Peer Review Report [here](#) under Term of Reference 8.

IX. References

- Atlantic States Marine Fisheries Commission (ASMFC). 1987. Fishery Management Plan for Atlantic Croaker. Washington (DC): ASMFC. Fishery Management Report No. 10. 90 p.
- ASMFC. 2005a. Atlantic Croaker Stock Assessment & Peer Review Reports. Washington (DC): ASMFC. 370 p.
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- ASMFC. 2010. Atlantic Croaker 2010 Benchmark Stock Assessment. Washington (DC): ASMFC. 366 p.
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- Brown, K. 2015. Characterization of the commercial shrimp otter trawl fishery in the estuarine and ocean (0-3 miles) waters of North Carolina. Morehead City (NC): NCDEQ, Division of Marine Fisheries. Abstract.

X. Figures

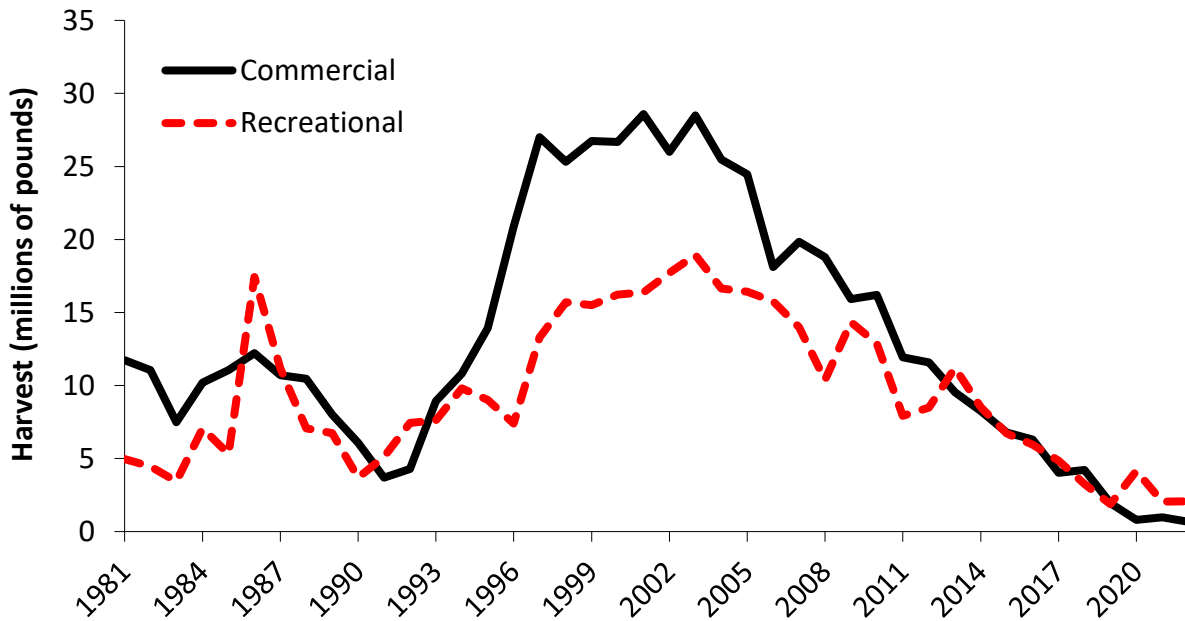


Figure 1. Atlantic croaker commercial and recreational landings (millions of pounds) from 1981-2022. (See Tables 2 and 3 for source information. Commercial landings estimates for 2022 is preliminary. Reliable recreational landings estimates are not available prior to 1981. Recreational landings estimates are based on the mail-based Fishing Effort Survey.)

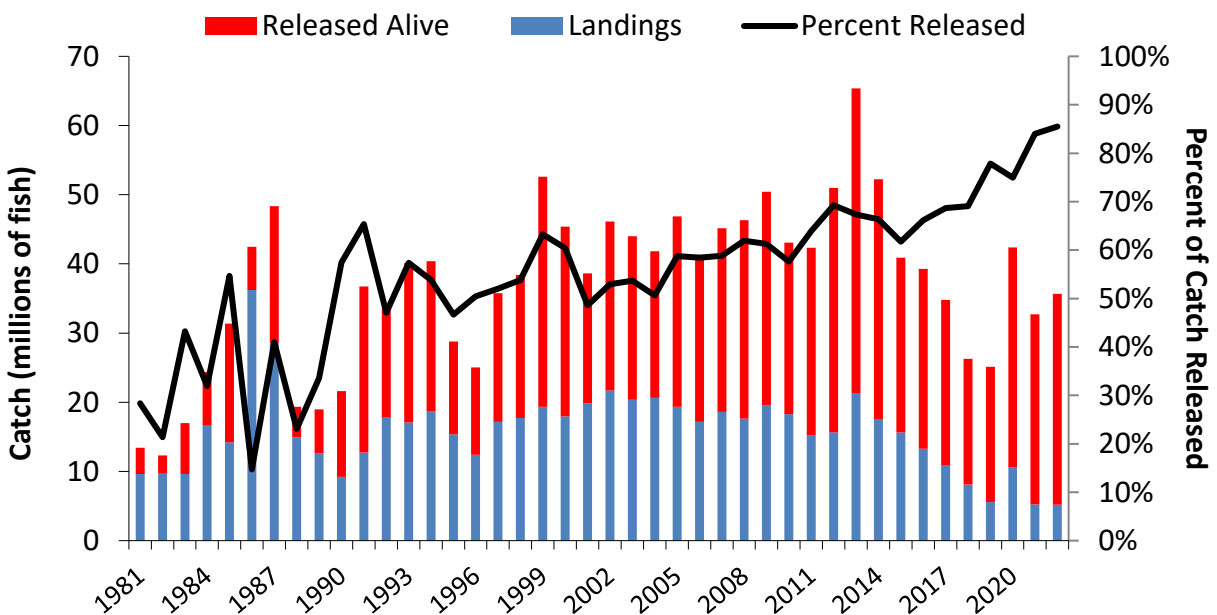


Figure 2. Recreational catch (landings and alive releases, in millions of fish) and the percent of catch that is released, 1981-2022, based on the mail-based Fishing Effort Survey calibration. (See Tables 4 and 5 for values and source information.)

**XI.
Tables**

Table 1. Summary of state regulations for Atlantic croaker in 2022.

State	Recreational	Commercial
NJ	None	Otter/beam trawl mesh restriction for directed croaker harvest (>100 lbs in possession)
DE	8" minimum; recreational gill nets (up to 200 ft.) with license	8" minimum
MD	9" min, 25 fish/day, charter boat logbooks	9" minimum; open 3/16 to 12/31
PRFC	9" min, 25 fish/day	Open 1/1 to 9/30 (effective 1/1/22) Pound net season: 2/15 to 12/15
VA	50 fish/day, with additional charter live bait allowance (effective 3/23/21)	Open 1/15 to 12/31 (effective 3/23/21)
NC	50 fish/day (effective 4/15/21), recreational use of commercial gears with license and gear restrictions	Open 1/1 to 12/15 (effective 4/15/21)
SC	Mandatory for-hire logbooks, small Sciaenidae species aggregate bag limit of 50 fish/day	None
GA	25 fish/day	25 fish/day limit except for trawlers harvesting shrimp for human consumption (no limit)
FL	50 fish/day (effective 12/1/21)	1,200 commercial vessel limit (effective 12/1/21)

* A commercial fishing license is required to sell croaker in all states with fisheries. For all states, general gear restrictions affect commercial croaker harvest.

Table 2. Commercial harvest (pounds) of Atlantic croaker by state, 2013-2022.

(Estimates for 2022 are preliminary. Sources: 2023 state compliance reports for 2022 fishing year and for years prior to 2022, personal communication with ACCSP, except PRFC [compliance reports only].) Note that Georgia does not have a commercial fishery for Atlantic croaker.

Year	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
2013	C	C	820,777	130,285	6,237,602	1,927,938	C		76,463	9,538,901
2014	265,166	C	443,661	177,777	4,697,381	2,629,908	C		45,587	C
2015	C	C	294,038	118,996	4,426,957	1,819,007	C		39,096	6,784,146
2016	C	C	101,949	168,889	3,825,737	2,092,287	C		57,538	6,302,799
2017	C	C	42,958	114,319	2,822,005	1,008,015	C		43,033	4,032,993
2018	C	C	44,306	16,561	2,450,984	1,643,646	C		54,409	4,210,715
2019	C	463	2,865	C	595,434	1,278,340	C		68,179	1,945,723
2020	C	C	1,857	601	147,026	570,453	C		84,906	806,781
2021	C	C	4,584	11,430	287,898	540,622	C		124,642	972,121
2022	C	773	3,944	C	193,161	357,312	C		117,958	684,464

C: Confidential data

Table 3. Recreational harvest (pounds) of Atlantic croaker by state, 2013-2022. (Sources: 2023 state compliance reports for 2022 fishing year and for years prior to 2022, personal communication with MRIP)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013	1,637,516	253,447	1,581,384	6,442,166	453,881	84,248	89,781	642,887	11,200,818
2014	750,580	427,615	1,265,217	4,354,046	758,751	104,434	138,423	712,090	8,511,554
2015	263,749	189,320	871,596	3,514,410	557,735	181,909	248,431	881,185	6,708,335
2016	7,133	10,959	407,010	2,998,022	443,728	81,896	116,313	1,893,203	5,958,264
2017	0	26,441	238,659	3,383,057	237,160	310,621	100,565	555,389	4,851,892
2018	34,125	5,859	191,854	2,245,518	164,644	81,251	83,258	445,663	3,252,172
2019	973	23,973	38,895	995,491	224,337	133,227	97,791	358,941	1,873,628
2020	16,358	21,870	91,047	2,410,612	223,685	230,205	77,876	1,072,714	4,144,367
2021	7,079	35,746	69,744	823,319	376,121	173,526	95,031	461,048	2,041,614
2022	33,048	22,483	21,043	554,254	481,721	240,275	152,231	577,555	2,082,610

Table 4. Recreational harvest (numbers) of Atlantic croaker by state, 2013-2022. (Sources: 2023 state compliance reports for 2022 fishing year and for years prior to 2022, personal communication with MRIP)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013	2,707,410	530,236	2,308,987	12,517,286	1,300,804	336,140	264,984	1,332,465	21,328,324
2014	852,733	806,256	2,197,125	9,533,829	1,935,961	600,482	289,781	1,359,207	17,576,096
2015	339,021	334,676	1,738,576	8,024,381	1,437,019	555,263	790,014	2,429,723	15,648,673
2016	8,236	24,546	659,318	7,276,719	1,109,570	268,470	402,254	3,553,777	13,302,890
2017	0	65,606	423,790	7,644,516	666,930	765,227	371,301	969,146	10,906,516
2018	104,321	12,370	305,469	5,472,329	472,917	335,833	241,382	1,176,999	8,121,620
2019	3,031	53,048	69,771	3,055,510	651,268	593,475	332,073	801,751	5,559,927
2020	58,097	54,193	244,788	6,529,494	673,377	827,904	232,535	2,010,168	10,630,556
2021	22,722	71,237	174,056	1,862,543	1,066,533	707,924	371,257	952,581	5,228,853
2022	91,584	64,397	55,408	1,969,042	1,110,382	545,062	394,967	942,037	5,172,879

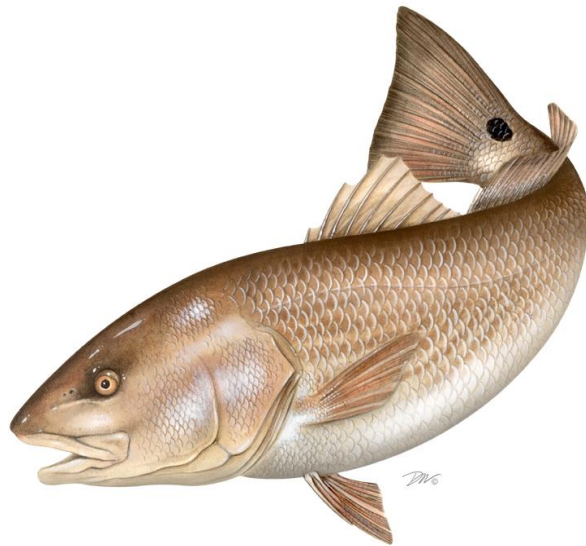
Table 5. Recreational releases (number) of Atlantic croaker by state, 2013-2022. (Sources: 2023 state compliance reports for 2022 fishing year and for years prior to 2022, personal communication with MRIP)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013	2,980,744	1,811,661	7,557,223	18,480,099	6,729,556	3,754,143	1,361,943	1,265,571	44,025,744
2014	703,031	1,396,970	2,806,693	10,314,405	10,347,332	4,742,718	2,057,898	2,265,961	34,635,008
2015	240,840	309,389	1,236,293	6,815,343	9,632,560	3,236,774	1,320,939	2,451,253	25,243,391
2016	139,085	390,655	726,662	6,993,470	7,254,382	5,233,835	1,178,630	4,073,001	25,989,720
2017	152,540	230,455	2,829,255	8,464,305	4,631,445	4,755,853	1,059,539	1,770,846	23,894,238
2018	144,637	85,424	203,081	5,359,179	4,311,368	5,568,892	1,403,560	1,072,381	18,148,522
2019	33,333	101,523	1,243,785	6,642,685	3,634,211	3,768,288	1,893,287	2,259,705	19,576,817
2020	147,494	286,780	2,870,268	6,223,025	5,560,605	12,921,019	1,696,852	2,057,158	31,763,201
2021	116,606	353,743	1,909,466	4,306,221	9,539,047	8,207,074	1,687,801	1,363,075	27,483,033
2022	74,058	467,349	1,537,746	7,193,201	7,914,042	8,359,506	2,056,650	2,901,874	30,504,426

ATLANTIC STATES MARINE FISHERIES COMMISSION
REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR
RED DRUM
(Sciaenops ocellatus)

2022 FISHING YEAR



Prepared by the Plan Review Team
Drafted September 2023



Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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I. Status of the Fishery Management Plan

Date of FMP Approval: Original FMP – October 1984

Amendments & Addenda: Amendment 1 – October 1991
Amendment 2 – June 2002
Addendum 1 – August 2013

Management Areas: The Atlantic coast distribution of the resource from New Jersey through Florida
Northern: New Jersey through North Carolina
Southern: South Carolina through the east coast of Florida

Active Boards/Committees: Sciaenids Management Board, Red Drum Technical Committee, Stock Assessment Subcommittee, Plan Development Team, Plan Review Team, South Atlantic Species Advisory Panel

The Atlantic States Marine Fisheries Commission (ASMFC) adopted an [Interstate Fishery Management Plan \(FMP\) for Red Drum](#) in 1984. The original management unit included the states from Maryland to Florida. In 1988, the Interstate Fisheries Management Program (ISFMP) Policy Board requested all Atlantic coastal states from Maine to Florida implement the plan's recommended management regulations to prevent development of northern markets for southern fish. The states of New Jersey through Florida are now required to follow the FMP, while Maine through New York (including Pennsylvania) are encouraged to implement consistent provisions to protect the red drum spawning stock.

In 1990, the South Atlantic Fishery Management Council (Council) adopted an FMP for red drum that defined overfishing and optimum yield (OY) consistent with the Magnuson Fishery Conservation and Management Act of 1976. Adoption of this plan prohibited the harvest of red drum in the exclusive economic zone (EEZ), a moratorium that remains in effect today. Recognizing all harvest would take place in state waters, the Council FMP recommended states implement measures necessary to achieve the target level of at least 30% escapement.

Consequently, ASMFC initiated [Amendment 1](#) in 1991, which included the goal to attain optimum yield from the fishery over time. Optimum yield was defined as the amount of harvest that could be taken while maintaining the level of spawning stock biomass per recruit (SSBR) at or above 30% of the level which would result if fishing mortality was zero. However, a lack of information on adult stock status resulted in the use of a 30% escapement rate of sub-adult red drum to the off-shore adult spawning stock.

Substantial reductions in fishing mortality were necessary to achieve the escapement rate; however, the lack of data on the status of adult red drum along the Atlantic coast led to the adoption of a phase-in approach with a 10% SSBR goal. In 1991, states implemented or maintained harvest controls necessary to attain the goal.

As hoped, these management measures led to increased escapement rates of juvenile red drum. Escapement estimates for the northern region of New Jersey through North Carolina

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(18%) and the southern region of South Carolina through Florida (17%) were estimated to be above the 10% phase-in goal, yet still below the ultimate goal of 30% (Vaughan and Carmichael 2000). North Carolina, South Carolina, and Georgia implemented substantive changes to their regulations from 1998-2001 that further restricted harvest.

The Council adopted new definitions of OY and overfishing for red drum in 1998. Optimum yield was redefined as the harvest associated with a 40% static spawning potential ratio (sSPR), overfishing as an sSPR less than 30%, and an overfishing threshold as 10% sSPR. In 1999, the Council recommended management authority for red drum be transferred to the states through the Commission's Interstate Fishery Management Program (ISFMP) process. This was recommended, in part, due to the inability to accurately determine an overfished status, and therefore stock rebuilding targets and schedules, as required under the revised Sustainable Fisheries Act of 1996. The transfer necessitated the development of an amendment to the interstate FMP in order to include the provisions of the Atlantic Coastal Fisheries Cooperative Management Act.

ASMFC adopted [Amendment 2](#) to the Red Drum FMP in June 2002 (ASMFC 2002), which serves as the current management plan. The goal of Amendment 2 is to achieve and maintain the OY for the Atlantic coast red drum fishery as the amount of harvest that can be taken by U.S. fishermen while maintaining the sSPR at or above 40%. There are four plan objectives:

- Achieve and maintain an escapement rate sufficient to prevent recruitment failure and achieve an sSPR at or above 40%.
- Provide a flexible management system to address incompatibility and inconsistency among state and federal regulations which minimizes regulatory delay while retaining substantial ASMFC, Council, and public input into management decisions; and which can adapt to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups or by area.
- Promote cooperative collection of biological, economic, and sociological data required to effectively monitor and assess the status of the red drum resource and evaluate management efforts.
- Restore the age and size structure of the Atlantic coast red drum population.

The management area extends from New Jersey through the east coast of Florida, and is separated into a northern and southern region at the North Carolina/South Carolina border. The sSPR of 40% is considered a target; an sSPR below 30% (threshold level) results in an overfishing determination for red drum. Amendment 2 required all states within the management unit to implement appropriate recreational bag and size limit combinations needed to attain the target sSPR, and to maintain current, or implement more restrictive, commercial fishery regulations. All states were in compliance by January 1, 2003. See Table 1 for state commercial and recreational regulations in 2022.

Following the approval of Amendment 2 in 2002, the process to transfer management authority to ASMFC began, including an Environmental Assessment and public comment period. The final

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rule became effective November 5, 2008. It repeals the federal Atlantic Coast Red Drum Fishery Management Plan and transfers management authority of Atlantic red drum in the exclusive economic zone from the South Atlantic Fishery Management Council to the Atlantic States Marine Fisheries Commission.

The Board approved [Addendum I](#) to Amendment 2 in August 2013. The Addendum revised the habitat section of Amendment 2 to include current information on red drum spawning habitat and life-stages (egg, larval, juvenile, sub-adult, and adult). It also identified and described the distribution of key habitats and habitats of concern.

II. Status of the Stocks

The 2017 Red Drum Stock Assessment and Peer Review Report indicated overfishing was not occurring for either the northern or southern stock of red drum (ASMFC 2017). The assessment was unable to determine an overfished/not overfished status because population abundance could not be reliably estimated due to limited data for the older fish (ages 4+). A simulation assessment was recently completed, providing a roadmap for future red drum stock assessments through the ASMFC process, with a planned benchmark assessment to follow; all work will be completed by the end of 2024. Results of the 2017 assessment for both the Northern Region and Southern Region are given below.

Northern Region (NJ-NC)

Recruitment (age 1 abundance) has varied annually with a large peak occurring in 2012 (Figure 1). The trend in the three-year average sSPR indicates low sSPR early in the time series with increases during 1991 – 1997 and fluctuations thereafter (Figure 2). The average sSPR has been above the overfishing threshold ($F_{30\%}$) since 1994, and at or above the target ($F_{40\%}$) since 1996, except during one year (2002). Fishing pressure and mortality appear to be stabilized near the target fishing mortality. The average sSPR is also likely above the target benchmark.

Southern Region (SC-FL)

Recruitment (age 1 abundance) has fluctuated without apparent trend since 1991 (Figure 1). A high level of uncertainty exists around the three-year average sSPR estimates for the southern region. While the 3-year average sSPR estimate in 2013 was above both the target ($F_{40\%}$) and the overfishing threshold ($F_{30\%}$), indicating that overfishing is not occurring, the high level of uncertainty around this estimate indicates this conclusion should be considered with extreme caution (Figure 2).

NOTE: In 2018, the Marine Recreational Information Program (MRIP) transitioned from estimating effort using the Coastal Household Telephone Survey (CHTS) to the mail-based Fishing Effort Survey (FES). The 2017 stock assessment used CHTS data to estimate recreational harvest. However, as red drum is not managed by a quota and to accommodate the transition, recreational harvest estimates based on the FES data or calibration are shown in this report. Due to differing estimation methodologies, these harvest data should not be compared to reference points from the 2017 stock assessment.

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III. Status of the Fishery

Red drum landings from New Jersey through the east coast of Florida in 2022 are estimated at 5.8 million pounds (Tables 3 and 4; Figure 3). In 2022, 56% of the total landings came from the southern region where the fishery is exclusively recreational, and 44% from the northern region, similar to 2020 and 2021 when approximately 55% of the total landings came from the southern region and approximately 45% from the northern region (Figure 4). This shift is a significant change from the historic regional landings split (1981-2019), which averaged 76% from the southern region and 24% from the northern region.

Northern Region (NJ-NC)

Red drum landings in the northern region totaled 2.6 million pounds in 2022, a decrease of approximately 9% from the previous year (Tables 3 and 4). There was a decline in both commercial and recreational landings. Commercial landings totaled 192,496 pounds or 7% of the combined commercial and recreational harvest in the northern region, with 91% of commercial landings coming from North Carolina (Figure 5). This is a 12% decrease in commercial landings from 2021. In North Carolina, a daily commercial trip limit and an annual cap of 250,000 pounds with payback of any overage constrained the commercial harvest. Unique to this state, the red drum fishing year extends from September 1 to August 31. In 2008, the Board approved use of this fishing year to monitor the cap. During the 2021/2022 fishing year, North Carolina landed 216,528 pounds of the 250,000-pound annual landings cap.

Recreational landings in the northern region in 2022 were estimated to be 2.4 million pounds, a slight decrease from the previous year's estimates of recreational harvest at 2.6 million pounds (Table 4). North Carolina is estimated to have 1.6 million pounds of recreational landings, followed by Virginia with 0.8 million pounds. Virginia red drum recreational landings decreased by 14% from the previous year. The number of fish harvested in the recreational fishery was 500,242 fish, a decline of 13% from 2021 (Table 5). The number of fish released in the northern region, 2.9 million fish, declined by 23% from 2021, at 3.8 million fish (Figure 6). It is estimated that 8% of released fish die as a result of being caught, resulting in an estimated 236,128 dead discarded fish in 2022 (Table 6). Recreational removals from the fishery are thus estimated to be 736,370 fish in 2022 (Figure 6 and 7).

Southern Region (SC-FL)

The southern region had no commercial landings; Florida commercial harvest has been prohibited since January 1988. South Carolina and Georgia designated red drum as a gamefish, banning commercial harvest and sale since 1987 and 2013, respectively.

Recreational landings in the southern region in 2022 were estimated to be 3.3 million pounds, similar to the 2021 estimate of 3.4 million pounds (Table 4). Florida is estimated to have 1.6 million pounds of recreational landings, followed by Georgia with 1.1 million pounds, and South Carolina with 0.6 million pounds. Recreational landings declined in Florida by 35% and increased in Georgia by 113% and South Carolina by 32%. The number of fish harvested in the recreational fishery was 1.23 million fish, which was a slight increase from recreational harvest

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in 2021 (1.18 million fish; Table 4). The number of fish released in the southern region was 7.3 million fish, which was a slight decrease from 2021 when 7.4 million fish were released (Figure 6). It is estimated that 8% of released fish die as a result of being caught, resulting in an estimated 583,432 dead discarded fish in 2022 (Table 6). Recreational removals from the fishery are thus estimated to be 1.8 million fish in 2022 (Figure 6 & 7).

IV. Status of Assessment Advice

Current stock status information comes from the 2017 stock assessment (ASMFC 2017) completed by the ASMFC Red Drum Stock Assessment Subcommittee (SAS) and Technical Committee (TC), peer reviewed by an independent panel of experts through ASMFC's desk review process, and approved by the South Atlantic State-Federal Fisheries Management Board for use in management decisions. The approved base model from this assessment is a statistical catch-at-age model. Previous interstate management decisions were based on the last coastwide assessment, SEDAR 18 (SAFMC 2009), and prior to 2009, decisions were based on regional assessments conducted by Vaughan and Helser (1990), Vaughan (1992, 1993, 1996), and Vaughan and Carmichael (2000) that reflected the current stock structure, two stocks divided at the North Carolina-South Carolina border. Several states have also conducted state-specific assessments (e.g., Murphy and Munyandorero 2009; Takade and Paramore 2007 [update of Vaughan and Carmichael 2000]).

In 2017, a state-specific stock assessment was completed by South Carolina, which indicated the South Carolina population of red drum was experiencing overfishing (Murphy 2017). This assessment result prompted new state management regulations, which went into effect on July 1, 2018 (Table 1).

In 2020, Florida completed a stock assessment for red drum in Florida state waters, and found the Atlantic Coast red drum stock was not overfished and overfishing was not occurring (Addis 2020). The northeast region (Flagler through Nassau counties) exceeded the Commission's target escapement rate of 40%. The formally defined southeast region (Miami-Dade-Volusia counties) exceeded the escapement rate in the terminal year (2019), but does not meet the current escapement rate target. Overall, the state of Florida has an escapement rate higher than the Commission's goal of 40%.

At the Winter meeting of ASMFC in 2019, the Board reviewed a proposal from the SAS that recommended a population simulation model be developed to simulate the full red drum population. The simulated population would be used to test a variety of assessment modeling techniques to determine which model would be the most applicable for the next benchmark stock assessment. Due to the work and modeling expertise needed for the simulation assessment, the benchmark assessment was postponed until 2024. The Red Drum Simulation Assessment and Peer Review Report was accepted by the Board at their May 2022 meeting. The Peer Review Panel recommended the Stock Synthesis model should be used to assess the northern (from New Jersey – North Carolina) and southern (from South Carolina – Florida) red drum stocks, while the statistical catch-at-age model should not be used. The Panel also recommended using a traffic light approach to monitor changes in landings and stock

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abundance in between assessments. A new benchmark assessment for red drum is currently in progress and is scheduled to be complete in Fall 2024.

V. Status of Research and Monitoring

No monitoring or research programs are annually required of the states except for the submission of a compliance report. Fishery-dependent (other than catch and effort data) monitoring programs are conducted from Maryland to Florida, with biological and sportfish carcass recovery programs collecting age, length, and sex data. Virginia, North Carolina, and South Carolina also conduct sportfish tagging programs. Fishery-independent monitoring programs that directly target or may encounter red drum are conducted in New Jersey, Delaware, North Carolina, South Carolina, Georgia, and Florida. Data collected includes CPUE, biological data, YOY indices, and mark-recapture data. See Table 2 for details on the fishery independent indices and ongoing surveys.

VI. Status of Management Measures and Issues

Fishery Management Plan

Amendment 2 was fully implemented by January 1, 2003, providing the management requirements for 2022. Requirements include: recreational regulations designed to achieve at least 40% sSPR, a maximum size limit of 27 inches or less, and current or more stringent commercial regulations. States are also required to have in place law enforcement capabilities adequate to successfully implement their red drum regulations. In August 2013, the Board approved Addendum 1 to Amendment 2 of the Red Drum FMP. The Addendum revises the habitat section of Amendment 2 to include the most current information on red drum spawning habitat for each life stage (egg, larval, juvenile, sub-adult, and adult). It also identifies the distribution of key habitats and habitats of concern, including potential threats and bottlenecks.

Changes to State Regulations

In 2022, Florida adopted a more holistic approach to red drum management, to better capture regional differences in ecological and human factors and improve angler satisfaction. Each year, the FWC will evaluate the red drum stock in each region using set metrics, and results will be summarized in annual reviews. Regulations may be changed based on the results of these reviews. Based on the results of the 2022 review of red drum management metrics and subsequent stakeholder feedback, the Florida Fish and Wildlife Conservation Commission approved the following regulation changes for red drum in state waters, which went into effect on September 1, 2022¹:

- Northeast Region – Reduced the daily bag limit to 1 fish per person per day and reduced the vessel limit to 4 fish.
- Indian River Lagoon Region – Catch-and-release only until metrics improve.
- Southeast Region – Maintained a daily bag limit of 1 fish per person per day and reduced the vessel limit to 2 fish.

¹ Regulation changes are only provided for Florida regions on the Atlantic Coast in this document. For a complete list of red drum regulation changes implemented on September 1, 2022 in Florida state waters and a map of the regions, please refer to: <https://myfwc.com/fishing/saltwater/recreational/red-drum/>.

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De Minimis Requests

New Jersey and Delaware requested *de minimis* status through the annual reporting process. While Amendment 2 does not include a specific method to determine whether a state qualifies for *de minimis*, the PRT chose to evaluate an individual state's contribution to the fishery by comparing the two-year average of total landings of the state to that of the management unit. New Jersey and Delaware each harvested zero percent of the two-year average of total landings. *De minimis* status does not exempt either state from any requirement; it may exempt them from future management measures implemented through addenda to Amendment 2, as determined by the Board.

VII. Implementation of FMP Compliance Requirements for 2022

The PRT found no inconsistencies between state compliance reports and the requirements of Amendment 2.

VIII. Recommendations of the Plan Review Team

Management and Regulatory Recommendations

Consider approval of the *de minimis* requests by New Jersey and Delaware.

Research Recommendations

Additional research recommendations can be found in the most recent stock assessment found [here](#) and the 2022 Simulation Assessment and peer review report [here](#). The PRT had the additional research recommendations:

- Implement surveys (e.g., logbooks, electronic methods, etc.) to determine the length composition (and age data, if possible) of recreational discards (B2) of red drum. This information has been highlighted as the single largest data gap in previous assessments.
- Continue sampling of adult red drum surveys to determine abundance, size, age, sex composition, and maturity of the adults. Additionally, investigate the possibility of senescence in female red drum. Investigate how targeting of adult red drum spawning and post-spawning aggregations via catch-and-release hook-and-line fisheries by anglers is affecting the reproductive potential of the stock due to both direct lethal and sub-lethal effects.
- Assess the effects of environmental factors and habitat loss on stock density/year class strength. Determine whether natural environmental perturbations and habitat loss affect recruitment and modify relationships with spawning stock size.
- Support and conduct applied research to evaluate the social and economic value of this important, primarily recreational fishery. Accomplishing this includes continued support of the Marine Recreational Fishing Expenditures Survey that is conducted every three to five years by NOAA Fisheries as well as conducting applied research on projecting social and/or economic estimated impacts associated with this fishery.

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IX. References

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X. Figures

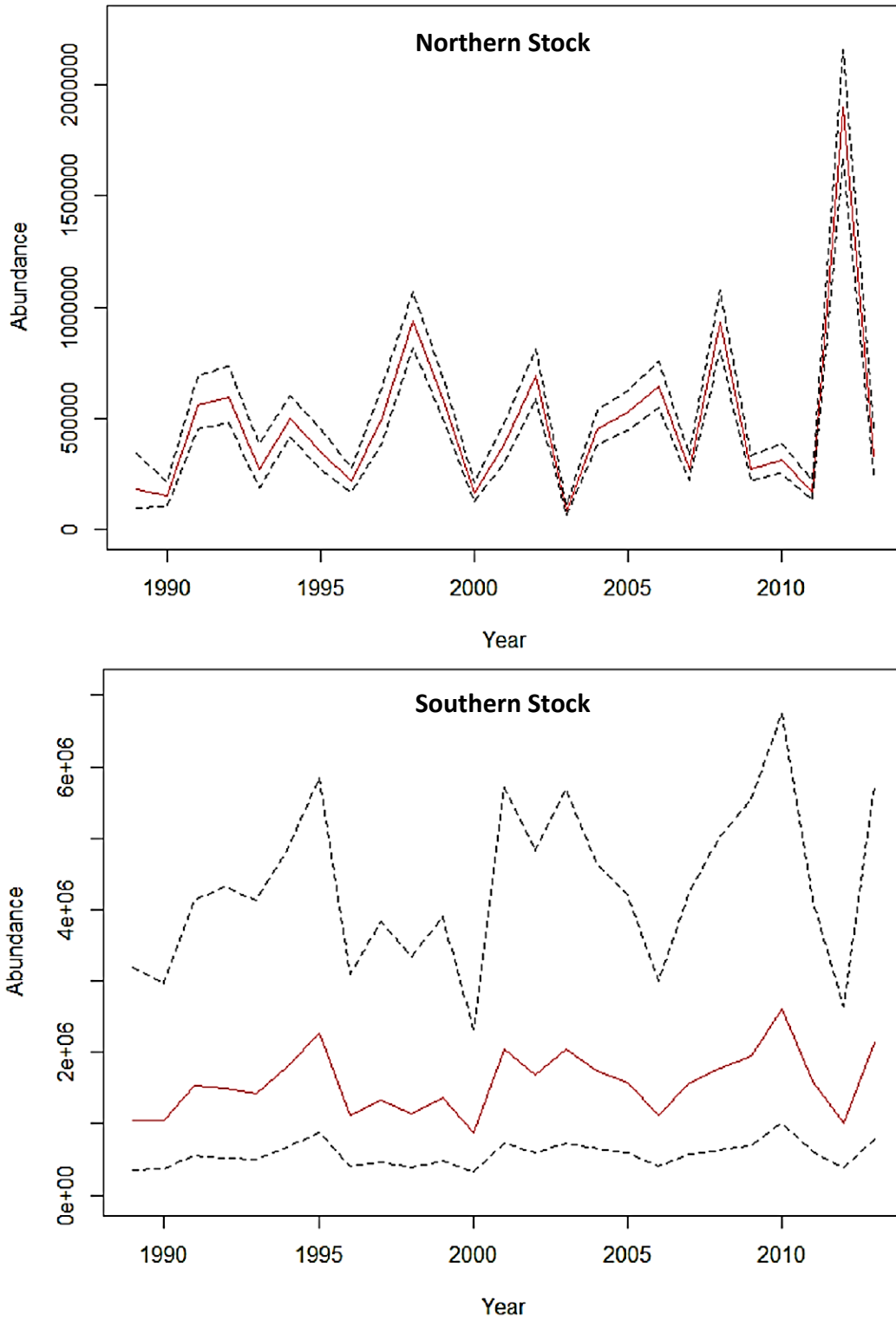


Figure 1. Predicted recruitment (age-1 abundance, red lines) with 95% confidence intervals (dashed black lines) for the northern (top) and southern (bottom) regions (Source: ASMFC 2017).

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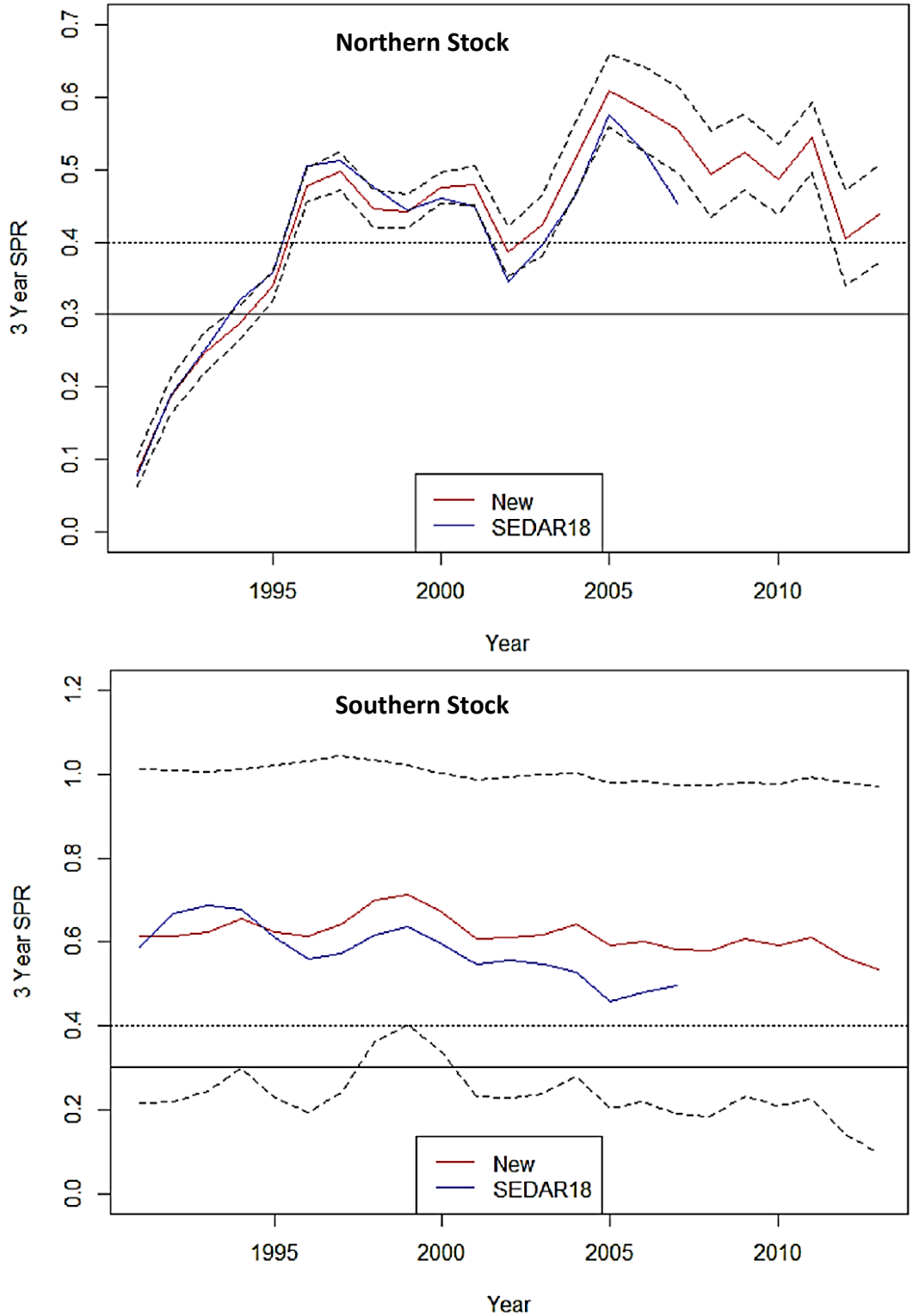


Figure 2. Three-year average sSPR (red lines) for the northern (top) and southern (bottom) stocks with 95% confidence intervals (dashed black lines). Point estimates from the previous benchmark assessment (SEDAR18) are included for comparison. The target sSPR (dotted black line) is 40% and the threshold sSPR (solid black line) is 30% (Source: ASMFC 2017).

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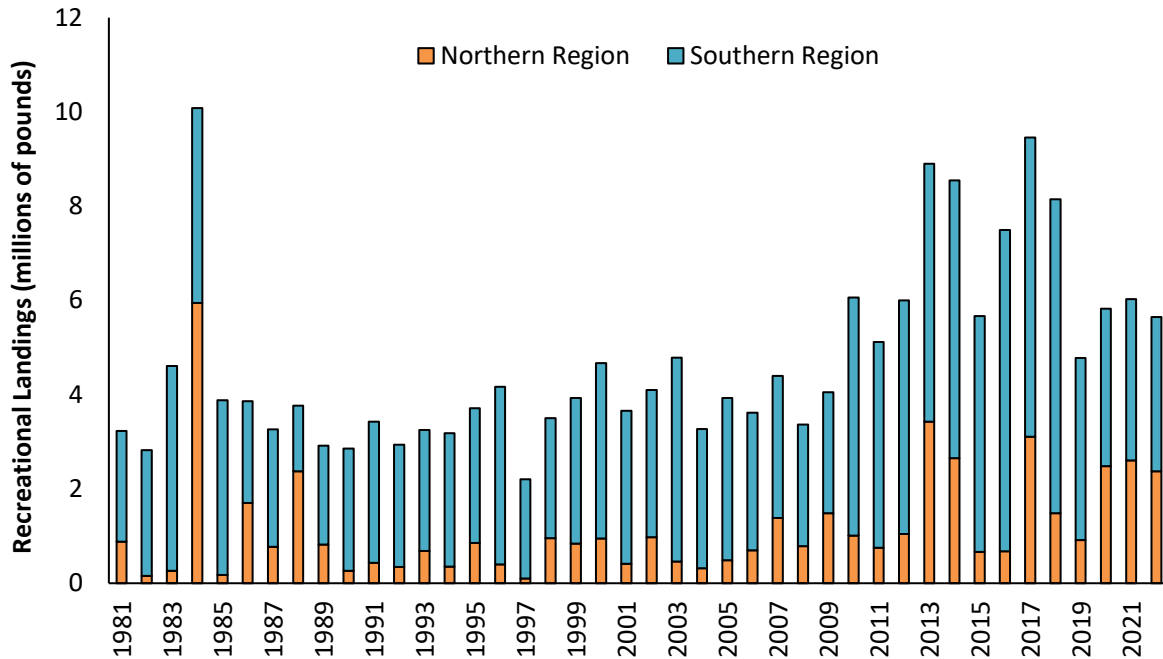


Figure 3. Recreational landings of red drum by region (1981-2022). See Table 4 for values and data sources.

*Recreational weight data for NC-FL in 1988 is unavailable. Recreational harvests in pounds were estimated for these states in this year by multiplying each state’s 1988 harvest in numbers of fish by its time series average weight.

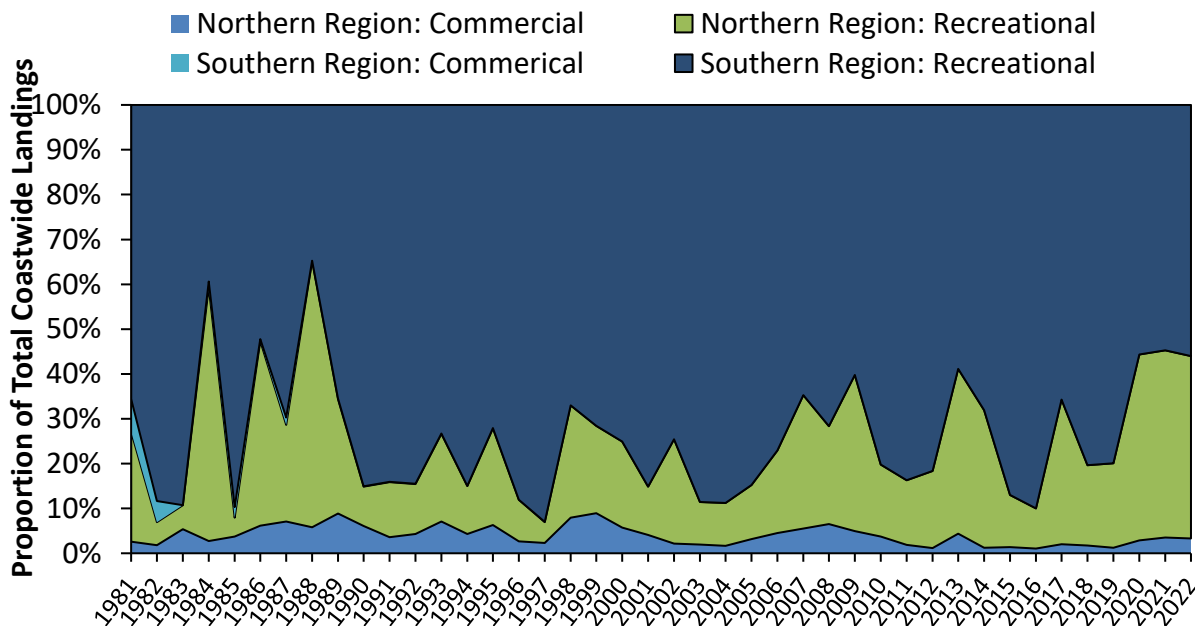


Figure 4. Proportion of regional, sector-specific landings to total coastwide landings (pounds) from 1981-2022. See Tables 3 and 4 for data sources.

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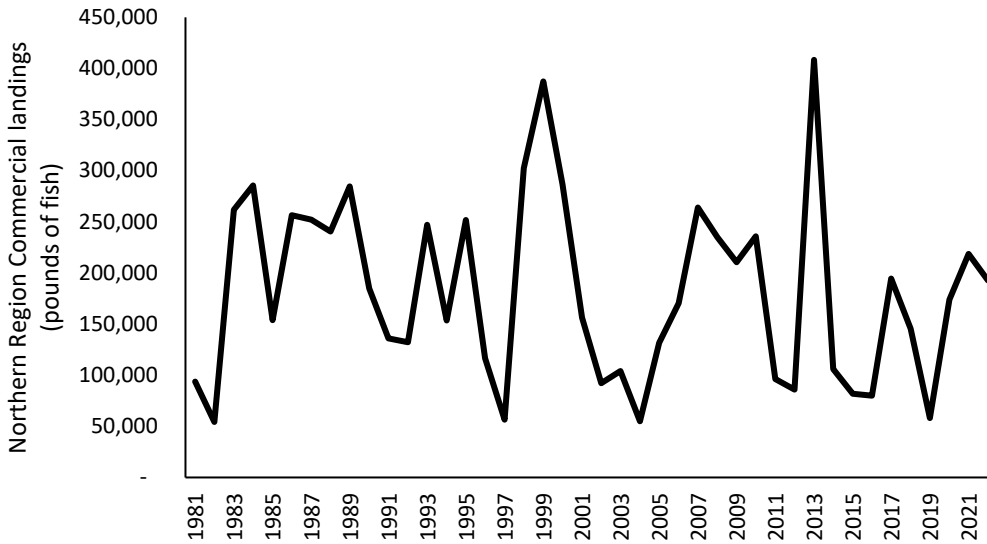


Figure 5. Commercial landings of red drum from the Northern Region (1981-2022). See Table 3 for values and data sources.

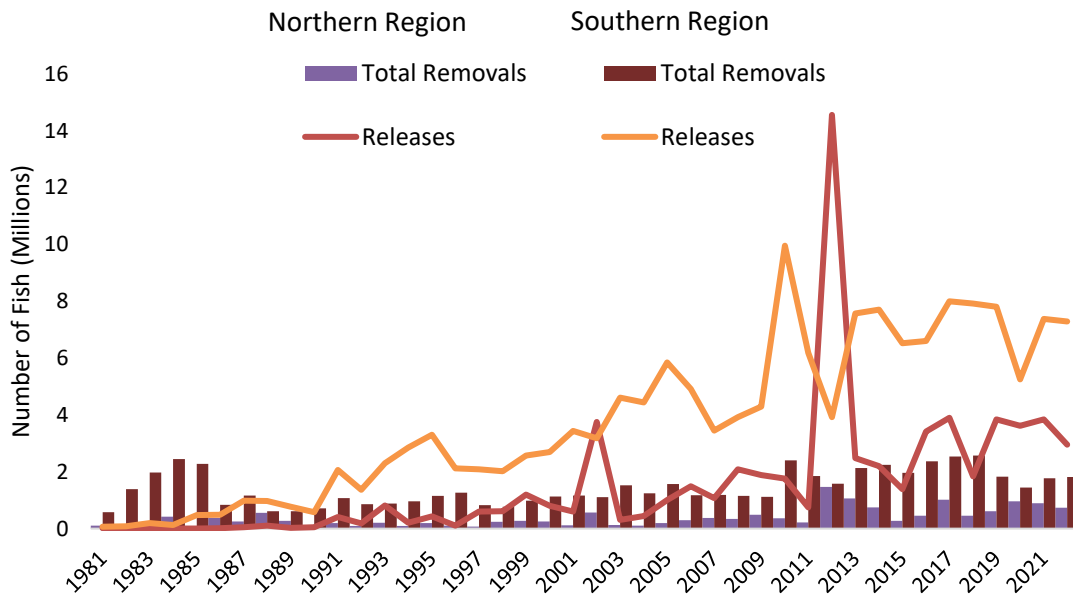


Figure 6. Total recreational removals (numbers) compared to recreational releases of red drum (numbers) for 1981-2022. See Tables 5 and 6 for values and data sources.

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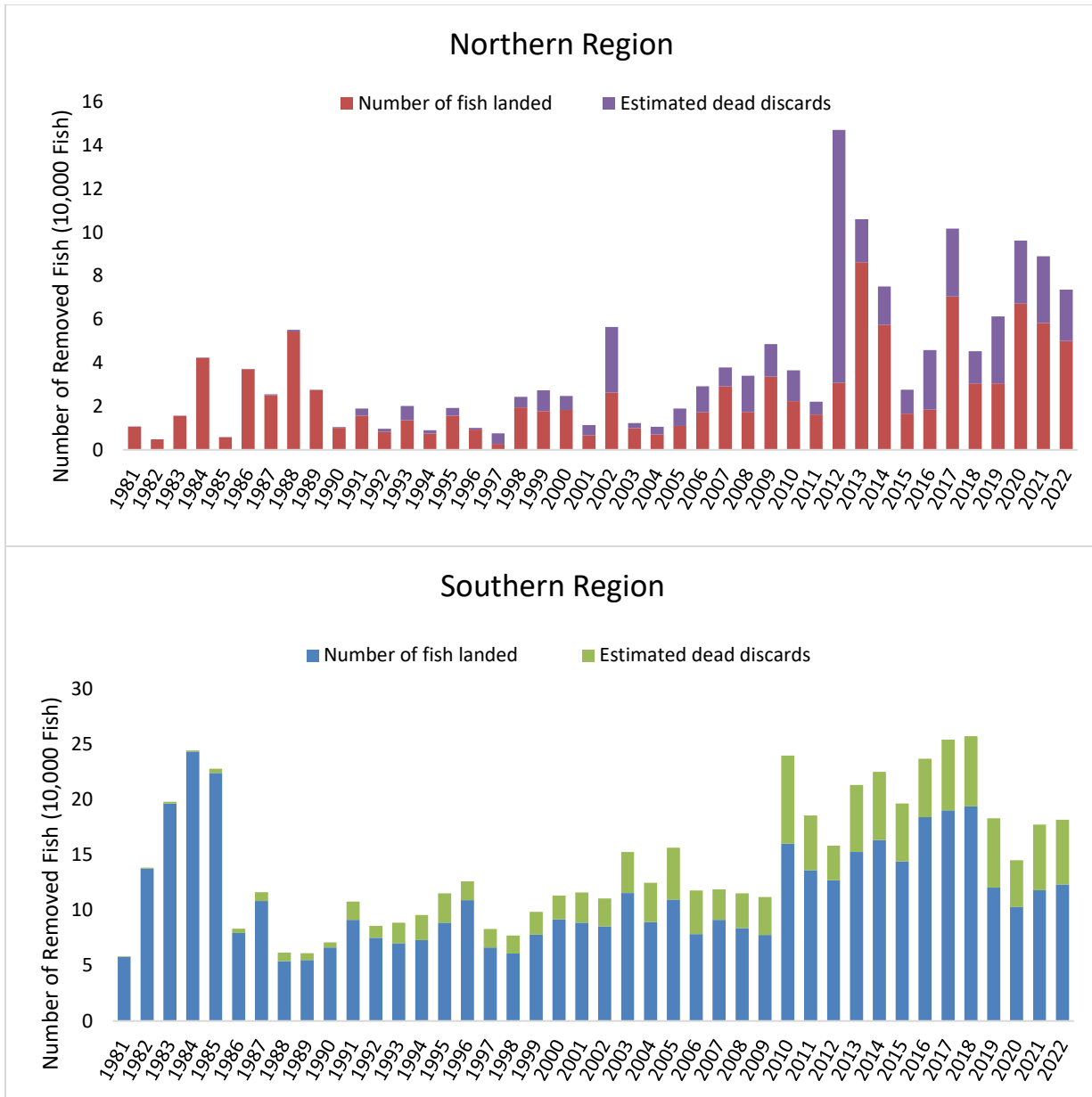


Figure 7. Recreational removals (landings and dead discards) of red drum (numbers) by region from 1981-2022. Dead discards are estimated by applying an 8% discard mortality rate to alive releases. See Tables 5 & 6 for values and data sources.

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XI. Tables

Table 1. Red drum regulations for 2022. The states of New Jersey through Florida are required to meet the requirements in the FMP; states north of New Jersey are encouraged to follow the regulations. All size limits are total length.

State	Recreational	Commercial
NJ	18" - 27", 1 fish	18" - 27", 1 fish
DE	20" - 27", 5 fish	20" - 27", 5 fish
MD	18" - 27", 1 fish	18" - 25", 5 fish
PRFC	18" - 25", 5 fish	18" - 25", 5 fish
VA	18" - 26", 3 fish	18" - 25", 5 fish
NC	18" - 27", 1 fish	18" - 27"; 250,000 lbs harvest cap with overage payback (150,000 lbs Sept 1- April 30; 100,000 lbs May 1-Aug 31); harvest of red drum allowed with 7 fish daily trip limit; daily landed catch of flounder, bluefish, black drum or striped mullet must exceed daily catch of drum; small mesh (<5" stretched mesh) gill nets attendance requirement May 1 - November 30. Fishing year: September 1 – August 31.
SC	15" - 23", 2 fish per person per day bag limit and 6 fish per boat per day boat limit	Gamefish Only
GA	14" - 23", 5 fish	Gamefish Only
FL	18" - 27"; Northeast Region – 1 fish per person per day, 4 fish vessel limit; Indian River Lagoon Region – 0 fish per person per day, 0 vessel limit; Southeast Region – 1 fish per person per day, 2 fish vessel limit (effective September 1, 2022).	Sale of native fish prohibited

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Table 2. Overview of each state’s fishery independent surveys.

State	Fishery Independent Monitoring Details
New Jersey	Five annual nearshore trawl surveys conducted since 1988, in January/February, April, June, August, and October. Length and weight data, and catch per unit effort (CPUE) in number of fish per tow and biomass per tow recorded for all species.
Delaware	30-ft bottom trawl survey and 16-ft bottom trawl survey. Neither survey has ever captured red drum.
North Carolina	Seine survey since 1991 produces age-0 abundance index. Gill net survey in Pamlico Sound since 2001 characterizes size and age distribution, produces abundance index, improves bycatch estimates, and studies habitat usage. Longline survey since 2007 produces adult index of abundance and tags fish.
South Carolina	Estuarine trammel net survey for subadults. Electrofishing survey in low salinity estuarine areas for juveniles/subadults. Inshore and coastal bottom longline survey for biological data and adult abundance index. Genetic sub-sampling and tagging conducted during these three surveys.
Georgia	Estuarine trammel net survey for subadult biological data and abundance index. Estuarine gill net survey for young-of-year (YOY) biological data and abundance index. Bottom longline survey for adult biological data and abundance index.
Florida	Seine surveys characterizing young-of-year (YOY) (<40 mm standard length) and sub-adult (>299 mm) abundance along the northeast (NE) and southeast (SE) Florida coasts.

Table 3. Commercial landings (pounds) of red drum by state, 2013-2022. (Source: personal communication with ACCSP, for years prior to 2022 and state compliance reports for 2022, except as noted below.) Note that SC, GA, and FL do not have commercial red drum fisheries, and years with incidental landings are included in the total.

Year	NJ to PRFC	VA	NC	Total
2013	3,176	30,137	371,949	405,262
2014	353	14,733	90,647	105,732
2015	421	814	80,282	81,516
2016	197	1,898	77,833	79,927
2017	644	6,971	186,411	194,032
2018	C	885	144,464	145,501
2019	32	1,650	56,393	58,107
2020	104	7,989	165,670	173,867
2021	217	19,584	200,825	220,843
2022	57	17,411	175,029	192,554

*C indicates confidential landings, and totals have been rounded to protect confidentiality.

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Table 4. Recreational landings (pounds) of red drum by state, 2013-2022. (Source: personal communication with MRIP for data prior to 2022; state compliance reports for 2022)

Year	NJ	DE	MD	VA	NC	Northern Region Total
2013		13,536	12,086	1,185,572	2,214,045	3,425,239
2014				979,388	1,674,595	2,653,983
2015				98,329	567,730	666,059
2016				45,451	633,496	678,947
2017			6,782	1,628,692	1,475,852	3,111,326
2018				31,566	1,452,358	1,483,924
2019	4,107		2,113	470,940	436,219	913,379
2020		1,544	115,181	610,001	1,758,789	2,485,515
2021			5,441	1,123,953	1,479,550	2,608,944
2022				762,729	1,615,108	2,377,837

Year	SC	GA	FL	Southern Region Total
2013	682,544	452,283	4,341,545	5,476,372
2014	921,971	387,367	4,582,561	5,891,899
2015	656,747	394,787	3,949,000	5,000,534
2016	536,550	586,235	5,694,370	6,817,155
2017	1,048,249	826,857	4,470,905	6,346,011
2018	643,213	1,186,306	4,829,344	6,658,863
2019	862,124	630,294	2,372,773	3,865,191
2020	671,004	535,674	2,135,395	3,342,073
2021	441,191	506,962	2,473,995	3,422,148
2022	584,289	1,081,410	1,605,556	3,271,255

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Table 5. Recreational landings (numbers) of red drum by state, 2013-2022. (Source: personal communication with MRIP for data prior to 2022; state compliance reports for 2022)

Year	NJ	DE	MD	VA	NC	Northern Total
2013		3,734	4,766	333,590	520,758	862,848
2014				251,501	324,303	575,804
2015				22,102	143,876	165,978
2016				15,866	169,195	185,061
2017			4,943	347,145	353,716	705,804
2018				6,334	299,577	305,911
2019	1,331		1,258	205,824	97,186	305,599
2020		493	44,975	214,069	413,419	672,956
2021			1,415	256,281	325,662	583,358
2022				163,962	336,280	500,242

Year	SC	GA	FL	Southern Total
2013	282,688	236,760	1,007,729	1,527,177
2014	393,424	212,193	1,027,980	1,633,597
2015	258,493	201,049	981,685	1,441,227
2016	241,224	289,928	1,309,505	1,840,657
2017	455,887	467,522	978,520	1,901,929
2018	262,725	606,836	1,069,604	1,939,165
2019	333,315	271,970	599,348	1,204,633
2020	239,874	230,026	560,382	1,030,282
2021	210,454	261,488	710,091	1,182,033
2022	219,659	607,512	406,391	1,233,562

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Table 6. Recreational alive releases (numbers) of red drum by state, 2013-2022. (Source: personal communication with MRIP for data prior to 2022; state compliance reports for 2022)

Year	NJ	DE	MD	VA	NC	Northern Region Total	Northern Region Dead Discards
2013		1,325	7,125	576,743	1,892,171	2,477,364	198,189
2014		264	659	1,108,646	1,086,967	2,196,536	175,723
2015			1,456	78,590	1,308,072	1,388,118	111,049
2016		2,598	47,908	164,575	3,203,452	3,418,533	273,483
2017			14,148	1,722,618	2,165,656	3,902,422	312,194
2018	4,715		21,384	85,338	1,729,260	1,840,697	147,256
2019		474	5,740	865,957	2,976,601	3,848,772	307,902
2020			217,710	716,277	2,686,150	3,620,137	289,611
2021		1,147	22,218	1,272,609	2,545,371	3,841,345	307,308
2022		2,116	18,010	770,731	2,160,742	2,951,599	236,128

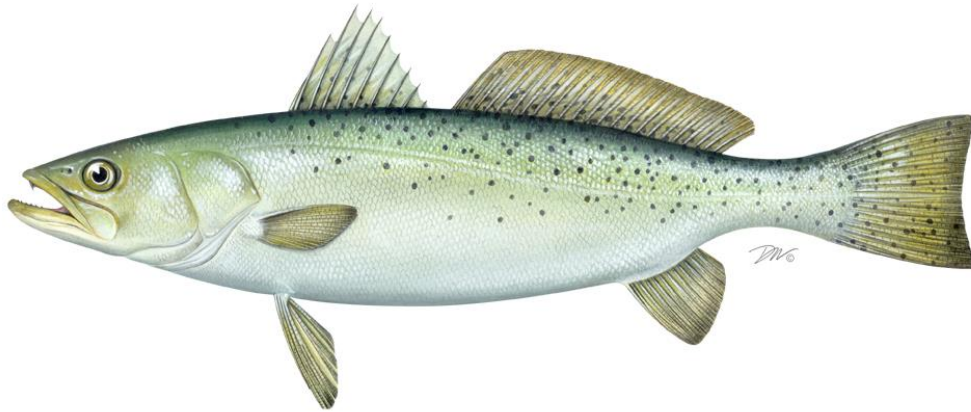
Year	SC	GA	FL	Southern Region Total	Southern Region Dead Discards
2013	1,864,510	504,759	5,196,513	7,565,782	605,263
2014	1,874,809	750,619	5,074,602	7,700,030	616,002
2015	1,432,754	961,277	4,132,461	6,526,492	522,119
2016	1,266,931	601,153	4,734,303	6,602,387	528,191
2017	2,094,199	1,176,524	4,727,411	7,998,134	639,851
2018	1,493,803	1,045,570	5,375,011	7,914,384	633,151
2019	2,911,653	1,206,707	3,688,884	7,807,244	624,580
2020	1,705,054	393,368	3,154,500	5,252,922	420,234
2021	1,894,088	794,030	4,689,059	7,377,177	590,174
2022	1,289,714	1,814,251	4,188,940	7,292,905	583,432

ATLANTIC STATES MARINE FISHERIES COMMISSION
REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR

SPOTTED SEATROUT
(Cynoscion nebulosus)

2022 FISHING YEAR



Prepared by the Plan Review Team
Drafted October 2023



Sustainable and Cooperative Management of Atlantic Coastal Fisheries

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I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	Original FMP – October 1984
<u>Amendments:</u>	Amendment 1 – November 1991 Omnibus Amendment to Spanish Mackerel, Spot, and Spotted Seatrout -- August 2011
<u>Management Area:</u>	The Atlantic coast distribution of the resource from Maryland through the east coast of Florida
<u>Active Boards/Committees:</u>	Sciaenids Management Board; Spotted Seatrout Plan Review Team; South Atlantic Species Advisory Panel

The Atlantic States Marine Fisheries Commission (ASMFC) adopted the [Fishery Management Plan \(FMP\)](#) for spotted seatrout in 1984. The ISFMP Policy Board approved Amendment 1 to the FMP in November 1991. In August 2011, the South Atlantic State/Federal Management Board approved the Omnibus Amendment to the Spanish Mackerel, Spot, and Spotted Seatrout FMPs, bringing the Spotted Seatrout FMP under the authority of the Atlantic Coastal Fisheries Cooperative Management Act (Act, 1993) and the ASMFC Interstate Fishery Management Plan Charter (1995). The management unit is comprised of the states of Maryland through Florida.

The goal of the management plan is "to perpetuate the spotted seatrout resource in fishable abundance throughout its range and generate the greatest possible economic and social benefits from its harvest and utilization over time." Plan objectives include:

1. Attain optimum yield over time.
2. Maintain a spawning potential ratio of at least 20% to minimize the possibility of recruitment failure.
3. Promote conservation of the stocks to reduce inter-annual variation in availability and to increase yield per recruit.
4. Promote collection of economic, social, and biological data required to effectively monitor and assess management efforts relative to the overall goal.
5. Promote research that improves understanding of the biology and fisheries of spotted seatrout.
6. Promote harmonious use of the resource among various components of the fishery through coordination of management efforts among the various political entities having jurisdiction over the spotted seatrout resource.
7. Promote determination and adoption of standards of environmental quality and provide habitat protection necessary for the maximum natural protection of spotted seatrout.

The [Omnibus Amendment](#) added the following objectives to support compliance under the Act:

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1. Manage the spotted seatrout fishery by restricting catch to mature individuals.
2. Manage the spotted seatrout stock to maintain sufficiently high spawning stock biomass.
3. Develop research priorities that will further refine the spotted seatrout management program to maximize the biological, social, and economic benefits derived from the population.

Management measures include a minimum size limit of 12 inches in total length (TL), with comparable mesh size regulations in directed fisheries, and data collection for stock assessments and monitoring of the fishery. All states with a declared interest in spotted seatrout (NJ-FL) have implemented, at a minimum, the recommended minimum size limit. In addition, each state has either initiated spotted seatrout data collection programs or modified other programs to collect improved catch and effort data. Table 1 provides the states' recreational and commercial regulations for spotted seatrout in 2022.

II. Status of the Stock

A coastwide stock assessment of spotted seatrout has not been conducted, given the largely non-migratory nature of the species and the lack of data on migration where it does occur. Instead, state-specific age-structured analyses of local stocks have been performed by several states. These stock assessments provide estimates of static spawning potential ratio (SPR), a measure of the effect of fishing pressure on the relative spawning power of the female stock. The FMP recommends a goal of 20% SPR. South Carolina and Georgia have adopted this goal while North Carolina and Florida have established a 30% and 35% SPR goal, respectively.

A benchmark stock assessment for spotted seatrout in North Carolina and Virginia waters was completed and approved to use for management in late 2022 (<https://www.deq.nc.gov/marine-fisheries/fisheries-management/spotted-seatrout/2022-spotted-seatrout-stock-assessment/open>; NCDMF 2022). The assessment indicated the spotted seatrout stock in North Carolina and Virginia waters was not overfished with spawning stock biomass (SSB) above $SSB_{35\%}$, but overfishing was occurring. A review of the North Carolina FMP is currently underway. Amendment 1 to the North Carolina Spotted Seatrout FMP will focus on management to end overfishing and ensure sustainable harvest.

The South Carolina Department of Natural Resources packaged several state-specific assessments into a report in 2001, though these were not peer reviewed. The initial assessment covering 1986-1992 indicated female SPR was just above the 20% goal in the terminal year (Zhao and Wenner 2001), leading to a minimum size limit increase and a creel limit reduction. A more recent assessment was conducted for the period 1981-2004 (de Silva, Draft 2005). Two modeling approaches were used, and both models indicated the current SSB is below the requirement to maintain 20% SPR.

Florida completed a new statewide assessment in 2018, which in 2019 was updated with data through 2017 (<https://myfwc.com/media/26731/seatrout-assessment-summary-2019.pdf>;

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Addis et al. 2018; Muller and Addis 2019). They assessed the status of spotted seatrout populations among management regions in Florida waters using an integrated statistical catch-at-age model, Stock Synthesis, as the primary modeling platform. Spotted seatrout population dynamics were described for the period 1950-2017 utilizing available information on catch, effort, relative abundance, and size/age composition. For the Northeast (Nassau through Flagler counties) and Southeast (Volusia through Miami-Dade counties) management regions along Florida's Atlantic coast, the regional base SS model estimates of current transitional spawning potential ratios ($tSPR_{Current}$, geometric mean for 2015-2017) are 31% in the northeast, and 34% in the southeast region. The $tSPR_{Current}$ values for the two Atlantic coast regions were found to be below the Commission's 35% $tSPR_{Current}$ management target. These assessment results led to changes in spotted seatrout regulations in Florida, including decreasing bag limits and modifying the slot size limit (Table 1). Work on a new benchmark stock assessment is underway in Florida, and is scheduled to be completed in Fall 2024.

III. Status of the Fishery

Spotted seatrout are typically caught both commercially and recreationally from Delaware through the east coast of Florida. In South Carolina, spotted seatrout are declared a gamefish and can only be taken by recreational means. Landings from states north of Delaware are minimal and/or inconsistent from year to year. In 2022, landings ranged as far north as Connecticut. State catch estimates in this section include those in the management area only (NJ-FL), but coastwide totals include the entire Atlantic coast. Total recreational landings have surpassed total commercial landings every year since recreational landings were first recorded in 1981 (Figure 1). Spotted seatrout, particularly those found from Virginia through South Carolina, are susceptible to cold stuns that result in sporadic, high winter mortality, which can lead to sudden declines in harvest. The last cold stun occurred in 2018, prompting in-season changes to management in affected states.

Commercial Fishery

Commercial harvest statistics were obtained from the Atlantic Coastal Cooperative Statistics Program (ACCSP) for years prior to 2022 and from state compliance reports for 2022. Atlantic coast commercial landings (1950-2022) range from 157,000 pounds in 2011 to 2.3 million pounds in 1952 (Figure 1). Historically, commercial landings primarily came from Virginia, North Carolina, and Florida, with Maryland, South Carolina, Georgia, and occasional landings Delaware and north accounting for a small portion. From 1950 to 1976, annual commercial landings averaged 1.3 million pounds, followed by a decline due to increased regulations and possible declines in abundance. Significant changes to regulations include the 1987 designation of spotted seatrout as a gamefish in South Carolina, and the 1995 prohibition on the use of entangling nets in Florida's coastal waters. From 2013 to 2022, commercial landings averaged approximately 448,481 pounds. In 2022, commercial landings totaled 681,598 pounds, a 11% decrease from 2021 (Table 2). North Carolina, Virginia, and Florida accounted for 88%, 10%, and 1% of the total commercial landings, respectively.

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Recreational Fishery

Recreational harvest statistics were obtained from the Marine Recreational Information Program (MRIP) for years prior to 2022 and from state compliance reports for 2022. Over the last 41 years, recreational catch of spotted seatrout (kept and released) has shown an upward trend, increasing from 4.3 million fish in 1981 to 31.2 million fish in 2018 and has remained high. In 2022, recreational catch totaled 25.9 million fish, a 17% increase from 2021 (Figure 2). Recreational harvest has remained stable throughout the time series with an average of 4.0 million fish over the last five years. Recreational harvest in 2022 was 6.5 million pounds or 3.8 million fish (Tables 3 and 4), with North Carolina (52%), Georgia (25%), and Florida (9%) responsible for the largest shares in numbers of fish. Due in part to recreational size and creel limits and closed seasons, as well as the encouragement of catch and release practices, the percentage of caught fish being released has increased throughout the time series, with the 10-year average (2013-2022) at 82%. The percent of fish released in 2022 (83%) was approximately equal to the percent of fish released in 2021 (83%; Figure 2, Table 5). The number of fish released has averaged 18.9 million fish in the last 10 years (2013-2022). In 2022, 22.1 million fish were released, which is the third highest number released in the time series, and the highest since 2018. Rod and reel is the primary recreational gear, but some spotted seatrout are taken by recreational nets and gigging where these methods are permitted. Most recreational fishing is conducted from private boats and the majority of the catch is taken from nearshore waters.

IV. Status of Assessment Advice

A coastwide stock assessment of spotted seatrout has not been conducted and the Plan Review Team (PRT) does not recommend that one be completed due to the life history of the fish and the availability of data. Several states have performed age-structured analyses on local stocks, and recent assessments provide divergent trends on the status of the species. The 2005 stock assessment in South Carolina indicated an increasing population trend but a status level that is still below target spawning stock biomass levels (de Silva 2005).

The 2022 North Carolina and Virginia stock assessment indicated overfishing was occurring but that the stock was not overfished (NCDMF 2022). The stock assessment model was a novel, size structured model with winter and non-winter seasonal time-steps. Additionally, the model allowed winter natural mortality (M) to vary year to year in order to capture the signature of increased winter M from cold stuns and predicted high or rising M in most years with documented cold stuns.

In the 2019 Florida stock assessment update, the regional base SS model estimated current transitional spawning potential ratios of 31% in the Northeast management region, and 34% in the Southeast management region on Florida's Atlantic coast. The transitional spawning potential ratio for the spotted seatrout stock in northeast Florida was below the Commission's 35% $tSPR_{Current}$ management target and in southeast Florida, it was just below or at the management target (Muller and Addis 2019).

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The PRT supports the continuation of state-specific assessments, yet recognizes the difficulty most states face to attain sufficient data of assessment quality and personnel who can perform the necessary modeling exercises. The lack of biological and fisheries data for effective assessment and management of the resource was recognized in the 1984 FMP and continues to be a hindrance. Some states are increasing their collection of biological and fisheries data, which will provide insight on stock status over time.

V. Status of Research and Monitoring

In addition to commercial and recreational fishery-dependent data collected and/or compiled through the NMFS Fisheries Statistics Division, some states have implemented fishery-independent or additional fishery-dependent monitoring programs. States currently conducting fishery dependent sampling include Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. Delaware, Maryland, North Carolina, South Carolina, Georgia, and Florida currently conduct fishery independent surveys for spotted seatrout or run surveys encountering spotted seatrout. Virginia, North Carolina, and South Carolina conduct aging, and in 2022 the NCDMF aging lab aged a total of 815 spotted seatrout by otoliths with a maximum age of 6 and a modal age of 2. In 2022, Virginia aged 283 spotted seatrout, with a modal age of 1.

VI. Status of Management Measures and Issues

De Minimis Requests

A state qualifies for *de minimis* status if its previous three-year average combined commercial and recreational catch is less than 1% of the previous three-year average coastwide combined commercial and recreational catch. Those states that qualify for *de minimis* are not required to implement any monitoring requirements, as none are included in the plan.

The states of Delaware and New Jersey request continuation of *de minimis* status, and the PRT notes they meet the requirements of *de minimis*.

VII. Implementation of FMP Compliance Requirements for 2022

The PRT found no inconsistencies in relation to the FMP compliance requirements among state compliance reports.

VIII. Recommendations of Plan Review Team

Management and Regulatory Recommendations

- Consider approval of *de minimis* requests by New Jersey and Delaware.

Prioritized Research Recommendations

- The PRT recommends focusing on addressing important missing components to improve state specific stock assessments. Specific focal areas include the development or improvement of state specific abundance indices, particularly for juvenile abundance

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indices, research into fecundity and recruitment relationships, and additional research into B2 releases due to a rise in popularity of the catch and release fishery.

- Consider trigger factors to allow for a swift management response to environmental events that have been shown to heavily impact spotted seatrout. An example is a temperature trigger in North Carolina to protect spotted seatrout that have had long-term exposure to cold temperatures. Additional research into links between spotted seatrout population dynamics and life history variability in response to environmental factors such as land use patterns, climate change, etc.

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X. Figures

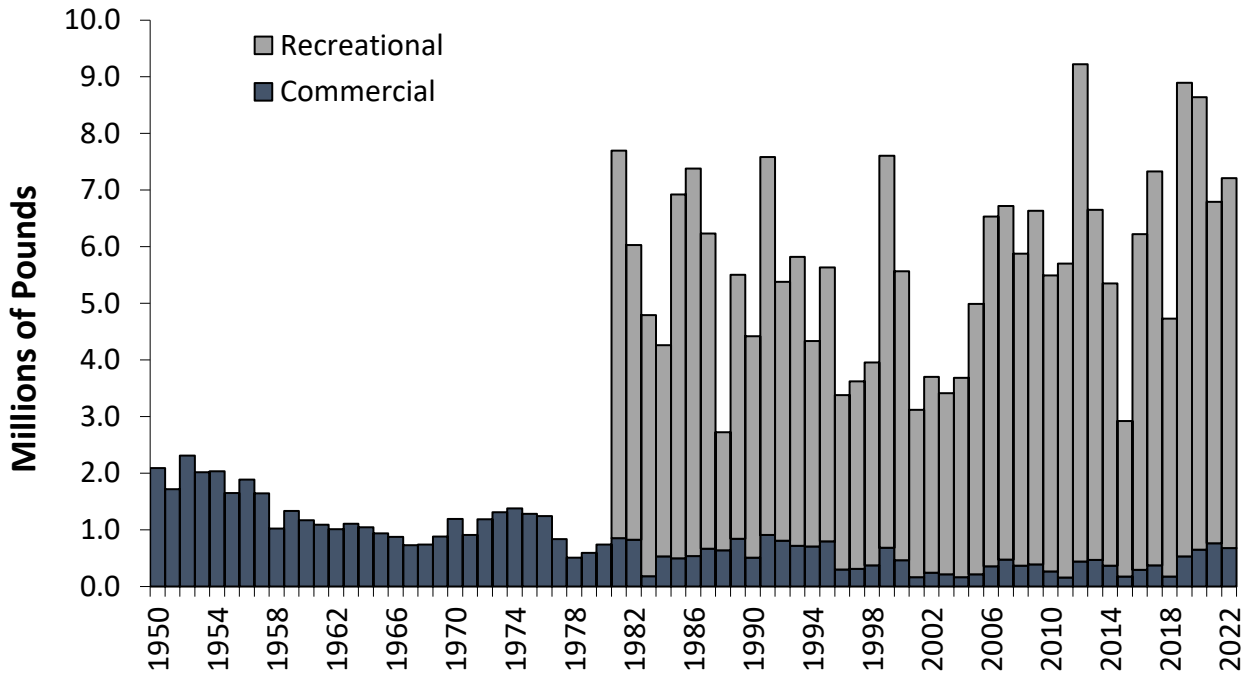


Figure 1. Coastwide commercial landings (1950-2022) and recreational landings (1981-2022), in pounds (See Tables 2 and 4 for values and sources). Recreational data not available prior to 1981.

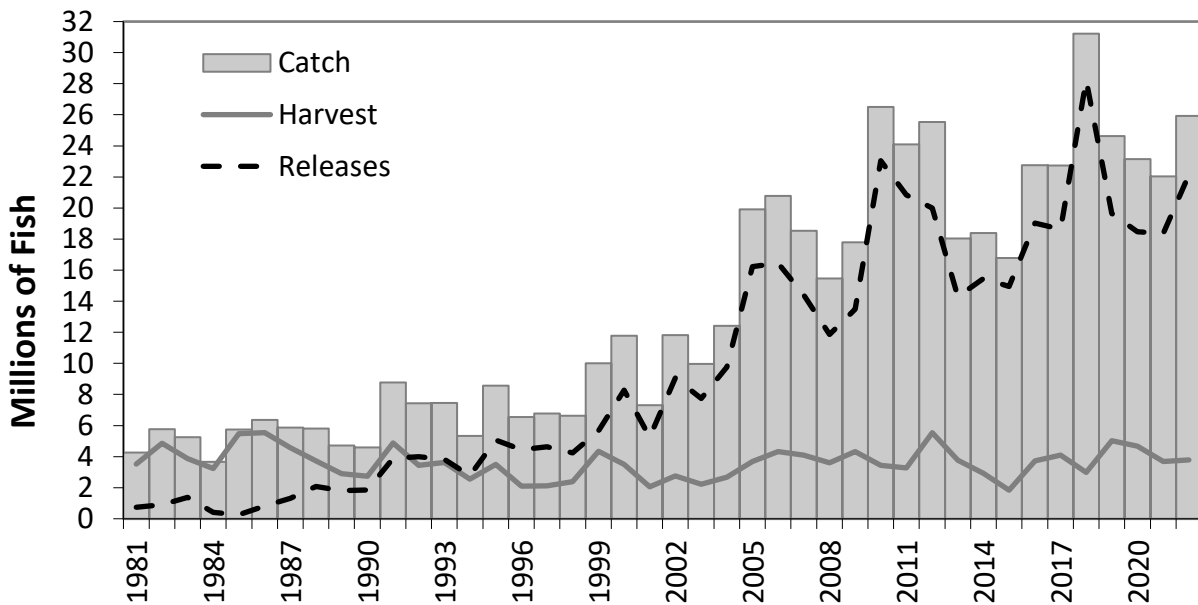


Figure 2. Coastwide recreational catch, harvest, and releases (numbers), 1981-2022 (See Tables 3 and 5 for values and sources).

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XI. Tables

Table 1. Summary of state regulations for spotted seatrout in 2022.

State	Recreational	Commercial
New Jersey	13" TL; 1 fish	13" TL; 100 lbs/vessel/day during open seasons 100 lbs bycatch allowance during closed season if equal lbs of other species are also harvested. Gill net: 3.25 in minimum mesh size; closed season from 5/21-9/2 and 10/20-10/26. Otter trawl: 3.75 in minimum diamond stretched mesh size or 3.375 in stretched square mesh; closed season 8/1 to 10/12 Pound net: closed season 6/7 to 6/30 Hook and line: must follow recreational bag and size limit
Delaware	12" TL	12" TL
Maryland	14" TL; 4 fish	14" TL. 150 lbs limit per day or trip (whichever is longer). Trawl and gill net mesh size restrictions.
PRFC	14" TL; 10 fish	14" TL
Virginia	14-24" TL; 1 fish >24" allowed; 5 fish	14" TL; pound nets/seines allowed 5% by weight less than 14". Hook & line fishermen must follow rec limits. Quota: 51,104 lbs (Sept-Aug). After it's been announced the quota has been reached, then daily incidental catch of 50 lbs/licensee aboard the vessel, not to exceed 100 lbs per vessel
North Carolina	14" TL; 4 fish	14" TL; 75 fish limit. Unlawful to possess or sell Friday 12:00am-Sunday 12:00am.
South Carolina	14" TL; 10 fish. Gig March-Nov.	Gamefish status since 1987; native caught fish may not be sold.
Georgia	14" TL; 15 fish	14" TL; 15 fish. BRD requirement for trawl; gear mesh regulations.
Florida	15-19" TL slot; 1 fish >19" allowed per vessel, or per person if fishing on land; 0 captain and crew bag limit on for-hire trip; hook & line/cast net only. Western Panhandle: 3 fish, closed February; Big Bend: 5 fish; South: 3 fish; Central East: 2 fish, closed Nov -Dec; Northeast: 5 fish	Hook & line/cast net only; 15-24" TL; Season varies by region; 50 fish per person per day or 100 fish vessel limit with two or more licensed fishermen on board South, Big Bend, and Western Panhandle: Open June 1 - October 31. Central East: Open May 1 - September 30. Northeast: Open June 1 - November 30.

Note: A commercial fishing license is required to possess spotted seatrout for sale in all states with a fishery.

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Table 2. Commercial landings (pounds) of spotted seatrout by state, 2013-2022 (Source: ACCSP for years prior to 2022 and State Compliance Reports for 2022). Totals are for the coastwide fishery and may extend beyond the management unit. “C” represents confidential data.

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013			C	42,086	367,610	C	C	58,288	471,243
2014			C	90,051	242,245	C	C	37,710	370,110
2015			C	7,888	128,752	C	C	39,226	175,931
2016			C	18,483	254,590	C	C	23,105	296,419
2017			C	55,219	299,910	C	C	16,194	371,590
2018			C	17,526	128,980	C	C	22,105	173,651
2019			C	100,763	378,491	C	C	16,700	531,010
2020		C	C	67,794	568,764	C	C	12,591	650,034
2021			C	51,594	694,784	C	C	12,352	762,443
2022	C		72	68,479	603,155	C	C	5,696	681,598

Table 3. Recreational harvest (A + B1; numbers of fish) of spotted seatrout using the FES effort calibration, by state, 2013-2022 (Source: MRIP). Totals are for the coastwide fishery and may extend beyond the management unit.

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013		5,436		153,706	1,107,957	440,751	937,046	1,122,151	3,767,047
2014		3,514	21,560	84,537	725,086	260,321	724,411	1,111,177	2,930,606
2015		39	11,619	23,062	249,260	311,106	740,932	504,137	1,840,155
2016	547	12	10,092	163,529	978,624	311,168	1,290,220	962,946	3,717,042
2017			24,255	172,288	1,217,834	647,679	1,060,493	977,797	4,100,346
2018		344		189,537	449,473	175,191	1,096,602	929,155	2,993,485
2019		4,644	36,314	596,428	1,937,250	813,548	1,008,284	620,337	5,016,805
2020		774	11,951	591,624	2,053,354	511,261	830,771	678,934	4,678,669
2021			17,664	399,529	1,223,508	483,046	935,052	621,389	3,680,188
2022			8,739	248,150	1,963,400	281,274	952,260	337,142	3,790,965

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Table 4. Recreational harvest (A + B1; pounds of fish) of spotted seatrout using the FES effort calibration, by state, 2013-2022 (Source: MRIP). Totals are for the coastwide fishery and may extend beyond the management unit.

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013		8,866		379,399	1,881,881	717,402	1,125,802	2,075,929	6,180,413
2014		6,295	46,870	166,182	1,451,592	382,155	825,903	2,111,818	4,984,520
2015		10	23,546	48,477	430,579	462,498	794,861	984,940	2,744,901
2016	451	8	20,024	341,977	1,724,492	475,749	1,740,513	1,625,597	5,928,352
2017			48,624	342,463	2,157,198	992,938	1,403,646	2,011,777	6,956,646
2018		248		226,786	658,555	414,442	1,556,782	1,701,275	4,557,840
2019		10,878	61,935	1,256,916	3,334,163	1,238,834	1,440,368	1,033,847	8,366,063
2020		790	28,170	1,375,062	3,632,315	713,197	1,196,591	1,045,536	7,990,871
2021			40,801	815,724	2,241,421	696,038	1,277,168	956,682	6,027,834
2022			12,902	549,095	3,756,040	423,318	1,268,493	519,335	6,529,183

Table 5. Recreational releases (number of fish) of spotted seatrout using the FES effort calibration, by state, 2013-2022 (Source: MRIP). Totals are for the coastwide fishery and may extend beyond the management unit.

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2013		8,039	22,780	738,474	4,278,671	2,190,796	1,320,699	5,722,715	14,282,174
2014		2,926	74,250	1,059,287	3,949,284	1,407,310	1,687,540	7,279,660	15,460,257
2015		604	242,150	834,028	4,824,088	1,147,982	1,763,638	6,131,007	14,943,497
2016	15,423	15,066	133,223	3,708,969	6,475,193	1,791,072	2,113,253	4,783,644	19,035,843
2017	0	71	107,611	3,154,997	5,147,567	1,949,554	2,436,867	5,845,559	18,641,985
2018	418		54,795	4,455,420	15,245,249	1,062,769	2,022,125	5,306,034	28,230,566
2019	2,262	5,905	334,805	2,865,887	7,161,183	2,476,659	2,673,432	4,098,551	19,643,063
2020		9,027	237,023	2,830,854	6,155,571	1,301,634	2,632,036	5,306,269	18,471,640
2021			84,300	3,035,971	6,284,614	1,467,051	3,022,516	4,467,598	18,362,050
2022			97,241	2,291,186	10,860,575	1,189,063	2,039,833	5,667,898	22,145,796