Atlantic States Marine Fisheries Commission

South Atlantic State/Federal Fisheries Management Board

August 6, 2015
10:45 a.m. – 12:15 p.m.
Alexandria, Virginia

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 *(P. Geer)*	10:45 a.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from May 2015	10:45 a.m.
3.	Public Comment	10:50 a.m.
4.	Consider Extending the Provisions of Addendum I to the Spanish Mackerel Fishery Management Plan (*L. Daniel*) **Action**	11:00 a.m.
5.	Consider 2015 Traffic Light Assessment for Atlantic Croaker and Spot (*C. McDonough*)	11:30 a.m.
6.	Stock Assessment Updates (*J. Kipp*) **Action** • Update on 2015 Red Drum Stock Assessment • Update on 2016 Atlantic Croaker and Spot Stock Assessment • Review and Consider Approval of 2016 Atlantic Croaker and Spot Stock Assessment Terms of Reference	11:45 a.m.
7.	Consider 2015 FMP Reviews and State Compliance (*M. Ware)* **Action** • Atlantic Croaker FMP Review • Red Drum FMP Review • Black Drum FMP Review	12:00 p.m.
8.	Other Business/Adjourn	12:15 p.m.

The meeting will be held at The Westin Alexandria, 400 Courthouse Square, Alexandria, Virginia 703.253.8600

MEETING OVERVIEW

South Atlantic State/Federal Fisheries Management Board Meeting
Thursday, August 6, 2015
10:45 a.m. – 12:15 p.m.
Alexandria, Virginia

Chair: Pat Geer (GA) Assumed Chairmanship: 10/13	Technical Committee Chair: Atlantic Croaker: Chris McDonough (SC) Red Drum: Mike Murphy (FL)	Law Enforcement Committee Representative: Doug Lewis (GA)
Vice Chair: Jim Estes (FL)	Advisory Panel Chair: Tom Powers (VA)	Previous Board Meeting: May 5, 2015
Voting Members: NJ, DE, MD, PRFC, VA, NC, SC, GA, FL, NMFS, USFWS, SAFMC (12 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 5, 2015

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. Consider Extending the Provisions of Addendum I to the Spanish Mackerel Fishery Management Plan (11:00-11:30 a.m.) Action

Background

- Addendum I (2013) reduced the minimum size in the commercial pound net fishery to 11.5" for the 2013-2014 fishing years
- North Carolina is interested in extending this Addendum I and provided the Board with a report of landings from 2012-2014 (**Briefing Materials**)
- A preliminary electronic vote taken by the Board passed 8-0 (**Briefing Materials**)

Presentations

- Review of request by North Carolina by L. Daniel

Board actions for consideration at this meeting

- Extend Addendum I of the Spanish Mackerel FMP until a specified sunset date

5. 2015 Traffic Light Assessment for Atlantic Croaker and Spot (11:30 – 11:45 a.m.)

Background

- Addendum II (2014) of the Atlantic Croaker FMP and Addendum II (2014) of the Spot FMP establish Traffic Light Analysis as the new management framework for these species.

Presentations

- Traffic Light Analysis for Atlantic Croaker and Spot by C. McDonough (**Briefing Materials)**

6. Stock Assessment Updates (11:45 a.m. – 12:00 p.m.) Action

Background

- The Red Drum Stock Assessment had its second assessment workshop in June and will under-go peer review in August
- Both the Spot and Atlantic Croaker Stock Assessments are scheduled for completion in 2016 and the joint data workshop will be held in September
- The Atlantic Croaker Technical Committee, the Spot Plan Review Team, and the Atlantic Croaker/Spot Stock Assessment Subcommittee drafted Terms of Reference in June 2015 (**Briefing Materials**)

Presentations

- Atlantic Croaker and Spot Stock Assessment Terms of Reference by J. Kipp.

Board actions for consideration at this meeting

- Approve Terms of Reference

7. 2015 Fishery Management Plan Reviews (12:00 p.m. -12:15 p.m.) Action

Background

- Atlantic Croaker State Compliance Reports are due on July 1, 2015. The Plan Review Team reviewed each state report and compiled the annual FMP Review. Delaware, South Carolina, Georgia, and Florida have applied for *de minimis.*
- Red Drum State Compliance Reports are due on July 1, 2015. The Plan Review Team reviewed each state report and compiled the annual FMP Review. New Jersey and Delaware have applied for *de minimis.*
- Black Drum State Compliance Reports are due on March 1, 2015. The Plan Review Team reviewed each state report and compiled the annual FMP Review. No states have applied for *de minimis.*

Presentations

- Overview of the Atlantic Croaker, Red Drum, and Black Drum FMP Review Reports by M. Ware. **(Briefing Materials)**

Board actions for consideration at this meeting

- Accept 2015 FMP Reviews and State Compliance Reports
- Approve *de minimis* requests

11. Other Business/Adjourn

Megan Ware

From: SHELDON AREY <sarey2@verizon.net>
Sent: Friday, June 12, 2015 10:04 AM
To: Megan Ware; SUSANNA MUSICK
Cc: Kirby Rootes-Murdy; Ken Schultz
Subject: RE: FMP for specks

Megan

I appreciate your response to Susanna's inquiry as a result of an effort by some Virginia Speckled Trout fisherman who are concerned over the lack of population monitoring for this species in Virginia. As I understand it from taking to Mr. O'Reilly and others on this matter the population is not an important one to the state in contrast to Rockfish etc. and therefore there is no funding allocated to determining young of the year (YoY) indexes and other population monitoring etc. as is performed in other states.

Virginia has had two devastating cold Stun events over the last two winters. One in the middle of the state including the Piankitank, Corrotoman, Lynnhaven and other rivers and Rudee Inlet in the area in 2014, and this February in all the above as well as the Elizabeth River where a 60 plus year old coal fired Power Plant was closed and the population was decimated. Those of us who fish that river have had no Spotted Seatrout caught in there since the cold stun event in Mid-February 2015. Concerned anglers addressed the VMRC and were told we had nothing to worry about because the North Carolina FMP for Speckled Trout says we share the Speckled Trout population with them and they estimate that their population is healthy. Many of the concerned anglers do not believe that we should be depending on another state's FMP for Speckled Trout when we actually share the Chesapeake Bay and its tributaries with Maryland and not North Carolina and realize that many state's Speckled Trout migration studies have shown that Speckled Trout rarely travel more than 60 miles. I have been an active Speckled Trout tagger for the Virginia program and my boat has tagged almost 10 thousand Specks in the last 6 years or so. During that time I have had 3 tag returns from North Carolina total, and up until this year 4 to 6 annual returns from Maryland. I have had no returns at all from anywhere since the Feb 15 cold stun. Susanna has mentioned that the Recreational Anglers have worked with the VMRC to use angler license money to fund a two year Speckled Trout Genetics study that hopefully will shed light on the issue of if we share a significant Speckled Trout population with NC or not. In the mean time we have to wait until the commercial fisheries totals for Speckled Trout caught this Spring and Fall in Virginia and the angler tagging data to provide any meaningful information that would allow the VMRC the data needed to reduce the Speckled Trout harvest to a point where the species may have some chance of recovery. We have already had the two top spawning months occur for Specks in the area for this year and we have no idea what the overall health and welfare of the species is in Virginia and yet the season for commercial and recreational harvesting remains as in previous years.. I can tell you anecdotally that my network of about a dozen Speck addicts over the state can only say that about a dozen overall have been caught that they have heard of and they themselves as a group have not caught more than 3 or 4 combined.

So why am I talking to you? Mr. O'Reilly indicated that if the AMSFC told the states that they need to support FMPs for their states the VMRC would be required to respond to that direction and develop a Virginia or cooperative Virginia and Maryland FMP for Speckled Trout (since we share the Chesapeake Bay system). I am hoping that you can provide the concerned Speckled Trout fisherman of Virginia some guidance on what path we need to follow to have a working discussion undertaken by the ASMFC to mandate at least a Chesapeake Bay FMP for Speckled Trout.

Yes we are focused on Speckled Trout and to some extent it was because up until the cold stuns that started in the winter of 2014 it was the last really good fishery in the state in comparison to what some of us experienced in past years. I appreciate your time and effort in listening to us and if you can provide any guidance on the way ahead that we can potentially follow to get our concerns heard it would be helpful.

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

July 13, 2015

To: South Atlantic Board

From: Megan Ware, FMP Coordinator

RE: Preliminary Continuation of Addendum I to the Spanish Mackerel FMP

Addendum I to the Spanish Mackerel Fishery Management Plan (FMP) reduced the minimum size limit in the commercial pound net fishery from 12" to 11.5". The intent of the Addendum was to reduce seasonal regulatory discards during the months of July through September. The management measure was implemented as a pilot program and only applied to the 2013 and 2014 fishing seasons; however, the Addendum did allow for the extension of the 11.5" minimum size pending results of the program. North Carolina was the only state to adopt the reduced minimum size.

In June 2015, North Carolina expressed interest in continuing the 11.5" minimum size during the 2015 fishing season. The state prepared a report outlining the impacts of Addendum I on their catch of Spanish mackerel between 2012 and 2014. The report found that while the percentage of catch in the pound net fishery remained fairly stable (ranging from 3-5%), the proportion of Spanish mackerel caught between 11.5"-11.99" increased from 3% in 2012, to 18% in 2013, and then decreased to 8% in 2014. Similarly, the catch of Spanish mackerel under 11.5" increased from less than 1% in 2012, to 19% in 2013, and then decreased to 7% in 2014.

Since the July 1st start date was before the next Board meeting on August 6th, an electronic vote was taken by the Board. The vote was considered a hold-over until further discussion at the August Board meeting and only applied from July 1, 2015 until August 6, 2015. A "Yes" vote meant North Carolina would be allowed to continue to use the 11.5" minimum size until further discussion and a final vote at the August Board meeting.

Votes were received from 8 parties and the extension passed 8-0. Votes were not received from two states. As a result, North Carolina will be allowed to continue to use the 11.5" minimum size in their commercial pound net fishery until further discussion at the August Board meeting.

North Carolina Division of Marine Fisheries

Report to Atlantic States Marine Fisheries Commission South Atlantic Board: Spanish Mackerel Addendum I Pilot Program

June 15, 2015

Introduction

In August 2013, the South Atlantic State-Federal Fisheries Management Board (Board) approved a two-year pilot program through Addendum I to the Interstate Fishery Management Plan for Spanish Mackerel to allow states to reduce the commercial minimum size limit of Spanish mackerel from 12 inches to 11.5 inches (fork length) in the pound net fishery during the months of July through September. The intent was to reduce dead discards of these undersized fish that do not survive the bunting and bailing of the net during the summer months. The use of cull panels to allow for escape of undersized Spanish mackerel at this time of year has met with only limited success.

This exemption applied only for the 2013 and 2014 fishing years to allow the Board to review the impacts of the pilot program and determine if it should be allowed to continue. North Carolina was the only state to apply this exemption in its pound net fisheries during both years. The results of sampling efforts and the impacts on harvest are detailed in the tables and figures below.

Results

A description of the North Carolina Spanish mackerel fishery and associated harvest characteristics from 2000-2012, including the pound net fishery, is contained in Addendum I and incorporated herein by reference. The following information is based on data collected through the North Carolina Trip Ticket Program and fishery-dependent biological sampling.

Tables 1a and 1b contain Spanish mackerel landings and proportion of harvest by pound nets vs. all other gear types, respectively, for the years 2012-2014. Although the pilot program only applied to fishing years 2013 and 2014, harvest characteristics from 2012 are included for comparison. Total Spanish mackerel commercial landings, as well as that from pound nets, decreased substantially in 2013 relative to 2012 and increased only slightly in 2014 (Table 1a). However, the overall proportion of commercial landings of Spanish mackerel from pound nets stayed relatively constant over all three years (Table 1b), representing approximately four percent of total Spanish mackerel harvest. Table 2 provides an additional breakdown of landings by major gear type; harvest from gill nets clearly dominates landings.

The proportions of Spanish mackerel pound net landings by size bin were calculated using commercial trip ticket data and fishery-dependent sampling. The number of individuals, weight, and length frequencies (fork length) of Spanish mackerel in a pound net sample were expanded to represent the species quantities in the total state pound net catch (trip sample data were expanded to represent the total catch). Expansion was accomplished by matching at the market grade level biological fish house sample data (mean weight or length data) to the corresponding commercial trip ticket market grade harvest. For example, the total length frequency of a species within a catch was derived by expanding the length frequency of the individuals measured in the subsample of a market grade (culled samples) to the total market category weight of that species in the sampled trip. These sample distributions were then summed and the summed distribution applied to the total landings of that market grade.

All of the monthly market grade distributions were summed to produce a single monthly length distribution (i.e., weighted by number of individuals in each distribution); similarly, annual distributions were summed to produce a single weighted annual distribution. In instances where only partial data sets were obtained, such as no fish house length data for a reported trip ticket market grade of extra-large, the number of fish values was applied to the proportions of fish greater than or equal to 12 inches fork length. However, in June 2013, 1,382 small market grade Spanish mackerel are not accounted for in the length distributions due to the high variability of proportion at size above and below the 11.50 to 11.99 inch threshold and no corresponding substitute sample for an applicable estimate. In cases where species collection weight was obtained, but not species collection number, substitute estimates based on means calculated from available data (e.g., average year market weight) in the same or adjacent sampling cells were used to fill in missing values.

Tables 3 and Figure 1 show the proportions of July through September Spanish mackerel pound net harvest accounted for by different size bins for the years 2012-2014. There was a distinct increase of the proportions of fish below 11.5 inches during these months, from one percent in 2012 to 23 percent in 2013. Similarly, the proportion of fish harvested between 11.5 and 11.99 inches increased from 14 percent in 2012 to 23 percent in 2013. In 2014, the proportion of fish less than 11.5 inches dropped to 15 percent of Spanish mackerel pound net harvest during July through August, while the proportion of fish between 11.5 and 11.99 inches dropped to 10 percent.

Table 4 and Figure 2 illustrate the annual proportions of Spanish mackerel pound net harvest (in numbers of fish) by size bin. On an annual basis, the proportion of fish less than 11 inches increased from one percent to 19 percent in 2013, but dropped back down to seven percent in 2014. The proportion of fish between 11.5 and 11.99 inches increased from less than one percent to 18 percent in 2013, and fell back to eight percent of annual Spanish mackerel pound net harvest in 2014.

Discussion

The harvest of Spanish mackerel by pound nets in North Carolina represents a small fraction of the total commercial landings. Despite the decrease in pound net landings of Spanish mackerel in 2013, the proportion of fish harvested within the exempted size limit and below is unexpectedly high in comparison to 2014. There are several possible reasons for this: a decrease in the total number of pound net trips in 2013 compared to 2012; the relatively short timeframe during which this fishery occurs; and the small geographic area (the eastern edge of Pamlico Sound on the backside of the Outer Banks). All of these factors combined to produce limited fishery-dependent sampling opportunities in 2013 for the pound net fishery. Indeed, Table 3 illustrates that the bulk of 2013 Spanish mackerel pound net landings occurred in June, prior to the Board's approval of Addendum I. Fewer available trips and a shortened season can result in missed sampling of certain market grades, as noted above, which impacts the ability to accurately characterize the fishery. For these reasons, 2014 may be a better comparison with regard to the effectiveness and impact of the size limit exemption on harvest.

Finally, while the proportional increases in harvest by size bin in 2013 are high in comparison to 2012 and 2014, the magnitude of that harvest is relatively small in comparison to the total harvest (across all fisheries) of Spanish mackerel. Applying the proportions of July through September harvest below 11.5 inches and between 11.5 and 11.99 inches from Table 4 to the pound net landings during these months in Table 3, approximately 5,800 pounds of Spanish mackerel under the regular 12-inch size limit were harvested in 2013 (roughly 2,900 lbs below 11.5 inches and 2,900 pounds between 11.5 and 11.99 inches). Similarly for 2014, approximately 700 pounds of Spanish mackerel below 11.5 inches and 500 pounds between 11.5 and 11.99 inches were harvested by pound nets.

Table 1a. North Carolina Spanish mackerel landings (pounds) by pound nets vs. other gears (2012-2014).

Gear Type	2012	2013	2014	Grand total
Pound net	104,586	18,764	25,600	148,950
Other gears	2,034,686	598,051	645,508	3,278,245
TOTAL	2,139,272	616,815	671,108	3,427,195

Table 1b. North Carolina Spanish mackerel proportion of landings from pound nets vs. other gears (2012-2014).

Gear Type	2012	2013	2014	Grand total
Pound net	5%	3%	4%	4%
Other gears	95%	97%	96%	96%
TOTAL	100%	100%	100%	100%

Table 2. North Carolina Spanish mackerel landings (pounds) by major gear type (2012-2014).

Gear Type	2012	2013	2014
Beach seine	39	44	23
Estuarine gill net	914,303	250,521	221,895
Long haul	432	682	1,069
Ocean gill net	1,119,912	346,804	422,521
Pound net	104,586	18,764	25,600
TOTAL	2,139,272	616,815	671,108

Table 3. North Carolina pound net landings (pounds) by month (2012-2014).

Month	2012	2013	2014
May	9,519	-	389
June	72,572	6,222	20,262
July	11,522	4,408	2,425
August	5,438	3,585	2,297
September	5,244	4,357	218
October	292	111	9
November	-	81	-
TOTAL	104,587	18,764	25,600

Table 4. Proportion of July - September Spanish mackerel pound net landings (number of fish) by size class (2012-2014).

Size (July-Sept)	2012	2013	2014
<11.5 in	1%	23%	15%
11.5-11.99 in	14%	23%	10%
>=12 in	85%	54%	75%

Table 5. Proportion of annual Spanish mackerel pound net landings (number of fish) by size class (2012-2014).

Size (Jan-Dec)	2012	2013	2014
<11.5 in	<1%	19%	7%
11.5-11.49 in	3%	18%	8%
>=12 in	97%	63%	84%

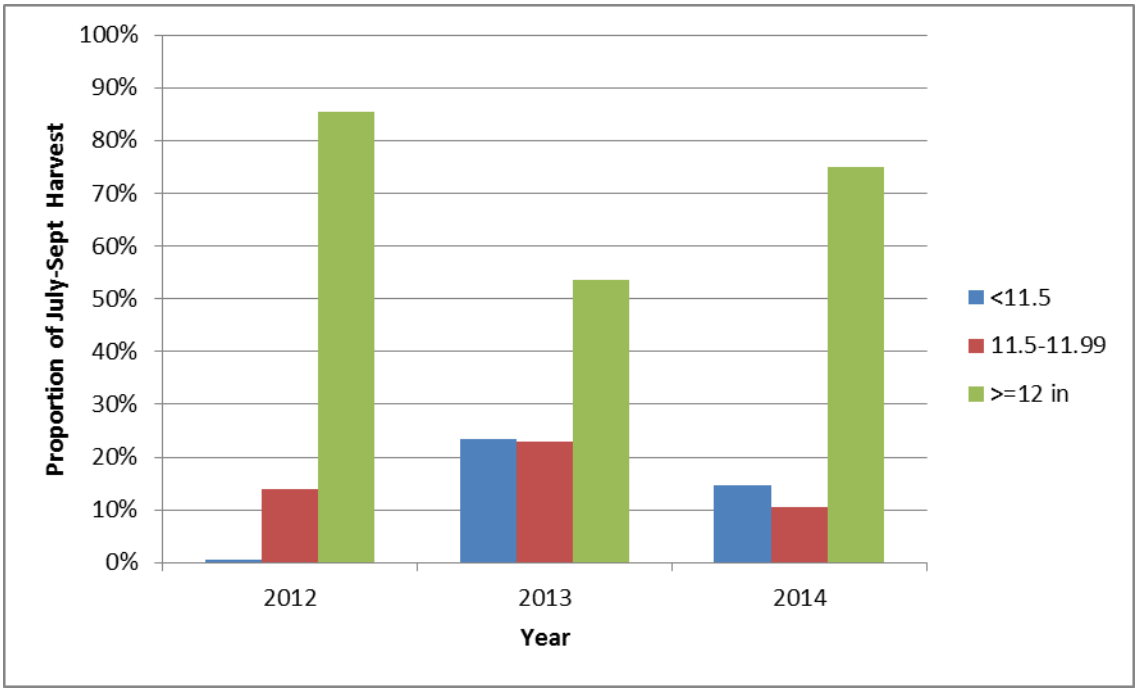


Figure 1. Proportion of July through September Spanish mackerel pound net harvest accounted for by different size bins (2012-2014).

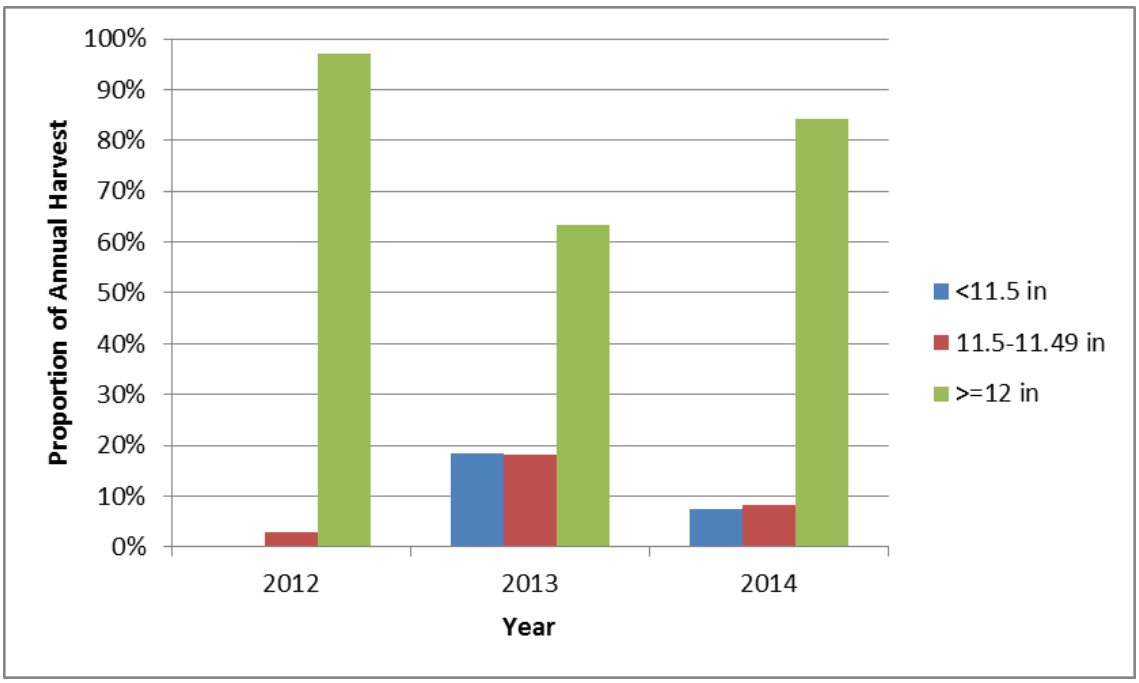
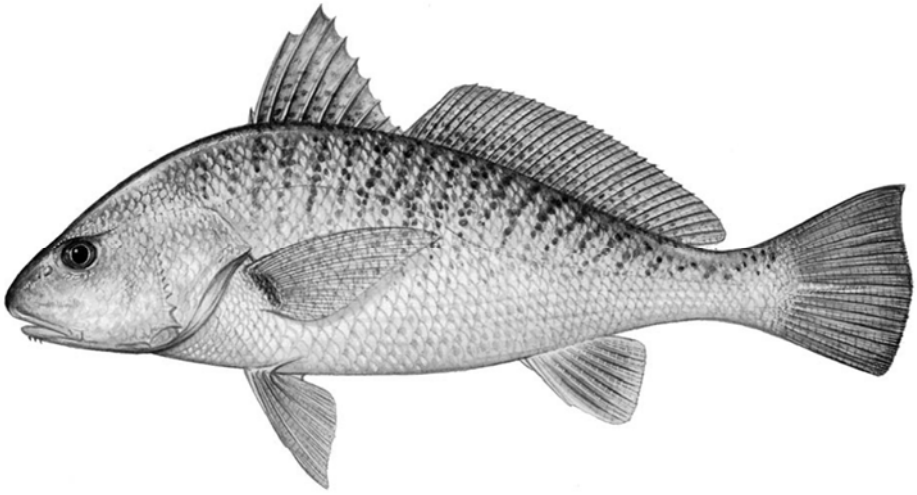


Figure 2. Proportion of annual Spanish mackerel pound net harvest accounted for by different size bins (2012-2014).

2015 Traffic Light Analysis of Atlantic Croaker (*Micropogonias undulatus)* for the Atlantic States Marine Fisheries Commission Fishery Management Plan Review

2014 Fishing Year



Atlantic Croaker Plan Review Team

*****Chris McDonough, South Carolina Department of Natural Resources
Adam Kenyon, Virginia Marine Resources Commission
Wilson Laney, Ph.D., United States Fish and Wildlife Service
Jason Rock, North Carolina Department of Marine Fisheries
Megan Ware, Atlantic States Marine Fisheries Commission, Chair

*Prepared Analysis and Report

Introduction

Atlantic croaker are managed under Amendment 1 to the Interstate Fishery Management Plan for Atlantic Croaker (2005) and Addendum I (2011). The Amendment does not require any specific measures restricting harvest but encourages states with conservative measures to maintain them. It also implemented a set of management triggers, based on an annual review of certain metrics, to respond to changes in the fishery or resource and initiate a formal stock assessment on an accelerated timeline if necessary. The Addendum revises the management program's biological reference points to assess stock condition on a coastwide basis as recommended by the 2010 stock assessment.

In August 2014, the South Atlantic State/Federal Fisheries Management Board approved Addendum II to Amendment I to the Atlantic Croaker Fishery Management Plan (FMP). The Addendum establishes a new management framework (i.e., Traffic Light Approach or TLA) to evaluate fisheries trends and develop state-specified management actions (i.e., bag limits, size restrictions, time & area closures, and gear restrictions) when harvest and abundance thresholds are exceeded. The TLA is a statistically-robust way to incorporate multiple data sources (both fishery-independent and -dependent) into a single, easily understood metric for management advice. It is often used for data-poor species, or species which are not assessed on a frequent basis, such as blue crabs in North Carolina and snow crabs in the Gulf of St. Lawrence. As such, its serves as an excellent management tool for Atlantic croaker, which was last assessed in 2010.

The name comes from assigning a color (red, yellow, or green) to categorize relative levels of indicators on the condition of the fish population (abundance metric) or fishery (harvest metric). For example, as harvest or abundance increase relative to their long-term mean, the proportion of green in a given year will increase and as harvest or abundance decrease, the amount of red in that year becomes more predominant. Under the Addendum, state-specific management action would be initiated when the proportion of red exceeds specified thresholds (30% or 60%), for both harvest and abundance, over three consecutive years.

The current management triggers for Atlantic croaker compare annual changes in various indices (e.g. recent landings and survey information) to review trends in the fisheries. The Atlantic Croaker Technical Committee expressed concern that previous review methodology did not illustrate long-term trends in the stock nor did it include specific management measures to implement in response to declines in the stock or fishery. This resulted in the change to the TLA for annual review of Atlantic croaker. A new stock assessment for Atlantic croaker was begun in 2015 and the current management triggers from the TLA will be re-evaluated and adjusted as needed once the stock assessment has been completed.

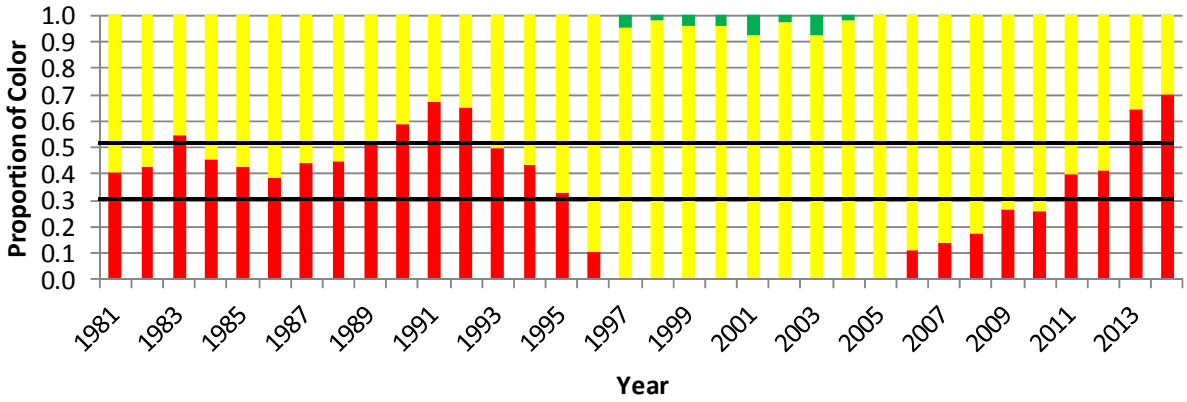
The indices used for the TLA include both commercial and recreational harvest (fishery dependent) and four fishery independent monitoring surveys that occur in different areas of the Atlantic coast of the United States. The fishery independent surveys include the Northeast Fisheries Science Center (NMFS) fall ground fish trawl survey, the Virginia Institute of Marine Science (VIMS) trawl survey, the North Carolina Dept. of Marine Fisheries trawl program 195, and the Southeast Area Monitoring Assessment Program (SEAMAP) trawl survey.

Traffic Light Analysis (Fishery Dependent)

Commercial Landings

- Commercial landings were down 41.2% from 2013 and were at one of the lowest levels of harvest since the 1960s.
- The TLA for commercial landings was above the 60% threshold for the second year in a row in 2014 (Fig. 1). This was the fourth year in a row where landings were above the 30%.
- The three year red proportion average was 58.7% which tripped the trigger for this index.

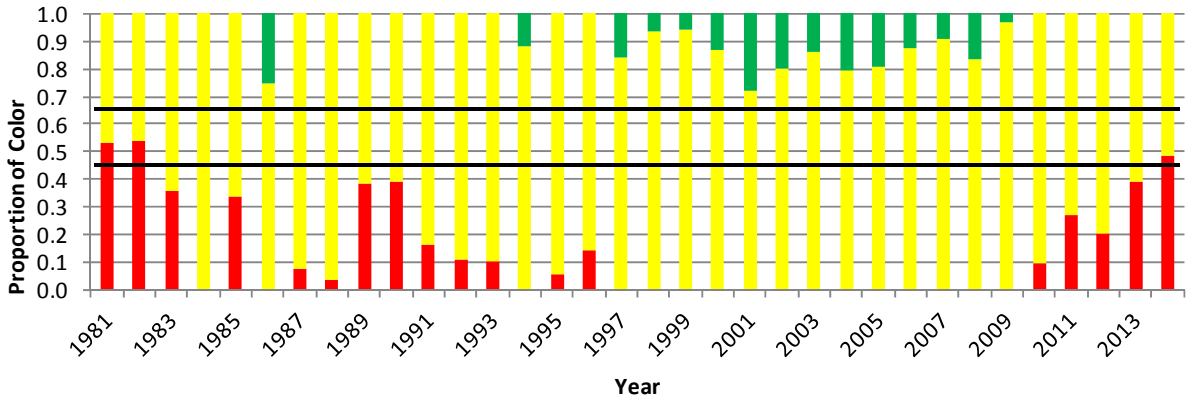
Figure 1. Annual TLA color proportions for Atlantic croaker commercial landings for the Atlantic coast of the US.



Recreational Harvest

- The recreational harvest index also continued to decrease in 2014, down 22.5% from 2013.
- The recreational harvest level in 2014 (3,092,699 lbs) was among the lowest annual harvests in the entire time series (1981-2014) and the only years with lower levels occurred in the first two years of the data series.
- Annual percent standard error (PSE) levels were elevated (> 20%) but not quite at the level where considered completely unreliable (> 50%).
- The proportion of red in the TLA for the last three years was 35.9% (Fig. 2), indicating the recreational index would have also triggered in 2014 at the 30% level. However, the red proportion was only above 30% for the last two years (2013-2014).

Figure 2. Annual TLA color proportions for Atlantic croaker from Atlantic coast (NJ-FL) recreational harvest of the U.S. based on a 1996-2008 reference period.

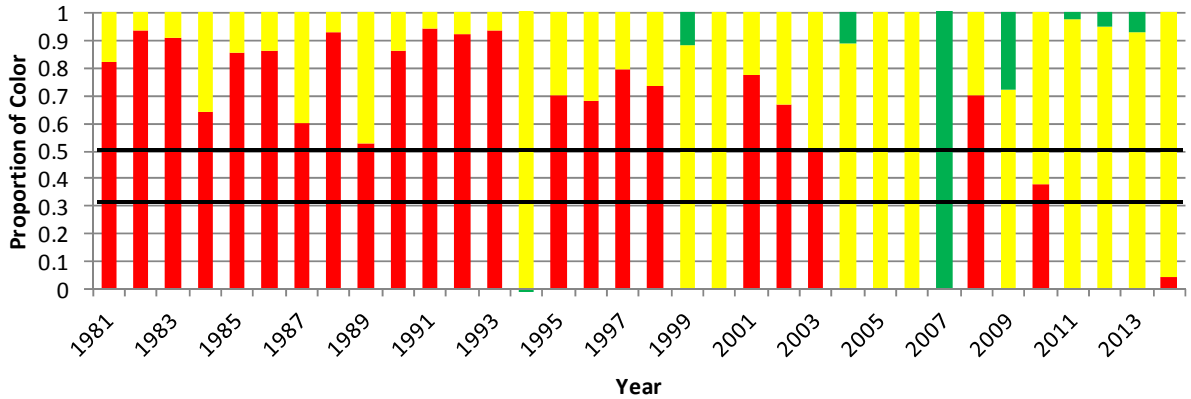


Traffic Light Analysis (Fishery Independent Surveys)

NEFSC/NMFS Fall Groundfish Survey

- The NMFS index declined ~22% in 2014 with only a small proportion of red in the TLA (Fig. 3).
- The index dropped just below the long term mean for the series (which was why there was some red in the TLA) for the first time since 2010 but was still at a relatively good index level.
- The TLA trigger would not have tripped on the NMFS index in 2014 given the high catch levels in the previous three years.

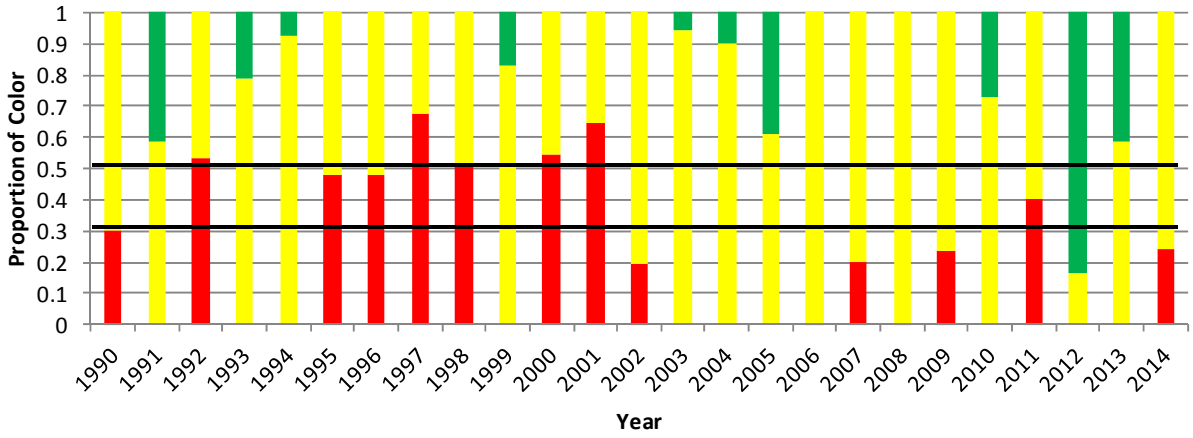
Figure 3. Annual TLA color proportions for Atlantic croaker from NMFS ground-fish trawl survey based on 1996-2008 reference period.



SEAMAP Survey

- The SEAMAP index declined for the second year in a row and was down 64.8% from 2013 and dropped below the long term mean but still remained above the red/yellow threshold (60% of long term mean).
- The red proportion in 2014 was 24.1% and was the first year since 2011 with any red in the TLA (Fig. 4).
- The TLA trigger for the SEAMAP survey did not trip in 2014.

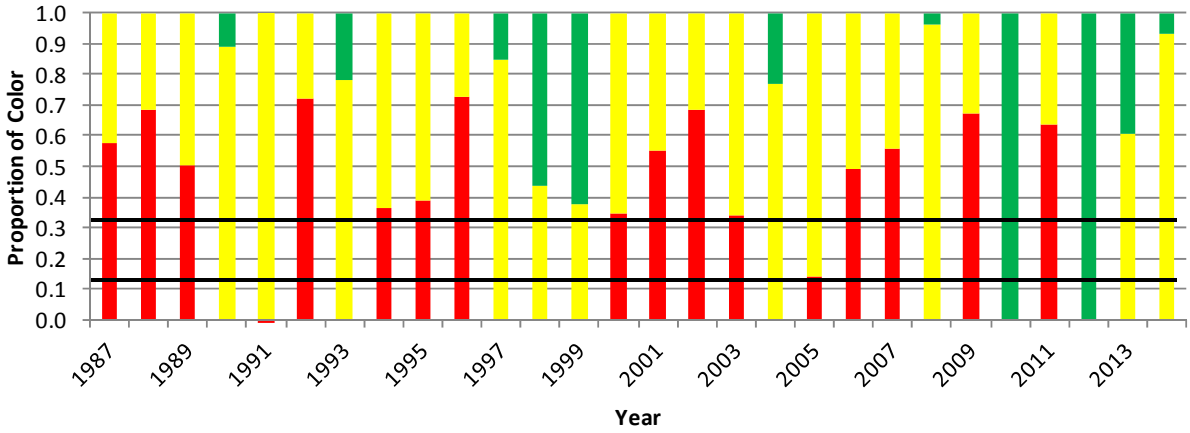
Figure 4. Traffic Light Model for SEAMAP catch data by weight



North Carolina Program 195

- The North Carolina index also declined in 2014 (down 64.3% from 2013) for the second year in a row, but did not drop below the long term mean for the data series.
- While the TLA indicates a declining trend for the last two years (decreasing green proportions, Figure 5), general catch levels in the index remained above the long term mean for the series and did not trigger in 2014.

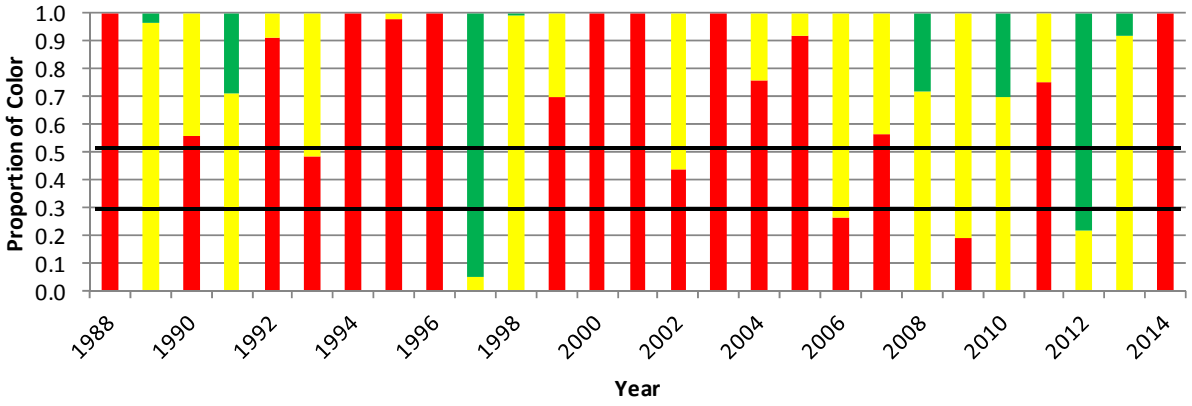
Figure 5. NCDMF Program 195 FTLA color proportions for Atlantic croaker



VIMS Survey

- The VIMS index dropped significantly (90.7%) in 2014 from 2013 and represented one of the lowest levels in the entire time series. The index dropped so much, that the TLA red proportion for 2014 was 100% red (Fig. 6).
- However, even with the precipitous decline in 2014, relative catch levels were high the two previous years (including a peak in 2012) so the index would not have tripped the TLA trigger.
- Even without tripping the TLA trigger, the decline in 2014 is concerning given the level to which it dropped.

Figure 6. Annual TLA color proportions for Atlantic croaker from VIMS spring trawl survey.

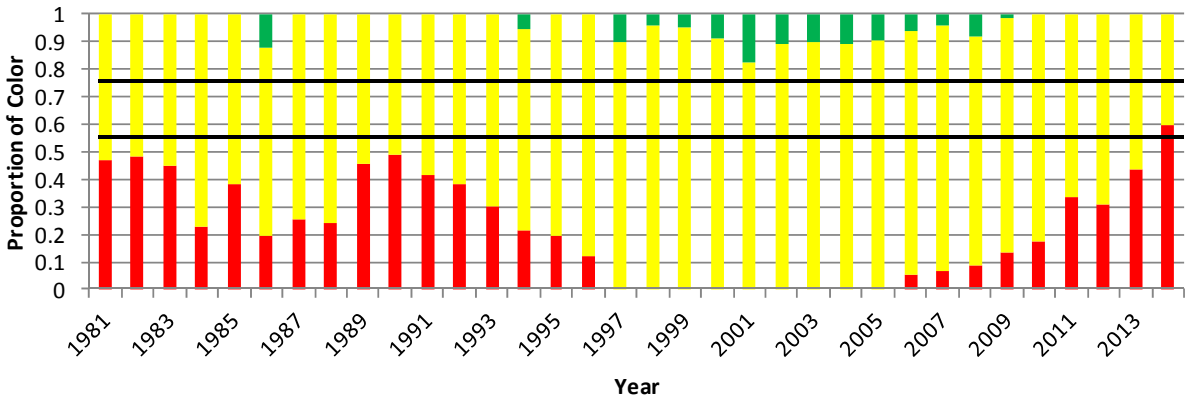


Traffic Light Analysis (Composite Indexes)

Harvest Composite Index

- The harvest composite TLA index indicates that the management response trigger would have been tripped for the second year in a row.
- The mean red proportion for this time period (2012-2014) was 44.5% which was well above the 30% threshold.

Figure 7. Annual color proportions for harvest composite TLA of Atlantic Croaker recreational and commercial landings



Abundance Composite Characteristic Indexes

The abundance composite TLA index was broken into two components based age composition. The adult composite index was generated from the NMFS and SEAMAP surveys since the majority of Atlantic croaker captured in those surveys were ages 1+. The juvenile composite index was generated from the NC program 195 and VIMS surveys because these two captured primarily young-of-the-year Atlantic croaker.

- All four abundance composite indexes showed declines in 2014 with red occurring in all but one (NC 195) of the TLA indexes.
- The adult composite TLA characteristic (Fig. 8) did not trigger in 2014 with only a 14.2% red proportion and no red in the two previous years.
- The juvenile composite TLA characteristic (Fig. 9) had a red proportion level above the 30% threshold in 2014, which was due to the precipitous drop in the VIMS index. While the NC 195 index did drop in 2014, it did not do so enough to bring it into the red zone.
- The juvenile composite characteristic index did not trip in 2014 due to the higher index values in 2012-2013 such that the three year red proportions were below the 30% threshold.
    - The higher annual variability for the different color proportions in the juvenile composite characteristic (compared to the adult composite characteristic) is likely a reflection of annual recruitment variability rather than population trends.
    - It is also worthwhile to point out that the trends in the two abundance composite characteristics reflect each other closely for the last three years with declining trends.

Figure 8. Adult croaker TLA composite characteristic index (NMFS and SEAMAP surveys).

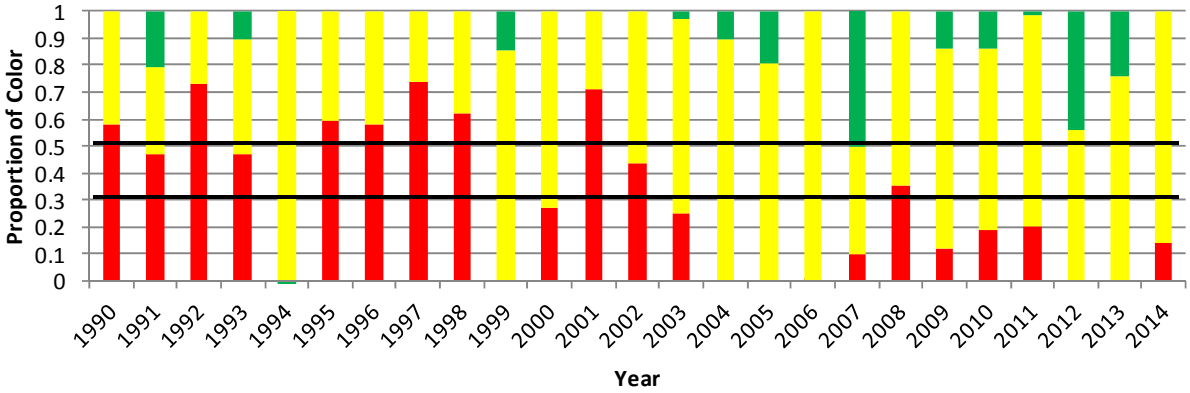
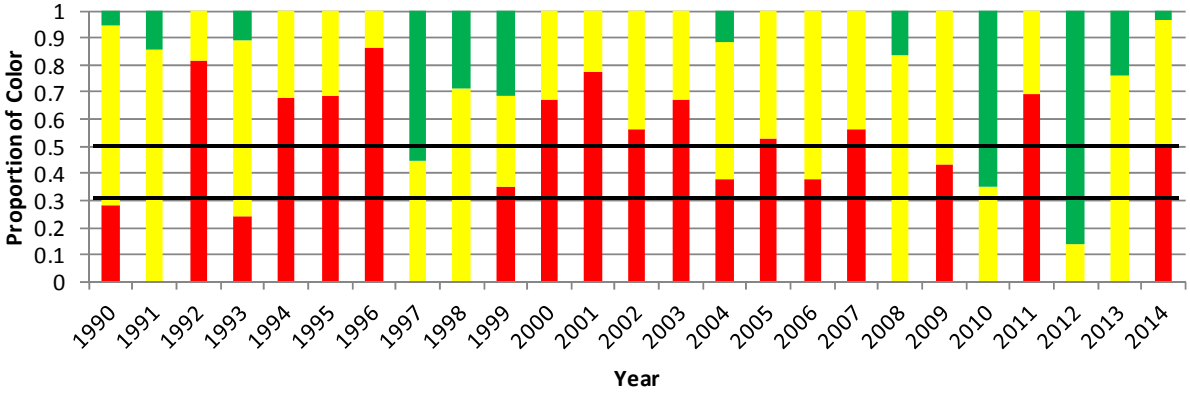


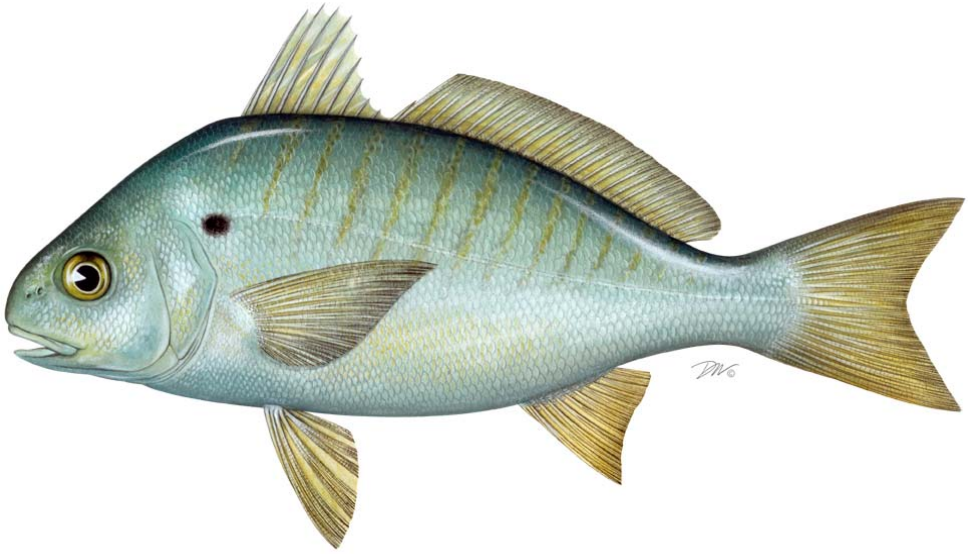
Figure 9. Juvenile croaker TLA composite characteristic index (NC 195 and VIMS surveys).



While the management triggers were not tripped in 2014, since not all of the composite characteristics showed red proportions of greater than 30% for the 2012-2014 time period, the declining trends in both the fishery independent indices as well as the drop in both commercial and recreational harvests for the Atlantic coast are of concern. The stock assessment, which has just gotten underway in 2015, will hopefully provide some answers on both the nature of these trends as well as general state of the Atlantic coast croaker stock.

2015 Traffic Light Analysis of Spot (*Leiostomus xanthurus)* for the Atlantic States Marine Fisheries Commission Fishery Management Plan Review

2014 Fishing Year



Plan Review Team

*Chris McDonough: South Carolina Dept. of Natural Resources
Kevin Brown: North Carolina Dept. of Marine Fisheries
Adam Kenyon: Virginia Marine Resources Commission
Harry Rickabaugh: Maryland Dept. of Natural Resources
Megan Ware: Atlantic States Marine Fisheries Commission (Chair)

*Prepared analysis and report

Introduction

Spot is managed under the Omnibus Amendment for Spot, Spotted Seatrout, and Spanish Mackerel (2011) and Addendum I (2014). The Omnibus Amendment updates all three species plans with requirements of the Commission's ISFMP Charter. No coastwide assessment has been performed for spot; however, spot are a target or component of several state surveys using trawls, gillnets, or seine nets. Abundance indices have been highly variable throughout the survey time series. The Commission has begun preparations for the development of the first coastwide benchmark stock assessment in 2015 for final presentation to the South Atlantic Management Board in 2016.

In the absence of a coastwide stock assessment, the South Atlantic Board approved Addendum I to the Spot FMP in 2014. The Addendum establishes use of a Traffic Light Analysis (TLA), similar to that used for Atlantic croaker, to evaluate fisheries trends and develop state-specified management actions (e.g., bag limits, size restrictions, time and area closures, and gear restrictions) when harvest and abundance thresholds are exceeded for two consecutive years. The TLA is a statistically-robust way to incorporate multiple data sources (both fishery-independent and -dependent) into a single, easily understood metric for management advice. It is often used for data-poor species, or species which are not assessed on a frequent basis. The name comes from assigning a color (red, yellow, or green) to categorize relative levels of indicators on the condition of the fish population (abundance metric) or fishery (harvest metric). For example, as harvest or abundance increase relative to their long-term mean, the proportion of green in a given year will increase and as harvest or abundance decrease, the amount of red in that year becomes more predominant. The TLA improves the management approach as it illustrates long-term trends in the stock and includes specific management recommendations in response to declines in the stock or fishery. Under the Addendum, state-specific management action would be initiated when the proportion of red exceeds specified thresholds (30% or 60%), for both harvest and abundance, over two consecutive years.

The current management triggers for spot compare annual changes in various indices (e.g. recent landings and survey information) to review trends in the fisheries. The spot Plan Review Team expressed concern that previous review methodology did not illustrate long-term trends in the stock nor did it include specific management measures to implement in response to declines in the stock or fishery. This resulted in the change to the TLA for annual review of spot. A new stock assessment for spot was begun in 2015 and the current management triggers from the TLA will be re-evaluated and adjusted as needed once the stock assessment has been completed.

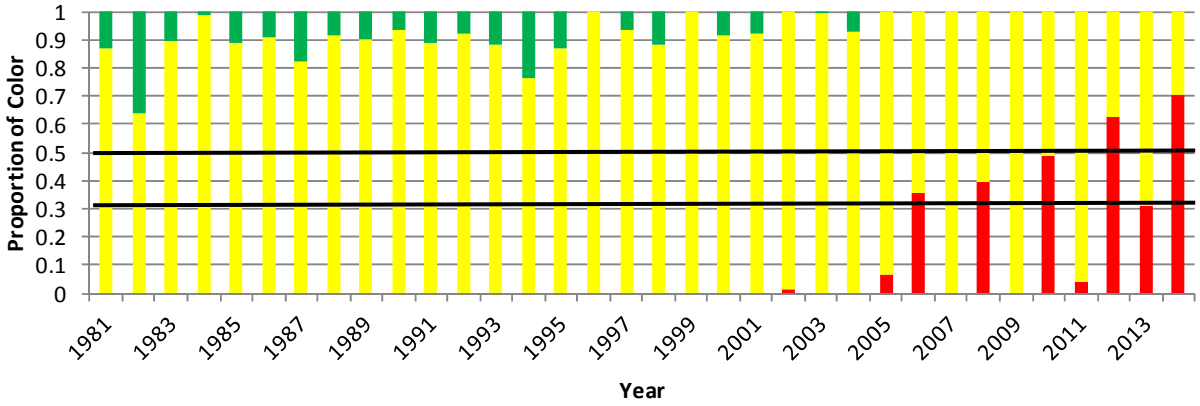
The indices used for the TLA include both commercial and recreational harvest (fishery dependent) and three fishery independent monitoring surveys that occur in different areas of the Atlantic coast of the United States. The fishery independent surveys include the Northeast Fisheries Science Center (NMFS) fall ground fish trawl survey, the Maryland Dept. of Natural Resources juvenile striped bass seine survey, and the Southeast Area Monitoring Assessment Program (SEAMAP) trawl survey.

Traffic Light Analysis (Fishery Dependent)

Commercial

- Commercial landings for spot on the Atlantic coast were down 76% in 2014, continuing a declining trend that has been going on since 2004. While annual landings are highly variable in a relatively short lived species like spot, the apparent magnitude of the decline has increased in the last five years.
- The TLA for commercial landings generally did not show any red in the index until 2005 when the decline began (Fig. 1), after which it has steadily increased over alternating years.
- The TLA index tripped at the 30% level in 2014, and would have also been tripped in the two previous years at that level if the TLA scheme had been in place. The previous management trigger scheme (10th percentile trigger) did not trigger in either of the two previous years.

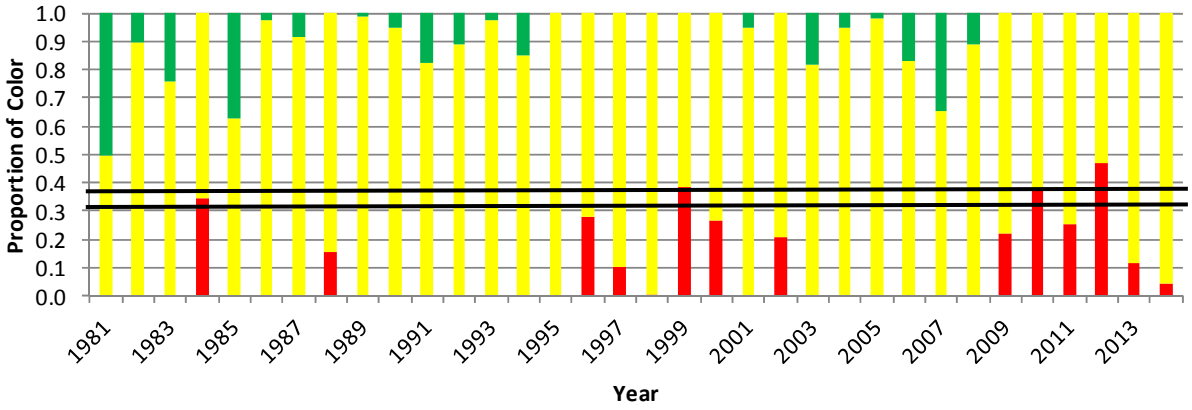
Figure 1. Annual FTLA color proportions using 1981-2012 reference time period for Spot from NMFS commercial landings for the Atlantic coast of the U.S.



Recreational

- The recreational harvest (in lbs) for spot on the Atlantic coast increased slightly (~10%) in 2014 from 2013.
- Annual harvest in the recreational fishery has been below the long term mean (LTM) since 2009 and was still below that threshold in 2014.
- There were two periods of general decline in the time series which occurred from 1995-2002 and 2009-2014 (Fig. 2).
- The red proportion of the TLA decreased in 2014 to 4.5% and would not have tripped the trigger in 2014.
- However, in previous years, the trigger would have tripped in 2011 and 2012 at the 30% threshold.

Figure 2. Annual TLA color proportions using 1989-2012 reference period for spot from recreational harvest in LBS on the Atlantic coast of the U.S.

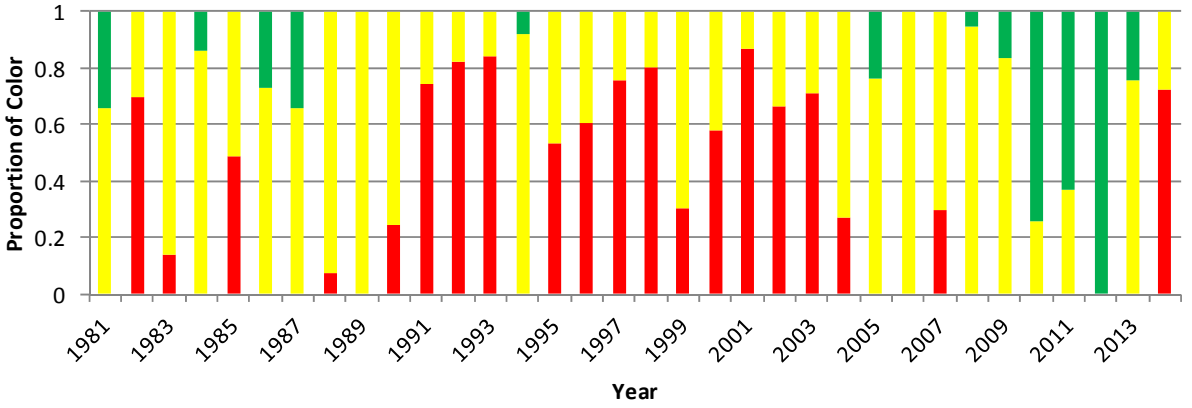


Traffic Light Analysis (Fishery Independent)

NEFSC/NMFS Fall Groundfish Trawl Survey

- The NMFS index declined significantly (90.2%) in 2014 from 2013. This annual decrease followed another large decline (64.2%) that occurred in 2013. Both of these declines followed the peak year (2012) that occurred in the entire time series (1972-2014).
- The longest time period with high red proportions in the TLA occurred from 1990-2003 (Fig. 3), after which catch steadily increased until the peak in 2012. Higher proportions of green in the index did not occur until 2010-2012 when the catch was well above the LTM.
- The TLA did trip the trigger in 2014 at the 30% level with the two year average red proportion at 36% high. This was due to the very high proportion of red in 2014 (72.5%) due to the sharp drop in CPUE.

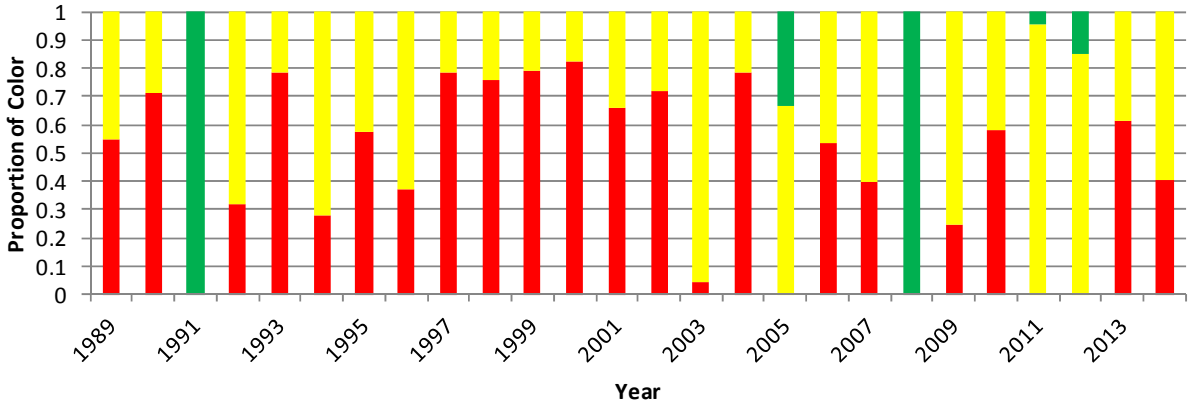
Figure 3. Annual FTLA color proportions for spot from NMFS fall groundfish survey using 1989-2012 reference time period.



SEAMAP Trawl Survey

- While annual CPUE did increase in 2014, it still remained below the LTM and thus still had a red proportion of 40.3%.
- The TLA index did trigger in both 2013 and 2014 with two year combined red proportions of 30.6% and 59.0% respectively.
- Examining previous years under the TLA scheme, the trigger would have been tripped in most years except for 2008, 2009, 2010 and 2011.

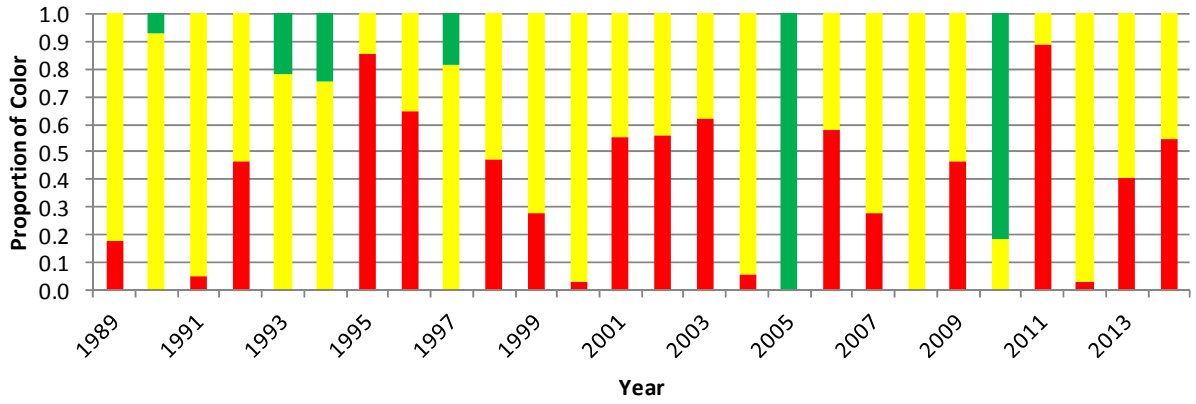
Figure 4. Annual FTLA color proportions for spot from SEAMAP survey using 1989-2012 reference time period.



Maryland Juvenile Striped Bass Survey

- Since the Maryland survey was the only juvenile index used in the trigger exercise it was used by itself to compare to the other two composite characteristic indexes (harvest and abundance).
- The Maryland CPUE declined 25% in 2014 resulting in a red proportion in the TLA index of 54% (Fig. 5). This was the third year in a row of decline in the index.
- Mean annual CPUE was only above the LTM twice since 1998 with peak years occurring in 2005 and 2010. The large fluctuations in CPUE (and alternating red and green proportions in the TLA) were likely due to changes in annual recruitment and year-class strength rather than population changes as this is a juvenile fish index.
- The TLA trigger did trip in 2014 at the 30% threshold. In previous years of the index, the trigger would have also tripped in almost all of the years from 1995-2013 except in the two peak years of 2005 and 2010.

Figure 5. Annual TLA color proportions for the Maryland seine survey juvenile index using 1990-2012 reference period.

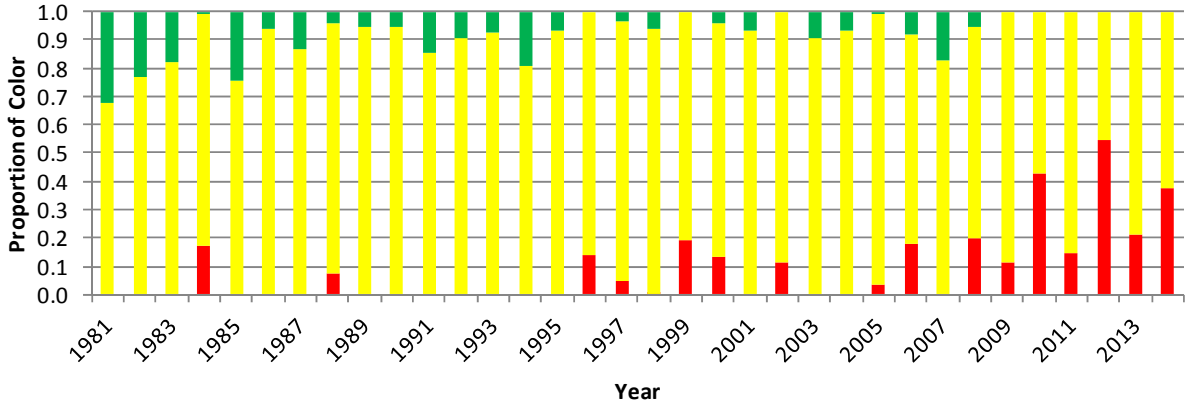


Traffic Light Analysis (Composite Indexes)

Harvest Composite Characteristic Index

- The harvest composite characteristic TLA showed a general decline beginning in 2005 (Fig. 6).
- The composite characteristic did not quite trip in 2014 with the mean red proportion of 29.4% for 2013-2014. However, the index did trip in 2013 (38.1%) and 2012 (34.8%).
- The decline in the composite index was driven mostly by the decline in commercial landings rather than the recreational harvest.

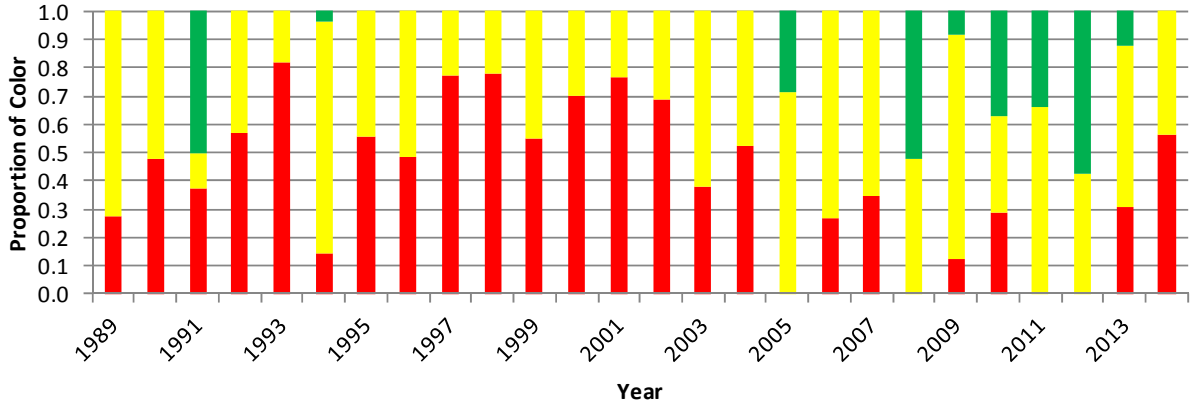
Figure 6. Annual TLA color proportions for composite commercial and recreational harvest of spot for the Atlantic coast of the United States using a 1989-2012 reference period.



Abundance Composite Characteristic Index

- The TLA composite characteristic for adult spot (NMFS and SEAMAP surveys) was run using the 1989-2014 time period since that was when the two surveys overlapped.
- The TLA composite characteristic did trigger in 2014 with a mean red proportion for 2013-2014 of 43.5% (Fig 7). This isn't surprising given the drop in annual catch levels in both indexes for the last two years.
- During past years, the index would have tripped most years from 1989 to 2004 given the proportions of red in the index above the 30% threshold (Fig. 7).

Figure 7. Annual TLA color proportions for composite index of NMFS and SEAMAP surveys for Spot using a 1989-2012 reference period.



The TLA composite characteristic indexes tripped for both adult and juvenile spot and came very close to the 30% threshold in the harvest composite index (29.4%). Additionally given that all of the composite characteristics showed increasing red proportions in the last two years there does seem to be cause for concern with spot. The stock assessment, which has just gotten underway in 2015, will hopefully provide some answers on both the nature of these trends as well as the general state of the Atlantic coast spot stock.

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

July 14, 2015

To: **South Atlantic State-Federal Management Board**

From: **Atlantic Croaker and Spot Stock Assessment Subcommittee**

RE: **Draft Terms of Reference for 2016 Atlantic Croaker Benchmark Stock Assessment**

The next Atlantic Croaker Stock Assessment is scheduled to be completed in 2016. In order to meet this deadline, work must begin on the assessment this fall. The Board will need to approve Terms of Reference at the August 2015 South Atlantic Board Meeting. The Atlantic Croaker and Spot Stock Assessment Subcommittee has recommended the Board consider the following Terms of Reference for the assessment and as well as the Peer Review Panel:

Draft Terms of Reference for the 2016 Atlantic Croaker Benchmark Stock Assessment

1. Characterize uncertainty of fishery-dependent and fishery-independent data used in the assessment, including the following but not limited to:
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, potential explanation for outlying or anomalous data)
    b. Describe calculation and potential standardization of abundance indices.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors)
    d. Justify inclusion or elimination of available data sources.
    e. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivity, aging accuracy, sample size) on model inputs and outputs.
2. Review estimates and PSEs of MRIP recreational fishing estimates. Request participation of MRIP staff in the data workshop process to compare historical and current data collection and estimation procedures and to describe data caveats that may affect the assessment.
3. Develop estimates of Atlantic croaker discards in the South Atlantic shrimp trawl fishery. Develop estimates of bycatch and discards in other fisheries where possible. Characterize uncertainty of all discard and bycatch estimates.
4. Develop models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, and analyze model performance.
    a. Describe stability of model (e.g., ability to find a stable solution, invert Hessian)
    b. Justify choice of CVs, effective sample sizes, or likelihood weighting schemes.
    c. Perform sensitivity analyses for starting parameter values, priors, etc. and conduct other model diagnostics as necessary.
    d. Clearly and thoroughly explain model strengths and limitations.

    e. Briefly describe history of model usage, its theory and framework, and document associated peer-reviewed literature. If using a new model, test using simulated data.
    f. If multiple models were considered, justify the choice of preferred model and the explanation of any differences in results among models.
5. State assumptions made for all models and explain the likely effects of assumption violations on synthesis of input data and model outputs. Examples of assumptions may include (but are not limited to):
    a. Choice of stock-recruitment function.
    b. Calculation of M. Choice to use (or estimate) constant or time-varying M and catchability.
    c. Choice of equilibrium reference points or proxies for MSY-based reference points.
    d. Choice of a plus group for age-structured species.
    e. Constant ecosystem (abiotic and trophic) conditions.
6. Characterize uncertainty of model estimates and biological or empirical reference points.
7. Perform retrospective analyses, assess magnitude and direction of retrospective patterns detected, and discuss implications of any observed retrospective pattern for uncertainty in population parameters (e.g., F, SSB), reference points, and/or management measures.
8. Recommend stock status as related to reference points (if available). For example:
    a. Is the stock below the biomass threshold?
    b. Is F above the threshold?
9. Other potential scientific issues:
    a. Compare trends in population parameters and reference points with current and proposed modeling approaches, including recent results of the Traffic Light Approach. If outcomes differ, discuss potential causes of observed discrepancies.
    b. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies.
10. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority.
11. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.
12. Recommend timing of next benchmark assessment and intermediate updates, if necessary relative to biology and current management of the species.

Terms of Reference for Peer Review Panel

1. Evaluate the thoroughness of data collection and the presentation and treatment of fishery-dependent and fishery-independent data in the assessment, including the following but not limited to:
    a. Presentation of data source variance (e.g., standard errors).
    b. Justification for inclusion or elimination of available data sources,

    c. Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivity, aging accuracy, sample size),
    d. Calculation and/or standardization of abundance indices.
2. Evaluate methods used to develop discard and bycatch estimates.
3. Evaluate the methods and models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, including but not limited to:
    a. Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of the species?
    b. If multiple models were considered, evaluate the analysts' explanation of any differences in results.
    c. Evaluate model parameterization and specification (e.g., choice of CVs, effective sample sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, plus group treatment).
4. Evaluate the diagnostic analyses performed, including but not limited to:
    a. Sensitivity analyses to determine model stability and potential consequences of major model assumptions
    b. Retrospective analysis
5. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.
6. If a minority report has been filed, review minority opinion and any associated analyses. If possible, make recommendation on current or future use of alternative assessment approach presented in minority report.
7. Recommend best estimates of stock biomass, abundance, and exploitation from the assessment for use in management, if possible, or specify alternative estimation methods.
8. Evaluate the choice of reference points and the methods used to estimate them. Recommend stock status determination from the assessment, or, if appropriate, specify alternative methods/measures.
9. Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.
10. Recommend timing of the next benchmark assessment and updates, if necessary, relative to the life history and current management of the species.
11. Prepare a peer review panel terms of reference and advisory report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within 4 weeks of workshop conclusion.

If you have any questions, please contact Megan Ware at mware@asmfc.org or (703) 842 0740

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

July 14, 2015

To: **South Atlantic State-Federal Management Board**

From: **Atlantic Croaker and Spot Stock Assessment Subcommittee**

RE: **Draft Terms of Reference for 2016 Spot Benchmark Stock Assessment**

The next Spot Stock Assessment is scheduled to be completed in 2016. In order to meet this deadline, work must begin on the assessment this fall. The Board will need to approve Terms of Reference at the August 2015 South Atlantic Board Meeting. The Atlantic Croaker and Spot Stock Assessment Subcommittee has recommended the Board consider the following Terms of Reference for the assessment and as well as the Peer Review Panel:

Terms of Reference for the 2016 ASMFC Spot Benchmark Stock Assessment

1. Characterize uncertainty of fishery-dependent and fishery-independent data used in the assessment, including the following but not limited to:
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, potential explanation for outlying or anomalous data)
    b. Describe calculation and potential standardization of abundance indices.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors)
    d. Justify inclusion or elimination of available data sources.
    e. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivity, aging accuracy, sample size) on model inputs and outputs.
2. Review estimates and PSEs of MRIP recreational fishing estimates. Request participation of MRIP staff in the data workshop process to compare historical and current data collection and estimation procedures and to describe data caveats that may affect the assessment.
3. Develop estimates of spot discards in the South Atlantic shrimp trawl fishery. Develop estimates of bycatch and discards in other fisheries where possible. Characterize uncertainty of all discard and bycatch estimates.
4. Develop models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, and analyze model performance.
    a. Describe stability of model (e.g., ability to find a stable solution, invert Hessian)
    b. Justify choice of CVs, effective sample sizes, or likelihood weighting schemes.
    c. Perform sensitivity analyses for starting parameter values, priors, etc. and conduct other model diagnostics as necessary.
    d. Clearly and thoroughly explain model strengths and limitations.
    e. Briefly describe history of model usage, its theory and framework, and document associated peer-reviewed literature. If using a new model, test using simulated data.

    f. If multiple models were considered, justify the choice of preferred model and the explanation of any differences in results among models.
5. State assumptions made for all models and explain the likely effects of assumption violations on synthesis of input data and model outputs. Examples of assumptions may include (but are not limited to):
    a. Choice of stock-recruitment function.
    b. Calculation of M. Choice to use (or estimate) constant or time-varying M and catchability.
    c. Choice of equilibrium reference points or proxies for MSY-based reference points.
    d. Choice of a plus group for age-structured species.
    e. Constant ecosystem (abiotic and trophic) conditions.
6. Characterize uncertainty of model estimates and biological or empirical reference points.
7. Perform retrospective analyses, assess magnitude and direction of retrospective patterns detected, and discuss implications of any observed retrospective pattern for uncertainty in population parameters (e.g., F, SSB), reference points, and/or management measures.
8. Recommend stock status as related to reference points (if available). For example:
    a. Is the stock below the biomass threshold?
    b. Is F above the threshold?
9. Other potential scientific issues:
    a. Compare trends in population parameters and reference points with recent results of the Traffic Light Approach. If outcomes differ, discuss potential causes of observed discrepancies.
    b. Compare reference points derived in this assessment with what is known about the general life history of the exploited stock. Explain any inconsistencies.
10. If a minority report has been filed, explain majority reasoning against adopting approach suggested in that report. The minority report should explain reasoning against adopting approach suggested by the majority.
11. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.
12. Recommend timing of next benchmark assessment and intermediate updates, if necessary relative to biology and current management of the species.

Terms of Reference for Peer Review Panel

Evaluate the thoroughness of data collection and the presentation and treatment of fishery-dependent and fishery-independent data in the assessment, including the following but not limited to:

a. Presentation of data source variance (e.g., standard errors).
b. Justification for inclusion or elimination of available data sources,
c. Consideration of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivity, aging accuracy, sample size),
d. Calculation and/or standardization of abundance indices.

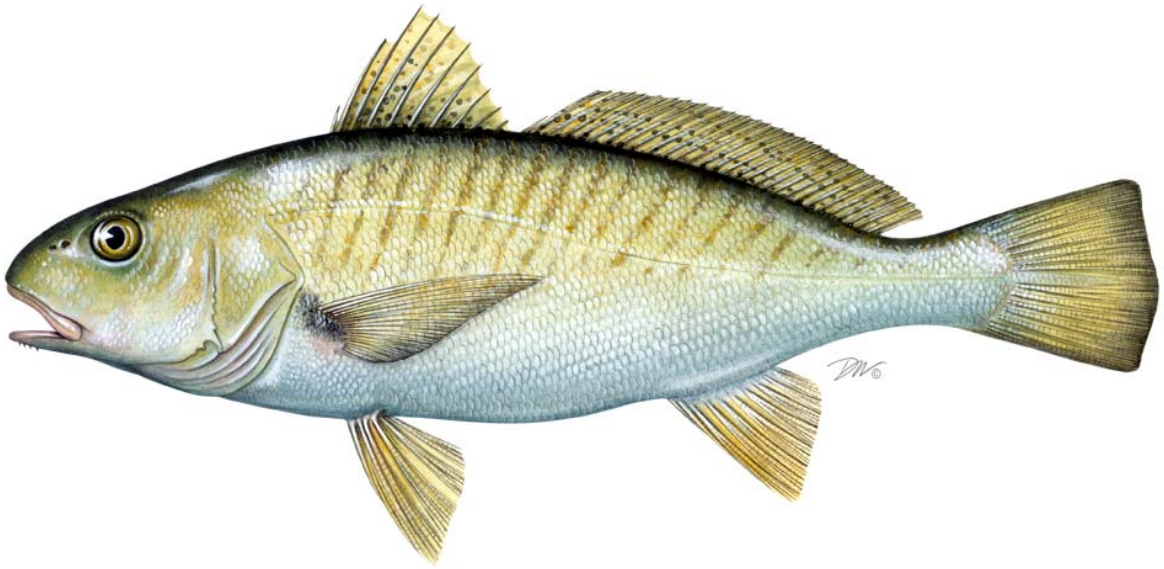
2. Evaluate methods used to develop discard and bycatch estimates.
3. Evaluate the methods and models used to estimate population parameters (e.g., F, biomass, abundance) and biological reference points, including but not limited to:
    a. Evaluate the choice and justification of the preferred model(s). Was the most appropriate model (or model averaging approach) chosen given available data and life history of the species?
    b. If multiple models were considered, evaluate the analysts' explanation of any differences in results.
    c. Evaluate model parameterization and specification (e.g., choice of CVs, effective sample sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, plus group treatment).
4. Evaluate the diagnostic analyses performed, including but not limited to:
    a. Sensitivity analyses to determine model stability and potential consequences of major model assumptions
    b. Retrospective analysis
5. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.
6. If a minority report has been filed, review minority opinion and any associated analyses. If possible, make recommendation on current or future use of alternative assessment approach presented in minority report.
7. Recommend best estimates of stock biomass, abundance, and exploitation from the assessment for use in management, if possible, or specify alternative estimation methods.
8. Evaluate the choice of reference points and the methods used to estimate them. Recommend stock status determination from the assessment, or, if appropriate, specify alternative methods/measures.
9. Review the research, data collection, and assessment methodology recommendations provided by the TC and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.
10. Recommend timing of the next benchmark assessment and updates, if necessary, relative to the life history and current management of the species.
11. Prepare a peer review panel terms of reference and advisory report summarizing the panel's evaluation of the stock assessment and addressing each peer review term of reference. Develop a list of tasks to be completed following the workshop. Complete and submit the report within 4 weeks of workshop conclusion.

If you have any questions, please contact Megan Ware at mware@asmfc.org or (703) 842 0740

2015 REVIEW OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
FISHERY MANAGEMENT PLAN FOR

ATLANTIC CROAKER
(Micropogonias undulatus)

2014 FISHING YEAR



Atlantic Croaker Plan Review Team
Wilson Laney, Ph.D., United States Fish and Wildlife Service
Adam Kenyon, Virginia Marine Resources Commission
Chris McDonough, South Carolina Department of Natural Resources
Jason Rock, North Carolina Department of Marine Fisheries
Megan Ware, Atlantic States Marine Fisheries Commission, Chair

Table of Contents

I. Status of the Fishery Management Plan

Date of FMP Approval: Original FMP – October 1987

Amendments: Amendment 1 – November 2005 (implemented January 2006)
Addendum I – March 2011
Addendum II – August 2014

Management Areas: The Atlantic coast distribution of the resource from New Jersey through Florida

Active Boards/Committees: 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) reviewed the FMP and found its recommendations to be vague. As a result, the Board recommended 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 to conduct the first coastwide stock assessment of the species in preparation of 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 the 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 is 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.
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, including the states Florida through South Carolina; and the mid-Atlantic region, including the states 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 X F_{MSY} (estimated to be 0.29); SSB threshold = 0.7 X 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 is an overfished status determination, and an F estimate above the F threshold resulted is an overfishing status determination. The Amendment established that the Board would take action, including a stock rebuilding schedule if necessary, should the BRPs indicate an overfished stock or a stock subject to overfishing.

Amendment 1 did not require any specific measures restricting recreational or commercial harvest of Atlantic croaker. States with more conservative measures were encouraged to maintain those regulations (Table 1). Through adaptive management, the Management Board may revise Amendment 1, and regulatory and/or monitoring requirements could be included in the resulting addendum, 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 based on a coastwide unit, rather than the two management units established within Amendment I. In approving Addendum I, the Management Board endorsed the consolidation of 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.

Addendum I did not add or change any additional management measures or requirements. The only existing requirement is for states to submit an annual compliance report by July 1 of each year that contains commercial and recreational landings as well as results from any monitoring programs that intercept Atlantic croaker.

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 abundances thresholds of 30% and 60% were established in Addendum II, representing 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. Under the previous management scheme, action was taken if recreational and commercial landings dropped below 70% of the previous two year average. These triggers, however, were limited in their ability to illustrate long-term declines or increases in stock abundance. In contrast, the TLA approach better illustrates trends in the fishery through changes in the proportion of green, yellow, and red coloring.

II. Status of the Stock

Stock status is based on the data and results of the 2010 stock assessment (ASMFC 2010). Results include revised biological reference points (below). These reference points are ratio-based and apply to the entire coastwide resource (unlike those in Amendment 1). Overfishing is occurring if F/F_{MSY} is greater than 1 and the stock is considered overfished if $SSB/(SSB_{MSY}(1-M))$ is less than 1.

	Overfishing Definition	Overfished Definition
Target	$F/(F_{MSY}*0.75) = 1$	$SSB/SSB_{MSY} = 1$
Threshold	$F/F_{MSY} = 1$	$SSB/(SSB_{MSY}(1-M)) = 1$

Atlantic croaker is not experiencing overfishing. According to the 2010 stock assessment, biomass has been increasing and fishing mortality decreasing since the late 1980s. Biomass conclusions are based on information from the data compiled for the assessment, namely increasing indices of relative abundance and expanding age structure in the catch and indices. Model estimated values of fishing mortality (F), spawning stock biomass (SSB), and biological reference points are too uncertain to be used to determine stock status. However, the ratio of F to F_{MSY} (the F needed to produce maximum sustainable yield) is reliable and can be used to determine that overfishing is not occurring. It is not possible to be confident with regard to stock status, particularly a biomass determination, until the discards of Atlantic croaker from the South Atlantic shrimp trawl fishery can be adequately estimated and incorporated into the stock assessment.

Absolute estimates of total F are unavailable because of model uncertainty; however, the general trend in total F from the model is considered reliable due to support from the data. The trend in total F decreases substantially during the first five years of the time series (1988-1992) and shows an overall decline over the remainder of the time series, except for occasional, brief spikes (Figure 1). Retrospective analysis of the model showed that estimates of F decreased as more years of data were used. A series of sensitivity runs conducted over a range of plausible values of shrimp-trawl fishing mortality found that the ratio of directed fishing mortality to F_{MSY} was less than one in all cases, indicating overfishing was not occurring.

Absolute estimates of SSB are unavailable because of model uncertainty; however, the general trend in SSB from the model is considered reliable due to support from the data. Spawning stock biomass shows a nearly consistent increasing trend since 1998 (Figure 2). Sensitivity runs of the model, including rough estimates of shrimp trawl discards, do not change the overall trend in SSB. Retrospective analysis of the model showed that estimates of SSB increased as more years of data were used.

Recruitment, estimated in the model as age-1 abundance, has been variable but generally increasing over the time series. Figure 2 shows the trend in recruitment; absolute values are omitted because of uncertainty in abundance estimates. The model estimated the production of strong year classes in 1997, 2001, and 2007.

III. Status of the Fishery

Total Atlantic croaker harvest from New Jersey through the east coast of Florida in 2014 is estimated at 10.08 million pounds (Tables 2 and 3, Figure 3). This represents a 75% decline in total harvest since the peak of 41.2 million pounds in 2001 (77% commercial decline, 72% recreational decline). The commercial and recreational fisheries harvested 70% and 30% of the total, respectively. The vast majority of landings are from the Mid-Atlantic region (97% in 2014), and the recent decline in total landings is a result of both commercial and recreational landings declines in that region, although some states showed increases in either or both sectors (Figure 4). Commercial and recreational landings in the South Atlantic region have been generally stable over the last decade; however, 2010 showed large decreases in the recreational harvest of the South Atlantic states' fisheries. Recreational and commercial harvests in the South Atlantic region rose to 2.7% of coastwide harvest in 2014 from 2.3% in 2013.

Atlantic coast commercial landings of Atlantic croaker exhibit a cyclical pattern, with low domains in the 1960s to early 1970s and the 1980s to early 1990s, and high domains in the mid-to-late 1970s and the mid-1990s to 2011 (Figure 3). Commercial landings increased from a low of 3.7 million pounds in 1991 to 30.1 million pounds in 2001 (Table 2); however, landings have declined consistently since 2003 to 7.0 million pounds in 2014, which registers below the 1960-2014 average of 13.45 million pounds. Within the management unit, the majority of 2014 commercial landings came from Virginia (49%) and North Carolina (37%). Maryland had the next highest level, with 7% of coastwide landings.

From 1981-2014, recreational landings of Atlantic croaker from New Jersey through Florida have varied between 2.8 million fish (1.3 million pounds) and 13.2 million fish (11.1 million pounds; Tables 3 and 4, Figure 5). Landings generally increased until 2001, held stable from 2001-2006 before exhibiting a declining trend from 2007 through 2014. The 2014 landings are estimated at 6.2 million fish and 3.06 million pounds. Virginia was responsible for 55% of the 2014 recreational landings, in numbers of fish, followed by Maryland (17.5%), and Delaware (5.8%). This is change from 2013 when New Jersey accounted for 11% of recreation catch, in numbers of fish. The number of recreational releases has increased over the time series, but appears to be in decline since 2008 (Figure 5). In 2014, anglers released roughly 10 million fish, a decline from the 14 million fish released in 2013. Anglers released an estimated 62% of the croaker catch in 2014 (Figure 5).

IV. Status of Assessment Advice

A statistical catch-at-age (SCA) model was used in the last Atlantic croaker stock assessment (ASMFC 2010). This model combines the 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 Review Panel was unable to support some of the assessment results due to uncertainty regarding the estimation of Atlantic croaker discards in the shrimp trawl fishery, and the application of estimates in modeling. 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. Adequate discard estimates cannot be developed from currently available data and assessments of Atlantic croaker will be unreliable until adequate estimates are properly incorporated into modeling. Despite the uncertainty in assessment results caused by shrimp trawl bycatch, the Review Panel concluded that it is unlikely that the stock is in trouble. The stock is not experiencing overfishing, biomass has been trending up, commercial catches are stable, and discards from the shrimp trawl fishery have been much reduced.

In conjunction with recommending the TLA for Atlantic croaker in 2014, the Plan Review Team also recommended the species for a stock assessment. The next benchmark stock assessment is scheduled for 2016.

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. The following fishery-dependent (other than catch and effort data) and fishery-independent monitoring programs were reported in the 2015 compliance reports.

Fishery-Dependent Monitoring

- New Jersey: initiated biological monitoring of commercially harvested Atlantic croaker in 2006 in conjunction with ACCSP (2014: n=27)
- Maryland: commercial pound net fishery biological sampling (1,436 length measurements, 193 samples aged in 2014); Maryland Charter Boat CPUE (1993-present; 2014 catch was a time-series low of 82,387)
- Delaware: collects information on pounds landed, area fished, effort, and gear type data through mandatory monthly state logbook reports submitted by fishermen.
- PFRC: has a mandatory commercial harvest daily reporting system.
- Virginia: commercial fishery biological sampling (6,976 length measurements, 6,975 weight measurements, 364 otolith ages, and 666 sex determinations in 2014)
- North Carolina: commercial fishery biological sampling since 1982 for length, weight, otolith, sex determination, and reproductive condition.
- South Carolina: recreational fishery biological sampling via SCDNR State Finfish Survey, MRIP, and a SCDNR-managed mandatory trip reporting system for licensed charter boat operators. In 2013, SCDNR took over MRIP data collection in SC.
- Georgia: collects biological information through the Marine Sportfish Carcass Recovery Project (4 fish in 2014)
- Florida: commercial fishery biological sampling (27 length measurements in 2014)

Fishery-Independent Monitoring

- New Jersey: 3 nearshore ocean (within 12 nm) juvenile trawl surveys (New Jersey Ocean Trawl Survey 1988-present; 2014 CPUE above time-series average but below 2013 value; nearshore Delaware Bay juvenile trawl survey (1991-present; 2014 survey index was well below time series average); Delaware River juvenile seine survey (1980-present; 2014 survey index was below time series average but above 2013 value)

- Delaware: offshore Delaware Bay adult finfish trawl survey (1990-present; 2014 #/tow = 2.456; 82% decrease in relative abundance from 2013 index, dropping below mean and median for time series); nearshore Delaware Bay juvenile finfish trawl survey (1980-present; 2014 index increased from 1.16 in 2013 to 6.63; Inland Bays index increased from 1.83 in 2013 to 3.22 in 2014)
- Maryland: Atlantic coast bays juvenile otter trawl survey (standardized from 1989-present; 2014 GM of 0.67 fish/hectare before time series mean of 1.62); Chesapeake Bay juvenile trawl survey (standardized from 1989-present; 2014 CPUE decreased from 2.24 in 2013 to 0.97); incidental catches in Maryland coastal bays juvenile seine survey (1972-present) and Chesapeake Bay juvenile seine survey (1959-present; 2014 indices decreased from 0.30 in 2013 to 0.00).
- Virginia: VIMS Juvenile Finfish and Blue Crab Trawl Survey (1988-present; 2014 index representing the 2013 year class was 1.550 which is down from the 2013 value of 16.6655.)
- North Carolina: Pamlico Sound juvenile trawl survey (1987-present; 2014 juvenile abundance index (mean number of individuals/tow) was 324, below the time series average)
- South Carolina: estuarine electroshock survey for juveniles (2001-present; 2014 CPUE 61.5% from 2013); SEAMAP shallow water (15-30 ft) trawl survey from Cape Hatteras to Cape Canaveral (1989-present; 2014 CPUE decreased 64.8% from 2013); inshore estuarine trammel net survey for adults (May-September, 1991-present; 2014 CPUE decreased 25.1% from 2013); SCECAP estuarine trawl survey (1999-present, primarily targets juveniles, CPUE stable since 2010).
- Georgia: Marine Sportfish Population Health Survey (trammel and gill net, 2002-present;); Ecological Monitoring Survey (trawl, 2003-present; 2014 n = 21,340; CPUE decreased from 347.78 in 2012 to 171.69 in 2014); Trammel and gill net surveys in the Altamaha River Delta and Wassaw estuary (2014: n=139)
- Florida: juvenile seine survey (2002-present; 2014 index continued variable trend with a decrease from 2013); juvenile trawl survey (2002-present; 2014 index continued variable trend with a decrease from 2013); adult haul seine survey (2001-present; 2014 index value increased from 2013)

The Northeast Fishery Science Center performs a randomly stratified groundfish survey along the U.S. east coast. Atlantic croaker are one of the main species caught throughout much of the survey area and, since the surveys started in 1972, it provides a long term data set. Regionally, mean CPUE of Atlantic croaker has increased from north to south. Since 1994, there has been an increase in annual catch variability. Catch levels in 2014 decreased 22.9% from 2013, going below the long term mean for the first time since 2010.

The Northeast Area Monitoring and Assessment Program (NEAMAP) also conducts nearshore trawl surveys from Cape Cod, MA to Cape Hatteras, NC. NEAMAP grew out of an ASMFC resolution in October 1997 to begin the development of a coordinated fishery-independent sampling program in the Northeast. The program began in 2006 with a pilot study and instituted a spring and fall survey in 2008. The surveys target both juvenile and adult fishes, including croaker.

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.

Traffic Light Approach

Addendum II established the TLA as the new management framework for Atlantic croaker. Under this management program, if thresholds for both population characteristics (harvest and adult abundance) achieve or exceed the proportion of threshold for the specified three year period, management action will be taken.

Analysis of the harvest composite index for 2014 shows that the population characteristic tripped for a second year in a row (Figure 6). The mean proportion of red color from 2012-2014 was 44.5%, well above the 30% threshold. The harvest composite index was comprised of commercial and recreational landings. Both commercial and recreational indices would have individually tripped in 2014 at the 30% level. The TLA for commercial landings was above the 60% threshold for the second year in a row.

The abundance composite TLA index was broken into two components based age composition. The adult composite index was generated from the NMFS and SEAMAP surveys since the majority of Atlantic croaker captured in those surveys were ages 1+. The juvenile composite index was generated from the NC Program 195 and VIMS surveys because these two captured primarily young-of-the-year Atlantic croaker.

All four composite abundance indices showed declines in 2014 with red occurring in all but one (NC 195) of the TLA indices. The adult composite TLA characteristic (Figure 7) did not trigger in 2014 with only a 14.2% red proportion and no red in the two previous years. The juvenile composite characteristic index (Figure 8) also did not trip in 2014; however, this is due to high index values in 2012 and 2013. In 2014, the juvenile composite index had a red proportion above the 30% threshold which was due to a precipitous drop in the VIMS index. The higher annual variability for the different color proportions in the juvenile composite characteristic (compared to the adult composite characteristic) is likely a reflection annual recruitment variability rather than population trends.

Overall, management measures were not tripped in 2014 since both population characteristics (harvest and abundance) were not above the 30% threshold for the 2012-2014 time period. Nonetheless, the analysis shows that there are declining trends in the fishery independent indices as well as the commercial and recreational harvests of Atlantic croaker.

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 they qualify 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. Thus, *de minimis* status does not exempt states from any measures.

In the annual compliance reports, the following states requested *de minimis* status: Delaware (commercial fishery), South Carolina (commercial fishery), Georgia (commercial and recreational fisheries), and Florida (commercial fishery). The commercial and recreational *de minimis* criteria for 2014 are based on 1% of the average coastwide 2012-2014 landings in each fishery: 95,623 pounds for the commercial fishery and 33,345 pounds for the recreational fishery. The Delaware commercial fishery qualifies for *de minimis* status with an average of 6,368 pounds. The South Carolina commercial fishery qualifies for *de minimis* status with an average of 104 pounds. The Georgia commercial and recreational fisheries qualify for *de minimis* status with averages of less than 1,000 pounds (confidential) and 21,182 pounds, respectively. The Florida commercial fishery qualifies for *de minimis* status with an average of 63,637 pounds.

Changes to State Regulations

In 2014, Georgia removed their 8 inch size limit from regulations for the recreational fishery (DNR Rule 391-2-4-.04). The size limit was originally put in to place in 1989 as an anticipatory measure to changes that were expected to be established through interstate fishery management. Since such changes were proposed in the past 25 years, Georgia removed the size limit.

In 2014, the South Carolina Legislature enacted a law that included Atlantic croaker under an aggregate bag limit (50 fish per person per day) as part of a small *Sciaenidae* group that includes Atlantic croaker, spot, and kingfish.

Atlantic Croaker Habitat

The ASMFC Habitat Committee is currently preparing a Sciaenid Habitat Source Document which outlines the habitat needs of Atlantic croaker at different life stages (egg, larval, juvenile, and adult). The report also highlights threats and uncertainties facing these ecological areas and identifies Habitat Areas of Particular Concern. It is expected that the Sciaenid Habitat Source Document will be available by the end of 2015.

Bycatch Reduction

Atlantic croaker is subject to both direct and indirect fishing mortality. Historically, croaker ranked as one of the most abundant species in the bycatch of the south Atlantic shrimp trawl fishery. As a result, the original FMP recommended 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, and croaker bycatch from this fishery has been reduced (ASMFC 2010). However, monitoring of bycatch and discards from this fishery is inadequate and results in the major source of uncertainty for assessing this stock, as well as other important Mid- and South Atlantic species. Most of the discarded

croakers are age-0 and thus likely have not yet reached maturity (ASMFC 2010). The North Carolina Department of Marine Fisheries secured funding for a two-year study, beginning in 2012, to collect bycatch data from state shrimp trawlers. It is expected that the report will come out in the fall of 2015. These data will be valuable for incorporating estimates of removals in the next stock assessment.

Atlantic croaker are also discarded from other commercial fishing gears. This is primarily due to market pressures and few restrictions on croaker harvest at the state level. The NMFS 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 last 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 has also been a major component of the scrap/bait fishery. Landings from this fishery are not reported to the species level, except for North Carolina, which has a continuous program in place to sample the landings and enables estimating scrap landings of croaker 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 the fisheries that produced the highest scrap/bait landings (ASMFC 2010). Several of the 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 has also begun a state monitoring program to account for scrap landings. The state initiated a bait harvester trip ticket program for all commercial bait harvesters licensed in SC. 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. This program should be useful for future stock assessments.

Several states have implemented other commercial gear requirements that further reduce bycatch and bycatch mortality, while others continue to encourage the use of these BRD devices. NOAA Fisheries published a notice on June 24, 2011 for public scoping in the Federal Register to expand the methods for reducing bycatch interactions with sea turtles, which may have additional effects on the bycatch of finfish like Atlantic croaker in trawls (76 FR 37050). Continuing to reduce the quantity of sub-adult croaker harvested should increase spawning stock biomass and yield per recruit.

Atlantic croaker are also subject to recreational discarding. The number of Atlantic croaker released alive by recreational anglers has generally increased over time. Ten percent of croakers released alive were estimated to die as a result of being discarded for the last stock assessment (ASMFC 2010). The use of circle hooks and appropriate handling techniques can help to reduce mortality of released fish.

VII. Implementation of FMP Compliance Requirements for 2014

The PRT finds that all states have fulfilled the requirements of Amendment 1.

VIII. Recommendations

Management and Regulatory Recommendations

- Encourage the use of circle hooks to minimize recreational discard mortality.
- Consider approval of the *de minimis* requests from Delaware, South Carolina, Georgia, and Florida.
- Consider the basic research and monitoring information needed for informed management in light of the budgetary constraints limiting all state governments

Research and Monitoring Recommendations

<u>High Priority</u>

- Develop and implement compatible and coordinated sampling programs for the South Atlantic shrimp trawl fishery in order to monitor and characterize Atlantic croaker bycatch in this fishery.
- Continue fisheries-independent surveys throughout the species range, with increased focus on collecting subsamples in the southern range
- Encourage fishery-dependent biological sampling, with increased focus in the southern range and expanding the commercial and recreational fishery samples to afford a full age-length key
- Determine migratory patterns and mixing rates through cooperative, multi-jurisdictional tagging studies; further studies on relative degree of genetic separation between fish in the northern and southern range of species; and continue research and analysis of otolith microchemistry data.
- Collect bio-profile information and conduct studies on growth rates, age structure, estimates of fecundity, and maturity schedule throughout the species range with a standardized protocol.
- Evaluate bycatch and discard estimates from commercial and recreational fisheries, and extend coverage of scrap fishery sampling to other states.
- Develop fishery-independent size, age, and sex specific relative abundance estimates to monitor long-term changes in croaker abundance.
- Maintain funding for current surveys and monitoring to provide needed information for stock monitoring and assessment

<u>Medium Priority</u>

- Develop age-size data that are representative of all seasons and areas in the fisheries on an annual basis.
- Improve catch and effort statistics from the commercial and recreational fisheries and develop more rigorous methods to standardize catch-per-unit-effort.
- Collect data on fishing attributes necessary to develop gear-type-specific fishing effort estimates.
- Evaluate commercial and recreational mortality under varying environmental factors and fishery practices and include in updated assessment.
- Update studies on the effectiveness of bycatch reduction devices (BRDs) in reducing croaker bycatch.
- Validate otolith aging methods with appropriate methods, e.g., tagging, chemical marking.
- Evaluate the optimum utilization (economic and biological) of a long-term fluctuating population such as croaker.

- Identify essential habitat requirements.
- Determine species interactions and predator/prey relationships for croaker (prey) and other more highly valued fisheries (predators).
- Determine the impacts of any dredging activity (i.e. for beach re-nourishment) on all life history stages of croaker.
- Investigate environmental covariates in stock assessment models.
- Examine socio-economic aspects of the fishery.
- Re-examine historical ichthyoplankton studies of the Chesapeake Bay for an indication of the magnitude of estuarine spawning.

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.

ASMFC. 2005b. Amendment 1 to the Interstate Fishery Management Plan for Atlantic Croaker. Washington (DC): ASMFC. Fishery Management Report No. 44. 92 p.

ASMFC. 2010. Atlantic Croaker 2010 Benchmark Stock Assessment. Washington (DC): ASMFC. 366 p.

X. Figures

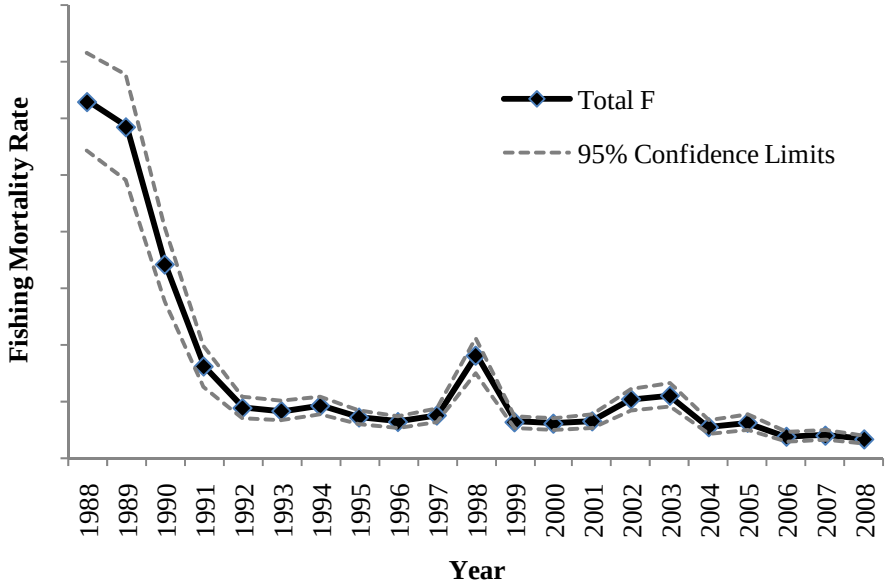


Figure 1. Trend in estimated total fishing mortality rate (F) of Atlantic croaker
(Absolute estimates of F are unreliable because of uncertainty regarding the estimation of Atlantic croaker discards in the shrimp trawl fishery, and the application of estimates in modeling. Source: ASMFC 2010.)

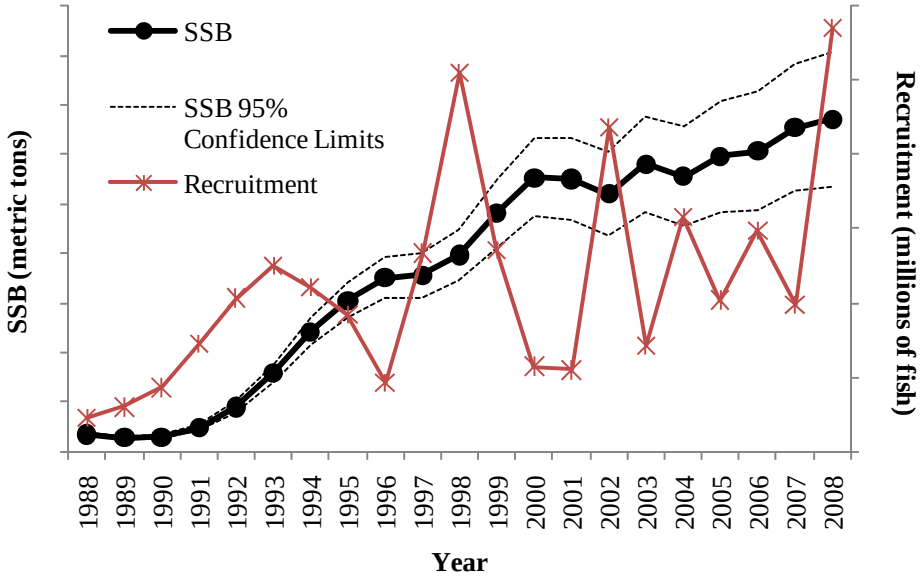


Figure 2. Trends in estimated spawning stock biomass (SSB, metric tons) and age-1 recruitment (numbers of fish) of Atlantic croaker
(Absolute estimates of stock size are unreliable because of uncertainty regarding the estimation of Atlantic croaker discards in the shrimp trawl fishery, and the application of estimates in modeling. Source: ASMFC 2010.)

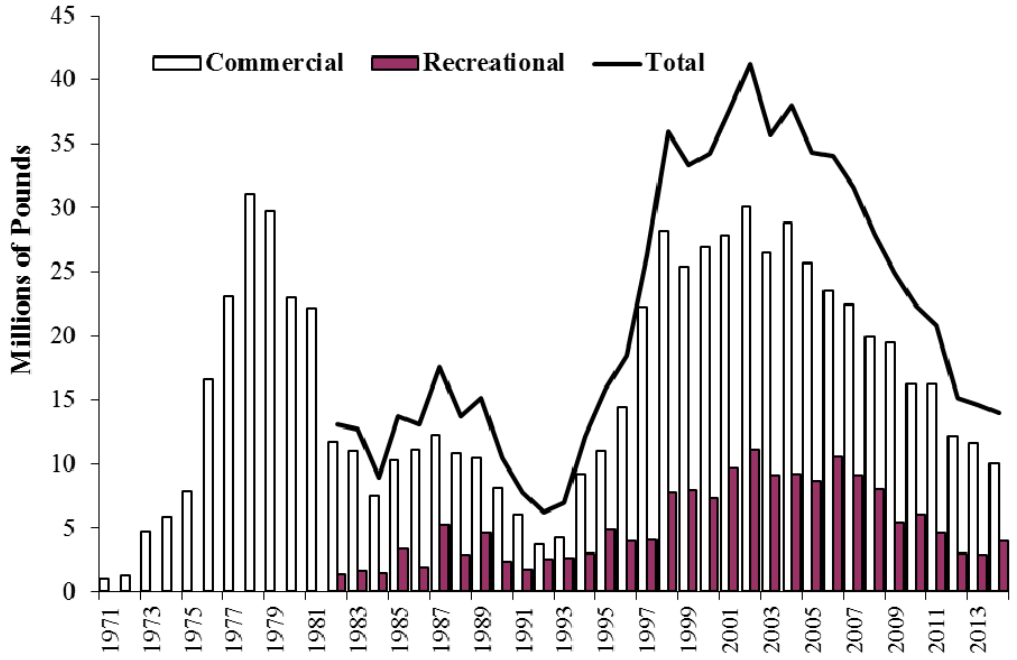


Figure 3. Atlantic croaker commercial, recreational, and total landings (pounds)
(See Tables 2 and 3 for values and source information. Commercial landings estimate for 2014 is preliminary. Reliable recreational landings estimates are not available before 1981.)

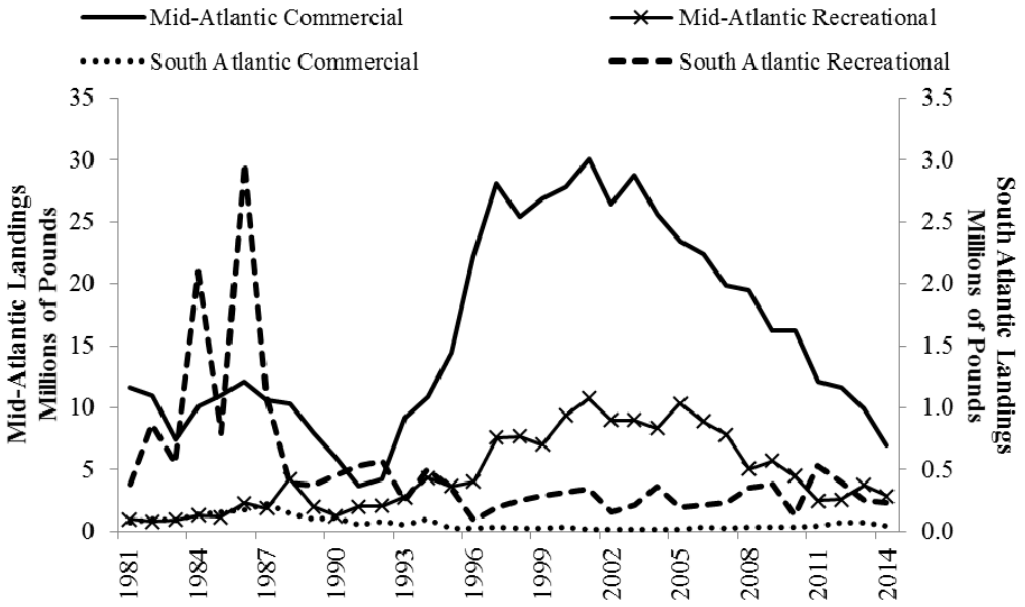


Figure 4. Mid-Atlantic (NJ-NC) and South Atlantic (SC-FL) landings (pounds)
(See Tables 2 and 3 for values and source information.)

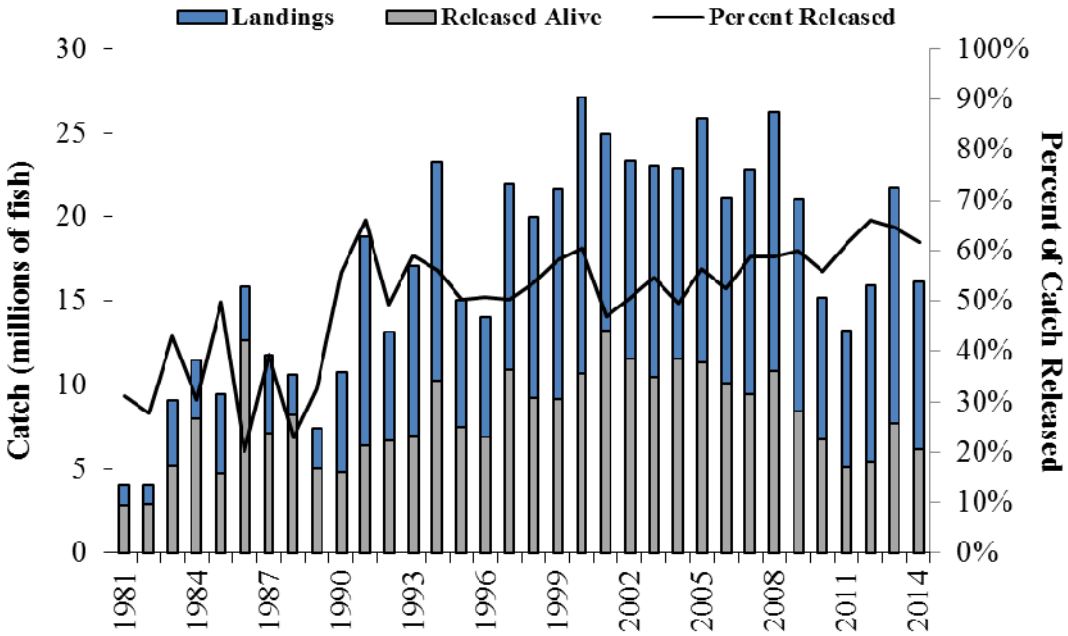


Figure 5. Recreational catch (landings and alive releases, in numbers) and the percent of catch that is released, 1981-2014
(See Tables 4 and 5 for values and source information.)

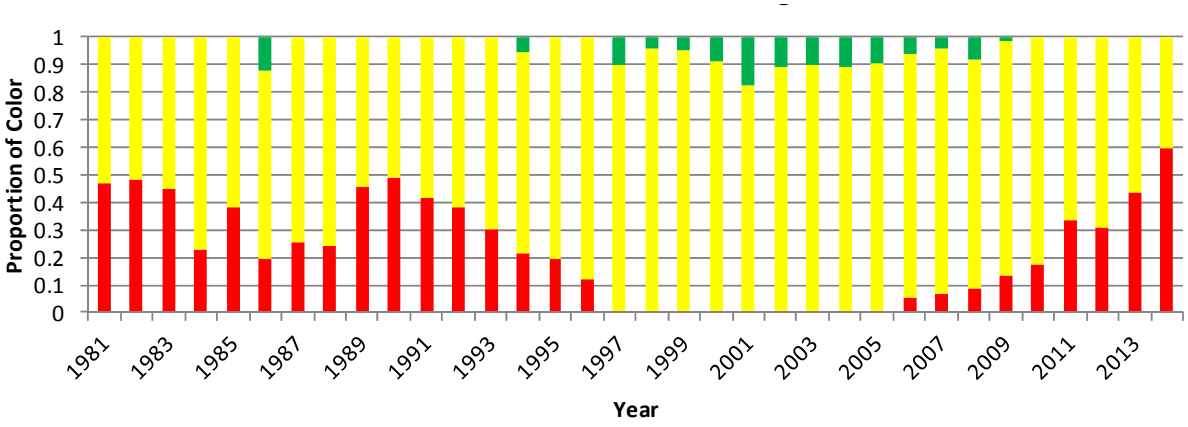


Figure 6. Annual color proportions for the harvest composite TLA of Atlantic croaker recreational and commercial landings.

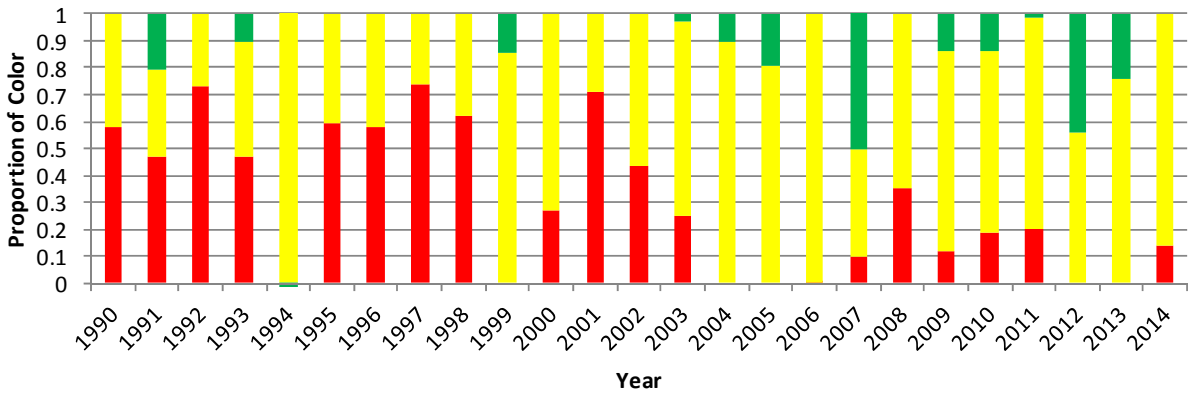


Figure 7. Adult croaker TLA composite characteristic index (NMFS and SEAMAP surveys).

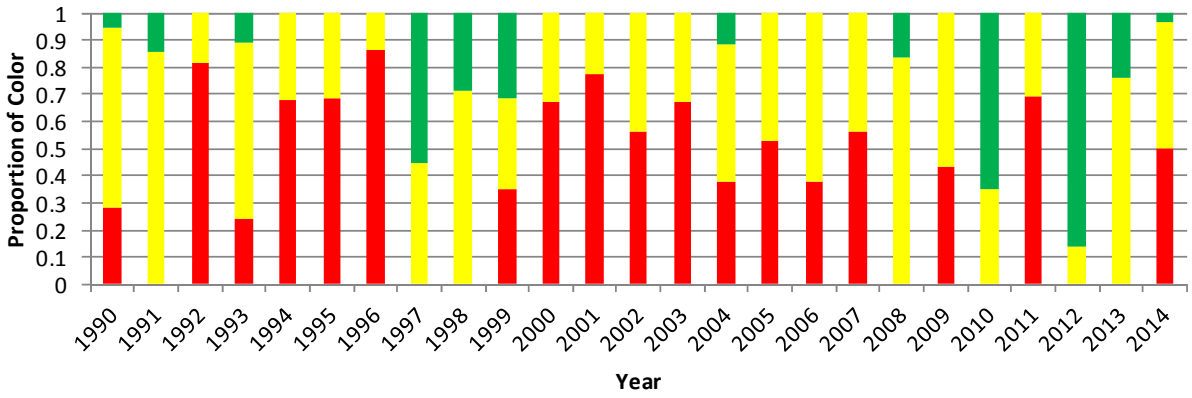


Figure 8. Juvenile croaker TLA composite characteristic index (NC 195 and VIMS surveys).

XI. Tables

Table 1. Summary of state regulations for Atlantic croaker in 2013*

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	25 fish/day	pound net season: 2/15 to 12/15
VA	none	none
NC	recreational use of commercial gears with license and gear restrictions	
SC	mandatory for-hire logbooks	
GA	25 fish/day	25 fish/day limit except for trawlers harvesting shrimp for human consumption (no limit)
FL	none	none

* 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, 1981-2014
(Estimates for 2014 are preliminary. Sources: state compliance reports; personal communication with ACCSP, Arlington, VA.)

Year	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
1981	23,500	0	2,104	648	429,800	11,205,342	2,441	1,038	72,112	11,736,985
1982	100	0	7,091	188	119,300	10,824,953	386	2,177	95,357	11,049,552
1983	200	0	417	1,549	150,400	7,249,680	3,200	1,097	81,737	7,488,280
1984	57,700	0	27,072	73,701	817,700	9,170,775	3,793	434	131,375	10,282,550
1985	48,800	100	9,510	19,854	2,171,821	8,714,432	1,256		153,803	11,119,576
1986	106,000	500	135,922	99,373	2,367,000	9,424,828	924		173,531	12,308,078
1987	357,600	800	119,409	102,691	2,719,500	7,289,191	698	553	217,932	10,808,374
1988	30,100	200	98,855	12,796	1,749,200	8,434,415	2,614	304	140,033	10,468,517
1989	137,100	0	89,173	5,579	949,649	6,824,088	1,950		95,021	8,102,560
1990	644	42	2,473	5,115	201,353	5,769,512	1,190		104,402	6,084,731
1991	31,292	700	6,183	996	164,126	3,436,960	*		56,739	3,696,996
1992	51,600	800	17,050	17,692	1,339,353	2,796,612			79,040	4,302,147
1993	183,414	2,500	114,159	262,482	5,326,293	3,267,652	*		52,031	9,208,531
1994	117,256	3,000	158,918	240,271	5,759,975	4,615,754	*		96,018	10,991,192
1995	334,654	13,000	489,506	606,184	6,949,639	6,021,284	*		22,879	14,437,146
1996	621,889	9,681	792,326	1,427,285	9,409,904	9,961,834			26,045	22,248,964
1997	1,994,446	10,509	1,088,969	1,518,196	12,832,221	10,711,667	*		36,577	28,192,585
1998	1,029,332	10,368	1,006,529	610,885	11,898,586	10,865,897			26,418	25,448,015
1999	2,071,046	14,729	948,191	1,190,138	12,481,326	10,185,507			26,824	26,917,761
2000	2,130,465	11,121	902,379	1,812,130	12,822,400	10,122,627			37,953	27,839,075
2001	1,389,837	22,736	1,488,815	1,963,294	13,214,731	12,017,424		*	14,831	30,111,668
2002	1,828,484	10,732	894,879	1,421,094	12,133,834	10,189,153	*	*	17,191	26,495,367
2003	1,575,738	16,561	713,205	1,128,003	10,937,167	14,429,197	140	*	16,348	28,816,359
2004	2,067,992	30,369	1,354,982	1,631,596	8,550,574	11,993,003	*	*	11,413	25,639,929
2005	1,847,753	36,624	972,800	481,912	8,211,802	11,903,292	41	*	16,520	23,470,744
2006	1,617,144	19,307	466,833	670,276	9,252,110	10,396,554	160	*	30,272	22,452,656
2007	1,358,000	13,522	474,388	188,567	10,557,370	7,301,295	*		27,028	19,920,170
2008	946,062	10,465	592,211	337,062	11,796,771	5,791,874	116	*	31,560	19,506,121
2009	585,552	16,341	433,238	234,101	8,808,677	6,135,427	215	0	32,313	16,245,864
2010	342,116	6,182	490,067	162,571	7,879,847	7,312,159	3	0	36,960	16,229,905
2011	465,117	12,252	736,259	243,196	5,611,855	5,054,186	44	*	44,932	12,167,841
2012	363,381	2,811	901,455	273,849	6,963,815	3,106,616	62	*	74,023	11,686,012
2013	337,313	6,700	884,363	130,285	6,621,836	1,928,637	2	0	71,573	9,980,709
2014	271,706	9,647	478,674	177,777	3,406,958	2,629,793	247	0	45,314	7,020,116

* confidential data

Table 3. Recreational harvest (pounds) of Atlantic croaker by state, 1981-2014
(Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD.)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	582	2,317		535,297	426,240	67,284	9,665	305,547	1,346,932
1982			70,276	455,250	264,607	67,015	45,161	754,956	1,657,265
1983			32,053	486,006	395,402	14,158	25,412	510,599	1,463,630
1984			86,462	634,870	584,660	161,661	80,684	1,856,599	3,404,936
1985			17,169	843,414	278,214	72,780	40,421	684,449	1,936,447
1986		2,595	116,542	2,034,337	126,888	173,028	21,504	2,783,651	5,258,545
1987			191,628	1,306,814	352,346	64,696	14,947	1,005,053	2,935,484
1988		827	926,399	2,390,573	935,460	54,313	20,313	316,900	4,644,785
1989		284	19,189	1,329,680	658,567	80,580	21,138	268,335	2,377,773
1990		112	37,873	875,427	347,183	123,795	205,352	127,525	1,717,267
1991	4,264	10,972	117,210	1,728,021	157,660	16,173	54,116	460,453	2,548,869
1992		3,291	53,556	1,768,962	233,533	28,512	132,596	407,672	2,628,122
1993	844	9,641	476,866	1,993,915	282,910	18,005	55,604	180,517	3,018,302
1994	818	2,892	991,166	3,024,118	351,230	128,306	34,048	337,474	4,870,052
1995	9,515	82,864	567,149	2,675,381	326,135	25,386	20,862	301,918	4,009,210
1996	39,099	205,526	702,037	2,716,759	346,501	14,480	21,797	50,038	4,096,237
1997	278,758	340,198	1,117,999	5,522,195	309,457	53,863	26,272	113,096	7,761,838
1998	135,733	293,560	1,150,459	5,920,436	161,117	76,821	30,966	141,756	7,910,848
1999	301,957	522,201	1,024,398	4,969,283	212,991	26,356	32,375	231,692	7,321,253
2000	1,125,730	483,963	2,672,996	4,888,910	201,306	13,457	62,390	242,912	9,691,664
2001	1,132,214	304,127	1,278,699	7,674,759	355,009	10,750	7,844	320,487	11,083,889
2002	268,423	250,899	1,162,278	7,075,130	242,184	29,343	10,622	117,880	9,156,759
2003	682,698	262,114	2,069,176	5,674,111	317,606	59,399	71,881	79,396	9,216,381
2004	1,151,926	342,335	1,016,801	5,792,487	267,455	53,563	15,554	179,018	8,819,139
2005	1,189,849	846,084	942,702	7,240,971	143,963	42,088	14,709	147,117	10,567,483
2006	765,867	757,082	884,082	6,460,336	151,403	19,010	9,236	176,886	9,223,902
2007	409,392	334,850	1,056,471	6,111,612	87,013	39,368	14,106	207,821	8,260,633
2008	422,833	266,787	458,671	3,612,065	154,937	15,753	12,653	340,304	5,284,003
2009	114,015	240,468	1,504,806	3,915,033	131,742	72,363	32,746	222,239	6,233,412
2010	36,063	41,533	976,143	3,394,913	241,993	11,971	10,205	56,022	4,768,843
2011	21,460	52,889	444,595	1,761,731	99,298	240,665	21,548	194,847	2,837,033
2012	96,366	63,037	535,325	1,898,966	105,530	12,291	13,503	292,365	3,017,383
2013	533,822	100,320	744,642	2,217,664	141,880	29,610	17,209	205,970	3,991,117
2014	206,339	180,787	610,667	1,602,504	227,826	33,363	32,833	165,353	3,059,672

Table 4. Recreational harvest (numbers) of Atlantic croaker by state, 1981-2014
(Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD.)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	1,054	3,003	0	964,013	1,043,240	165,742	35,591	598,896	2,811,539
1982			10,452	273,039	596,493	193,554	169,749	1,682,619	2,925,906
1983			108,355	2,154,133	1,620,909	60,811	75,173	1,148,227	5,167,608
1984			211,035	2,047,720	2,147,871	588,114	202,364	2,781,742	7,978,846
1985			21,276	2,284,334	723,933	260,265	144,341	1,306,955	4,741,104
1986		4,694	123,578	6,384,966	356,742	599,442	69,887	5,118,552	12,657,861
1987	0	0	208,488	3,234,224	904,030	166,978	44,783	2,580,727	7,139,230
1988		1,186	1,005,452	4,048,690	2,256,128	144,057	64,093	685,778	8,205,384
1989		478	22,871	2,203,504	2,131,763	217,023	72,598	359,417	5,007,654
1990		281	100,673	2,374,679	1,063,452	346,631	585,380	304,064	4,775,160
1991	16,235	37,500	288,471	4,298,542	434,067	100,816	184,435	1,030,115	6,390,181
1992	0	9,854	117,427	4,524,040	723,823	74,051	440,185	754,595	6,643,975
1993	2,552	19,352	805,560	4,990,098	755,998	32,700	89,734	304,067	7,000,061
1994	1,567	5,718	1,633,581	6,494,691	1,179,735	188,520	102,974	599,032	10,205,818
1995	15,184	136,865	827,183	5,029,708	850,606	75,422	100,826	438,076	7,473,870
1996	35,037	235,389	775,115	4,997,021	662,240	37,464	61,957	116,575	6,920,798
1997	342,089	385,586	1,053,232	8,066,926	661,116	118,428	64,050	235,430	10,926,857
1998	143,404	391,231	1,126,058	6,730,181	387,427	170,528	64,953	234,360	9,248,142
1999	357,261	662,724	1,209,572	5,881,671	442,185	54,761	104,438	403,982	9,116,594
2000	1,023,442	517,886	2,674,880	5,486,159	391,056	32,332	128,922	455,870	10,710,547
2001	1,177,813	312,005	1,319,928	9,335,313	635,552	19,802	21,503	426,264	13,248,180
2002	253,472	261,634	1,223,385	9,129,060	408,944	66,409	36,497	177,751	11,557,152
2003	692,391	341,174	1,619,766	6,695,192	490,399	198,339	248,853	165,459	10,451,573
2004	855,927	389,218	896,855	8,259,608	511,418	171,544	38,599	415,570	11,538,739
2005	1,227,349	825,267	784,246	7,657,147	326,777	143,387	39,561	302,784	11,306,518
2006	511,220	763,216	754,969	7,221,148	556,024	58,500	34,081	172,586	10,071,744
2007	406,238	359,064	872,838	6,944,886	461,162	38,147	45,068	310,130	9,437,533
2008	600,975	368,911	619,942	8,388,497	317,940	65,853	38,246	449,054	10,849,418
2009	193,464	451,849	1,335,439	5,327,388	368,990	238,900	82,269	438,209	8,436,508
2010	63,027	75,404	1,136,589	4,743,697	478,156	46,464	35,635	132,664	6,711,636
2011	40,855	92,289	554,206	3,305,707	246,676	349,464	44,044	476,292	5,109,533
2012	237,994	84,403	701,482	3,445,232	288,812	27,541	38,402	589,643	5,413,509
2013	875,200	222,401	1,155,538	4,273,744	411,882	99,356	54,915	586,411	7,679,447
2014	266,664	359,010	1,085,339	3,429,768	541,474	146,430	64,138	298,332	6,191,145

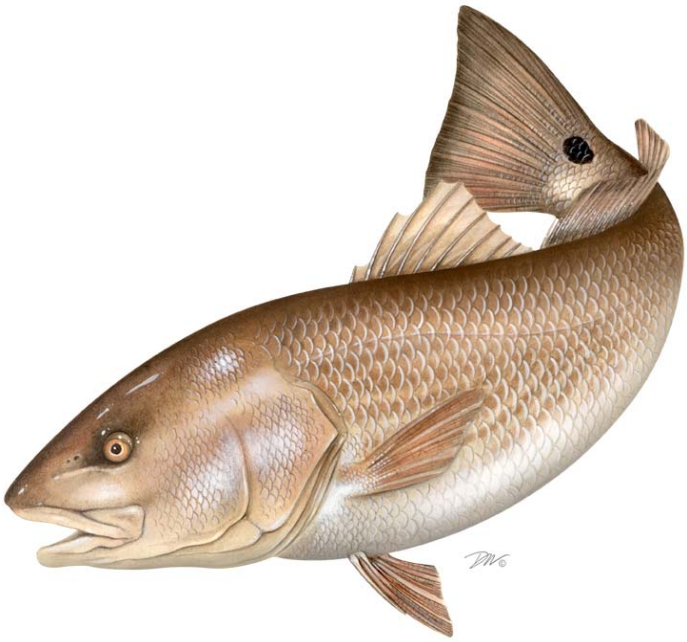
Table 5. Recreational releases (number) of Atlantic croaker by state, 1981-2014
(Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD.)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981			16,233	324,238	704,259	128,192	13,481	85,740	1,272,143
1982				77,756	641,327	107,340	111,630	188,277	1,126,330
1983			1,507,184	1,410,151	424,562	119,036	70,499	379,021	3,910,453
1984			70,192	673,080	1,701,418	746,905	37,573	236,432	3,465,600
1985			13,132	1,616,052	1,596,901	238,678	66,649	1,146,582	4,677,994
1986		1,757	43,399	2,578,268	137,841	84,335	40,623	318,511	3,204,734
1987	1,374	861	32,074	2,056,580	560,853	108,366	76,908	1,770,697	4,607,713
1988		582	273,231	832,284	984,219	112,271	20,021	200,630	2,423,238
1989		1,307	41,822	1,342,169	891,926	58,642	17,632	72,822	2,426,320
1990		1,268	88,688	3,922,564	1,351,152	111,085	317,497	168,144	5,960,398
1991	91,633	75,319	3,352,190	7,418,045	669,385	25,168	140,402	647,824	12,419,966
1992	4,103	43,583	856,292	4,167,137	954,494	26,729	178,267	251,343	6,481,948
1993	5,799	13,194	2,504,362	5,795,479	1,499,217	16,949	83,203	138,875	10,057,078
1994	17,253	14,069	1,628,824	7,676,780	3,110,528	141,513	99,026	331,736	13,019,729
1995	31,019	41,574	496,046	5,494,289	1,172,716	108,345	89,609	141,732	7,575,330
1996	17,585	76,851	403,776	5,151,206	1,218,799	64,494	60,282	126,300	7,119,293
1997	111,468	384,233	1,497,670	7,275,160	1,443,568	138,107	25,630	116,276	10,992,112
1998	221,324	839,932	3,021,780	4,990,541	1,060,928	266,068	159,928	152,744	10,713,245
1999	860,325	1,017,499	2,483,800	5,668,925	1,368,478	116,826	57,567	967,894	12,541,314
2000	688,746	694,813	4,967,856	7,811,048	1,569,385	96,402	169,903	428,131	16,426,284
2001	853,621	285,123	1,585,806	7,086,706	1,256,807	115,284	192,362	282,461	11,658,170
2002	369,003	361,355	2,523,276	7,107,656	925,806	92,498	194,474	217,054	11,791,122
2003	833,508	654,697	1,393,224	6,543,524	1,552,315	440,446	965,496	192,356	12,575,566
2004	1,237,164	599,207	854,132	6,276,767	1,656,049	320,788	154,259	253,951	11,352,317
2005	1,692,401	674,684	1,136,876	8,738,109	1,401,413	321,861	280,889	293,692	14,539,925
2006	503,490	937,193	1,783,557	4,193,675	2,578,819	595,075	283,851	187,562	11,063,222
2007	590,078	672,771	1,258,131	8,504,212	1,608,120	224,454	228,564	321,559	13,407,889
2008	2,373,945	601,994	2,127,219	7,806,627	1,419,019	205,373	293,926	596,450	15,424,553
2009	108,370	537,587	1,137,578	7,621,484	1,912,670	514,839	434,608	406,822	12,673,958
2010	167,191	228,936	1,011,236	4,824,151	1,598,139	187,138	263,987	188,637	8,469,415
2011	62,391	88,524	365,716	4,872,928	1,798,230	240,605	262,493	452,669	8,143,556
2012	1,134,778	444,935	1,578,524	5,091,063	1,255,215	216,420	167,488	641,569	10,529,992
2013	765,652	764,045	2,905,537	5,968,340	1,984,701	793,500	298,409	550,130	14,030,314
2014	206,098	630,964	1,148867	3,606,078	2,714,578	763,159	470,751	393,360	9,933,855

2015 REVIEW OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION FISHERY MANAGEMENT PLAN FOR

RED DRUM (*Sciaenops ocellatus*)

2014 FISHING YEAR



The Red Drum Plan Review Team
Steve Arnott, South Carolina Department of Natural Resources
Mike Murphy, Florida Fish & Wildlife Conservation Commission
Lee Paramore, North Carolina Division of Marine Fisheries
Roger Pugliese, South Atlantic Fishery Management Council
Megan Ware, Atlantic States Marine Fisheries Commission, Chair

Table of Contents

I. Status of the Fishery Management Plan

Date of FMP Approval:	Original FMP – October 1984
Amendments:	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:	South Atlantic State/Federal Fisheries Management Board; Red Drum Technical Committee, Stock Assessment Subcommittee, Plan Development Team, Plan Review Team, Stock Enhancement Subcommittee; 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 Florida to Maryland. In 1988, the Interstate Fisheries Management Program (ISFMP) Policy Board requested that all states from Florida to Maine implement the plan's recommended management regulations to prevent development of northern markets for southern fish. All Atlantic coastal states Florida through New Jersey are now required to implement the provisions of the FMP, while New York through Maine (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 that all harvest would take place in state waters, the Council FMP recommended that states implement measures necessary to provide the target level of at least 30% escapement.

Consequently, the ASMFC updated the interstate FMP in 1991 with Amendment 1, 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 spawning stock biomass per recruit (SSBR) level at or above 30% of the level that would result if fishing mortality were zero. However, the lack of adequate information on the status of the adult stock 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, because of a lack of data on the status of adult red drum along the Atlantic coast, a phase-in approach with a 10% SSBR goal was adopted. States were recommended to implement or maintain harvest controls necessary to attain the goal. All states in the management unit north of Florida modified regulations and/or commercial quotas to reach this goal. Florida maintained its strict regulations that were thought to exceed the target escapement rate. The harvest regulations

remained unchanged from 1992-1998, except in Florida where regulations were relaxed somewhat by opening the previously closed March-May period.

As hoped, these management measures led to increased escapement rates of juvenile red drum. Escapement estimates for a northern region from New Jersey through North Carolina (18%) and a southern region from South Carolina through the east coast of Florida (17%) were estimated to be above the 10% phase-in goal, yet still below the ultimate goal of 30% (Vaughan and Carmichael 2000). These regions were based on stock identity, mark-recapture experiments, life history, habitat preferences, human dimensions of the fisheries, and management goals. North Carolina, South Carolina, and Georgia implemented substantive changes to their regulations from 1998-2001 that further restricted the harvest of red drum.

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 threshold overfishing as 10% sSPR. A year later, the Council also recommended that management authority for red drum be transferred to the states through the Commission's Interstate Fishery Management Program (ISFMP) process. One reason the Council recommended this transfer to the ASMFC was 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 management transfer would necessitate the development of an amendment to the interstate FMP, in order to include the provisions of the Atlantic Coastal Fisheries Cooperative Management Act.

The ASFMC 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.
- To 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 with the division occurring 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.

All states in the management area were required (rather than recommended as in previous versions of the plan) to implement appropriate recreational bag and size limit combinations needed to attain the target sSPR. Amendment 2 also required all states to maintain their current, or implement more restrictive, commercial fishery regulations. The states implemented the provisions of Amendment 2 by January 1, 2003. See Table 1 for state commercial and recreational regulations in 2014.

Following the approval of Amendment 2 in 2002, the process was begun to transfer management authority, including an Environmental Assessment and public comment period. The final rule for the transfer of management authority became effective November 5, 2008. It repeals the federal Atlantic Coast Red Drum Fishery Management Plan and transfers the management authority of Atlantic red drum in the exclusive economic zone from the South Atlantic Fishery Management Council, in cooperation with the Mid-Atlantic Fishery Management Council, under the Magnuson-Stevens Conservation and Management Act to the Atlantic States Marine Fisheries Commission under the Atlantic Coastal Fisheries Cooperative Management Act, as requested by the Councils and the Commission.

Addendum I to Amendment 2 was approved by the Board in August 2013. The Addendum revised Amendment 2's habitat section 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

At present, only an overfishing status can be determined for red drum (SAFMC 2009). The threshold (below which the stock is experiencing overfishing) and the target fishing mortality rates are those that achieve 30 % and 40 % sSPR, respectively. The three-year average sSPR is compared to these reference points. The stock is assessed by region.

Northern Region

Recruitment (age 1 abundance) has fluctuated widely and without apparent trend since 1989 (Figure 1). Abundance of age 1 – 3 red drum increased during 1990 – 2000 after which it fluctuated widely (Figure 2). The initial increase in abundance of these age groups can be explained by the reduction in exploitation rates in the early part of the time series with relative stability since then (Figure 3).

The trend in the three-year average sSPR indicates low sSPR at the start of the time series with increases during 1990 – 1997 and fluctuations thereafter (Figure 4). The average sSPR has been above the overfishing threshold ($F_{30\%}$) since 1994, and, with the exception of one year (2002), has been at or above the target ($F_{40\%}$) since 1996. Fishing pressure and mortality appear to be stable and holding near the target fishing mortality. There is a high probability that the stock is not subject to overfishing. The average sSPR is also likely above the target benchmark. Fishing mortality could be allowed to increase relative to the overfishing threshold, but the level of risk associated with any increase should be considered and reviewed in conjunction with Amendment 2's goal of maintaining a 40% SPR.

Southern Region

The relative trend in recruitment (age 1 abundance) has fluctuated without apparent trend since 1989 (Figure 1). The relative trend in abundance of age 1 – 3 red drum increased during 1989 – 1992, declined during 1992 – 1998 and has fluctuated thereafter (Figure 2). As with the northern stock, the initial increase in abundance of these age groups can be explained by the reduction in exploitation rates in the early part of the time series. There appears to have been a slight increase in exploitation rates since 1990 (Figure 3). This is reflected in the long-term decline in the three-year average sSPR since 1990 (Figure 4).

There is a high level of uncertainty around the sSPR estimates for the southern region. More work is needed to make definitive statements about sSPR, but it is likely that the average sSPR in 2007 was above the overfishing threshold ($F_{30\%}$), although not above the target as likely in the northern region. The stock is therefore likely not subject to overfishing at this time. Due to the uncertainties, it is not possible to determine status in relation to the target of 40% sSPR.

III. Status of the Fishery

The following discussion utilizes the results from direct queries of the MRIP data through their website. Adjustments needed to make these consistent through time (convert pre-2004 MRFSS data, adjust for changes in for-hire component of survey, and deletion of 1981-85 headboat data) have not been made here.

Total red drum landings from New Jersey through the east coast of Florida in 2014 are estimated at 2.45 million pounds (Tables 2 and 3, Figure 5). This represents a roughly 650,000 lbs decrease from 2013 but is above the previous ten-year (2005-2014) average of 1.89 million lbs. The commercial and recreational fisheries harvested 4% and 96% of the total, respectively. In 2014, 57% of the total landings came from the South Atlantic region, where the fishery is exclusively recreational, and 43% from the Mid-Atlantic region (Figure 6).

Few commercial landings of red drum have been recorded in states north of Maryland in recent years (Table 2). Coastwide commercial landings show no particular temporal trends, ranging from approximately 55,000 to 440,000 pounds annually over the last 50 years (Figure 5). The greatest harvest was taken in 1950, and the lowest in 2004. In 2014, coastwide commercial harvest decreased from 403,889 pounds in 2013 to 102,949 pounds, with 88% coming from North Carolina. Historically, the major commercial harvesters were North Carolina and Florida. However, commercial harvest has been prohibited in Florida under state regulation since January 1988. South Carolina also banned the commercial harvest or sale of native caught red drum beginning in 1987, and in 2013 Georgia designated Red Drum Gamefish status, eliminating the commercial harvest and sale.

In North Carolina, a daily commercial trip limit and an annual cap of 250,000 pounds, with payback of any overage, constrain the commercial harvest. The red drum fishing year in North Carolina extends from September 1 to August 31 (all other states operate on a calendar year). In 2008, the Management Board approved using the fishing year to monitor the cap. During the 2009/2010 fishing year, North Carolina had an overage of 25,858 lbs and set its 2010/2011 fishing cap at 224,142 lbs. North Carolina's harvest for 2010/2011 was 126,185 pounds (2011 calendar

harvest was 91,980 pounds), which corrected the overage. For fishing year 2012/2013, North Carolina's harvest totaled 134,372 pounds. In November 2013, harvest exceeded the 250,000 lbs annual cap for the 2013/2014 fishing year and was closed. The commercial fishery reopened September 2014 and the annual cap for the 2014/2015 season is reduced by the 12,753 pound overage from 2013/2014.

Recreational harvest of red drum peaked in 1984 at 1.05 million fish (or 2.6 million pounds; Tables 3 and 4). Since 1988, the number has fluctuated without trend between 250,000 and 760,000 fish (800,000 to 2.6 million pounds; Figures 5 and 7). Recreational harvest decreased from 760,933 fish (2.7 million pounds) in 2013 to 641,658 fish (2.3 million pounds) in 2014. The 2014 harvest is higher than the 10 year average (2005-2014) for recreational harvest in numbers (510,359) and pounds (1.7 million). Florida anglers landed the largest share of the coastwide recreational harvest in numbers (43%), followed by North Carolina (18%) and South Carolina (16%). Anglers release far more red drum than they keep; the percent of the catch released is generally over 80% during the last decade (Figure 7). Recreational releases show an increasing trend over the time series. The proportion of releases in 2014 was 83% (versus 81% in 2013), and the overall number of fish released was 3.1 million in 2014 (Figure 3, Table 5). It is estimated that 8% of released fish die as a result of being caught, resulting in an estimated 245,415 dead discarded fish in 2014 (Table 5). Recreational removals from the fishery are thus estimated to be 887,073 fish in 2014 (Figure 8).

IV. Status of Assessment Advice

Current stock status information comes from the 2009 benchmark stock assessment (SAFMC 2009) completed by the ASMFC Red Drum Stock Assessment Subcommittee and Technical Committee, peer reviewed by an independent panel of experts at the Southeast Data, Assessment, and Review (SEDAR) 18, and approved by the South Atlantic State-Federal Fisheries Management Board for use in management decisions. Previous interstate management decisions were based on regional assessments conducted by Vaughan and Helser (1990), Vaughan (1992, 1993, 1996), and Vaughan and Carmichael (2000). Several states have also conducted state-specific assessments (e.g., Murphy and Munyandorero 2009; Takade and Paramore 2007).

The 2009 stock assessment uses a statistical catch at age (SCA) model with age-specific data for red drum ages 1 through 7+. The Stock Assessment Subcommittee decided to move away from virtual population analyses used in past assessments primarily because of the assumption inherent in these models that the catch at age is known without error, whereas there is limited data to describe the catch of red drum early in the time series. Data available for the years 1989 through 2007 were included from the following sources: commercial and recreational harvest and discard data, fishery-dependent and -independent biological sampling data, tagging data, and fishery-independent survey abundance data.

The SEDAR 18 Review Panel considered the use of an SCA model appropriate given the types of data available for red drum. With certain revisions made to the data and the model configurations before or at the Review Workshop, the SEDAR 18 Review Panel supported the use of the final model runs. For the northern region, the Review Panel agreed that the model was informative of age 1 – 3 abundance and exploitation rates, but not for older age groups. The model was also found to be informative of annual trends in static spawning potential ratio (sSPR) and the 2005 – 2007

average sSPR. For the southern region, the Review Panel agreed that the model was informative of relative (not absolute) trends in age 1 – 3 abundance and exploitation, but not for older age groups. The model was also considered to be informative of relative trends in annual sSPR and the three-year average sSPR, this result being highly conditional on the estimated fishery selectivity pattern. These results for the southern region allow for only general statements on stock status.

The Review Panel accepted the existing threshold and target overfishing benchmarks of 30% sSPR and 40% sSPR for red drum. However, the Review Panel did not consider annual changes in sSPR to be informative and recommended adopting a three-year running mean of estimated annual sSPR as the indicator to compare to the management benchmarks. Because of the high uncertainty in the age 4 -7^{+} dynamics, the Review Panel did not see value in attempting to estimate indicators and benchmarks of stock biomass which would be used to measure overfished status.

A new benchmark assessment for red drum is currently on-going and is expected to be presented to the Board in November 2015.

V. Status of Research and Monitoring

There are no monitoring or research programs required annually of the states except for the submission of a compliance report. The following fishery-dependent (other than catch and effort data) and fishery-independent monitoring programs were reported in the 2015 reports.

Fishery Dependent Monitoring

- Maryland DNR – Samples commercial pound nets bi-weekly in the Chesapeake Bay from late spring through summer (2014: 1 fish). Monitors licensed charter boat captain logbooks for red drum captures (2014: 95 caught, 51 harvested).
- PRFC - Red drum are taken as incidental harvest in the commercial pound net and haul seine fisheries. The PRFC has a mandatory commercial harvest daily reporting system that collects harvest as well as discards or releases; however, no red drum were reported as being released in 2014.
- Virginia MRC – Samples commercially landed red drum through its biological monitoring program (2014: 131 fish of which 39 were aged). Coordinates volunteer angler tagging of red drum via the Virginia Game Fish Tagging Program that began in 1995 (2014: 3,025 fish tagged, 351 reported recaptures). Collects carcasses through the Marine Sportfish Collection Project.
- Delaware DFW: Commercial fishery monitored through mandatory logbook reports.
- North Carolina DMF – Commercial cap monitored through trip ticket program; samples commercially-landed red drum through its biological monitoring program (1982-present; 2014: 444 fish measured, primarily gill net).
- South Carolina DNR –State finfish survey reduced to the months of January and February in 2013 (2014: n=105). Charter Vessel Trip Reporting (2014: release rate = 94%). SC Marine Game Fish Tagging Program studies movement patterns, growth rates, and release-mortality rates (2014: 2711 fish tagged, 502 recaptured).
- Georgia CRD – Collects age, length, and gender data through the Marine Sportfish Carcass Recovery Project (2014: 700 red drum).
- Florida FWC – Conducted 10.973 trip interviews in 2014 to collect data on total-catch rates and sizes (through MRIP).

- NMFS – Collects recreational catch, harvest, release, and effort data, and length measurements via the Marine Recreational Information Program.

Fishery Independent Monitoring

- New Jersey BMF – Conducts five nearshore (within 12 nautical miles) trawl surveys each year. These surveys occur in January/February, April, June, August, and October. All species taken during these surveys are weighed and measured. Catch per unit effort in number of fish per tow and biomass per tow is calculated each year. Since the survey began in 1988, 2 red drum were caught during a single tow on January 24, 2013.
- North Carolina DMF - Conducts a seine survey to produce an age-0 abundance index (1991-present; 2014: n=270; CPUE of 2.3, increase from 2013 CPUE of 1.1). Conducts a gill net survey in Pamlico Sound to characterize size and age distribution, produce an abundance index, improve bycatch estimates, and study habitat usage (2001-present; 2014: CPUE was 3.14, the fourth highest in the time series); DMF conducts a longline survey to produce an adult index of abundance and tag fish (2007-present; 2014: n=322; CPUE remained relatively stable at 4.59 fish per set, with a time series average of 5.2).
- South Carolina DNR – Conducts an estuarine trammel net survey for subadults (2014 CPUE very low compared to historical values). Conducts an electrofishing survey in low salinity estuarine areas for juveniles and sub-adults (2014 CPUE third lowest in survey history). Conducts an inshore bottom longline survey for biological data and an abundance index of adults (2014 annual adult abundance stable since survey began, n=122 sampled for age in 2014). Conducts genetic sub-sampling as a part of the three surveys, particularly on YOY. Tags fish caught in each of these surveys (49,141 fish from trammel nets since 1991 (2014: n = 983); 7,676 fish from electrofishing since 2001 (2014: n = 431); 2,528 fish from longline since 2007 (2014: n = 434)).
- Georgia CRD – Conducts an estuarine trammel net survey for subadult biological data and an abundance index (2014: n = 157; CPUE increased in Wassaw estuary from 0.12 to 0.34 and increased in the Altamaha river delta from 0.39 to 2.09). Conducts an estuarine gill net survey for young-of-year biological data and an abundance index (2014: n = 434; CPUE in Wassaw estuary was 3.23 and in the Altamaha river delta was 1.3). Conducts a survey to determine the age structure of the adult stock on five year intervals (suspended indefinitely). Conducts a bottom longline survey for adult biological data and an abundance index (2014: n = 127).
- Florida FWC-FWRI – Conducts two seine surveys in the northern Indian River Lagoon (IRL) and the lower reaches of the St. Johns River (SJR) for young-of-the-year (< 40 mm SL) abundance indices (CPUE: increased in 2013 from a two-year low from 2011-2012). FWC-FWRI conducts a haul seine survey in these areas and the southern IRL for a subadult index (CPUE: 2013 decreased from an increasing trend between 2008 and 2012). Age and length data are collected during surveys (2013: 1,226 lengths from 183 meter haul seines, 348 otoliths from sampled fish).

Ageing Workshop

A Red Drum Ageing Workshop was held in October 2008. The Red Drum Technical Committee indicated the need for such as workshop prior to the 2009 stock assessment to standardize the otolith sectioning and ageing procedures and the current age dataset. Representatives from Virginia, North Carolina, South Carolina, Georgia, Florida, the National Marine Fisheries Service,

and the Gulf Council participated in the workshop. In addition to improving the age dataset for the ongoing assessment, the resulting standardized ageing procedure was published in an ASMFC reference document, with some states having already incorporated ageing instructions into their references.

VI. Status of Management Measures and Issues

Fishery Management Plan
Amendment 2 was fully implemented by January 1, 2003 and provided the management requirements for 2010. 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 for successfully implementing their red drum regulations. In August 2013, the Management Board approved Addendum I 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.

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 the two states' contribution to the fishery by comparing each state's two-year average of combined commercial and recreational landings to that of the management unit. New Jersey and Delaware harvested each harvested zero percent of the two-year average 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 Management Board.

VII. Implementation of FMP Compliance Requirements for 2014

The PRT finds that all states have implemented 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
< Support a continued moratorium of red drum fishing in the exclusive economic zone.

Prioritized Research and Monitoring Recommendations (H) =High, (M) =Medium, (L) =Low

Stock Assessment and Population Dynamics
< Improve catch/effort estimates and biological sampling from recreational and commercial fisheries for red drum, including increased effort to intercept night fisheries for red drum. This should include significant efforts to determine the size and age structure of regulatory discards of live red drum. (H)

- States should maintain annual age-length keys. Expand biological sampling based on a statistical analysis to adequately characterize the age/size composition of removals by all statistical strata (gears, states, etc.) (H)
- Each state should develop an on-going red drum tagging program that can be used to estimate both fishing and natural mortality and movements. This should include concurrent evaluations of tag retention, tagging mortality, and angler tag reporting rates. (M)
- Establish programs to provide on-going estimates of commercial discards and recreational live release mortality using appropriate statistical methods. Discard estimates should examine the impact of slot-size limit management and explore regulatory discard impacts due to high-grading. (M)
- Evaluate the broader survey needs to identify gaps in current activities and provide for potential expansion and/or standardization between/among current surveys (M).

Biological

- Explore methods to effectively sample the adult population in estuarine, nearshore, and open ocean waters, such as in the ongoing red drum long line survey. (H)
- Determine if natural environmental perturbations limit recruitment, and if spawning stock size is the cause of recruitment variability (H)
- Continue tagging studies to determine stock identity, inshore/offshore migration patterns of all life stages (i.e. basic life history info gathering). Specific effort should be given to developing a large-scale program for tagging adult red drum (M)
- Fully evaluate the effects and effectiveness of using cultured red drum to facilitate higher catch rates along the Atlantic coast. (M)
- Determine habitat preferences, environmental conditions, growth rates, and food habits of larval and juvenile red drum throughout the species range along the Atlantic coast. Assess the effects of environmental factors on stock density/year class strength. (M)
- Refine maturity schedules on a geographic basis. Thoroughly examine the influence of size and age on reproductive function. Investigate the possibility of senescence in female red drum. (M)

Social

- Examine the effectiveness of controlling fishing mortality and minimum size in managing red drum fisheries.
- Encourage the NMFS to fund socioeconomic add-on questions to the recreational fisheries survey that are specifically oriented to red drum recreational fishing.

Economic

- Encourage the NMFS to continue funding socioeconomic add-on questions to the recreational fisheries survey that include data elements germane to red drum recreational fisheries management.
- Where appropriate, encourage member states to conduct studies to evaluate the economic costs and benefits associated with current and future regulatory regimes impacting recreational anglers including anglers oriented toward catch and release fishing trips.
- Fully evaluate the efficacy of using cultured red drum to restore native stocks along the Atlantic Coast including risk adjusted cost-benefit analyses. In any area where there is stocking of red drum, conduct genetic monitoring for each year class.

- < Conduct a special survey and related data analysis to determine the economic and operational characteristics of the "for-hire sector" targeting red drum especially fishing guide oriented businesses in the South Atlantic states.
- < Estimate the economic impacts (e.g. sales, jobs, income, etc.) of recreational red drum fisheries at the state and regional level including the "for-hire sector" (e.g. fishing guides).
- < States with significant fisheries (over 5,000 pounds) should collect socioeconomic data on red drum fisheries through add-ons to the recreational fisheries survey or by other means.

Habitat

- < Identify spawning areas of red drum in each state from North Carolina to Florida so these areas may be protected from degradation and/or destruction. (H)
- < Identify changes in freshwater inflow on red drum nursery habitats. Quantify the relationship between freshwater inflows and red drum nursery/sub-adult habitats. (H)
- < Determine the impacts of dredging and beach re-nourishment on red drum spawning and early life history stages. (M)
- < Investigate the concept of estuarine reserves to increase the escapement rate of red drum along the Atlantic coast. (M)
- < Identify the effects of water quality degradation (changes in salinity, DO, turbidity, etc.) on the survival of red drum eggs, larvae, post-larvae, and juveniles. (M)
- < Quantify relationships between red drum production and habitat. (L)
- < Determine methods for restoring red drum habitat and/or improving existing environmental conditions that adversely affect red drum production. (L)

IX. References

Atlantic States Marine Fisheries Commission (ASMFC). 2002. Amendment 2 to the Interstate Fishery Management Plan for Red Drum. ASMFC, Washington, DC, Fishery Management Report No. 38, 141 p.

Murphy, MD and J. Munyandorero. 2009. An assessment of the status of red drum in Florida through 2007. Florida Fish and Wildlife Commission Fish and Wildlife Research Institute, St. Petersburg, In-House Report 2008-008, 106 p.

South Atlantic Fishery management Council (SAFMC). 2009. Southeast Data, Assessment and Review 18, Stock Assessment Report, Atlantic Red Drum. North Charleston, SC. 544 p.

Takade, H and L Paramore. 2007. Stock Status of the Northern Red Drum Stock. North Carolina Division of Marine Fisheries. In-House Report, 60 p.

Vaughan, DS. 1992. Status of the red drum stock of the Atlantic coast: Stock assessment report for 1991. NOAA Tech. Mem. NMFS-SEFC-297. 58 p.

Vaughan, DS. 1993. Status of the red drum stock of the Atlantic coast: Stock assessment report for 1992. NOAA Tech. Mem. NMFS-SEFC-313. 60 p.

Vaughan, DS. 1996. Status of the red drum stock of the Atlantic coast: Stock assessment report for 1995. NOAA Tech. Mem. NMFS-SEFC-380. 50 p.

Vaughan, DS and JT Carmichael. 2000. Assessment of Atlantic red drum for 1999: northern and southern regions. NOAA Tech. Mem. NMFS-SEFSC-447, 54 p. + app. U.S. DOC, NOAA, Center for Coastal Fisheries and Habitat Research, Beaufort, NC.

Vaughan, DS and JT Carmichael. 2001. Bag and size limit analyses for red drum in northern and southern regions of the U.S. South Atlantic. NOAA Tech. Mem. NMFS-SEFSC-454, 37 p. U.S. DOC, NOAA, Center for Coastal Fisheries and Habitat Research, Beaufort, NC.

Vaughan, DS and TE Helser. 1990. Status of the red drum stock of the Atlantic coast: Stock assessment report for 1989. NOAA Tech. Mem. NMFS-SEFC-263. 117 p.

X. Figures

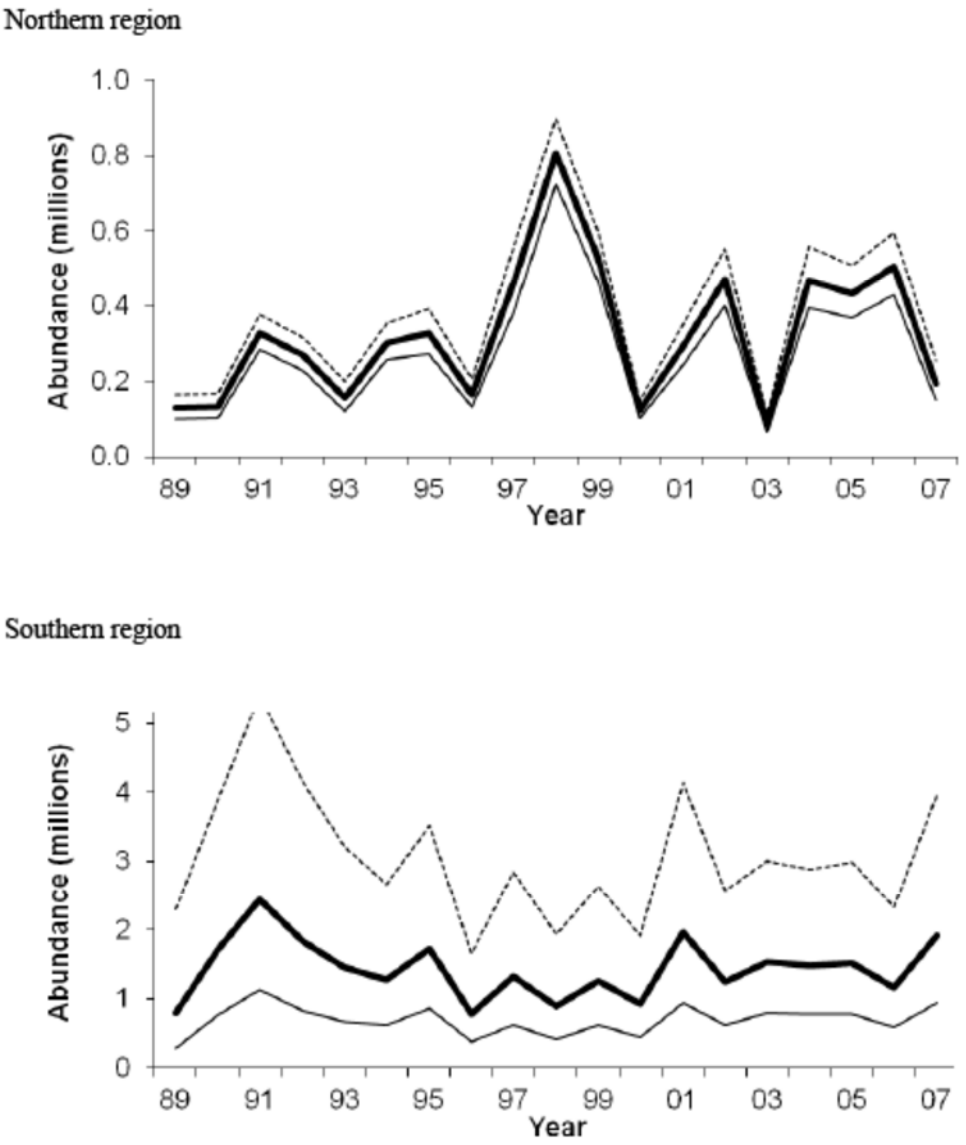


Figure 1. Estimated recruitment (age-1 abundance, heavy solid line) and ± 1.96 standard errors for the northern and southern regions during 1989-2007 (Source: SAFMC 2009). Note: assessment results for the southern region are indicative of relative trends but not absolute values.

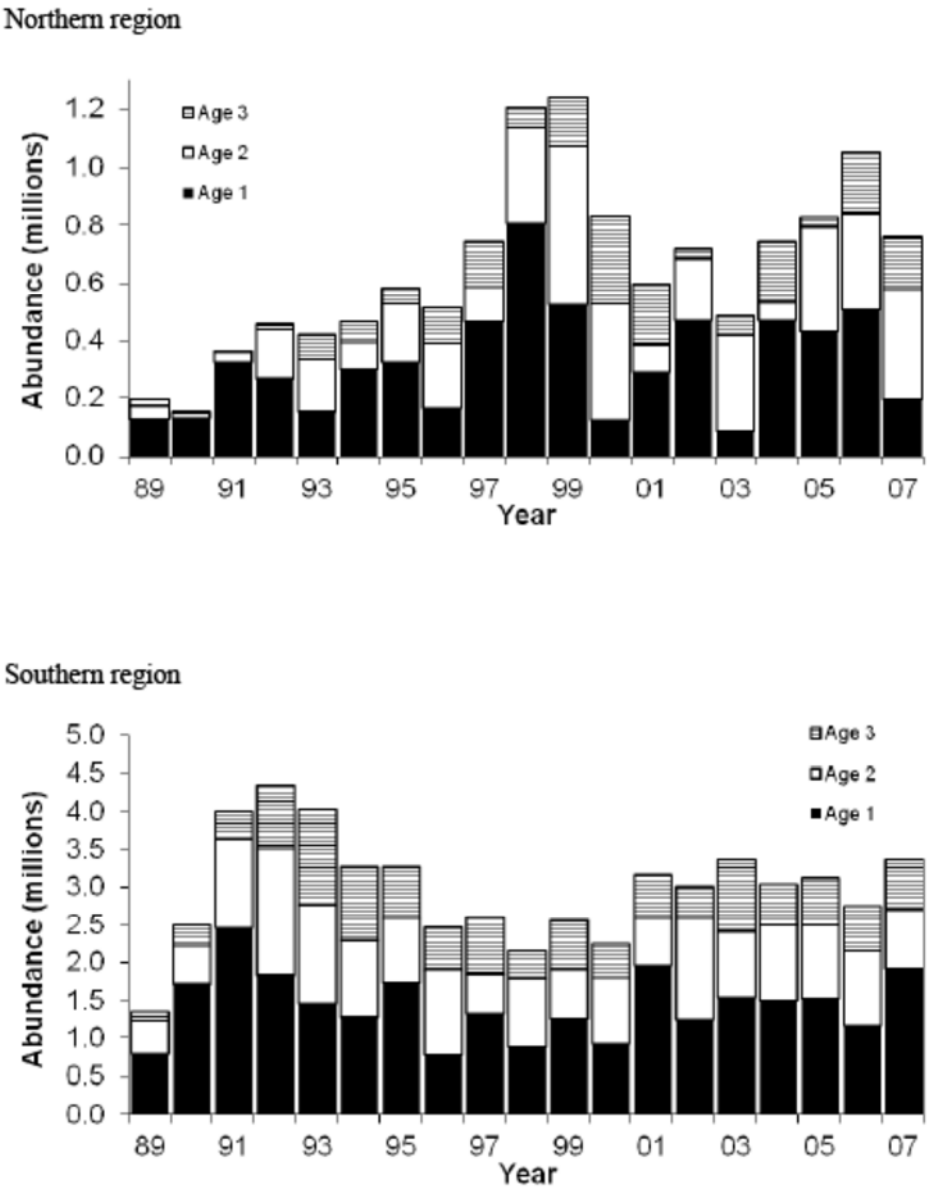


Figure 2. Estimates of abundance of red drum ages 1-3 in the northern and southern regions during 1989-2007 (Source: SAFMC 2009). Note: assessment results for the southern region are indicative of relative trends but not absolute values.

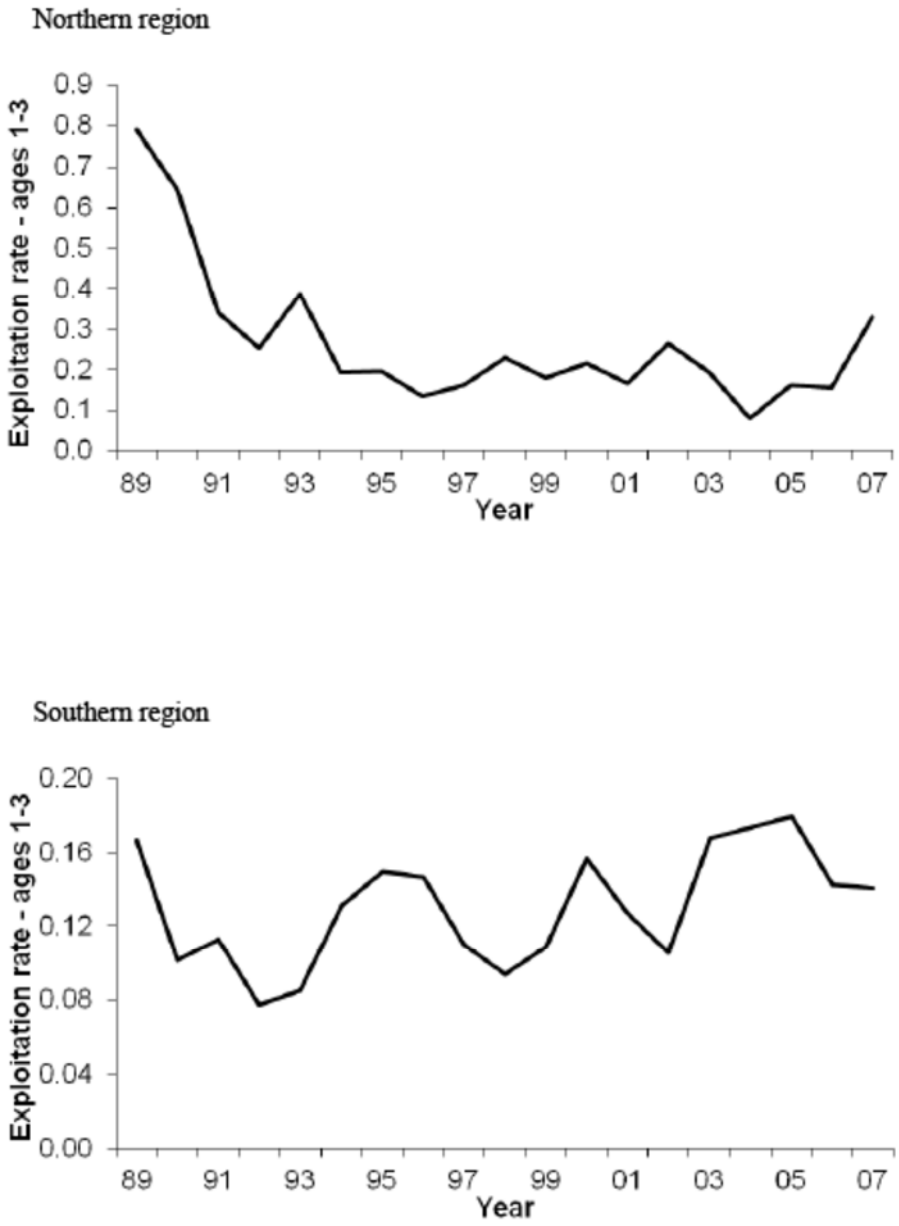


Figure 3. Estimated annual exploitation rate for red drum ages 1-3 in the northern and southern regions during 1989-2007 (Source: SAFMC 2009). Note: assessment results for the southern region are indicative of relative trends but not absolute values.

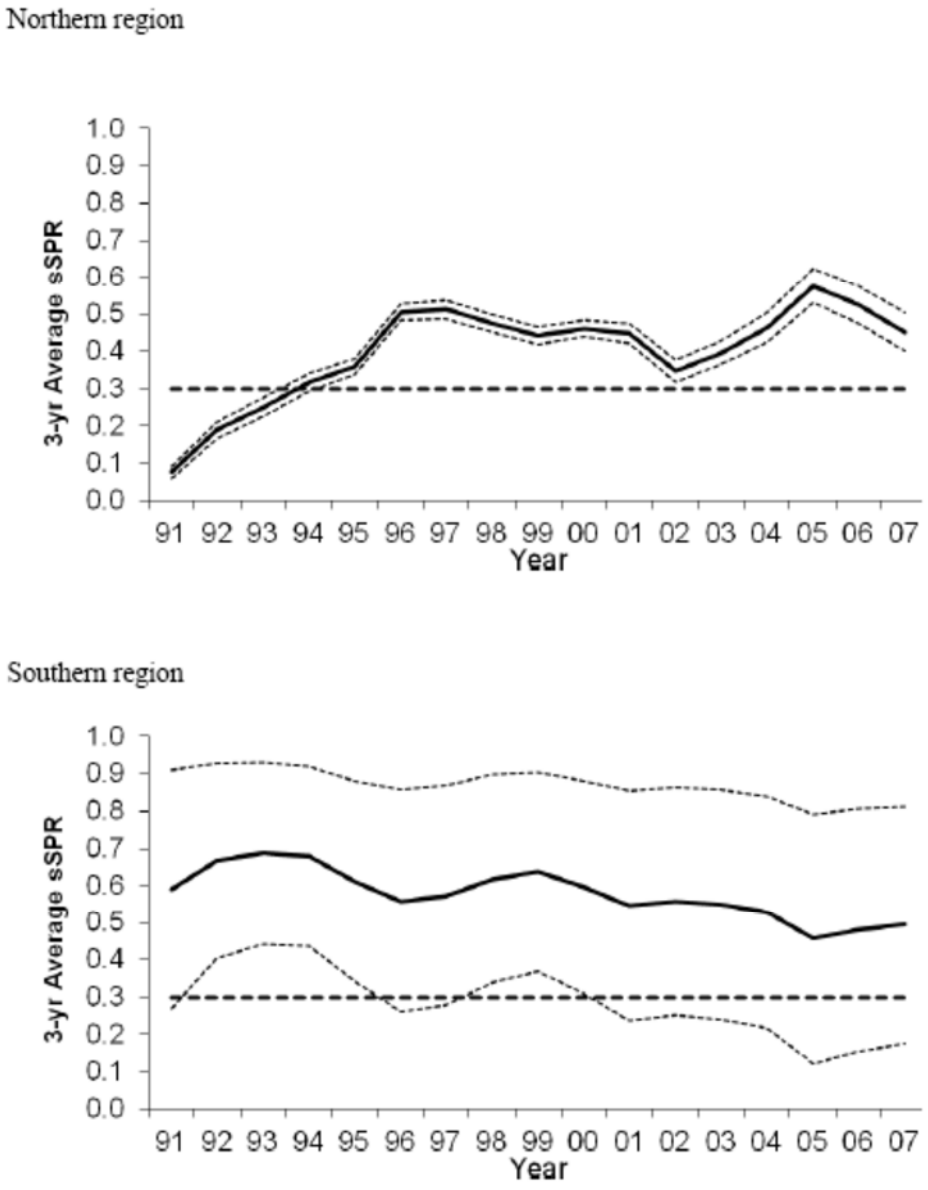


Figure 4. Northern and southern region estimates of three-year average static spawning potential ratio with ± 1.96 standard errors (dashed lines) during 1991-2007. Three-year averages include current and previous two year's sSPR estimates. The heavy dashed line shows the 30% overfishing threshold (Source: SAFMC 2009). Note: assessment results for the southern region are indicative of relative trends but not absolute values.

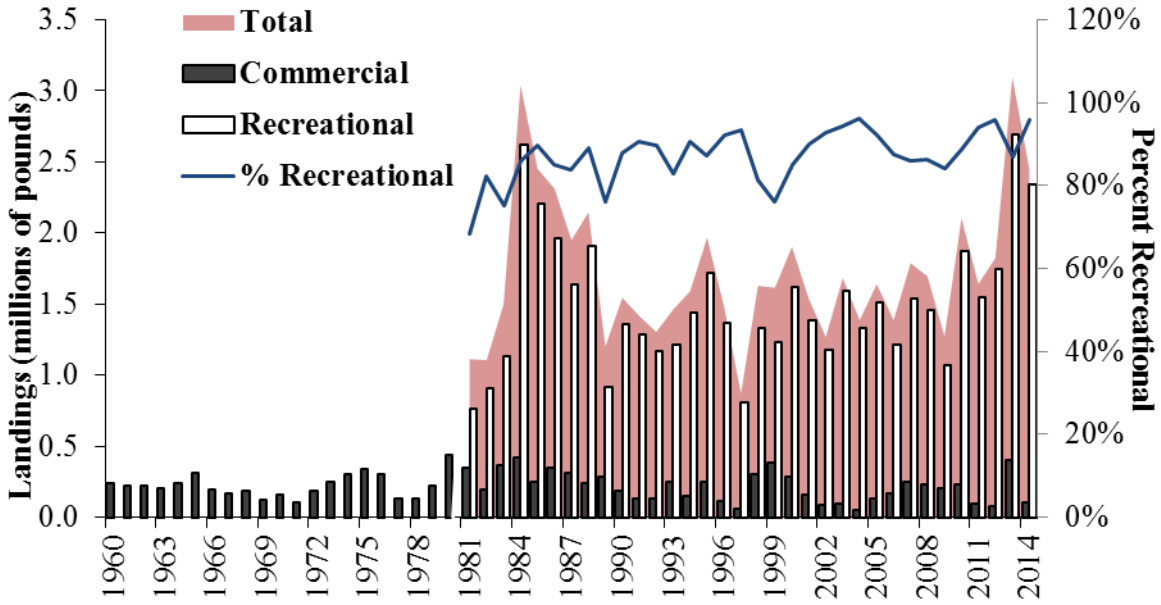


Figure 5. Commercial and recreational landings (pounds) of red drum. Recreational data not available prior to 1981. See Tables 2 and 3 for values and data sources.

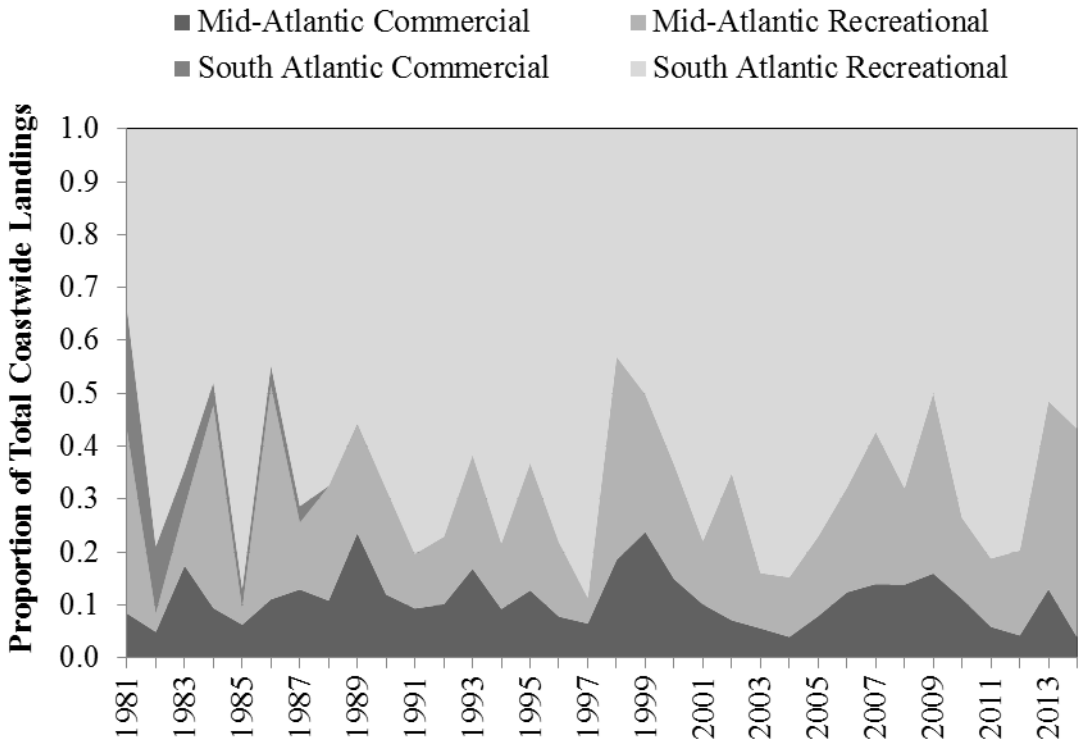


Figure 6. Proportion of regional, sector-specific landings to total coastwide landings (pounds). See Tables 2 and 3 for data sources.

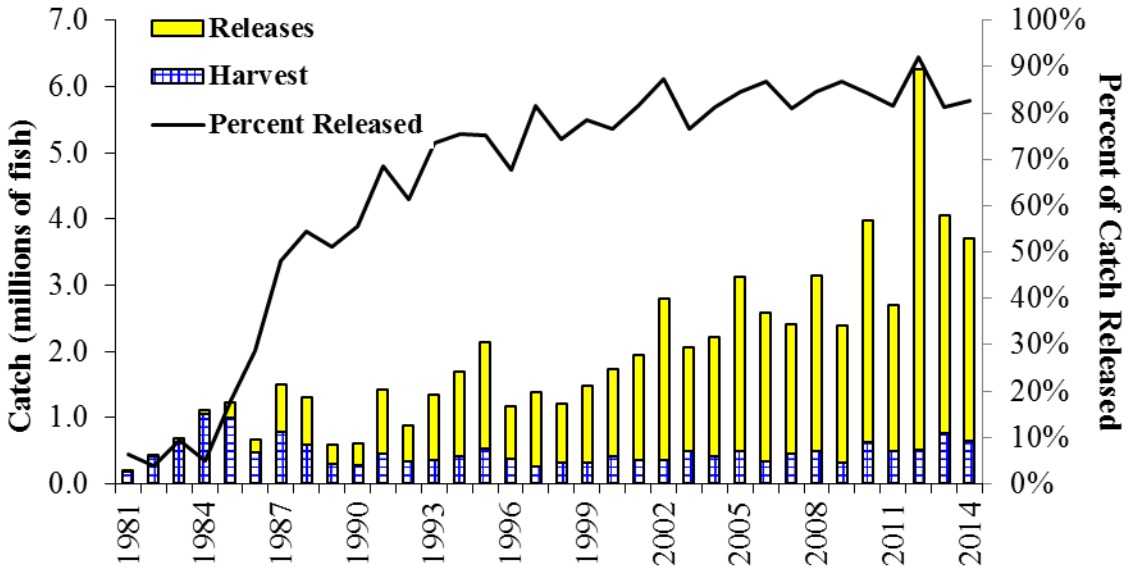


Figure 7. Recreational catch (harvest and alive releases) of red drum (numbers) and the proportion of catch that is released. See Tables 4 and 5 for values and data sources.

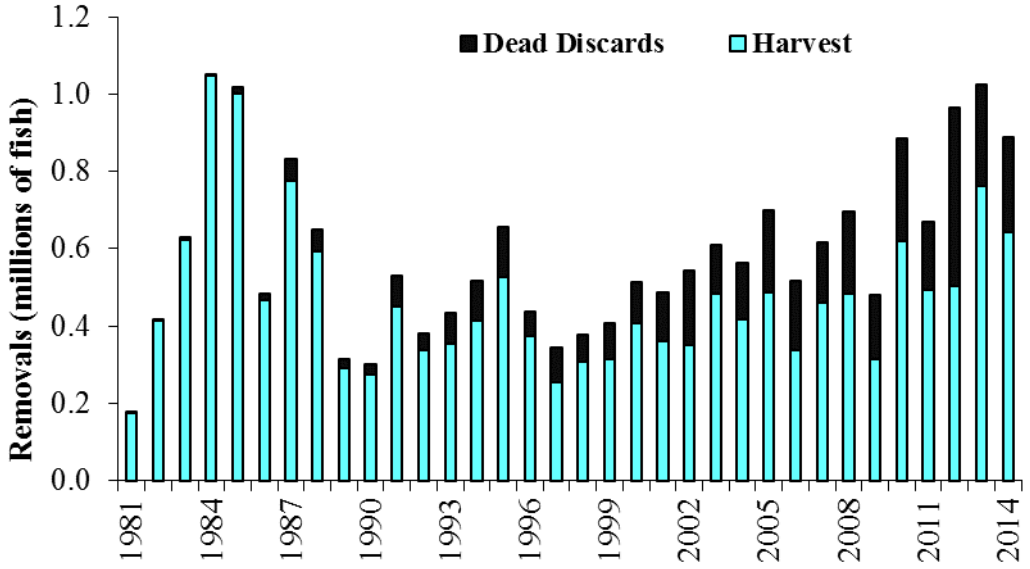


Figure 8. Recreational removals (harvest and dead discards) of red drum (numbers). Dead discards are estimated by applying an 8% discard mortality rate to alive releases. See Tables 4 & 5 for values and data sources.

XI. Tables

Table 1. Red drum regulations for 2014. 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" - 26", 3 fish
NC	18" - 27", 1 fish	18" - 27"; 250,000 lb harvest cap with overage payback (150,000 lbs Sept 1- April 30; 100,000 lbs May 1-Aug 31); closed November 23, 2013; September 1, 2014 harvest of red drum allowed with 7 fish daily trip limit; red drum must be less than 50% of catch (lbs); small mesh (<5" stretched mesh) gill nets attendance requirement May 1 - November 30. Fishing year: September 1 – August 31.
SC	15" - 23", 3 fish. Gigging allowed March-November	Gamefish Only
GA	14" - 23", 5 fish	Gamefish Only
FL	18" - 27", Northern Region- 2 fish; Southern Region- 1 fish	Sale of native fish prohibited

Table 2. Commercial landings (pounds) of red drum by state, 1981-2014. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD and ACCSP, Arlington, VA, except where noted below)

Year	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
1981					200	93,420		261	258,374	352,255
1982					1,700	52,561	2,228	251	139,170	195,910
1983			100		41,700	219,871	2,274	1,126	105,164	370,235
1984					2,600	283,020	3,950	1,961	130,885	422,416
1985					1,100	152,676	3,512	3,541	88,929	249,758
1986			1,000		5,400	249,076	12,429	2,939	77,070	347,914
1987					2,600	249,657	14,689	4,565	42,993	314,504
1988			8,100	2	4,000	220,271		3,281	284	235,938
1989			1,000	86	8,200	274,356	165	3,963		287,770
1990			29	86	1,481	183,216		2,763		187,575
1991			7,533	3,808	24,771	96,045		1,637		133,794
1992			1,087	196	2,352	128,497		1,759		133,891
1993			55		8,637	238,099		2,533		249,324
1994			859		4,080	142,119		2,141		149,199
1995			6		2,992	248,122		2,578		253,698
1996			215		2,006	113,338		2,271		117,830
1997			22	4	3,820	52,502		1,395		57,743
1998	311		336		6,456	294,366		672		302,141
1999	241	6	504	186	10,856	372,942		1,115		385,850
2000			843	10	11,512	270,953		707		284,025
2001			727	191	4,905	149,616		*		155,439
2002			1,161	285	7,361	81,370		*		90,177
2003			631	47	2,716	90,525		*		93,919
2004	12		12		638	54,086		*		54,748
2005			37	51	527	128,770		*		129,385
2006			8	2	2,607	169,206		*		171,823
2007			90	58	6,372	243,658		*		249,747
2008			40	69	4,585	229,809		*		234,503
2009	129		12	157	8,315	200296		*		208,909
2010			19	22	3,634	231,828		*		235,503
2011				3	4,369	91,980				96,352
2012	7,971		334	81	2,609	66,519				77,514
2013	176	0	2,730	268	28,766	371,949				403,889
2014	55	0	298	3	11,999	90,594		0	0	102,949

* Notes: NJ landings from SAFIS, 2004-present; MD landings from state reporting program, 1991-present; PRFC landings from agency reporting program, 1988-present; VA landings from state reporting program, 1996-present; NC landings from state reporting program, 1994-present; GA landings from state reporting program, 2000-present, * indicates confidential landings because less than three dealers reported.

Table 3. Recreational landings (pounds) of red drum by state, 1981-2014. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981			4,370	347,939	31,519	50,230	9,442	317,963	761,463
1982					37,511	340,686	52,150	480,676	911,023
1983			3,018	51,299	109,540	222,691	67,298	675,924	1,129,770
1984				1,285	1,160,539	183,282	294,583	976,971	2,616,660
1985					70,677	1,532,316	185,887	414,176	2,203,056
1986			754,161	145,517	31,594	498,586	173,837	360,725	1,964,420
1987				44,332	200,729	913,639	250,795	227,222	1,636,717
1988				9,030	451,974	1,050,049	385,860	12,507	1,909,420
1989			2,348	27,236	214,849	396,771	127,245	146,064	914,513
1990			2,679		302,994	631,819	161,712	258,569	1,357,773
1991			5,635	30,582	108,268	284,290	337,207	516,999	1,282,981
1992				55,324	109,134	411,484	198,751	396,555	1,171,248
1993				45,505	266,459	282,614	328,245	290,930	1,213,753
1994				3,684	192,060	314,632	353,616	578,412	1,442,404
1995				66,270	405,620	417,595	300,337	525,231	1,715,053
1996				1,512	204,556	396,394	164,756	596,483	1,363,701
1997				1,810	39,077	296,155	129,836	345,390	812,268
1998				34,861	591,428	129,619	84,348	487,091	1,327,347
1999				92,794	326,303	103,777	166,630	540,310	1,229,814
2000				95,596	316,029	93,043	228,965	885,447	1,619,080
2001				51,890	132,578	188,198	155,854	853,714	1,382,234
2002		860	15,154	155,212	182,225	103,831	170,572	551,128	1,178,982
2003				57,213	118,808	449,399	234,865	729,446	1,589,731
2004				32415	124,264	312,569	296,777	566,508	1,332,533
2005				7,624	239,694	298,600	177,169	788,993	1,512,080
2006		2,064		21,039	251,735	160,760	143,699	636,742	1,216,039
2007				209,248	305,664	152,190	197,510	674,463	1,539,075
2008				72,510	236,744	254,305	244,594	652,613	1,460,766
2009				148,573	286,702	165,874	125,499	343,359	1,070,007
2010				40,323	281,587	451,144	319,427	776,346	1,868,827
2011					212,245	441,833	229,214	662,811	1,546,103
2012	0	396	26,788	27,422	238,310	368,445	107,368	978,727	1,747,456
2013	0	7,153	6,367	411,236	676,050	236,887	129,279	1,226,481	2,693,453
2014	0	0	0	221,280	598,166	242,371	154,332	1,129,663	2,345,812

Table 4. Recreational landings (numbers) of red drum by state, 1981-2014. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981			601	49,630	15,054	27,319	6,323	75,244	174,171
1982					16,445	160,760	30,757	204,401	412,363
1983			2,413	32,940	81,528	104,806	56,854	344,513	623,054
1984				1,457	108,787	129,547	258,188	549,381	1,047,360
1985				0	22,077	530,110	183,837	265,185	1,001,209
1986			12,804	28,139	17,501	193,188	102,279	113,440	467,351
1987				2,186	61,100	522,420	138,062	51,225	774,993
1988				4,311	142,626	287,916	147,042	9,542	591,437
1989			1,014	12,007	62,359	127,492	51,557	34,748	289,177
1990			1,279	0	33,149	118,666	76,304	44,280	273,678
1991			2,745	17,119	38,658	125,833	162,802	102,727	449,884
1992				13,275	23,593	112,534	83,861	104,265	337,528
1993				14,005	49,493	119,189	105,710	65,140	353,537
1994				1,378	28,953	129,515	134,214	120,938	414,998
1995				3,665	88,593	202,430	134,915	96,927	526,530
1996				572	36,746	130,649	60,251	146,823	375,041
1997				1,920	8,749	129,022	39,041	75,235	253,967
1998				13,070	114,638	46,509	24,929	107,982	307,128
1999				12,425	64,739	44,069	67,283	126,180	314,696
2000				22,603	61,618	37,217	94,144	191,070	406,652
2001				6,967	23,142	61,420	90,376	177,633	359,538
2002		275	5,521	49,795	42,541	41,190	90,993	119,010	349,325
2003				13,607	25,481	162,484	122,259	159,331	483,162
2004				5,005	30,017	107,803	138,893	136,728	418,446
2005				2,766	51,807	130,655	105,655	195,550	486,433
2006		468	6,362	12,665	55,714	48,703	68,813	145,860	338,585
2007				46,405	66,789	72,261	113,237	161,427	460,119
2008				20,847	50,809	119,471	133,107	159,246	483,480
2009				38,670	57,543	70,326	68,857	79,635	315,031
2010				11,076	64,024	172,708	194,826	175,828	618,462
2011	995				45,143	161,503	106,962	180,001	494,604
2012		296	17,869	28,149	52,948	121,068	45,766	238,191	504,287
2013		1,686	2,134	124,156	164,217	97,387	73,826	297,527	760,933
2014	0	0	0	53,545	116,921	103,892	91,764	275,536	641,658

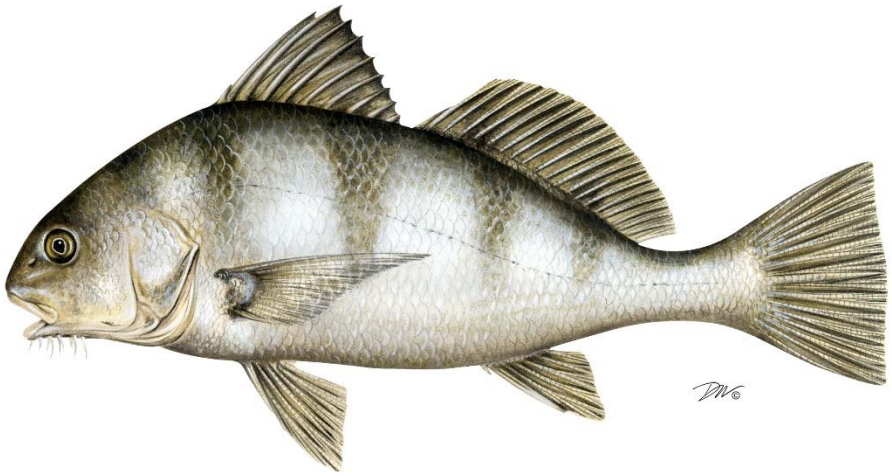
Table 5. Recreational alive releases and dead discards (numbers) of red drum by state, 1981-2014. Dead discards are estimated based on an 8% release mortality rate. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD.)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total	Dead Discards
1981					2,230	417		9,042	11,689	935
1982						2,496	3,377	10,172	16,045	1,284
1983					1,866	6,751	1,417	54,723	64,757	5,181
1984					2,931	0	4,232	47,196	54,359	4,349
1985				1,115		16,688	6,315	193,399	217,517	17,401
1986				7,595		24,018	56,045	100,095	187,753	15,020
1987					18,499	82,595	234,676	377,959	713,729	57,098
1988				3,958	24,874	269,176	177,319	233,988	709,315	56,745
1989			2,918	7,038	7,566	42,824	71,162	172,303	303,811	24,305
1990			0	934	12,452	102,611	156,263	68,667	340,927	27,274
1991			4,432	14,461	121,178	99,968	92,803	645,773	978,615	78,289
1992	301			15,383	60,230	46,269	128,066	284,893	535,142	42,811
1993				50,434	182,301	146,324	140,386	465,656	985,101	78,808
1994				10,684	107,662	324,706	146,039	691,261	1,280,352	102,428
1995				33,560	164,520	362,844	356,618	683,706	1,601,248	128,100
1996				2,424	35,752	176,517	71,983	500,374	787,050	62,964
1997		2,571		109,754	259,570	175,772	22,736	560,559	1,130,962	90,477
1998			2,768	93,660	199,701	84,274	33,882	481,009	895,294	71,624
1999			2,148	232,893	247,146	87,776	18,586	565,981	1,154,530	92,362
2000			1,458	196,541	203,967	94,050	129,190	693,152	1,318,358	105,469
2001				30,365	238,552	221,045	249,892	850,044	1,589,898	127,192
2002		1,388	18,412	801,239	640,857	142,931	168,902	663,879	2,437,608	195,009
2003		731	2,935	43,379	75,561	430,052	272,897	748,765	1,574,320	125,946
2004				33,777	181,252	438,173	141,972	1,006,814	1,801,988	144,159
2005				28,351	378,541	493,595	334,521	1,405,967	2,640,975	211,278
2006		875	12,357	185,859	510,264	539,936	136,306	847,269	2,232,866	178,629
2007				110,566	416,352	436,797	225,985	758,684	1,948,384	155,871
2008		75	217	236,787	658,887	552,217	313,743	889,550	2,651,476	212,118
2009			14,754	178,396	429,776	751,123	167,704	521,659	2,063,412	165,073
2010			2,182	28,580	635,876	786,452	483,650	1,414,115	3,350,855	268,068
2011				61,330	207,697	664,291	213,781	1,051,143	2,198,242	175,859
2012	0	5,873	280,000	2,503,237	1,533,006	543,618	90,237	799,428	5,755,399	460,432
2013	0	407	2,207	220,305	654,030	673,377	198,722	1,541,541	3,290,589	263,247
2014	0	41	273	114305	383421	635,152	285770	1648723	3067685	245,415

2015 REVIEW OF THE ATLANTIC STATES MARINE FISHERIES COMMISSION FISHERY MANAGEMENT PLAN FOR

BLACK DRUM (*Pogonias cromis*)

2013 FISHING YEAR



The Black Drum Plan Review Team

Jordan Zimmerman, Delaware Division of Fish and Wildlife
Chris Stewart, North Carolina Division of Marine Fisheries
Chris McDonough, South Carolina Department of Natural Resources
Ryan Harrell, Georgia Department of Natural Resources
Michelle Sempsrott, Florida Fish & Wildlife Conservation Commission
Kirby Rootes-Murdy, Atlantic States Marine Fisheries Commission, Chair

Table of Contents

I. Status of the Fishery Management Plan

Date of FMP Approval:	Original FMP – June 2013
Management Areas:	The western Atlantic coast distribution of the resource from Gulf of Maine through Florida
Active Boards/Committees:	South Atlantic State/Federal Fisheries Management Board; Black 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 Black Drum in 2013. Prior to the FMP, management was state-specific and varied from no regulations in North Carolina to a combination of size limits, possession limits, commercial trip limits, and/or annual commercial quotas in other states from New Jersey to Florida. The Maryland portion of the Chesapeake Bay was closed to commercial fishing in 1998.

The FMP requires all states to implement a maximum possession limit and minimum size limit (of at least 12 inches) by January 1, 2014, with an additional increase of the minimum size limit to at least 14 inches required by January 1, 2016 (ASMFC 2013). The FMP also includes a management framework to adaptively respond to future concerns or changes in the fishery or population.

There are four plan objectives:

- Provide a flexible management system to address future changes in resource abundance, scientific information, and fishing patterns among user groups or area.
- Promote cooperative collection of biological, economic, and sociological data required to effectively monitor and assess the status of the black drum resource and evaluate the management efforts.
- Manage the black drum fishery to protect both young individuals and established breeding stock.
- Develop research priorities that will further refine the black drum management program to maximize the biological, social, and economic benefits derived from the black drum population.

The management unit for black drum under the FMP is defined as the range of the species within U.S. waters of the northwest Atlantic Ocean from estuaries eastward to the offshore boundaries of the Exclusive Economic Zone (EEZ).

II. Status of the Stocks

In the 2015 Black Drum benchmark stock assessment, the Stock Assessment Subcommittee (SASC) selected the Depletion-Based Stock Reduction Analysis (DB-SRA; Dick and McCall 2011) as the preferred method for estimating catch reference points. The SASC considered Depletion-Corrected Average Catch (DCAC; McCall 2009) analysis but due to the method not

incorporating the removals into a population dynamics process, and uncertainty over how changes in exploitation rate time series may impact the sustainable yield relative to the current stock condition, it became the less preferred method. Based on the DB-SRA results, black drum life history, indices of abundance, and history of exploitation, the black drum stock is not overfished and not experiencing overfishing (ASMFC 2015). Median biomass was estimated to decline slowly and steadily from 135.2 million pounds in 1900 to 90.78 million pounds in 2012, though the median biomass estimate in 2012 is still well above the median biomass that produces maximum sustainable yield (BMSY; 47.26 million pounds). The median maximum sustainable yield (MSY) estimate is 2.12 million pounds and provides an annual catch target that can be used to sustainably manage the fishery. The median overfishing limit (OFL) estimated with DB-SRA is 4.12 million pounds and provides a catch threshold that indicates overfishing when exceeded. The OFL is the maximum exploitation rate at the current biomass that does not lead to overfishing.

III. Status of the Fishery

The following discussion utilizes the results from direct queries of the MRIP data through their website. Adjustments needed to make these consistent through time (convert pre-2004 MRFSS data, adjust for changes in for-hire component of survey, and deletion of 1981-85 headboat data) have not been made here.

Total black drum landings from New Jersey through the east coast of Florida in 2013 are estimated at 1.8 million pounds (Tables 2 and 3, Figure 2). This represents an 84.2% increase from the total harvest in 2012 but is below (81%) the previous ten-year (2003-2012) average. The commercial and recreational fisheries harvested 16% and 84% of the total in 2013, respectively.

Commercial landings of black drum span from New Jersey through Florida, with Virginia and North Carolina making up the majority (75%) of landings (Table 2). Coastwide commercial landings show no particular temporal trends, ranging from approximately 130,000 to 400,000 pounds annually over the last 10 years (Figure 2). In 2013, coastwide commercial harvest increased from 237,846 pounds in 2012 to 284,632 pounds, the majority (45%) from North Carolina (Table 2). Historically, the major commercial harvesters were Virginia and North Carolina.

Recreational harvest of black drum peaked in 2008 at 789,000 fish (or 5.2 million pounds; Tables 3 and 4). Since 2000, the number has fluctuated without trend between 263,000 and 789,000 fish (744,000 to 5.2 million pounds; Figures 2 and 3). Recreational harvest increased from 263,313 fish (744,267 pounds) in 2012 to 613,674 fish (1.5 million pounds) in 2013. The 2013 harvest represents a 43% increase in numbers but a 22% decrease in pounds from the previous ten year (2003-2012) average. North Carolina anglers landed the largest share of the coastwide recreational harvest in numbers (59%), followed by Florida (31%) and South Carolina (6%). Anglers released approximately the same number of black drum as they kept from their catch; the percent of the catch released is generally over 50% during the last decade (Figure 3). The proportion of releases decreased in 2013 to 47% (versus 59% in 2012), while the overall number of fish released increased by approximately 381,858 to 556,908 fish (Figure 3, Table 5). This increase in the number of releases may be attributable to recent management measures (ie: implementation of the 12” inch minimum size).

IV. Status of Assessment Advice

Current stock status information comes from the 2015 benchmark stock assessment (ASMFC 2015) completed by the ASMFC Black Drum Stock Assessment Subcommittee and Technical Committee, peer reviewed by an independent panel of experts, and approved by the South Atlantic State-Federal Fisheries Management Board for use in management decisions.

The black drum stock assessment would be improved by applying a more complex, data-rich assessment method such as a statistical catch-at-age model. Data limitations that need to be addressed to successfully make this transition are biological sampling (length and age) of recreational and commercial fisheries and a fishery-independent survey tracking abundance and the age structure of the mature stock. Additionally, information about fish discarded in commercial fisheries and movement of fish would improve the assessment.

V. Status of Research and Monitoring

There are no monitoring or research programs required annually of the states except for the submission of a compliance report. The following fishery-dependent (other than catch and effort data) and fishery-independent monitoring programs were reported in the 2015 reports.

<u>Fishery Dependent Monitoring</u>

- Delaware DFW- Samples commercial drifted gill nets and recreational anglers (2013: 81 fish sampled, 69 males & 12 females, recreational samples had higher mean age (29 years) and lengths (1054 mm))
- Maryland DNR – Samples commercial pound nets once every other week in the Chesapeake Bay from late spring through summer (2013: 4 fish).
- Virginia MRC – Samples commercially landed and recreational harvest of black drum through its biological monitoring program (2013: 87 fish; 56 weights recorded; 21 otoliths collected & aged).
- North Carolina DMF – Conducts a gill-net observer program.
- South Carolina DNR –State finfish survey terminated in February 2013; state took over MRIP intercept sampling in 2013 (information reported through MRIP). SC continues their tournament and freezer fish rack program to obtain biological information on age, sex, and maturity.
- Georgia CRD – Collects age, length, and gender data through the Marine Sportfish Carcass Recovery Project (2013: 54 black drum out of 4,392 fish; avg length 381.6 mm).
- Florida FWC – Conducts a random survey of licensed anglers on the sizes of kept and released fish (conducted through MRIP). The state also conducts commercial fish house sampling.
- NMFS – Collects recreational catch, harvest, release, and effort data, and length measurements via the Marine Recreational Information Program.

<u>Fishery Independent Monitoring</u>

- New Jersey
    - Ocean Trawl Survey: index has ranged from .57 to .00 over the last 5 years. In 2013 the black drum index was .10.

    - Delaware River Seine: index has ranged from .02 to .11 over the last 5 years, with 2013 (.11) marking the highest reading of abundance since 2007.
    - Delaware Bay Trawl: A near shore fixed station trawl survey has been conducted in Delaware Bay from April through November since 1991 at eleven stations using a 16 foot otter trawl. Indices of abundance were calculated for Black Drum for the months of August through October, the only time in the survey when juveniles recruit to the survey index has ranged from .00 to .21 over the last 5 years. In 2013 the black drum index was .12
- Delaware DFW- conducts two trawl surveys (16 ft for juvenile finfish; 30ft for adults). For the 16ft trawl survey, in 2013 the CPUE=.06 and the GM/tow=.04; for the 30ft trawl the CPUE= 1.00 and the GM/tow=.24.
- Maryland DNR- Conducts the Costal Bays Fisheries seine survey in Maryland's Coastal Bay and generally catches juvenile fishes. (2013: GM catch per haul in numbers, <.2)
- North Carolina DMF - Conducts a gill net survey in Pamlico Sound to characterize size and age distribution, produce an abundance index (2013: n= 120; CPUE=.42; avg centerline length=13.5").
- South Carolina DNR – Conducts an estuarine trammel net survey for subadults in 7 estuaries (as strata)-Port Royal, ACE Basin, Ashly River, Charleston Harbor, Wando River, Cape Roman, Winyah Bay (CPUE: increase from 2012 to 2013; .295 fish per set up from .185 fish per set).
- Georgia CRD – Conducts an estuarine trammel net survey for subadult biological data and an abundance index (2013: n = 4; CPUE in Wassaw estuary= .01; Altamaha river delta=0.05). Conducts an estuarine gill net survey for young-of-year biological data and an abundance index (2013: n = 2; CPUE in Wassaw estuary= 0; Altamaha river delta=0.02).
- Florida FWC-FWRI – Conducts two seine surveys in the northern and southern Indian River Lagoon (IRL) and northeast Florida near Jacksonville (N IRL: n=11, mean size of 256 mm, 2.6% of samples; S IRL: n=576, mean size of 239mm, 40.3% of samples; NE FL: n=7, mean size of 154mm). FWC-FWRI also conducts a haul seine survey in these areas and the southern IRL for a subadult index (S IRL: n=11, mean size of 217mm, 1% of samples).

VI. Status of Management Measures and Issues

Fishery Management Plan

The Black Drum FMP requires all states with a declared interest in the species to establish a maximum possession limit by January 1, 2014, a minimum size limit that shall be no less than 12 inches by January 1, 2014 and a minimum size limit that shall be no less than 14 inches by January 1, 2016. In 2013, Georgia and North Carolina were only states yet to implement these management measures.

De Minimis

The black drum FMP allows for states to request *de minimis* status if, for the preceding three years for which data are available, their average combined commercial and recreational landings (by weight) constitutes less than 1% of the coastwide commercial and recreational landings for the same three year period. A state that qualifies for *de minimis* will qualify for exemption in both their commercial and recreational fisheries.

De Minimis Requests
No state requested *de minimis* status through the annual reporting process.

VII. Implementation of FMP Compliance Requirements for 2013

The PRT finds that all states have implemented the requirements of the Fishery Management Plan.

VIII. Recommendations of the Plan Review Team

Management and Regulatory Recommendations

- Review impact of increased minimum sizes over the next years as data becomes available.

Prioritized Research and Monitoring Recommendations (H) =High, (M) =Medium, (L) =Low

Stock Assessment and Population Dynamics

- Age otoliths that have been collected and archived. (H)
- Collect information to characterize the size composition of fish discarded in recreational fisheries. (H)
- Increase biological sampling in commercial fisheries to better characterize the size and age composition of commercial fisheries by state and gear. (H)
- Increase biological sampling in recreational fisheries to better characterize the size and age composition by state and wave. (H)
- Obtain estimates of selectivity-at-age for commercial fisheries by gear, recreational harvest, and recreational discards. (H)
- Continue all current fishery-independent surveys and collect biological samples for black drum on all surveys. (H)
- Develop fishery-independent adult surveys. Consider long line and purse seine surveys. (H)
- Collect age samples, especially in states where maximum size regulations preclude the collection of adequate adult ages. (H)
- Conduct studies to estimate catch and release mortality rates in recreational fisheries. (H)
- Continue to do additional genetic work to figure out the extent of mixing between regional stocks. A recent study found significant genetic differences between black drum populations but also recent or current gene flow between the regions (Leidig et al., 2015). More studies are needed to confirm the extent of the species movement and the fluidity of the regional populations. (H)
- Conduct additional tagging studies, especially radio-tracking tags (H)
- Obtain better estimates of harvest from the black drum recreational fishery (especially in the mid-Atlantic and states with short seasons). (H)
- Conduct reproductive studies, including: age and size-specific fecundity, spawning frequency, spawning behaviors by region, and movement and site fidelity of spawning adults. (M)
- Collect information on the magnitude and sizes of commercial discards. Obtain better estimates of bycatch of black drum in the gill-net fisheries. (M)
- Conduct a high reward tagging program to obtain improved return rate estimates. (M)

- Continue and expand current tagging programs to obtain mortality and growth information and movement at size data. (M)
- Improve sampling of night time fisheries. (M)

IX. References

Atlantic States Marine Fisheries Commission (ASMFC). 2013. Interstate Fishery Management Plan for Black Drum. Arlington, VA.

ASMFC. 2015. Black Drum Stock Assessment for Peer Review. Atlantic States Marine Fisheries Commission, Stock Assessment Report. 352 p.

Dick, E.J. and MacCall, A. D. 2011. Depletion-Based Stock Reduction Analysis: A catch-based method for determining sustainable yields for data-poor fish stocks. Fisheries Research, 110: 331-341

Leidig, J.M., Shervetter, V. R., McDonough, C.J. and Darden, T.L. 2015. Genetic Population Structure of Black Drum in U.S. Waters. North American Journal of Fisheries Management, 35:464-477.

MacCall, A.D. 2009. Depletion-corrected average catch: a simple formula for estimating sustainable yields in data-poor situations. ICES Journal of Marine Science, 66: 2267-2271.

X. Figures

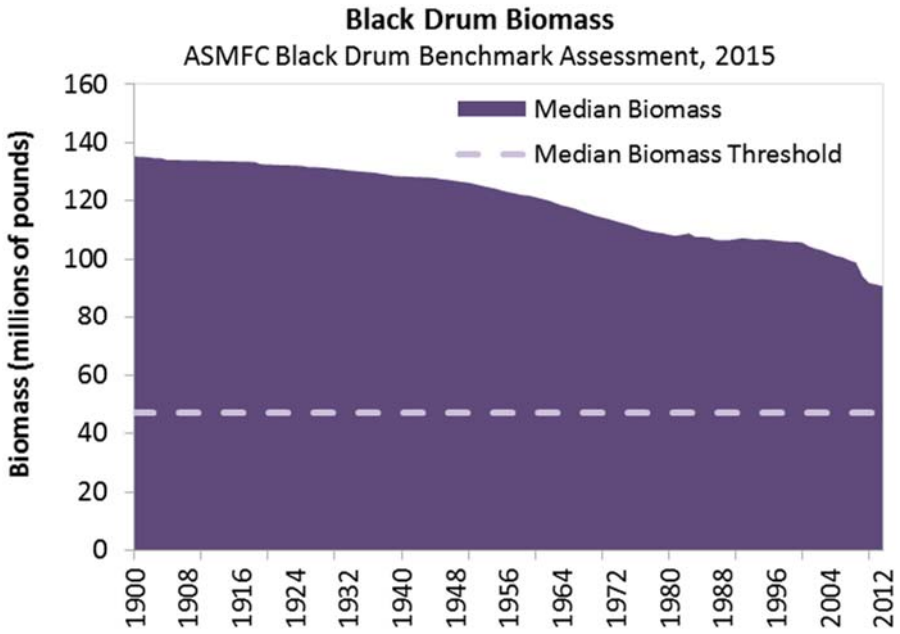


Figure 1. DB-SRA estimates of Median biomass and threshold 1900-2012 (Source: ASMFC 2015).

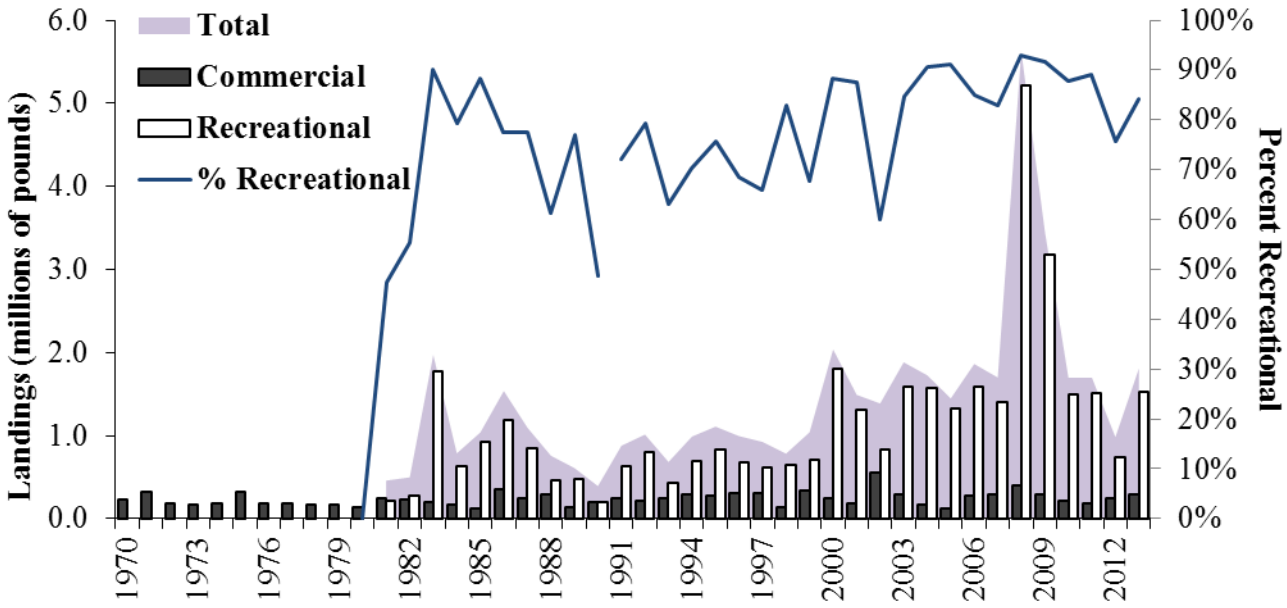


Figure 2. Commercial and recreational landings (pounds) of black drum. Recreational data not available prior to 1981. See Tables 2 and 3 for values and data sources.

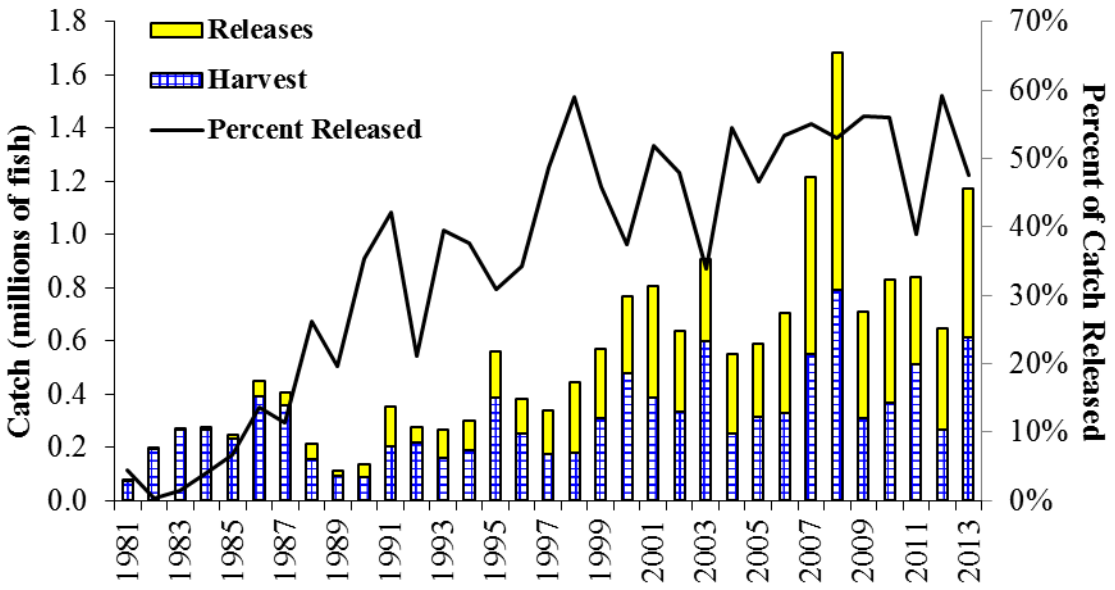


Figure 3. Recreational catch (harvest and alive releases) of black drum (numbers) and the proportion of catch that is released. See Tables 4 and 5 for values and data sources.

XI. Tables

Table 1. Black drum regulations for 2013. The states of New Jersey through Florida are required to meet the requirements in the FMP. All size limits are total length.

State	Recreational		Commercial			Notes
	Size limit	Bag limit	Size limit	Trip Limit	Annual Quota	
ME->NY	-	-	-	-	-	
NJ	16” min	3/person/day	16” min	10,000 lbs	65,000 lbs	
DE	16” min	3/person/day	16” min	10,000 lbs	65,000 lbs	
MD	16” min	1/person/day 6/vessel (Bay)	16” min		1,500 lbs Atlantic Coast	Ches Bay closed to commercial harvest
VA	16” min	1/person/day	16” min	1/person/day	120,000 lbs	without Black Drum Harvesting and Selling permit
NC	**		**			
SC	14” min 27” max	5/person/day	14” min 27” max	5/person/day		Commercial fishery primarily bycatch
GA	10” min*	15/person/day	10” min	15/person/day		
FL	14” min 24” max	5/person/day	14” min 24” max	500 lbs/day		One fish >24” allowed for recreational fishers

*To comply with the FMP requirements, Georgia increased their minimum size in 2014 from 10” to 14”.

**On January 1, 2014, North Carolina implemented a 14”-25” slot limit and 10 fish per person per day for their recreational fishery and 14”-25” slot limit and 500 lbs trip limit in the commercial fishery.

Table 2. Commercial landings (pounds) of black drum by state, 2003-2013. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD and ACCSP, Arlington, VA, except where noted below)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
2003			631	111,554	90,525		*		289,312
2004	15,202	4,092	1,039	64,823	62,445		*	12,653	160,254
2005	1,970	10,059	165	66,660	44,989		*	5,249	129,092
2006	16,454	70,097	552	65,973	125,214		*	3,975	282,265
2007	1,218	37,704	172	91,385	148,231		*	12,770	291,480
2008	1,487	9,563	*	69,825	301,998	*	*	19,348	402,221
2009	6,408	30,551	*	82,437	148,994		*	15,710	284,100
2010	3,079	49,535	*	69,659	69,194		*	15,679	207,146
2011	3,130	49,514	*	56,747	56,083		*	22,333	187,807
2012	19,017	10,828	558	98,789	94,352	*	0	14,302	237,846
2013	16,251	24,507	524	87,730	127,170	*	*	28,450	284,632

*indicates confidential landings because less than three dealers reported.

Table 3. Recreational landings (pounds) of black drum by state, 1981-2013. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	0	0	0	95,051	0	3,495	7,614	111,369	217,529
1982	0	0	0	0	2,720	13,222	6,278	253,705	275,925
1983	69,193	0	603,101	706,113	0	61,594	6,765	328,922	1,775,688
1984	0	0	0	38,672	0	5,452	31,848	549,047	625,019
1985	0	50	43,946	301,264	3,838	63,206	37,646	467,715	917,665
1986	103,942	3,220	219,916	395,311	62,146	24,503	52,558	330,239	1,191,835
1987	0	623	0	462,348	51,463	61,011	45,848	230,085	851,378
1988	0	0	0	36,203	79,484	60,861	28,804	258,667	464,019
1989	0	0	192,996	54,086	2,170	44,234	44,715	131,163	469,364
1990	0	2,378	0	8,147	3,767	22,270	51,723	103,101	191,386
1991	0	1,399	0	83,090	10,558	13,878	96,295	428,316	633,536
1992	0	0	0	237,596	20,082	30,276	30,037	485,267	803,258
1993	0	1,153	0	1,087	31,474	43,092	26,842	326,596	430,244
1994	0	0	0	2,807	92,749	15,801	99,814	484,657	695,828
1995	0	0	149,158	20,685	227,582	66,787	53,721	319,812	837,745
1996	0	4,027	0	97,782	172,959	68,865	8,635	330,368	682,636
1997	0	11,372	0	36,130	156,981	190,835	28,366	186,417	610,101
1998	0	15,499	0	91,296	102,534	51,655	19,004	368,574	648,562
1999	0	2,203	8,498	0	170,793	81,777	12,058	430,690	706,019
2000	0	6,381	17,207	12,097	259,623	276,622	188,957	1,036,211	1,797,098
2001	165,041	356	0	331	188,201	16,813	32,496	903,239	1,306,477
2002	9,492	5,930	10,246	14,554	474,619	58,679	24,880	233,136	831,536
2003	214,250	0	12,282	96,730	355,717	243,887	135,127	535,717	1,593,710
2004	809,306	2,592	20,891	11,880	221,925	30,190	57,953	411,968	1,566,705
2005	519,635	25,945	0	83,349	63,161	58,997	46,485	520,948	1,318,520
2006	792,896	23,607	25,212	26,834	162,932	63,024	33,147	452,507	1,580,159
2007	202,375	14,830	0	238,718	220,454	71,471	84,495	576,048	1,408,391
2008	2,998,236	19,795	0	497,913	524,138	115,043	244,350	817,806	5,217,281
2009	1,435,892	43,001	0	1,036,270	121,038	42,776	30,203	464,661	3,173,841
2010	251,577	76,316	48,166	8,203	305,517	114,281	169,331	516,412	1,489,803
2011	126,647	15,844	0	284,264	151,407	46,848	19,504	867,708	1,512,222
2012	13,718	2,869	0	5,508	243,965	103,088	59,278	315,841	744,267
2013	41,551	5,486	0	30,749	713,047	102,429	59,219	571,489	1,523,970

Table 4. Recreational landings (numbers) of black drum by state, 1981-2013. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	0	1,502	0	2,874	0	8,642	3,665	54,969	71,652
1982	0	0	0	0	1,682	11,028	8,464	172,414	193,588
1983	2360	0	13,308	30,797	0	27,161	9,867	179,691	263,184
1984	0	0	1,915	1,886	0	7,575	14,239	240,470	266,085
1985	0	114	937	5,630	5,196	16,810	38,835	163,720	231,242
1986	2798	14,605	5,668	11,767	18,697	21,108	55,040	259,168	388,851
1987	0	943	3,019	11,760	41,644	27,347	40,390	233,092	358,195
1988	0	0	0	1,225	10,553	15,568	21,525	107,293	156,164
1989	0	0	4,284	1,188	394	9,125	39,162	36,922	91,075
1990	0	1,704	0	840	2,112	15,048	16,227	52,741	88,672
1991	0	2,240	0	1,153	8,712	5,121	32,697	154,133	204,056
1992	0	0	0	5,330	7,877	13,600	19,021	171,190	217,018
1993	0	3,786	0	1,827	32,184	16,136	20,736	85,739	160,408
1994	0	0	0	1,411	53,345	8,635	18,254	106,267	187,912
1995	0	0	4,064	3,505	272,426	26,774	25,056	56,086	387,911
1996	0	206	0	3,993	134,926	28,033	6,718	77,295	251,171
1997	0	411	0	643	53,107	43,432	9,997	66,691	174,281
1998	0	412	649	3,271	44,822	14,073	5,378	112,404	181,009
1999	0	714	528	10,403	116,407	50,997	5,572	122,718	307,339
2000	0	1,194	964	2,708	113,205	63,284	62,637	235,869	479,861
2001	7983	1385	0	1,200	144,088	11,570	13,360	207,575	387,161
2002	5496	3314	3,358	4,547	197,211	28,376	23,074	67,024	332,400
2003	15828	0	2,158	11,431	273,024	114,905	43,902	137,191	598,439
2004	15152	320	2,351	2,485	97,262	18,384	18,568	94,967	249,489
2005	19998	1303	0	9,439	75,924	83,874	20,355	103,462	314,355
2006	42070	11462	701	1,556	92,956	93,364	20,080	66,415	328,604
2007	21095	4152	0	21,697	209,372	96,494	50,670	144,434	547,914
2008	74982	6973		26,097	359,702	54,490	91,777	175,195	789,216
2009	35782	1151		21,535	92,058	18,578	15,610	126,384	311,098
2010	8593	1450	2,731	730	122,709	33,178	69,547	127,214	366,152
2011	8590	918	0	30,386	211,396	13,660	10,590	236,625	512,165
2012	526	111	0	1,577	139,363	28,006	19,134	74,596	263,313
2013	4,582	820	0	1,944	363,466	35,994	18,290	188,578	613,674

Table 5. Recreational alive releases and dead discards (numbers) of black drum by state, 1981-2013. (Source: personal communication with NMFS Fisheries Statistics Division, Silver Spring, MD.)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981		0		0		0	1,008	2,300	3,308
1982					0	417	0	0	417
1983	0		0	0		0	852	2,832	3,684
1984			646	0		1,360	0	9,296	11,302
1985		0	564	0	0	0	3,250	12,677	16,491
1986	0	0	138	0	7,659	1,091	8,988	43,219	61,095
1987		452	0	0	473	485	6,519	37,558	45,487
1988				0	6,186	892	2,975	45,339	55,392
1989			0	0	213	1,575	8,892	11,455	22,135
1990		752		0	3,291	824	2,002	41,648	48,517
1991	996	273		0	1,931	0	11,664	134,080	148,944
1992				0	731	0	5,998	51,623	58,352
1993		2,270		4,214	6,053	2,375	2,487	87,653	105,052
1994				2,601	4,969	5,655	2,241	98,061	113,527
1995			1,250	19,077	101,866	2,829	1,114	47,413	173,549
1996		0	2,534	14,945	55,227	2,214	363	55,446	130,729
1997		0	1,106	6,671	35,537	6,380	213	115,821	165,728
1998		2,893	0	17,432	50,208	1,548	6,312	182,776	261,169
1999		0	0	1,859	75,409	14,086	2,504	166,416	260,274
2000		0	0	886	56,741	47,605	20,643	162,054	287,929
2001	6,319	21,271	1,173	28,902	139,525	7,219	13,820	198,900	417,129
2002	20,246	3,332	7,998	44,056	82,297	11,697	18,851	117,831	306,308
2003	1,003	3,132	0	20,588	128,873	4,051	27,804	122,288	307,739
2004	0	524	0	16,093	98,385	19,076	42,326	123,266	299,670
2005	21,172	12,960	2,525	19,620	95,255	17,847	10,458	94,682	274,519
2006	29,024	1,031	0	81,509	93,229	27,296	29,285	114,635	376,009
2007	27550	3,980	470	27,351	226,463	37,763	34,869	311,372	669,818
2008	223332	5,961	0	9,327	188,680	124,748	65,881	274,681	892,610
2009	105053	1,111	0	10,594	69,484	35,395	22,622	155,665	399,924
2010	25592	1,575	1,744	19,637	102,348	25,677	39,981	249,265	465,819
2011	1775	5	7,971	60,724	104,286	20,483	4,671	126,563	326,478
2012	10498	356	19,351	7,182	91,895	67,242	19,765	165,569	381,858
2013	0	27,135	6,414	22,182	121,306	78,262	10,066	291,543	556,908

paragraph (b)(2)(iii), by revising paragraph (c)(1)(ii), by removing paragraph (c)(1)(iii), and by adding paragraph (c)(2)(iii).

The revisions and additions read as follows:

§ 54.410 Subscriber eligibility determination and certification.

* * * * *

(b) * * *

(1) * * *

(ii) Must securely retain copies of documentation demonstrating a prospective subscriber's income-based eligibility for Lifeline consistent with § 54.417.

(2) * * *

(iii) An eligible telecommunications carrier must securely retain all information and documentation provided by the state Lifeline administrator or other state agency consistent with § 54.417.

* * * * *

(c) * * *

(1) * * *

(ii) Must securely retain copies of the documentation demonstrating a subscriber's program-based eligibility for Lifeline services, consistent with § 54.417.

(2) * * *

(iii) An eligible telecommunications carrier must securely retain all information and documentation provided by the state Lifeline administrator or other state agency consistent with § 54.417.

* * * * *

■ 8. Revise § 54.417 to read as follows:

§ 54.417 Recordkeeping requirements.

(a) Eligible telecommunications carriers must maintain records to document compliance with all Commission and state requirements governing the Lifeline and Tribal Link Up program for the three full preceding calendar years and provide that documentation to the Commission or Administrator upon request. Eligible telecommunications carriers must maintain the documentation required in §§ 54.404 (b)(11), 54.410(b), 54.410 (c), 54.410(d), and 54.410(f) for as long as the subscriber receives Lifeline service from that eligible telecommunications carrier, but for no less than the three full preceding calendar years.

(b) Prior to the effective date of the rules, if an eligible telecommunications carrier provides Lifeline discounted wholesale services to a reseller, it must obtain a certification from that reseller that it is complying with all Commission requirements governing the Lifeline and Tribal Link Up program. Beginning on the effective date of the rules, the eligible telecommunications carrier must retain the reseller certification for the three full preceding calendar years and provide that documentation to the Commission or Administrator upon request.

(c) Non-eligible telecommunications carrier resellers that purchased Lifeline discounted wholesale services to offer discounted services to low-income consumers prior to the effective date of the rules, must maintain records to document compliance with all Commission requirements governing the Lifeline and Tribal Link Up program for the three full preceding calendar years and provide that documentation to the Commission or Administrator upon request.

[FR Doc. 2015–17186 Filed 7–13–15; 8:45 am]

BILLING CODE 6712–01–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 622

[Docket No. 140819687–5583–02]

RIN 0648–BE40

Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic; Coastal Migratory Pelagic Resources in the Gulf of Mexico and Atlantic Region; Framework Amendment

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: In this final rule, NMFS implements management measures described in Framework Amendment 2 to the Fishery Management Plan (FMP) for the Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico and Atlantic Region (Framework Amendment 2), as prepared and submitted by the South Atlantic and Gulf of Mexico Fishery Management Councils (Councils). This final rule removes the unlimited commercial trip limit for Spanish mackerel in Federal waters off the east coast of Florida that began on weekdays beginning December 1 of each year. The modifications to the commercial trip limit system better fit the current fishery conditions and catch limits for Atlantic migratory group Spanish mackerel in the southern zone, while increasing social and economic benefits of the CMP fishery.

DATES: This final rule is effective August 13, 2015.

ADDRESSES: Framework Amendment 2 to the FMP, which includes an environmental assessment and a regulatory impact review, is available from *www.regulations.gov* or the Southeast Regional Office Web site at *http://sero.nmfs.noaa.gov.*

FOR FURTHER INFORMATION CONTACT: Karla Gore, NMFS Southeast Regional Office, telephone: 727–824–5305, or email: *karla.gore@noaa.gov.*

SUPPLEMENTARY INFORMATION: The CMP fishery of the South Atlantic and Gulf of Mexico (Gulf) includes Spanish mackerel and is managed under the CMP FMP. The FMP was prepared by the Councils and implemented through regulations at 50 CFR part 622 under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

On April 9, 2015, NMFS published a proposed rule for the framework action and requested public comment (80 FR 19056). The proposed rule and the framework action set forth additional rationale for the actions contained in this final rule. A summary of the actions implemented by this final rule is provided below.

Management Measure Contained in This Final Rule

This final rule modifies the commercial trip limit system for Atlantic migratory group Spanish mackerel. Changes in fishery conditions, such as an increase of the commercial annual catch limit (ACL), have necessitated modifications to some elements of the trip limit system.

This final rule streamlines the commercial trip limit system for the Atlantic migratory group Spanish mackerel by eliminating the unlimited weekday Spanish mackerel trip limit in Federal waters off the eastern coast of Florida. The final rule retains the adjusted quota, which provides a buffer to help prevent the commercial sector from exceeding the commercial ACL.

This final rule establishes a commercial trip limit of 3,500 lb (1,588 kg) for Spanish mackerel in Federal waters offshore of South Carolina, Georgia, and eastern Florida, which is the area established as the southern zone by the final rule implementing Amendment 20B to the FMP (80 FR 4216, January 27, 2015). When 75 percent of the adjusted southern zone quota (2,417,330 lb (1,096,482 kg)) is met or is projected to be met, the commercial trip limit will be reduced to 1,500 lb (680 kg). When 100 percent of the adjusted southern zone commercial quota is met or projected to be met, the commercial trip limit will be reduced to

500 lb (227 kg) until the end of the fishing year or until the southern zone commercial quota is met or is projected to be met, at which time the commercial sector in the southern zone would be closed to harvest of Spanish mackerel. The modified system of trip limits described above would control harvest more effectively.

Comments and Responses

NMFS received two comments on the proposed rule, one from a fishing organization that expressed support of the proposed action, and one from a Federal agency that stated it had no comment. NMFS did not receive any substantive comments on the proposed rule.

Classification

The Regional Administrator, Southeast Region, NMFS determined that this final rule is necessary for the conservation and management of Atlantic migratory group Spanish mackerel and is consistent with Framework Amendment 2, the FMP, the Magnuson-Stevens Act, and other applicable laws.

This final rule has been determined to not be significant for purposes of Executive Order 12866.

The Chief Counsel for Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration during the proposed rule stage that this rule would not have a significant economic impact on a substantial number of small entities. The factual basis for this determination was published in the proposed rule and is not repeated here. NMFS received no comments regarding the certification and has not received any new information that would affect its determination. As a result, a final regulatory flexibility analysis was not required and none was prepared.

List of Subjects in 50 CFR Part 622

Annual catch limit, Fisheries, Fishing, Gulf of Mexico, Quotas, South Atlantic, Spanish mackerel.

Dated: July 8, 2015.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR part 622 is amended as follows:

PART 622—FISHERIES OF THE CARIBBEAN, GULF OF MEXICO, AND SOUTH ATLANTIC

■ 1. The authority citation for part 622 continues to read as follows:

Authority: 16 U.S.C. 1801 *et seq.*

■ 2. In § 622.385, paragraphs (b)(1) and (2) are revised to read as follows:

§ 622.385 Commercial trip limits.

* * * * *

(b) * * *

(1) *Atlantic migratory group.* The following trip limits apply to vessels for which commercial permits for Spanish mackerel have been issued, as required under § 622.370(a)(3).

(i) Northern zone. Spanish mackerel in or from the EEZ may not be possessed on board or landed in a day from a vessel for which a permit for Spanish mackerel has been issued, as required under § 622.370(a)(3), in amounts exceeding 3,500 lb (1,588 kg).

(ii) Southern zone. Spanish mackerel in or from the EEZ may not be possessed on board or landed in a day from a vessel for which a permit for Spanish mackerel has been issued, as required under § 622.370(a)(3)—

(A) From March 1 until 75 percent of the adjusted quota for the southern zone has been reached or is projected to be reached, in amounts exceeding 3,500 lb (1,588 kg).

(B) After 75 percent of the adjusted quota for the southern zone has been reached or is projected to be reached, in amounts exceeding 1,500 lb (680 kg).

(C) After 100 percent of the adjusted quota for the southern zone has been reached or is projected to be reached, and until the end of the fishing year or the southern zone's quota has been reached or is projected to be reached, in amounts exceeding 500 lb (227 kg). See § 622.384(e) for limitations regarding Atlantic migratory group Spanish mackerel after the southern zone's quota is reached.

(2) For the purpose of paragraph (b)(1)(ii) of this section, the adjusted quota for the southern zone is 2,417,330 lb (1,096,482 kg). The adjusted quota for the southern zone is the quota for the Atlantic migratory group Spanish mackerel southern zone reduced by an amount calculated to allow continued harvest of Atlantic migratory group Spanish mackerel at the rate of 500 lb (227 kg) per vessel per day for the remainder of the fishing year after the adjusted quota is reached. Total commercial harvest in the southern zone is still subject to the southern zone quota and accountability measures. By filing a notification with the Office of the Federal Register, the Assistant Administrator will announce when 75 percent and 100 percent of the adjusted quota are reached or are projected to be reached.

* * * * *

[FR Doc. 2015–17192 Filed 7–13–15; 8:45 am]

BILLING CODE 3510–22–P