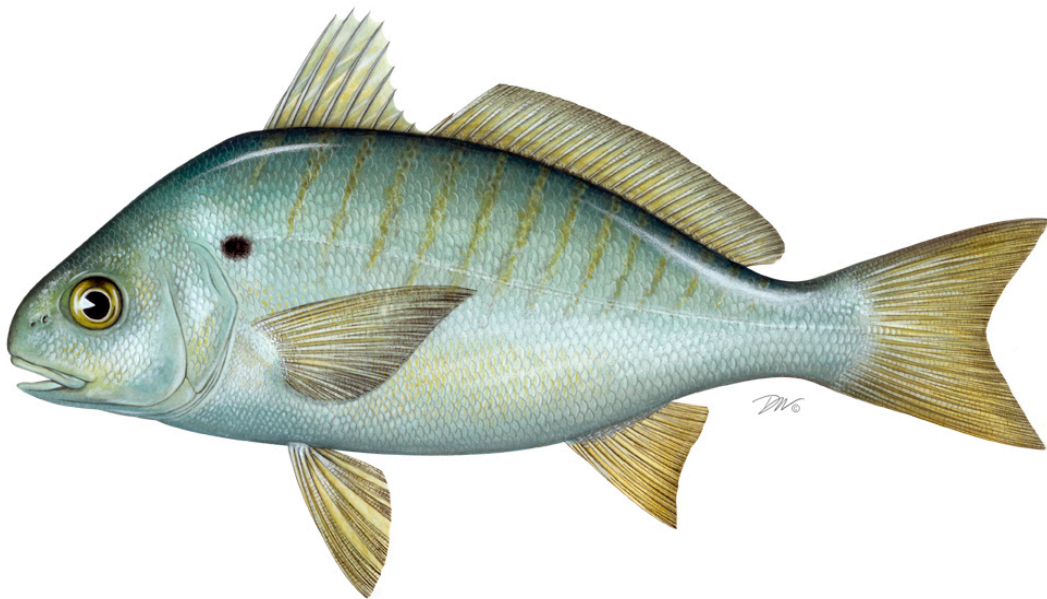


ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR SPOT
(Leiostomus xanthurus)

2018 FISHING YEAR



Prepared by the Plan Review Team

Approved by the South Atlantic Management Board
June 2020

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I. Status of the Fishery Management Plan

Date of FMP Approval: October 1987; Omnibus Amendment August 2011

Management Area: The Atlantic coast distribution of the resource from Delaware through Florida

Active Boards/Committees: South Atlantic State/Federal Fisheries Management Board; Spot Plan Review Team; South Atlantic Species Advisory Panel; Omnibus Amendment Plan Development Team

The Fishery Management Plan (FMP) for Spot was adopted in 1987 and includes the states from Delaware through Florida (ASMFC 1987). In reviewing the early plans created under the Interstate Fisheries Management Plan process, the ASMFC found the Spot FMP to be in need of evaluation and possible revision. A Wallop-Breaux grant from the U.S. Fish and Wildlife Service was provided to conduct a comprehensive data collection workshop for spot. The October 1993 workshop at the Virginia Institute of Marine Science was attended by university and state agency representatives from six states. Presentations on fishery-dependent and fishery-independent data, population dynamics, and bycatch reduction devices were made and discussed. All state reports and a set of recommendations were included in the workshop report (Kline and Speir 1993).

Subsequent to the workshop and independent of it, the South Atlantic State/Federal Fisheries Management Board (Management Board) reviewed the status of several plans in order to define the compliance issues to be enforced under the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA). The Management Board found recommendations in the plan to be vague and perhaps no longer valid, and recommended that an amendment be prepared to the Spot FMP to define the management measures necessary to achieve the goals of the FMP. In their final schedule for compliance under the ACFCMA, the ISFMP Policy Board adopted the finding that the FMP does not contain any management measures that states are required to implement. In August 2009, the Management Board expanded the initiated amendment to the Spanish Mackerel FMP to include spot and spotted seatrout, creating the Omnibus Amendment for Spot, Spotted Seatrout and Spanish Mackerel. The goal of the Omnibus Amendment was to update all three plans with requirements specified under the Atlantic Coastal Fisheries Cooperative Management Act (1993) and the Interstate Fishery Management Program Charter (1995). In August 2011, the Management Board approved the Omnibus Amendment for Spot, Spotted Seatrout, and Spanish Mackerel. This Amendment did not set specific management measures for spot but it did align management of the species with the requirements of ACFCMA.

In August 2014, the Board approved Addendum II to the Omnibus Amendment. The Addendum establishes use of a Traffic Light Analysis (TLA) 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.

In February 2020, the Board approved Addendum III to the Omnibus Amendment, which revised the TLA's trigger mechanism and management responses for the recreational and commercial fisheries. Under Addendum III, management action is triggered if harvest and abundance thresholds within a regional or coastwide TLA analysis are met or exceeded for any two of the three terminal years. If management action is triggered, the coastwide response includes recreational bag limits and quantifiable measures to achieve percent reductions in commercial harvest. Response requirements vary depending on which threshold is exceeded. Addendum III also defines the mechanism by which triggered management actions may be removed, after abundance characteristics are no longer triggering management action.

II. Status of the Stock

A benchmark stock assessment for spot was completed in 2017 but was not recommended for management use by the Peer Review Panel (ASMFC 2017). Therefore, stock status is unknown. The stock is monitored annually using the Traffic Light Analysis, described below.

Traffic Light Approach

As part of the requirements under the 2011 Omnibus Amendment, for years in-between benchmark stock assessments, the Spot PRT was tasked with conducting annual monitoring analyses. These trigger exercises compared five data sources to the 10th percentile of the data sets' time series. If two terminal values of the five data sources (at least one of which must be fishery independent) fell below the 10th percentile, the Management Board would be prompted to consider management action.

In August 2014, the Board approved Addendum II to the Omnibus Amendment. The Addendum established the Traffic Light Approach (TLA) as the new precautionary management framework to evaluate fishery trends and develop management actions. The TLA framework replaces the management trigger stipulated in the Omnibus Amendment after concern that the triggers were limited in their ability to illustrate long-term declines or increases in stock abundance. In contrast, 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 an effective method to illustrate long-term trends in the fishery.

The TLA was originally developed as a management tool for data poor fisheries. The name comes from assigning a color (red, yellow, or green) to categorize relative levels of population indicators. When a population characteristic improves, the proportion of green in the given year increases. Harvest and abundance thresholds of 30% and 60% red were established in Addendum II, representing moderate and significant concern for the fishery. If thresholds for both adult population characteristics achieved or exceeded a threshold for a two year period, then management action was enacted. Under recently approved Addendum III, management

action will be triggered if harvest and abundance thresholds within a regional or coastwide TLA analysis are met or exceeded for any two of the three terminal years.

Analysis of the harvest composite index showed a general decline beginning in 2005 (Figure 1). This decline was driven mostly by the decline in commercial landings rather than the recreational harvest. The composite harvest index did not trigger in 2018 because the percent red in 2017 was below the 30% threshold, but the percent red has exceeded 30% in three of the last four years.

The TLA abundance composite index for adult spot (NMFS and SEAMAP surveys) was run using the 1989-2018 time period since that was when the two surveys overlapped (Figure 1). The TLA composite characteristic did not trigger in 2018 and has not triggered since 2004.

The TLA juvenile index, based on the Maryland seine survey, triggered in 2017-2018 (30% threshold), which does not impact potential management action (ASMFC 2019). However, this does indicate some concern with recruitment, as the proportion red for this index has exceeded 30% in each of the last six years.

Because the harvest index and adult composite index did not both trigger for 2017-2018, management action is not triggered by the TLA.

Beginning in 2020, the TLA will be conducted with significant changes, including additional indices, a regional approach, a new reference period, incorporation of age and length information to revise adult abundance indices, and changes to the triggering mechanism, as defined by Addendum III.

III. Status of the Fishery

This report includes updated recreational estimates from the Marine Recreational Information Program's transition to the mail-based Fishing Effort Survey (FES) on July 1, 2018. Therefore, recreational estimates will likely be different from those shown in past FMP Reviews and state compliance reports through 2018. All figures, tables, and text only show data based on the FES and its calibration.

Total landings of spot from in 2018 are estimated at 4.2 million pounds, a decrease of approximately 6 million pounds from 2017 and the lowest total harvest on record (Tables 1 and 3). The recreational fishery harvested more than the commercial fishery (78% and 22% respectively, by pounds). Although historical harvests were more evenly split between sectors, over the last 10 years, harvests have been more heavily recreational (30% commercial and 70% recreational, by pounds).

Commercial spot landings have ranged between 617,288 and 14.52 million pounds from 1950-2018 (Figure 2). In 2018, 915,720 pounds were harvested commercially. Virginia landed approximately 61% of the commercial harvest in 2018, followed by North Carolina with 18% (Table 1). Coastwide, gill nets were used to capture 55% of commercially harvested spot (Table

2). Spot are a major component of Atlantic coast scrap landings (NCDMF 2001). A scrap fishery is one in which fish species that are unmarketable as food, due to size or palatability, are sold unsorted, usually as bait. The majority of removals for spot come from the South Atlantic shrimp trawl fishery (ASMFC 2017).

The recreational harvest of spot along the Atlantic coast from 1981 to 2018 has varied between 12.8 and 54.4 million fish (or 3.3 and 17.3 million pounds; Figures 2 and 3). Recreational harvest has fluctuated widely throughout the time series. Harvest has generally declined from the most recent peak in 2007, with the time series low harvest occurring in 2018. In 2018, recreational landings were 12.8 million fish (3.3 million pounds), a decrease of 11 million fish (4 million pounds) from 2017 (Tables 3 and 4). Anglers in Virginia harvested 57% of the coastwide number of fish in 2018, followed by anglers in North Carolina (16%). Many anglers are known to catch spot to use as bait, as well as for other recreational purposes. The estimated number of spot released annually by recreational anglers has varied between 4.7 and 30.4 million fish, with 2018 releases estimated at 7.2 million fish, an 874,186 fish decline from 2017. Releases have shown a declining trend since 2013 (Figure 3, Table 5).

IV. Status of Assessment Advice

A benchmark stock assessment for spot was completed in 2017 but was not recommended by the Peer Review Panel for management use because of uncertainty in biomass estimates due to conflicting signals among abundance indices and catch time series, as well as sensitivity of model results to assumptions and model inputs (ASMFC 2017). The Review Panel recommended continued annual monitoring of spot through the TLA, with incorporation of shrimp trawl discard estimates, and another benchmark assessment in 5 years (2022).

V. Status of Research and Monitoring

Catch and effort data are collected by the commercial and recreational statistics programs conducted by the states and the National Marine Fisheries Service (NMFS). Biological characterization data from fishery landings are also available from several states. Specifically, age data are now available from Maryland, Virginia, North Carolina, and South Carolina. Recruitment indices are available from surveys in Delaware, Maryland, Virginia, North Carolina, and South Carolina. Adult or aggregate (mix of juvenile and older spot) relative abundance indices are available from New Jersey, Delaware, North Carolina, South Carolina, Georgia, and SEAMAP (covering North Carolina through Florida). These surveys, in addition to the Northeast Fisheries Science Center Bottom Trawl Survey, the Northeast Area Monitoring and Assessment Program (NEAMAP), the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP), and the Chesapeake Bay Fishery-Independent Multispecies Survey (CHESFIMS), collect a variety of biological data elements.

Fishery-Dependent Sampling

Maryland: Maryland conducted an onboard commercial pound net survey on the Potomac River and the Chesapeake Bay, sampling once every other week from May 31, 2018 through

September 21, 2018. The 2018 spot mean length from the onboard sampling of 180 millimeters TL declined compared to the 2017 value of 200 millimeters TL, and was the third lowest value of the 26 year time series. Ninety-seven percent of spot encountered in the onboard pound net survey in 2018 were between 150 and 199 millimeters TL, a shift to smaller sizes and an overall truncation of the length frequency distribution. Seafood dealer sampling was also conducted in 2018, with 53 spot sampled from the pound net harvest. The mean length, 210 millimeters TL, and length frequency distribution of the seafood dealer sampling indicated harvested spot were larger than those seen during onboard sampling. This indicates some smaller spot are discarded, which is not unexpected, as smaller spot have a very low market value. In 2018, 62.2% of spot sampled from the onboard pound net survey were age zero, 37.8% were age one, and no age two plus fish were encountered.

Virginia: Virginia's Marine Resources Commission collects biological data from Virginia's commercial and recreational fisheries, with total length, weight, sex, and age measured whenever possible. The fish are aged by examining otoliths, which is done by Old Dominion University's Center for Quantitative Fisheries Ecology. In 2018, VMRC staff collected 4,918 spot from commercial harvesters in Virginia, with 4,918 length measurements and 4,883 individual weights. Total lengths ranged from 5 to 12 inches, with an average of 8 inches. Staff determined the sexes of 246 spot. Using otolith analysis, staff from Old Dominion University determined the ages of 206 spot, with ages ranging from 0 to 3 years old (average= 1 year old).

North Carolina: Commercial fishing activity is monitored through fishery-dependent sampling conducted under Title III of the Interjurisdictional Fisheries Act and has been ongoing since 1982. In 2018, 2,241 lengths were obtained from spot captured in commercial fisheries. Mean fork length was 199.6 mm and ranged from 106 mm to 278 mm fork length.

South Carolina: South Carolina's spot fishery is generally recreational in nature. Fishery-dependent data related to spot has been available primarily through the SCDNR State Finfish Survey (SFS), the National Marine Fisheries Service's Marine Recreational Information Program (MRIP), and a SCDNR managed mandatory trip reporting system for licensed charterboat operators. Beginning in 2013, the SCDNR took over the MRIP data collection in South Carolina. Since the data previously coming from the SC-SFS is now incorporated into the MRIP data set they will not be reported separately.

Georgia: The Marine Sportfish Carcass Recovery Project, a partnership with recreational anglers along the Georgia coast, was used to collect biological data from finfish. In 2018, a total of 4,522 fish carcasses representing 11 species were donated through this program. Although they are not one of the requested species, spot are occasionally donated to the program; however, none were donated in 2018.

Fishery-Independent Sampling

New Jersey: The New Jersey Bureau of Marine Fisheries conducts an Ocean Trawl Survey, Delaware River Seine Survey, and Delaware Bay Trawl Survey. Respective indices of abundance

(GM) for the three surveys in 2018 were: 2.14, 0.00, and 0.01 (2017 values were: 2.12, 0.01, and 0.06, respectively).

Delaware: Annual relative abundance estimates (number/nautical mile) of spot in Delaware are monitored through the Division's adult ground fish bottom trawl survey. The relative abundance of spot was 77.35/nm in 2018, the fifth highest for the time series. The Division monitors juvenile fish abundance through a 16-ft bottom trawl survey which has been conducted annually since 1980. Separate spot young of the year (YOY) indices are generated for the Delaware Estuary (Bay and River) and Delaware's "Inland Bays" (Indian River and Rehoboth Bays). YOY spot recruitment, 0.70 per tow (geometric mean), increased in 2018 relative to 2017 for the Delaware Estuary and was below the time series mean and median. The Inland Bays YOY index increased to 1.50 per tow, and remained below the time series mean in 2018.

Maryland: Maryland conducted a fisheries-independent gill net survey on the Choptank River once per week from June 7, 2018 to August 28, 2018. Spot catch in the Choptank River gill net survey was highest in 2014 (749 fish), moderate in 2013, 2015 and 2017 (272, 222 and 298 fish, respectively), and lowest in 2016 and 2018 (109 and 154 fish, respectively). The length distribution shifted back to smaller fish in 2018 after expanding to a broader distribution in 2017.

Four juvenile indices were calculated, two from the Maryland portion of Chesapeake Bay and two from the Maryland coastal bays. A 4.9 meter semi-balloon otter trawl was towed for 6 minutes at 4.0-4.8 km/h. A Chesapeake Bay juvenile trawl index was calculated as the geometric mean catch per tow. Spot juvenile trawl index values from 1989-2018 were quite variable. The 2010 GM value of 104.5 spot per tow was the highest value of the time series, the 2011 value declined to the second lowest of the 30 year time series, and the 2012 value increased to nearly the time series mean. The index values declined from 2012 to the time series low in 2015 (0.29 fish per tow). The 2016 and 2017 values increased, but the 2018 value decreased slightly to 1.66 fish per tow, and all three years were still below the 30 year time series mean.

The second JI was derived from the Striped Bass Juvenile Seine Survey (JSS). This survey used a 30.5 meter long by 1.2 meter deep beach seine at fixed stations in five areas of Maryland's Chesapeake Bay. The JSS index was calculated as a geometric mean catch per haul. The 2018 GM catch per haul of 0.23 was the sixth lowest value of the 53 year time series, and well below the mean value of 1.38 fish per haul.

A 4.9-meter semi-balloon otter trawl has been used to sample Maryland's Atlantic coastal bays since 1972 (Bolinger et al 2007). The geometric mean catch per hectare (GM) of juvenile spot was used as a standardized index of abundance (Bolinger et al 2007). The 2018 GM of 2.2 spot per hectare increased from 2017, but was still below the 30 year time series mean of 8.2 fish per hectare.

The final juvenile index was derived from the coastal bays seine survey, which utilized a 1.8 meter by 30.5 meter seine with a single central bag. Nineteen fixed stations were sampled once

a month in June and September, and the corresponding Coastal Seine Index was calculated using all sites to derive an annual geometric mean catch per haul. The coastal bays seine survey decreased slightly in 2018 to 3.9 spot per haul, and remained below the time series mean of 7.5 spot per haul.

Virginia: The Virginia Institute of Marine Science (VIMS) has been conducting a monthly juvenile trawl survey since 1955 to monitor the abundance and seasonal distribution of finfish and invertebrates in the Chesapeake Bay and its tributaries. The average index value for spot from 1988 through 2018 is 13.17, and the geometric mean value for 2018 was 14.70. This represents an increase from the 4.46 reported in 2017 and is considered an average level of recruitment.

One of the upcoming changes to the TLA is the addition of the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMap) to the Mid-Atlantic regional adult composite characteristic index for spot. In 2018, the numerical index was 1.4 and the biomass index was 0.4 for age 1 spot. For age 2 individuals in 2018, the numerical index was 3.7 and the biomass index was 1.0. The average numerical index from 2002-2018 for age 1 spot was 7.96, and the average biomass index was 2.84. For age 2 spot the average numerical index was 31.72 and the average biomass index was 6.94. All reported values for 2018 represent below average indices and decreases from 2017.

Data from the Northeast Area Monitoring and Assessment Program (NEAMAP) is also available for spot. Beginning in 2007, NEAMAP surveys have sampled twice a year (spring and fall) from Cape Cod, MA to Cape Hatteras, NC, targeting both juvenile and adult fishes. In the spring 2018 survey for age 1 spot, the numerical index was 0.58 and the biomass index was 0.14, with age 2+ spot having a numerical index of 0.23 and a biomass index of 0.06. The fall 2018 survey numerical index was 0.92 and the biomass index was 0.34 for age 1 spot, and a numerical index of 0.11 and the biomass index was 0.08 for age 2+ spot. All reported values for 2018 represent below average indices. Due to the short length of the time series, these indices were only used in sensitivity runs in the 2017 stock assessment, but may be considered in future assessments or in the TLA.

North Carolina: North Carolina has no current fishery-independent monitoring programs specifically for spot. However, the NCDMF has conducted a stratified random trawl survey in Pamlico Sound (Pamlico Sound Survey, Program 195) since 1987 to obtain juvenile abundance indices (JAI) for several economically important species, including spot. Spot less than 120 mm from the June portion of the Pamlico Sound Survey are considered in calculating the JAI. The 2018 spot JAI (mean number of individuals/tow) was 813.6, an increase from the 2017 JAI of 720.6 and the fourth highest value in the time series. From 1987-2018 the average JAI was 435.2 with many large fluctuations.

Since 2001, the NCDMF has conducted a stratified random fishery-independent gill net survey in Pamlico Sound (Program 915). While the survey is not specifically designed for spot, they are a target species. In 2018, CPUE was 1.1 individuals per sample. Mean CPUE over the 16-year

time series is 2.4 individuals per sample and has generally been declining since peaking in 2004 at 6.9 individuals per sample.

South Carolina: While spot are not necessarily a specifically targeted species for SCDNR monitoring programs or projects, they are a common component species of four fishery independent monitoring efforts conducted by the SCDNR.

The Southeast Area Monitoring and Assessment – South Atlantic Program (SEAMAP-SA) is a shallow water (15 to 30 ft depth) trawl survey that monitors status and trends of numerous coastal species within the South Atlantic Bight seasonally (spring, summer and fall) from Cape Canaveral, FL to Cape Hatteras, NC. The annual stratified mean catch per tow in weight for the entire survey in 2018 increased by 63.2% (9.34 kg/tow) over 2017 (5.72 kg/tow).

The second survey is an inshore estuarine trammel net survey conducted by the SCDNR. In 2018, CPUE decreased (15%) from 2017 and still remained below the long-term mean. It should be noted that the index value for 2016 was the lowest in the time series. The overall trend for spot in the trammel survey has been in decline since 1999, with only 7 years exceeding the long-term mean catch since 2000.

The third survey is an electroshock survey conducted in low salinity brackish and tidal freshwater portions of different South Carolina estuaries. The CPUE in 2018 (13.01 ± 3.1 fish per set) increased from 2017 by 336% (3.01 fish per set). The CPUE in 2018 was the first year since 2011 where it was above the long-term mean.

The fourth survey is the South Carolina Estuarine and Coastal Assessment Program (SCECAP). The CPUE increased significantly (487%) in 2018 (44.7 fish per hectare) from 2017 (7.6 fish per hectare) and was the first year where CPUE was above the long-term mean since 2011. Mean annual CPUE has only been above the long-term mean twice (2011 and 2018) in the last thirteen years.

Georgia: Spot are occasionally observed during the red drum gillnet survey and the trammel net survey. Lengths of captured spot were recorded and then fish were released. During 2018, 150 trammel and 216 gill net sets captured 146 and 239 spot, respectively. Average fork length of spot in trammel nets was 201 mm and in the gillnet survey was 195 mm. The 2018 geometric mean (#/net set) from trammel nets (0.5) and the mean from gillnets (0.5) were greater than those of 2017 (0.4 and 0.4, respectively).

The monthly Ecological Monitoring Survey (EMS) samples estuarine finfish from a total of 42 stations, distributed amongst 6 estuaries, from January to December. In 2018, a total of 407 tows were completed with an estimated 13,326 spot captured. Lengths ranged from 18 to 228 millimeters FL with a mean of 126 millimeters FL. The 2018 geometric mean (4.37) increased compared to 2017 (2.07) but fewer tows were completed in 2017 due to boat repair issues.

Florida: The FWC-FWRI's FIM program initiated surveys on estuarine, bay and coastal systems of the Florida Atlantic at northern Indian River Lagoon in 1996, southern Indian River Lagoon in

1997, and northeast Florida (Jacksonville study area) in 2001. Indices of abundance (IOAs) data for juvenile (YOY) spot (<30 mm standard length, SL) were available from 21.3-m seine and 183-m haul seine samples. Few spot have been collected in FIM surveys. Overall, IOAs for YOY have been low and highly variable. IOAs for sub-adult/adult spot (>90 mm SL) have been low with minor increases in 2010 and 2011. Neither group showed any evidence of directional trend.

VI. Status of Management Measures and Issues

The FMP for spot identified two management measures for implementation: 1) promote the development and use of bycatch reduction devices through demonstration and application in trawl fisheries, and 2) promote increases in spot yield per recruit by delaying their entry into the fishery until age one or older.

Considerable progress has been made in developing bycatch reduction devices (BRDs) and evaluating their effectiveness. Proceedings from a 1993 spot and Atlantic croaker workshop summarized much of the experimental work on bycatch reduction, and many states have conducted subsequent testing. For example, North Carolina Division of Marine Fisheries (NCDMF) conducted research on the four main gear types (shrimp trawl, flynet, long haul seine, and pound net) responsible for the bulk of the scrap fish landings in order to reduce the catch of small fish. State testing of shrimp trawl BRDs achieved finfish reductions of 50-70% with little loss of shrimp, although total bycatch numbers relative to shrimp fishery effort are still unknown. The Virginia Marine Resources Commission investigated the use of culling panels in pound nets and long haul seines to release small Atlantic croaker, spot, and weakfish. The Potomac River Fisheries Commission (PRFC) also investigated the use of culling panels in pound nets, finding that the panels allowed the release of 28% of captured spot less than six inches in length.

Following favorable testing, devices have been made mandatory or recommended in several state fisheries. The use of BRDs is required in all penaeid shrimp trawl fisheries in the South Atlantic. The PRFC recommends the use of culling panels in pound nets and allows those nets with panels to keep one bushel of bycatch of flounder and weakfish. In North Carolina, escapement panels have been required in the bunt nets of long haul seines in an area south and west of Bluff Shoals in the Pamlico Sound since April 1999. However, evaluation of the beneficial effects of BRDs to spot stocks continues to need further study.

General gear restrictions, such as minimum mesh sizes or area trawling bans, have helped protect some age classes of spot. Georgia has a spot creel limit (25 fish, both recreational and commercial, except for shrimp trawlers). South Carolina has an aggregate bag limit (50 fish) for hook and line fishing of spot, Atlantic croaker, and kingfish/whiting (*Menticirrhus* sp.).

Omnibus Amendment (Interstate)

In August 2011, the Management Board approved the development of an amendment to the Spot FMP to address three issues: compliance measures, consistency with federal management in the exclusive economic zone, and alignment with Commission standards. The updated FMP's

objectives are to: (1.) Increase the level of research and monitoring on spot bycatch in other fisheries, in order to complete a coastwide stock assessment (2.) Manage the spot fishery stock to maintain the spawning stock biomass above the target biomass levels. (3.) Develop research priorities that will further refine the spot management program to maximize the biological, social, and economic benefits derived from the spot population. The Omnibus Amendment does not require specific fishery management measures in either the recreational or commercial fisheries for states within the management unit.

Addendum II

In August 2014, the Board approved Addendum II which establishes a new management framework (i.e., Traffic Light Approach) 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 over two years. Management measures would remain in place for two years.

Addendum III

In February 2020, the Board approved Addendum III, which revises the TLA and requires coastwide management action if harvest and abundance thresholds are exceeded in two of the three most recent years. Management measures would remain in place for a minimum of two years and until abundance characteristics are no longer triggering management action.

Recent Changes in State Regulations

North Carolina: There are no direct restrictions on the commercial harvest of spot within coastal, joint, or inland waters of North Carolina. There are however numerous indirect restrictions that affect the commercial harvest and bycatch of spot in North Carolina. These restrictions do not impact compliance with the FMP and are specified in North Carolina's compliance report.

Georgia: Through 2017, Georgia had a general commercial fishing license. License applications had a voluntary survey asking purchasers to check off the species or species groupings they planned to pursue. The check-off was non-binding and the associated participation data was not useful for determining reporting requirements. In 2013, GADNR began issuing Letters of Authorization (LOAs) for several target species to improve the participation data. In 2017, the Georgia General Assembly approved the addition of species endorsements to commercial fishing licenses to replace LOAs. (O.C.G.A. 27-4-110 and Regulation 391-2-4-.17) The Board of Natural Resources then approved the proposed endorsement species with an effective date of April 1, 2018.

A new seafood dealer license was also implemented April 1, 2018. Seafood dealers are defined as "any person or entity, other than the end-consumer, who purchases seafood products from a harvester unless the harvester is a licensed seafood dealer." Georgia requires seafood dealers and commercial fishermen to be properly licensed as described by O.C.G.A Sections 27-4-118,

27-4-136, and Board of Natural Resources Rule 391-2-4-.09. Commercial harvesters fishing in Georgia waters and/or unloading seafood products must possess a commercial fishing license and the appropriate species endorsements. A harvester is required to have a dealer's license if he is selling his catch to end consumers.

De minimis Guidelines

A state qualifies for *de minimis* status if its past 3-years' average of the combined commercial and recreational catch is less than 1% of the past 3-years' average of the coastwide combined commercial and recreational catch. Those states that qualify for *de minimis* are not required to implement any monitoring requirements, none of which are included in the plan.

VII. De Minimis Requests

New Jersey and Georgia request *de minimis* status, and both states meet the requirements.

VIII. Implementation of FMP Compliance Requirements for 2017

All states within the management unit have submitted compliance reports for the 2018 fishing year. The PRT found no compliance issues.

IX. Recommendations of the Plan Review Team

Research and Monitoring Recommendations

High Priority

Expand collection of life history data for examination of lengths and age, especially fishery-dependent data sources.

Organize an otolith exchange and develop an ageing protocol between ageing labs.

Increase observer coverage for commercial discards, particularly the shrimp trawl fishery.

Develop a standardized, representative sampling protocol and pursue collection of individual lengths and ages of discarded finfish.

Continue state and multi-state fisheries-independent surveys throughout the species range and subsample for individual lengths and ages. Ensure NEFSC trawl survey continues to take lengths and ages. Examine potential factors affecting catchability in long-term fishery independent surveys.

Continue to develop estimates of length-at-maturity and year-round reproductive dynamics throughout the species range. Assess whether temporal and/or density-dependent shifts in reproductive dynamics have occurred.

Re-examine historical ichthyoplankton studies for an indication of the magnitude of estuarine and coastal spawning, as well as for potential inclusion as indices of spawning

stock biomass in future assessments. Pursue specific estuarine data sets from the states (NJ, VA, NC, SC, DE, ME) and coastal data sets (MARMAP, EcoMon).

Medium Priority

Develop and implement sampling programs for state-specific commercial scrap and bait fisheries in order to monitor the relative importance of spot. Incorporate biological data collection into program.

Conduct studies of discard mortality for commercial fisheries. Ask commercial fishermen about catch processing behavior for spot when trawl/gillnets brought over the rail to determine if the discard mortality rate used in the assessment is reasonable.

Conduct studies of discard mortality for recreational fisheries.

Collect data to develop gear-specific fishing effort estimates and investigate methods to develop historical estimates of effort.

Identify stocks and determine coastal movements and the extent of stock mixing, via genetic and tagging studies.

Investigate environmental and recruitment/ natural mortality covariates and develop a time series of potential covariates to be used in stock assessment models.

Investigate environmental covariates in stock assessment models, including climate cycles (e.g., Atlantic Multi-decadal Oscillation, AMO, and El Nino Southern Oscillation, El Nino) and recruitment and/or year class strength, spawning stock biomass, stock distribution, maturity schedules, and habitat degradation.

Investigate the effects of environmental changes (especially climate change) on maturity schedules for spot, particularly because this is an early-maturing species, and because the sSPR estimates are sensitive to changes in the proportion mature.

Investigate environmental and oceanic processes in order to develop better understanding of larval migration patterns into nursery grounds.

Investigate the relationship between estuarine nursery areas and their proportional contribution to adult biomass. I.e., are select nursery areas along Atlantic coast contributing more to SSB than others, reflecting better juvenile habitat quality?

Develop estimates of gear-specific selectivity.

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XI. Figures

Figure 1. Traffic Light Approach for spot, 2018. Top figure shows the harvest composite index and the bottom figure shows the abundance composite index.

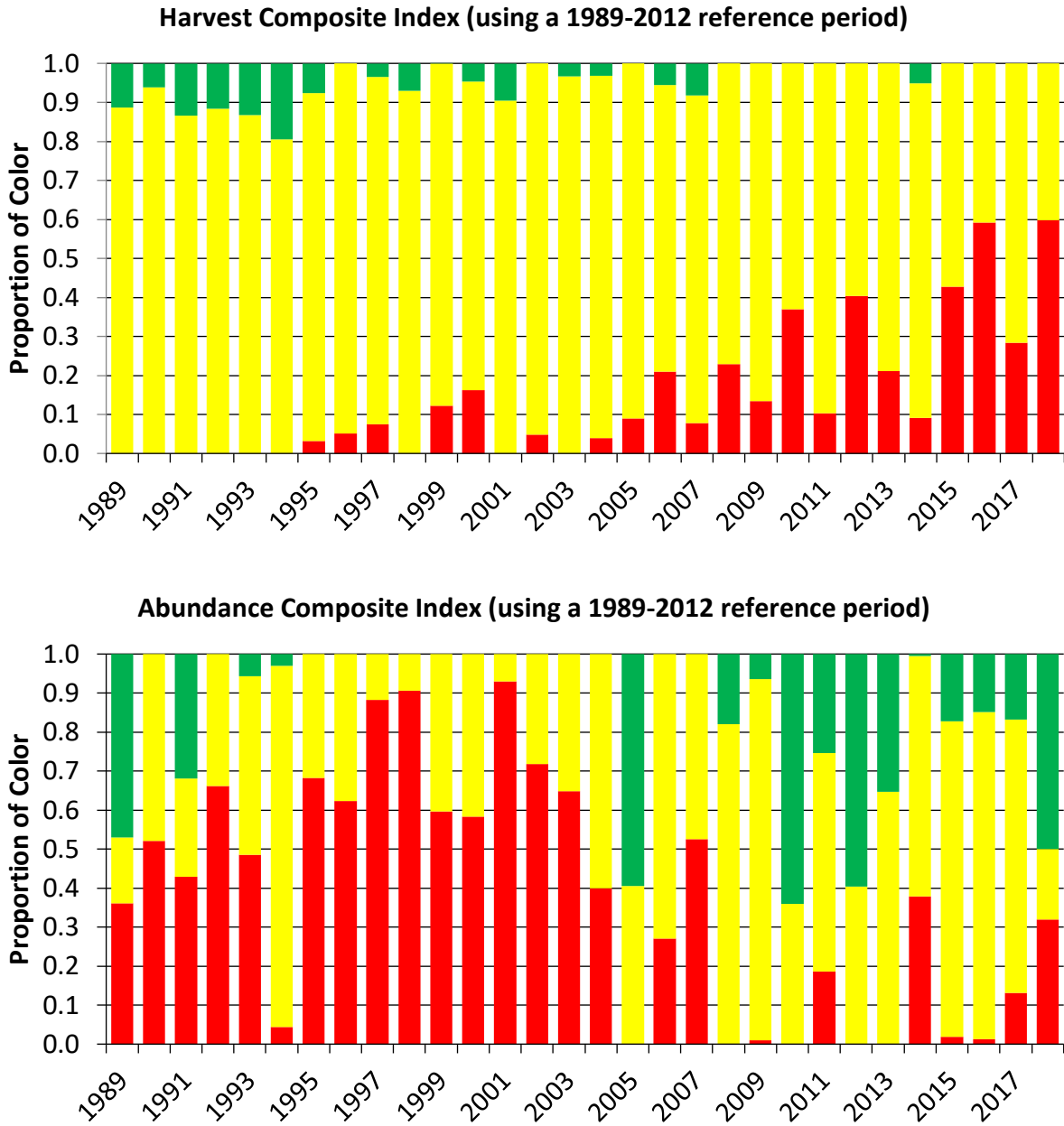


Figure 2. Spot commercial and recreational landings (pounds), 1950-2017. (Recreational landings available from 1981-present; see Tables 1 and 3 for state-by-state values from 2009-2018 and data sources)

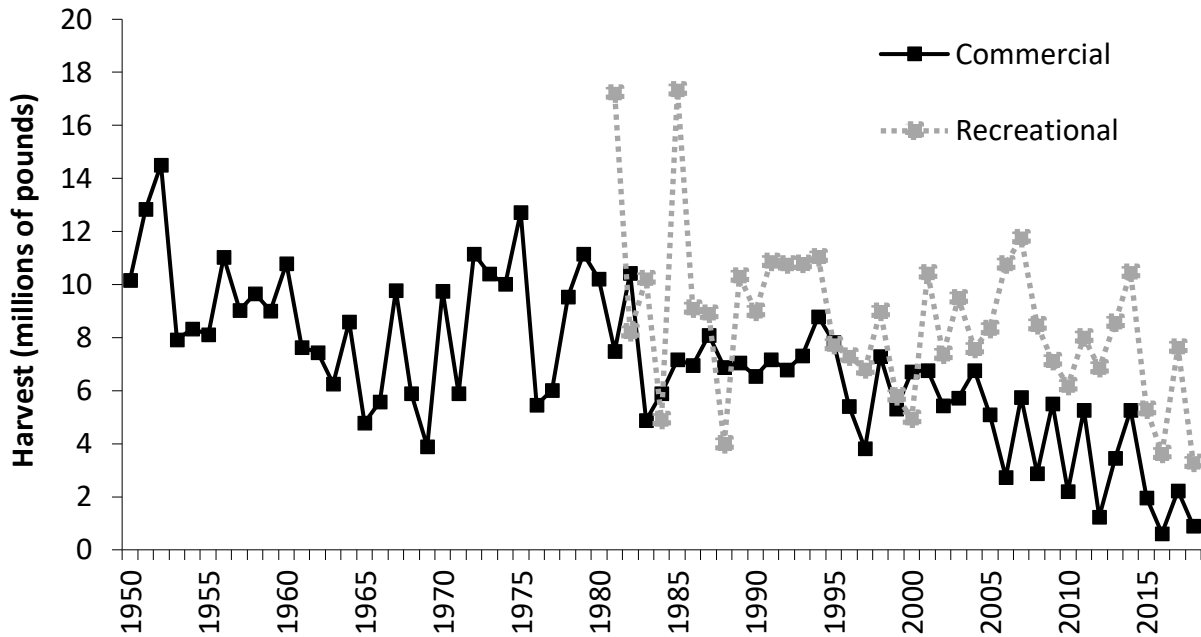
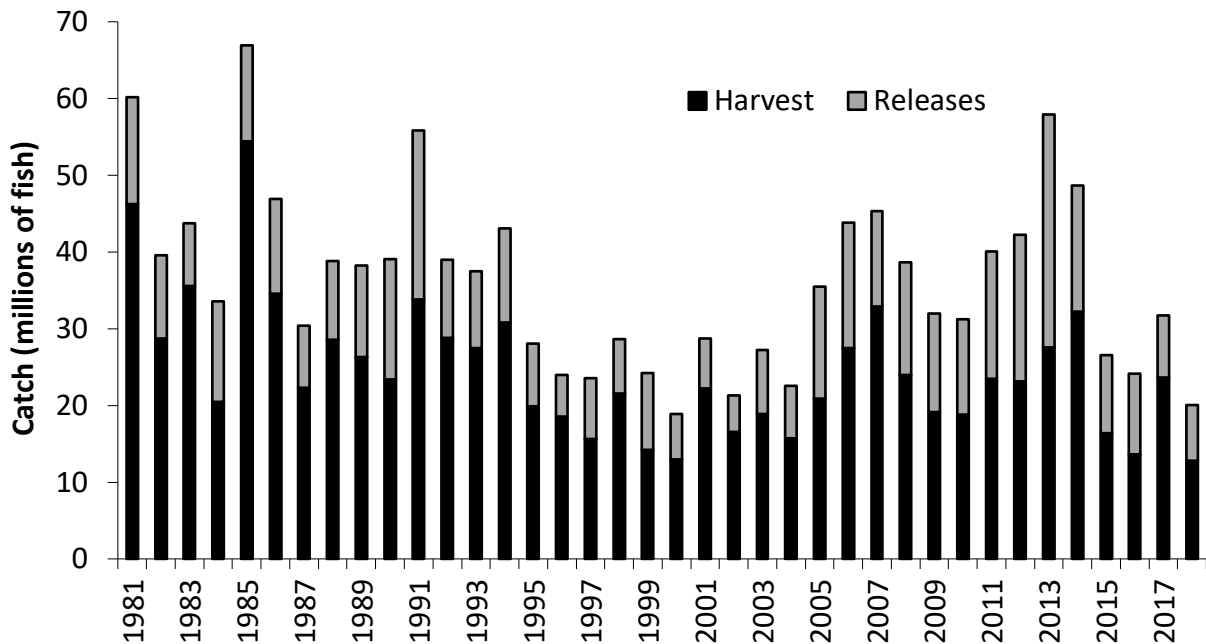


Figure 3. Spot recreational harvest and releases (numbers of fish), 1981-2017. (See Tables 4 and 5 for state-by-state values from 2009-2018 and data source)



XII. Tables

Table 1. Commercial landings (pounds) of spot by state 2009-2018. (Source: ACCSP for 2017 and earlier for all jurisdictions, except PRFC; annual compliance reports for 2018 and for all PRFC years. "C" values are confidential. Total values adhere to the ACCSP rule of 3, i.e. totals are reflective of the true total if 0 or at least 3 states' data are confidential in a given year. Otherwise, they are sums of non-confidential data.)

Year	N of NJ	NJ	DE	MD	PRFC	VA
2009	317	34,065	C	522,659	63,470	3,852,408
2010	447	6,048	C	587,028	44,025	984,892
2011	C	54,890	C	618,569	60,106	3,687,377
2012	95,850	9,935	C		14,563	600,351
2013	179,980	48,324	C	335,462	41,286	2,044,538
2014	2,112	29,683	C	348,435	148,908	3,843,869
2015	1,600	86	C	96,102	86,972	1,369,520
2016	1,880	26	C	18,105	8,480	266,859
2017	12,269	2,418	C	117,279	41,748	1,596,523
2018	4,696	10,809	C	58,480	41,747	558,932
	NC	SC	GA	FL		Total
2009	1,006,500	22,557		22,057		5,524,033
2010	572,315	3,957	C	13,420		2,212,132
2011	936,970	12,162		33,889		5,272,523
2012	489,676	541		36,744		1,247,659
2013	768,592	2,446		31,368		3,451,995
2014	765,824	5,917	C	16,742		5,281,330
2015	377,135	1,619		27,969		1,963,850
2016	238,003	1,059		82,875		617,288
2017	413,995	3,200		47,304		2,237,922
2018	167,678	4,514		68,864		915,720

Table 2. Commercial landings of spot (pounds) by gear, 2018. (Source: ACCSP, queried 5/6/2020)

Gear	Percent of Total
Gill Nets	54.8%
Haul Seines	19.7%
Fixed Nets	12.2%
Trawls	0.8%
Other	12.6%

Table 3. Recreational harvest (pounds) of spot by state, 2009-2018. (Source: MRIP for 2017 and earlier and annual compliance reports for 2018. Data dating back to 1981 are available upon request to the NMFS Fisheries Statistics Division.)

Year	N of NJ	NJ	DE	MD	VA
2009		20,108	85,965	1,753,560	2,806,172
2010		748,219	249,186	1,053,775	1,964,995
2011		532	169,341	732,588	3,437,094
2012	121,071	544,509	80,962	755,265	3,091,344
2013	18,889	423,887	244,253	720,315	3,443,742
2014		27,847	352,714	1,465,861	4,322,812
2015	0	0	30,693	469,462	551,389
2016		678	9,606	278,994	1,211,694
2017	0	1,064	340	1,086,667	5,019,896
2018	8,054	45,879	23,968	327,930	1,753,064
	NC	SC	GA	FL	Total
2009	1,427,956	931,316	24,810	87,161	7,137,048
2010	1,173,173	654,184	1,011	333,254	6,177,797
2011	2,201,947	1,118,599	790	358,943	8,019,834
2012	760,276	1,332,541	305	165,523	6,851,796
2013	1,789,251	1,708,520	10,525	213,949	8,573,331
2014	2,877,483	415,937	15,371	992,221	10,470,246
2015	833,390	2,539,187	2,573	861,523	5,288,217
2016	558,799	1,437,534	20,727	102,356	3,620,388
2017	909,796	522,645	8,282	76,502	7,625,192
2018	597,511	272,501	5,481	257,594	3,291,982

Table 4. Recreational harvest (numbers) of spot by state, 2009-2018. (Source: MRIP for 2017 and earlier and annual compliance reports for 2018. Data dating back to 1981 are available upon request to the NMFS Fisheries Statistics Division.)

Year	N of NJ	NJ	DE	MD	VA
2009		49,494	251,487	4,588,207	6,906,344
2010		2,312,612	727,390	2,839,870	5,630,976
2011		1,206	486,289	2,125,025	10,128,581
2012	168,109	2,189,239	213,687	2,120,554	10,147,723
2013	51,903	1,177,944	581,699	2,456,346	11,733,669
2014		54,853	590,613	4,396,291	13,652,625
2015	0	0	90,796	1,352,278	1,731,063
2016		2,052	29,700	1,145,272	5,279,153
2017	0	2,412	1,057	3,250,553	15,944,413
2018	39,083	106,332	70,390	1,209,971	7,360,908
	NC	SC	GA	FL	Total
2009	4,197,640	2,826,219	76,258	244,347	19,139,996
2010	3,830,384	2,521,398	4,584	912,677	18,779,891
2011	6,480,714	3,174,678	1,792	1,096,887	23,495,172
2012	2,677,082	5,003,162	1,230	590,701	23,111,487
2013	6,120,985	4,704,723	41,546	660,760	27,529,575
2014	8,343,467	1,258,300	68,852	3,847,994	32,212,995
2015	2,572,738	7,538,334	8,489	3,081,786	16,375,484
2016	1,928,716	4,974,300	61,252	203,651	13,624,096
2017	2,418,331	1,897,506	19,789	100,975	23,635,036
2018	2,068,865	895,830	15,553	1,039,402	12,806,334

Table 5. Recreational releases (numbers) of spot by state, 2009-2018. (Source: MRIP for 2017 and earlier and annual compliance reports for 2018. Data dating back to 1981 are available upon request to the NMFS Fisheries Statistics Division.)

Year	N of NJ	NJ	DE	MD	VA
2009		55,363	484,590	1,901,445	4,014,169
2010		562,172	289,178	2,772,655	4,080,918
2011		1,206	190,002	783,417	7,290,971
2012	237,028	1810472	184,949	3,291,874	6,371,367
2013	2,203	2,737,742	537,632	7,620,695	7,549,286
2014		34,941	237,395	2,206,814	4,125,116
2015	1,585	167,129	38,523	642,459	1,896,698
2016		2,705	16,620	713,418	2,858,405
2017	150	15,321	11,768	2,280,482	3,335,800
2018	15,467	37,739	69,619	943,468	3,043,068
	NC	SC	GA	FL	Total
2009	4,847,202	1,108,458	29,470	367,919	12,808,616
2010	3,615,808	577,998	1,193	545,687	12,445,609
2011	4,993,544	1,289,038	23,411	1,989,115	16,560,704
2012	2,995,879	673,292	10,110	3,571,066	19,146,037
2013	5,513,732	5,891,165	32,719	466,583	30,351,757
2014	4,043,710	1,908,552	74,795	3,781,382	16,412,705
2015	2,984,629	2,818,378	220,253	1,409,895	10,179,549
2016	1,831,415	3,421,589	335,695	1,296,190	10,476,037
2017	1,902,281	368,988	86,668	79,660	8,081,118
2018	2,062,163	315,406	70,598	649,404	7,206,932