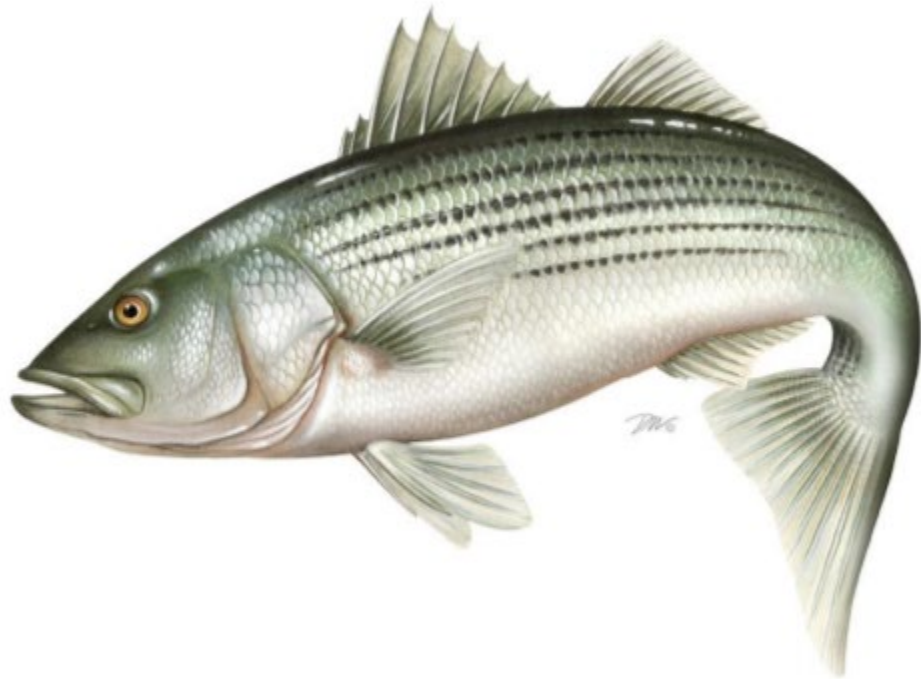


ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR ATLANTIC STRIPED BASS
(Morone saxatilis)

2018 FISHING YEAR



Prepared by the Plan Review Team

Approved by the Atlantic Striped Bass Management Board
August 2019

I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	Original FMP – 1981
<u>Amendments:</u>	Amendment 1 – 1984 Amendment 2 – 1984 Amendment 3 – 1985 Amendment 4 – 1989; Addendum I – 1991, Addendum II – 1992, Addendum III – 1993, Addendum IV – 1994 Amendment 5 – 1995; Addendum I – 1997, Addendum II – 1997, Addendum III – 1998, Addendum IV – 1999, Addendum V – 2000 Amendment 6 – 2003; Addendum I – 2007, Addendum II – 2010, Addendum III – 2012, Addendum IV – 2014
<u>Management Unit:</u>	Migratory stocks of Atlantic striped bass from Maine through North Carolina
<u>States With Declared Interest:</u>	Maine - North Carolina, including Pennsylvania
<u>Additional Jurisdictions:</u>	District of Columbia, Potomac River Fisheries Commission, National Marine Fisheries Service, United States Fish and Wildlife Service
<u>Active Boards/Committees:</u>	Atlantic Striped Bass Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Tagging Subcommittee, Plan Review Team, and Plan Development Team

The Atlantic States Marine Fisheries Commission (Commission) developed a Fisheries Management Plan (FMP) for Atlantic Striped Bass in 1981 in response to poor juvenile recruitment and declining landings. The FMP recommended increased restrictions on commercial and recreational fisheries, such as minimum size limits and harvest closures on spawning grounds. Two amendments were passed in 1984 recommending additional management measures to reduce fishing mortality. To strengthen the management response and improve compliance and enforcement, the Atlantic Striped Bass Conservation Act (P.L. 98-613) was passed in late 1984. The Striped Bass Act¹ mandated the implementation of striped bass regulations passed by the Commission and gave the Commission authority to recommend to the Secretaries of Commerce and Interior that states be found out of compliance when they failed to implement management measures consistent with the FMP.

The first enforceable plan under the Striped Bass Act, Amendment 3, was approved in 1985, and required size regulations to protect the 1982-year class – the first modest size cohort since the previous decade. The objective was to increase size limits to allow at least 95% of the females in the 1982 year class to spawn at least once. Smaller size limits were permitted in producer areas than along

¹ The 1997 reauthorization of the Striped Bass Act also required the Secretaries of Commerce and Interior provide a biennial report to Congress highlighting the progress and findings of studies of migratory and estuarine Striped Bass. The ninth such report was recently provided to Congress (Shepherd et al. 2017).

the coast. Several states, beginning with Maryland in 1985, opted for a more conservative approach and imposed a total moratorium on striped bass landings for several years. The amendment contained a trigger mechanism to relax regulations when the 3-year moving average of the Maryland juvenile abundance index (JAI) exceeded an arithmetic mean of 8.0 – which was attained with the recruitment of the 1989 year class. Also, in 1985, the Commission determined the Albemarle Sound-Roanoke River (A-R) stock in North Carolina contributed minimally to the coastal migratory population, and was therefore allowed to operate under an alternative management program.

Amendment 4, implemented in 1989, aimed to rebuild the resource rather than maximize yield. The amendment allowed state fisheries to reopen under a target fishing mortality (F) of 0.25, which was half the estimated F needed to achieve maximum sustainable yield (MSY). The amendment allowed an increase in the target F once spawning stock biomass (SSB) was restored to levels estimated during the late 1960s and early 1970s. The dual size limit concept was maintained (coastal versus producer areas), and a recreational trip limit and commercial season was implemented to reduce the harvest to 20% of that in the historic period of 1972-1979. A series of four addenda were implemented from 1990-1994 to maintain protection of the 1982 year class.

In 1990, to provide additional protection to striped bass and ensure the effectiveness of state regulations, NOAA Fisheries passed a final rule (55 Federal Register 40181-02) prohibiting possession, fishing (catch and release fishing), harvest, and retention of Atlantic striped bass in the Exclusive Economic Zone (EEZ), with the exception of a defined transit zone within Block Island Sound. Atlantic striped bass may be transported through this defined area provided that the vessel is not used to fish while in the EEZ and the vessel remains in continuous transit, and that the fish were legally caught in adjoining state waters.

In 1995, the Atlantic striped bass migratory stock was declared recovered by the Commission (the A/R stock was declared recovered in 1997) and Amendment 5 was adopted to increase the target F to 0.33, midway between the existing F target (0.25) and F_{MSY} . Target F was allowed to increase again to 0.40 after two years of implementation. Regulations were developed to achieve the target F (which included measures to restore commercial harvest to 70% of the average landings during the 1972-1979 historical period) and states were allowed to submit proposals to implement alternative regulations that were deemed conservationally equivalent to the Amendment 5 measures. From 1997-2000, a series of five addenda were implemented to respond to the latest stock status information and adjust the regulatory program to achieve each change in target F.

In 2003, Amendment 6 was adopted to address five limitations within the existing management program: 1) potential inability to prevent the Amendment 5 exploitation target from being exceeded; 2) perceived decrease in availability or abundance of large striped bass in the coastal migratory population; 3) a lack of management direction with respect to target and threshold biomass levels; 4) inequitable effects of regulations on the recreational and commercial fisheries, and coastal and

producer area sectors; and 5) excessively frequent changes to the management program. Accordingly, Amendment 6 completely replaced the existing FMP for Atlantic striped bass.²

The goal of Amendment 6 is “to perpetuate, through cooperative interstate management, migratory stocks of striped bass; to allow commercial and recreational fisheries consistent with the long-term maintenance of a broad age structure, a self-sustaining spawning stock; and also to provide for the restoration and maintenance of their essential habitat.” In support of this goal, the following objectives are included:

1. Manage striped bass fisheries under a control rule designed to maintain stock size at or above the target female spawning stock biomass level and a level of fishing mortality at or below the target exploitation rate.
2. Manage fishing mortality to maintain an age structure that provides adequate spawning potential to sustain long-term abundance of striped bass populations.
3. Provide a management plan that strives, to the extent practical, to maintain coastwide consistency of implemented measures, while allowing the States defined flexibility to implement alternative strategies that accomplish the objectives of the FMP.
4. Foster quality and economically viable recreational, for-hire, and commercial fisheries.
5. Maximize cost effectiveness of current information gathering and prioritize state obligations in order to minimize costs of monitoring and management.
6. Adopt a long-term management regime that minimizes or eliminates the need to make annual changes or modifications to management measures.
7. Establish a fishing mortality target that will result in a net increase in the abundance (pounds) of age 15 and older striped bass in the population, relative to the 2000 estimate.

Amendment 6 modified the F target and threshold, and introduced a new set of biological reference points (BRPs) based on female SSB, as well as a list of management triggers based on the BRPs. The coastal commercial quotas were restored to 100% of the states’ average landings during the 1972-1979 historical period, except for Delaware’s coastal commercial quota which remained at the level allocated in 2002³. In the recreational fisheries, all states were required to implement a two-fish bag limit with a minimum size limit of 28 inches, except for the Chesapeake Bay fisheries, North Carolina fisheries that operate in the A/R, and states with approved alternative regulations. The Chesapeake Bay and A/R regulatory programs were predicated on a more conservative F target than the coastal migratory stock, which allowed these states/jurisdictions (hereafter states) to implement separate seasons, harvest caps, and size and bag limits as long as they remain under that F target. No minimum size limit can be less than 18 inches under Amendment 6. The same minimum size standards regulate

² While NOAA Fisheries continues to implement a complete ban on the fishing and harvest of striped bass in the EEZ, Amendment 6 includes a recommendation to consider reopening the EEZ to striped bass fisheries. In September 2006, NOAA Fisheries concluded that it would be imprudent to open the EEZ to striped bass fishing because it could not be certain that opening the EEZ would not lead to increased effort and an overfishing scenario.

³ The decision to hold Delaware’s commercial quota at the 2002 level is based on tagging information that indicated F on the Delaware River/Bay stock is too high, and uncertainty regarding the status of the spawning stock for the Delaware River/Bay.

the commercial fisheries as the recreational fisheries, except for a minimum 20 inch size limit in the Delaware Bay spring American shad gillnet fishery.

States are permitted the flexibility to deviate from these regulations by submitting conservation equivalency proposals to the Plan Review Team (PRT). All proposals are subject to technical review and approval by the Atlantic Striped Bass Management (Board). It is the responsibility of the state to demonstrate through quantitative analysis that the proposed management program is equivalent to the standards in the FMP, or will not contribute to the overfishing of the resource.

Four addenda to Amendment 6 have been implemented. Addendum I, approved in 2007, established a bycatch monitoring and research program to increase the accuracy of data on striped bass discards and recommended development of a web-based angler education program. Also in 2007, President George W. Bush issued an Executive Order (E.O. 13449) prohibiting the sale of striped bass (and red drum) caught within the EEZ. Addendum II was approved in 2010 and established a new definition of recruitment failure such that each index would have a fixed threshold rather than a threshold that changes annually with the addition of each year's data. Addendum III was approved in 2012 and requires all states with a commercial fishery for striped bass to implement a uniform commercial harvest tagging program. The addendum was initiated in response to significant poaching events in the Chesapeake Bay and aims to limit illegal harvest of striped bass.

Addendum IV, approved in 2014, currently sets the regulatory program for striped bass fisheries. The addendum was initiated in response to the 2013 benchmark assessment which indicated a steady decline in SSB since the mid-2000s. The addendum established new F reference points, as recommended by the 2013 benchmark. In order to reduce F to a level at or below the new target, coastal states are required to implement 1-fish bag limit and 28" minimum size limit to achieve a 25% reduction from 2013 removals in the ocean fishery. Chesapeake Bay fisheries are required to implement regulations to achieve a 20.5% reduction from 2012 removals since their fisheries were reduced by 14% in 2013 based on their management program. The addendum maintains the flexibility to implement alternative regulations through the conservation equivalency process. This practice has resulted in a variety of regulations among states (Table 1 and Table 2). All states promulgated regulations prior to the start of their 2015 seasons.

In February 2017, the Board initiated the development of Draft Addendum V to consider liberalizing coastwide commercial and recreational regulations. The Board's action responded to concerns raised by Chesapeake Bay jurisdictions regarding continued economic hardship endured by its stakeholders since the implementation of Addendum IV and information from the 2016 stock assessment update indicating that F was below target in 2015, and that total removals could increase by 10% to achieve the target F. However, the Board chose to not advance the draft addendum for public comment largely due to harvest estimates having increased in 2016 without changing regulations. Instead, the Board decided to wait until it reviews the results of the 2018 benchmark stock assessment before considering making changes to the management program.

II. Status of the Stocks

The 2018 benchmark stock assessment for Atlantic striped bass was peer-reviewed at the 66th Northeast Regional Stock Assessment Workshop (SAW)/Stock Assessment Review Committee (SARC) meeting in November 2018. The assessment addressed several of the recommendations from the 57th SAW/SARC, including developing new maturity-at-age estimates for the coastal migratory stock and evaluating stock status definitions relative to uncertainty in biological reference points. The assessment also made progress on developing a spatially and temporally explicit catch-at-age model incorporating tag-based movement (migration) information. Although the Peer Review Panel did not accept the migration model for management use, it recommended continued work to improve the model for future assessments.

The accepted model is a forward projecting statistical catch-at-age (SCA) model which uses catch-at-age data and fishery-dependent and -independent survey indices to estimate annual population size and fishing mortality. Indices of abundance track relative changes in the population over time while catch data provide information on the scale of the population size. Age structure data (numbers of fish by age) provide additional information on recruitment (number of age-1 fish entering the population) and trends in mortality.

The biological reference points (BRPs) currently used for management are based on the 1995 estimate of female spawning stock biomass (SSB). The 1995 estimate of female SSB is used as the SSB threshold because many stock characteristics (such as an expanded age structure) were reached by this year and the stock was declared recovered. The SSB target is equal to 125% of SSB threshold. To estimate the associated fishing mortality (F) threshold and target, population projections were made by using a constant F and changing the value until the SSB threshold or target was achieved. For the 2018 benchmark, the BRP values have been updated. The benchmark incorporates the newly calibrated recreational catch estimates based on the Marine Recreational Information Program's (MRIP) Fishing Effort Survey (FES), resulting in higher estimates of SSB and therefore higher estimates for the SSB threshold and target (refer to *Section III* for more information). The SSB threshold is estimated at 91,436 metric tons (202 million pounds), with an SSB target of 114,295 metric tons (252 million pounds). The new MRIP estimates did not have a large effect on the estimates of fishing mortality, and the updated F threshold and target values are very similar to the previous F reference points. The F threshold is estimated at 0.24, and the target is estimated at 0.20

Based on the results of the 2018 benchmark, Atlantic striped bass is overfished and experiencing overfishing. In 2017, female SSB was estimated at 68,476 metric tons (151 million pounds) which is below the SSB threshold (Figure 1). Female SSB declined steadily since the time series high in 2003 and has been below threshold since 2013. The recent decline in female SSB appears to be attributed to a period of low recruitment since about 2005 (Figure 1). However, the 2011, 2014, and 2015 year classes (representing the 2012, 2015, and 2016 age-1 recruitment estimates) were above average. Total F was estimated at or above F threshold in 13 of the last 15 years, and was estimated above threshold in 2017 at 0.31 (Figure 2).

III. Status of the Fishery in the Ocean and Chesapeake Bay

In 2018, total Atlantic striped bass removals (commercial and recreational, including harvest, commercial discards and recreational release mortality) was estimated at 5.78 million fish, which is an 18% decrease relative to 2017 (Table 3; Figure 5). The recreational sector accounted for 88% of total removals by number. It should be noted that the recreational catch estimates reported here reflect the new, improved MRIP mail-based survey and are not directly comparable to past FMP Review reports.

The commercial fishery harvested 4.71 million pounds (622,451 fish) in 2018, which is a 2% increase by number but a 2% decrease by weight relative to 2017 (Table 4; Table 5). Harvest from Chesapeake Bay accounted for 65% of the total by weight; Maryland landed 32%, Virginia landed 23%, and PRFC landed 10% (Table 5; Figure 6). Additional harvest came from Massachusetts (16%), New York (13%), Rhode Island (4%), and Delaware (3%). The proportion of total harvest coming from Chesapeake Bay in numbers of fish is much higher; roughly 80% annually since 1990 (Table 6). This is because fish harvested in Chesapeake Bay have a lower average weight per fish than fish harvested in ocean fisheries. Commercial dead discards were estimated at 90,092 fish, and account for 2% of total removals in 2018 (Table 6).

Total recreational catch (harvest and releases) was estimated at 33.7 million fish which is an 18% decrease from 2017 and is likely attributed to the observed decrease in fishing effort for trips targeting striped bass in the ocean (Table 7). Total recreational harvest (A+B1) in 2018 is estimated at 2.24 million fish (23.1 million pounds), and represents a 23% decrease relative to 2017 (39% decrease by weight) (Table 8; Table 9). Maryland landed the largest proportion of recreational harvest in number of fish⁴ (44%), followed by New Jersey (21%), Massachusetts (17%), New York (8%), and Connecticut (4%) (Table 9). The proportion of recreational harvest in numbers from Chesapeake Bay has increased in recent years and was estimated at 47% in 2018.

The vast majority (89% on average since 1990) of recreational striped bass catch is released alive either due to angler preference or regulation (i.e., undersized or already caught the bag limit) (Figure 7). The assessment assumes, based on previous studies, that 9% of the fish that are released alive die as a result of being caught. In 2018, recreational anglers caught and released an estimated 31.4 million fish (93% of total catch), 2.8 million of which were assumed to have died (Table 7). This represents a 17% decrease relative to 2017. The ocean region accounted for majority of the decrease and is likely attributed to the observed decrease in fishing effort in 2018. According to MRIP, the number of fishing trips where the angler identified striped bass as the primary or secondary target species in 2018 was 18.3 million trips which is a 6% decrease relative to 2017 (19.4 million trips) in the ocean region, while effort in Chesapeake Bay remained constant at roughly 2.6 million trips targeting striped bass.

⁴ By weight, New Jersey had the largest proportion of harvest (30%), followed by Massachusetts (21%), Maryland (20%), New York (15%), and Connecticut and Rhode Island both at 5% (Table 8).

IV. Albemarle Sound and Roanoke River Management Area

Fishery Management Plan

While striped bass in North Carolina’s ocean waters are managed under the Interstate FMP, Addendum IV to Amendment 6 formally defers management of the A/R stock to the state of North Carolina using A/R stock-specific BRPs approved by the Board (NCDMF 2013, 2014).

Estuarine striped bass in North Carolina are currently managed under Amendment 1 to the North Carolina Estuarine Striped Bass Fishery Management Plan (FMP) and its subsequent revision and recent supplement (NCDMF 2013, 2014, 2019). It is a joint plan between the North Carolina Marine Fisheries Commission (NCMFC) and the North Carolina Wildlife Resources Commission (NCWRC). Amendment 1, adopted in 2013, lays out separate management strategies for the Albemarle Sound-Roanoke Rive (A-R) stock and the estuarine (non-migratory) Central and Southern striped bass stocks in the Tar-Pamlico, Neuse, and Cape Fear rivers. Management programs in Amendment 1 utilize annual total allowable landings (TAL), daily possession limits, open and closed harvest seasons, gill net mesh size and yardage restrictions, seasonal attendance requirements, barbless hook requirements in some areas, minimum size limits, and slot limits to maintain a sustainable harvest and reduce regulatory discard mortality in all sectors. Amendment 1 also maintains the stocking regime in the central and southern systems and the harvest moratorium on striped bass in the Cape Fear River and its tributaries (NCDMF 2013). Striped bass fisheries in the Atlantic Ocean of North Carolina are managed under ASMFC’s Amendment 6 and subsequent addenda to the Interstate FMP for Atlantic Striped Bass. Amendment 6 also requires North Carolina to inform the Commission of changes to striped bass management in the A-R System.

Albemarle Sound-Roanoke River Striped Bass Stocks

The most recent A/R benchmark stock-specific assessment utilized the ASAP3 statistical catch-at-age model. The model was peer reviewed by an outside panel of experts and approved for management use by the Board in October 2014. The benchmark assessment produced new BRPs and annual harvest quota to prevent overfishing. The model was most recently updated in 2016 with catch and index data through 2014 (Flowers and Godwin 2016). Based on results of the 2016 update, and in comparison to the BRPs below, A-R striped bass are not overfished and are not experiencing overfishing.

	<i>F</i>	<i>Female SSB</i>	<i>Total Allowable Landings (TAL)</i>
<i>Threshold</i>	0.41	785,150 lbs.	275,000 lb (split evenly between recreational and commercial sectors)
<i>Target</i>	0.33	969,496 lbs.	

In 2014, female SSB was estimated at 2,024,583 pounds which is above the peak in 2003 and the highest value in the time series (Figure 3). In 2014, F was estimated at 0.06 which is below both the F threshold and target (Figure 4). Caution should be used, however, when evaluating the estimates of SSB and F in the terminal year. The estimated SSB value in 2014 is likely an overestimate based on past years of retrospective bias exhibited by the model. Subsequent assessments, incorporating additional years of data, and possibly a revised stock-recruit relationship, will likely reduce the magnitude of the 2014 value (Flowers and Godwin 2016). A/R striped bass experienced a period of unusually strong

recruitment (number of age-1 fish entering the population) from 1994-2001 followed by a period of lower recruitment from 2002-2014 (Figure 3).

Overall, the trends in the A/R stock abundance are quite similar to the Atlantic striped bass stocks described above, with a steady decline in female SSB since about 2003. Total stock abundance reached its peak in the early 2000s, declined gradually through about 2009 and increasing slightly beginning in 2011 through the terminal year. A new benchmark A/R stock assessment with data through 2016 is currently underway and scheduled to be completed in late 2019.

Albemarle Sound and Roanoke River Atlantic Striped Bass Fisheries

In 2018, total commercial and recreational harvest in the Albemarle Sound Management Area (ASMA) and the Roanoke River Management Area (RRMA) was 154,617 pounds (39,942 fish). Commercial harvest in the ASMA was 116,057 pounds (27,735 fish). Recreational harvest in the ASMA was 11,763 pounds (3,466 fish), and recreational harvest in the RRMA was 26,797 pounds (8,741 fish).

V. Status of Research and Monitoring

Amendment 6 and its Addenda I-IV set the regulatory and monitoring measures for the coastwide striped bass fishery in 2018. Amendment 6 requires certain states to implement fishery-dependent monitoring programs for striped bass. All states with commercial fisheries or substantial recreational fisheries are required to define the catch and effort composition of these fisheries. Additionally, all states with a commercial fishery must implement a commercial harvest tagging program pursuant to Addendum III to Amendment 6.

Amendment 6 also requires certain states to monitor the striped bass population independent of the fisheries. Juvenile abundance indices are required from Maine (Kennebec River), New York (Hudson River), New Jersey (Delaware River), Maryland (Chesapeake Bay tributaries), Virginia (Chesapeake Bay tributaries), and North Carolina (Albemarle Sound). Spawning stock sampling is mandatory for New York (Hudson River), Pennsylvania (Delaware River), Delaware (Delaware River), Maryland (Upper Chesapeake Bay and Potomac River), Virginia (Rappahannock River and James River), and North Carolina (Albemarle Sound-Roanoke River). Amendment 6 requires NOAA Fisheries, USFWS, Massachusetts, New York, New Jersey, Maryland, Virginia, and North Carolina to continue their tagging programs, which provide data used to determine survivorship and migration patterns.

VI. Status of Management Measures and Issues

Coastal Commercial Quota

In 2018, the coastal commercial quota was 2,823,096 pounds and was not exceeded, however Delaware exceeded its allocation by 9,943 pounds which will be deducted from its 2019 quota. Table 10 contains state-specific quotas and harvest that occurred in 2018, and final 2019 quotas.

Chesapeake Bay Commercial Quota

In 2018, the Chesapeake Bay-wide quota was 3,120,247 pounds and was allocated to Maryland, the PRFC, and Virginia based on historical harvest. In 2018, the Bay-wide quota was not exceeded and all

jurisdictions maintained harvest below its respective quota. Table 10 contains jurisdiction-specific quotas and harvest that occurred in 2018 for the Chesapeake Bay, and final 2019 quotas. In 2018, Commercial harvest from Chesapeake Bay accounted for 52% of total commercial landings by weight, and has averaged 57% since implementation of Addendum IV in 2015.

Chesapeake Bay Spring Harvest of Migrant Striped Bass

Recreational fishermen in the Chesapeake Bay are permitted to take adult migrant fish during a limited seasonal fishery, commonly referred to as the Spring Trophy Fishery. From 1993 to 2007 the fishery operated under a quota. Beginning in 2008, the Board approved non-quota management until stock assessment indicates that corrective action is necessary to reduce F on the coastal stock. The Spring Trophy Fishery is currently managed via bag limits and minimum sizes (see *Appendix 1* for state specific measures). The 2018 estimate of migrant fish harvested during the trophy season was 17,198 fish (17,104 fish in Maryland and 94 fish in Virginia) which is decrease compared to 2017 (22,892 fish) and below the 2006-2018 average of 40,990 fish (Horne 2019).

Wave-1 Recreational Harvest Estimates

Evidence suggests that North Carolina, Virginia, and possibly other states have had sizeable wave-1 (January/February) recreational striped bass fisheries beginning in 1996 (NEFSC 2013b). MRIP, formerly the Marine Recreational Fisheries Statistics Survey (MRFSS), has sampled for striped bass in North Carolina during wave-1 since 2004 (other states are not currently covered during wave-1). For Virginia, harvest in wave-1 is estimated via the ratio of landings and tag returns in wave-6 and regression analysis (refer to the methods described in ASMFC 2016 for more detail).

However, based on fishery-independent data collected by NCDMF, ASMFC and USFWS, striped bass distributions on their overwintering grounds during December through February has changed significantly since the mid-2000s. The migratory portion of the stocks has been well offshore in the EEZ (>3 miles) effecting both Virginia's and North Carolina's striped bass winter ocean fisheries in recent years. Furthermore, North Carolina has reported zero striped bass harvest during wave-1 in the ocean for 2012-2018. Similarly, its commercial fishery has reported zero striped bass landings from the ocean during that time.

Addendum II: Juvenile Abundance Index Analysis

The following states are required to conduct striped bass young-of-year juvenile abundance index (JAI) surveys on an annual basis: Maine for the Kennebec River; New York for the Hudson River; New Jersey for the Delaware River; Maryland for the Maryland Chesapeake Bay tributaries; Virginia for the Virginia Chesapeake Bay tributaries; and North Carolina for the A/R stock.

The PRT annually reviews trends in all required JAIs. The definition of recruitment failure is a value that is below 75% (the first quartile, or Q1) of all values in a fixed time series appropriate to each juvenile abundance index (see *Addendum II* for details). If any survey's JAI falls below their respective Q1 for three consecutive years, appropriate action should be recommended by the PRT to the Management Board.

For the 2019 review of JAIs, the analysis evaluates the 2016, 2017, and 2018 JAI values. No state's JAI met the criteria for recruitment failure (Figure 8). North Carolina's JAI value was the only value below its respective Q1 in 2018. Maine's, New York's and New Jersey's JAI values were at or near the respective time series average in 2018, while Maryland's and Virginia's values were above average in 2018.

Addendum III: Commercial Fish Tagging Program

Addendum III to Amendment 6 includes compliance requirements for monitoring commercial fishery harvest tagging programs. In 2018, all states implemented commercial tagging programs consistent with the requirements of Addendum III. Table 11 describes commercial tagging programs by state.

Law Enforcement Reporting

States are asked to report and summarize law enforcement cases that occurred the previous season in annual compliance reports. In 2018, reported law enforcement cases (e.g., the number of warnings and citations) were similar to those reported in previous years. The most common violations were recreationally harvested fish under the legal size limit and possessing fish in excess of the bag limit.

VII. Annual State Compliance and Plan Review Team Recommendations

In 2018, and based on annual state compliance reports (ASMFC 2019), the PRT determined that each state and jurisdiction implemented a management program consistent with the requirements of Amendment 6 and addenda I-IV (Table 12). Refer to Table 1 and Table 2 for a summary of 2018 striped bass fishing regulations by state. In 2018, Maryland implemented a 19" minimum size limit in the Chesapeake Bay recreational fishery through conservation equivalency. The regulations also require anglers to use non-offset circle hooks when live-lining or chumming, and prohibit the use of treble hooks.

Addendum III to Amendment 6 includes compliance requirements for monitoring commercial fishery harvest tagging programs. The PRT determined that all states with commercial striped bass fisheries implemented a commercial harvest tagging program in 2018 consistent with the requirements of Addendum III. Table 11 describes each state's commercial tag program requirements.

Amendment 6 includes compliance requirements for monitoring programs (summarized in *Section V*). Compliance with these requirements is summarized in Table 12. The PRT determined that each state and jurisdiction carried out the required monitoring programs in the 2018 fishing year. It should be noted that Virginia significantly modified its spawning stock monitoring and tagging program methodologies. Specifically, the pound net component of the spawning stock survey was eliminated and replaced with multi-panel anchor gill nets, while tagging was conducted through electrofishing. Both parts of the new monitoring programs were reviewed by the TC and approved by the Board at its February 2019 meeting. The PRT also notes that while the New York spawning stock monitoring program in the Hudson River does meet the requirements of the FMP, it does not provide an index of relative abundance to characterize the Hudson River stock which was identified as a high priority research recommendation at SAW 66.

Massachusetts reported two new regulatory changes for 2019: 1) a prohibition on the gaffing of non-conforming sized striped bass (i.e., less than 34" in the commercial fishery, and less than 28" in the recreational fishery); and 2) an allowance for non-conforming sized striped bass to be imported during the state's commercial striped bass season (fish previously had to meet the state's commercial minimum size limit during the open season, plus five days after its closure).

VIII. Research Recommendations

The following categorized and prioritized research recommendations were developed by the 2018 Benchmark Stock Assessment Subcommittee and the 66th SARC:

Fishery-Dependent Priorities

High

- Continue collection of paired scale and otolith samples, particularly from larger striped bass, to facilitate development of otolith-based age-length keys and scale-otolith conversion matrices.
- Develop studies to provide information on gear specific (including recreational fishery) discard mortality rates and to determine the magnitude of bycatch mortality⁵.
- Conduct study to directly estimate commercial discards in the Chesapeake Bay.
- Collect sex ratio information on the catch and improve methods for determining population sex ratio for use in estimates of female SSB and biological reference points.

Moderate

- Improve estimates of striped bass harvest removals in coastal areas during wave 1 and in inland waters of all jurisdictions year round.

Fishery-Independent Priorities

High

- Develop and index of relative abundance from the Hudson River Spawning Stock Biomass survey to better characterize the Delaware Bay/Hudson River stock.
- Improve the design of existing spawning stock surveys for Chesapeake Bay and Delaware Bay.

Moderate

- Develop a refined and cost-efficient, fisheries-independent coastal population index for striped bass stocks.
- Collect sex ratio information from fishery-independent sources to better characterize the population sex ratio.

Modeling/Quantitative Priorities

High

- Develop better estimates of tag reporting rates; for example, through a coastwide tagging study.
- Investigate changes in tag quality and potential impacts on reporting rate.
- Explore methods for combining tag results from programs releasing fish from different areas on different dates.

⁵ Literature search and some modeling work completed

- Develop field or modeling studies to aid in estimation of natural mortality and other factors affecting the tag return rate.
- Compare M and F estimates from acoustic tagging programs to conventional tagging programs.

Moderate

- Examine methods to estimate temporal variation in natural mortality.

Low

- Evaluate truncated matrices to reduce bias in years with no tag returns and covariate based tagging models to account for potential differences from size or sex or other covariates.

Life History and Biology

High

- Continue in-depth analysis of migrations, stock compositions, sex ratio, etc. using mark-recapture data⁶.
- Continue evaluation of striped bass dietary needs and relation to health condition.
- Continue analysis to determine linkages between the Mycobacteriosis outbreak in Chesapeake Bay and sex ratio of Chesapeake spawning stock, Chesapeake juvenile production, and recruitment success into coastal fisheries.

Moderate

- Examine causes of different tag based survival estimates among programs estimating similar segments of the population.
- Continue to conduct research to determine limiting factors affecting recruitment and possible density implications.
- Conduct study to calculate the emigration rates from producer areas now that population levels are high and conduct multi-year study to determine inter-annual variation in emigration rates.

Striped Bass Research Priorities Identified as Being Met or Well in Progress

- Evaluate to what extent rising natural mortality among Chesapeake Bay striped bass affects the existing F and female SSB thresholds, which are based on a fixed M assumption ($M = 0.15$).
- Develop simulation models to look at the implications of overfishing definitions relative to development of a striped bass population that will provide “quality” fishing. Quality fishing must first be defined.
- Evaluate the stock status definitions relative to uncertainty in biological reference points.
- Develop a method to integrate catch-at-age and tagging models to produce a single estimate of F and stock status⁷.
- Develop a spatially and temporally explicit catch-at-age model incorporating tag based movement information⁸.
- Develop maturity ogives applicable to coastal migratory stocks.

⁶ Ongoing through Cooperative Winter Tagging Cruise and striped bass charter boat tagging trips. See Cooperative Winter Tagging Cruise 20 Year Report.

⁷ Model developed, but the tagging data overwhelms the model. Issues remain with proper weighting

⁸ Model developed with Chesapeake Bay and the rest of the coast as two stocks. External analysis of tagging data is used to inform the model but is not explicitly incorporated.

IX. References

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X. Tables and Figures

Table 1. Summary of Atlantic Striped bass commercial regulations in 2018. Source: 2019 State Compliance Reports. Minimum sizes and slot size limits are in total length (TL). *commercial quota reallocated to recreational bonus fish program

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
ME	Commercial fishing prohibited		
NH	Commercial fishing prohibited		
MA	34" minimum size	869,813 lbs. Hook & line only	6.23 until quota reached, Monday and Thursdays only. Fishing prohibited on July 3, July 4, and Labor Day.
RI	Floating fish trap: 26" minimum size	Total: 181,572 lbs., split 39:61 between the trap and general category. Gill netting prohibited.	Trap: 4.1 – 12.31, or until quota reached; unlimited possession limit until 70% of quota projected to be harvested, then 500
	General category (mostly rod & reel): 34" min.		General Category: 5.20-8.04, 8.05-12.31, or until quota reached. Closed Fridays and Saturdays. 5 fish/vessel/day possession limit.
CT*	Commercial fishing prohibited; bonus program: 1 fish at 22" – <28" slot size, 5.1 – 12.31 (voucher required)		
NY	28"-38" minimum size (Hudson River closed to commercial harvest)	795,795 lb. Pound nets, gill nets (6"-8" stretched mesh), hook & line.	6.1 – 12.15, or until quota reached. Limited entry permit only.
NJ*	Commercial fishing prohibited; bonus program: 1 fish at 24" – <28" slot size limit, 9.1 – 12.31 (permit required)		
PA	Commercial fishing prohibited		
DE	Gillnet: 28" minimum size, except 20" min in Del. Bay and River during spring season. Hook and Line: 28" min	Gillnet: 137,831 lbs. Hook and line: 14,509 lbs.	Gillnet: 2.15-5.31 (2.15-3.30 for Nanticoke River) & 11.15-12.31; drift nets only 2.15-28 & 5.1-31; no fixed nets in DE River. No trip limit.

(Table 1 continued – Summary of commercial regulations in 2018)

STATE	SIZE LIMITS	SEASONAL QUOTA	OPEN SEASON
MD	Ocean: 24" minimum CB and Rivers: 18"–36"	Ocean: 90,727 lbs. CB and Rivers: 1,471,888 lbs. (part of Bay-wide quota).	Ocean: 1.1-5.31, 10.1-12.31, Mon- Fri Bay Pound Net: 6.1-11.30, Mon-Sat Bay Haul Seine: 6.1-11.30, Mon-Fri Bay Hook & Line: 6.4-12.29, Mon-Thu Bay Drift Gill Net: 1.1-2.28, 12.3-12.31, Mon-Fri
PRFC	18"-36" slot limit 2.15-3.25 and 18" minimum size all other seasons	583,362 lbs. (part of Bay-wide quota). Allocated by gear and season.	Hook & line: 1.1-3.25, 6.1-12.31 Pound Net & Other: 2.15-3.25, 6.1-12.15 Gill Net: 1.1-3.25, 11.13-12.31 Misc. Gear: 2.15-3.25, 6.1-12.15
DC	Commercial fishing prohibited		
VA	Ocean: 28" min CB and Rivers: 18" minimum and 18"-28" slot	Ocean: 136,141 lbs. CB and Rivers: 1,064,997 lbs. (part of Bay- wide quota). ITQ- system for both areas.	Ocean: 1.16-12.31 CB and Rivers: 1.16-12.31
NC	Ocean: 28"	360,360 lbs. (split between gear types). Number of fish allocated to each permit holder. Allocation varies by permit.	Seine fishery was open for 120 days, 150 fish/permit Gill net fisher was open for 45 days, 50 fish/permit Trawl fishery was not opened due to lack of striped bass presence.

Table 2. Summary of Atlantic Striped bass recreational regulations in 2018. Source: 2019 State Compliance Reports. Minimum sizes and slot size limits are in total length (TL).

STATE	SIZE LIMITS	BAG LIMIT	GEAR/FISHING RESTRICTIONS	OPEN SEASON
ME	≥ 28" minimum size	1 fish/day	Hook & line only; circle hooks only when using live bait	All year, except spawning areas are closed Dec 1 – April 30 and catch and release only May 1 – June 30
NH	≥ 28" minimum size	1 fish/day	Gaffing and culling prohibited	All year
MA	≥ 28" minimum size	1 fish/day	Hook & line only; no high-grading	All year
RI	≥ 28" minimum size	1 fish/day	None	All year
CT	≥ 28" minimum size	1 fish/day	Spearing and gaffing prohibited	All year
NY	Ocean and Delaware River: ≥ 28" minimum size	1 fish/day	Angling only. Spearing permitted in ocean waters. Catch and release only during closed season.	Ocean: April 15 – Dec 15 Delaware River: All year
	Hudson River: 18-28" slot limit, or ≥40"			Hudson River: April 1 – Nov 30
NJ	1 fish at 28 to < 43", and 1 fish ≥ 43"		Circle hooks required while fishing with natural bait during spring spawning ground closure	Ocean: All year All other waters: March 1 – Dec 31, except spawning ground closure April 1 – May 31 in the lower Delaware River and tributaries
PA	Upstream from Calhoun St Bridge: 1 fish at ≥ 28" minimum size			
	Downstream from Calhoun St Bridge: 1 fish at ≥ 28" minimum size, from 4.1 – 5.31, a 2 fish at 21-25" slot size limit			
DE	28" minimum size, no harvest 38-43" (inclusive).	2 fish/day	Hook & line, spear (for divers) only. Circle hooks required in spawning season.	All year. Catch and release only April 1 - May 31 in spawning grounds. In Del. River, Bay & tributaries, may only harvest 20-25" slot from July 1 - Aug 31

(Table 2 continued – Summary of recreational regulations in 2018).

STATE	SIZE LIMITS	BAG LIMIT	GEAR/FISHING RESTRICTIONS	OPEN SEASON
MD[^]	Ocean: 28"-38" slot, or >44"	2 fish/day		All year
	CB: Catch and Release Only	C&R only	no eels	Jan 1 - Feb 28, March 1 – April 20 (mainstem only, tributaries closed)
	CB Spring Trophy: 35" minimum	1 fish/day	mainstem only from Baltimore to VA line	April 21 - May 15
	CB Summer and Fall: 19" minimum, only 1 fish can be >28"	2 fish/day	non-offset circle hooks when live-lining or chumming, no treble hooks when bait fishing	May 16 - 31, mainstem Bay only, Baltimore to VA line; June 1 - Dec 15 all Bay and Tributaries open
PRFC	Spring Trophy: 35" minimum	1 fish/day	Downstream of Rt. 301 Bridge - No more than two hooks or sets of hooks per rod or line. No high-grading allowed and no live eel.	April 20 - May 15
	Summer and Fall: 20" minimum and only 1 fish can be >28"	2 fish/day	No more than two hooks or sets of hooks for each rod or line	May 16 - Dec 31
DC	20" minimum size and only one fish can be >28"	2 fish/day	hook and line only	May 16 - Dec 31
VA	Ocean: 28" minimum size	1 fish/day	Hook & line, rod & reel, hand line only. Gaffing is illegal in Virginia marine waters.	Jan 1 - March 31 and May 16 - Dec 31
	Ocean Spring Trophy: 36" min	1 fish/day		May 1 - May 15
	CB Trophy: 36" minimum	1 fish/day	No possession of striped bass in the Spawning Reaches	May 1 - June 15
	Chesapeake Bay Spring: 20"-28"	2 fish/day	One fish can be greater 36" during the trophy season only	May 16 - June 15
	CB Fall: 20" minimum	2 fish/day	size and only one fish can be >28"	Oct 4 - Dec 31
NC	Ocean: ≥ 28" minimum size	1 fish/day	No gaffing allowed	All year

[^] Susquehanna Flats: C&R only Jan 1 – May 3; 1 fish at 19"-26" slot May 16 – May 31. Northeast River: C&R only May 16 – May 31

Table 3. Total removals (harvest plus discards/release mortality) of Atlantic striped bass by sector in numbers of fish, 1990-2018. Note: Harvest is from ACCSP/MRIP, discards/release mortality is from ASMFC. Estimates exclude inshore harvest from North Carolina.

Year	Commercial		Recreational		Total Removals
	Harvest	Discards	Harvest	Release Mortality	
1990	93,888	46,630	578,897	442,811	1,162,226
1991	158,491	90,439	798,260	715,478	1,762,667
1992	256,476	197,240	869,779	937,611	2,261,106
1993	314,483	116,921	789,037	812,404	2,032,844
1994	325,401	160,198	1,055,523	1,360,872	2,901,993
1995	537,412	187,185	2,287,578	2,010,689	5,022,865
1996	854,094	261,022	2,487,421	2,600,526	6,203,063
1997	1,076,460	331,383	2,774,981	2,969,781	7,152,605
1998	1,215,219	348,852	2,915,390	3,259,133	7,738,594
1999	1,223,572	332,101	3,123,495	3,140,905	7,820,072
2000	1,216,812	203,084	3,802,477	3,044,203	8,266,575
2001	931,412	174,926	4,052,474	2,449,599	7,608,411
2002	928,085	191,099	4,005,084	2,792,200	7,916,468
2003	854,326	129,813	4,781,402	2,848,445	8,613,986
2004	879,768	160,196	4,553,027	3,665,234	9,258,224
2005	970,403	145,094	4,480,802	3,441,928	9,038,227
2006	1,047,648	158,260	4,883,960	4,812,332	10,902,201
2007	1,015,226	166,397	3,944,679	2,944,253	8,070,556
2008	1,027,837	108,962	4,381,186	2,391,200	7,909,184
2009	1,049,959	128,191	4,700,222	1,942,061	7,820,433
2010	1,031,430	133,064	5,388,440	1,760,759	8,313,693
2011	944,777	87,924	5,006,358	1,482,029	7,521,088
2012	870,606	191,577	4,046,299	1,847,880	6,956,361
2013	784,379	112,097	5,157,760	2,393,425	8,447,661
2014	750,263	121,253	4,033,747	2,172,342	7,077,604
2015	623,313	101,343	3,085,725	2,307,133	6,117,515
2016	607,084	105,119	3,500,434	2,981,430	7,194,066
2017	592,670	108,475	2,934,293	3,419,651	7,055,089
2018	622,451	90,092	2,244,766	2,826,667	5,783,976

Table 4. Total harvest of Atlantic striped bass by sector, 1990-2018. Note: Harvest is from ACCSP/MRIP. Estimates exclude inshore harvest from North Carolina.

Year	Numbers of Fish			Pounds		
	Commercial	Recreational	Total	Commercial	Recreational	Total
1990	93,888	578,897	672,785	715,951	8,207,515	8,923,466
1991	158,491	798,260	956,751	962,833	10,640,601	11,603,434
1992	256,476	869,779	1,126,255	1,510,276	11,921,967	13,432,243
1993	314,483	789,037	1,103,520	1,787,741	10,163,767	11,951,508
1994	325,401	1,055,523	1,380,924	1,872,374	14,737,911	16,610,285
1995	537,412	2,287,578	2,824,990	3,775,586	27,072,321	30,847,907
1996	854,094	2,487,421	3,341,515	4,822,874	28,625,685	33,448,559
1997	1,076,460	2,774,981	3,851,441	6,077,751	30,616,093	36,693,844
1998	1,215,219	2,915,390	4,130,609	6,552,111	29,603,199	36,155,310
1999	1,223,572	3,123,495	4,347,067	6,474,290	33,564,988	40,039,278
2000	1,216,812	3,802,477	5,019,289	6,719,521	34,050,817	40,770,338
2001	931,412	4,052,474	4,983,886	6,266,769	39,263,154	45,529,923
2002	928,085	4,005,084	4,933,169	6,138,180	41,840,025	47,978,205
2003	854,326	4,781,402	5,635,728	6,806,583	54,091,836	60,898,419
2004	879,768	4,553,027	5,432,795	7,335,116	53,031,074	60,366,190
2005	970,403	4,480,802	5,451,205	7,121,319	57,421,174	64,542,493
2006	1,047,648	4,883,960	5,931,608	6,785,006	50,674,431	57,459,437
2007	1,015,226	3,944,679	4,959,905	7,047,195	42,823,614	49,870,809
2008	1,027,837	4,381,186	5,409,023	7,190,685	56,665,318	63,856,003
2009	1,049,959	4,700,222	5,750,181	7,216,792	54,411,389	61,628,181
2010	1,031,430	5,388,440	6,419,870	6,996,713	61,431,360	68,428,073
2011	944,777	5,006,358	5,951,135	6,789,792	59,592,092	66,381,884
2012	870,606	4,046,299	4,916,905	6,516,868	53,256,619	59,773,487
2013	784,379	5,157,760	5,942,139	5,819,678	65,057,289	70,876,967
2014	750,263	4,033,747	4,784,010	5,937,949	47,948,610	53,886,559
2015	623,313	3,085,725	3,709,038	4,830,124	39,898,799	44,728,923
2016	607,084	3,500,434	4,107,518	4,831,442	43,671,532	48,502,974
2017	592,670	2,934,293	3,526,963	4,803,867	37,896,549	42,700,416
2018	622,451	2,244,766	2,867,217	4,714,661	23,069,028	27,783,689

Table 5. Commercial harvest by region in pounds (x1000), 1990-2018. Source: ACCSP. ^Estimates exclude inshore harvest.

Year	Ocean								Chesapeake Bay				Grand Total
	MA	RI	NY	DE	MD	VA	NC^	Total	MD	PRFC	VA	Total	
1990	159.7	4.0	81.9	6.5	0.0	10.1	9.8	272.0	3.6	169.1	271.3	444.0	716.0
1991	235.2	28.0	105.2	21.1	19.8	4.6	6.2	420.1	113.9	216.8	212.0	542.7	962.8
1992	237.1	39.0	226.6	17.8	18.4	17.2	27.7	583.8	590.9	127.4	208.2	926.5	1,510.3
1993	266.6	40.0	109.4	28.0	4.8	11.3	36.5	496.5	945.4	143.5	202.4	1,291.2	1,787.7
1994	200.0	39.8	171.3	33.9	17.9	30.2	139.7	632.7	915.9	149.9	173.9	1,239.6	1,872.4
1995	751.5	113.5	500.8	38.5	79.3	46.2	344.6	1,874.3	1,185.0	198.5	517.8	1,901.3	3,775.6
1996	695.9	122.6	504.4	120.5	75.7	165.9	58.2	1,743.2	1,487.7	346.8	1,245.2	3,079.7	4,822.9
1997	784.9	96.5	460.8	166.0	94.0	179.1	463.1	2,244.4	2,119.2	731.1	983.0	3,833.4	6,077.8
1998	810.1	94.7	485.9	163.7	84.6	375.0	273.0	2,287.0	2,426.7	726.2	1,112.2	4,265.1	6,552.1
1999	766.2	119.7	491.8	176.3	62.6	614.8	391.5	2,622.9	2,274.8	653.3	923.4	3,851.4	6,474.3
2000	796.2	111.8	542.7	145.1	149.7	932.7	162.4	2,840.5	2,261.8	666.0	951.2	3,879.0	6,719.5
2001	815.4	129.7	633.1	198.6	113.9	782.4	381.1	3,054.1	1,660.9	658.7	893.1	3,212.6	6,266.8
2002	924.9	129.2	518.6	146.2	93.2	710.2	441.0	2,963.2	1,759.4	521.0	894.4	3,174.9	6,138.2
2003	1,055.5	246.3	753.3	191.2	103.9	166.4	201.2	2,717.8	1,721.8	676.6	1,690.4	4,088.7	6,806.6
2004	1,214.2	232.3	741.7	176.5	134.2	161.3	605.4	3,265.5	1,790.3	772.3	1,507.0	4,069.6	7,335.1
2005	1,102.2	215.5	689.8	174.0	46.9	185.2	604.5	3,018.0	2,008.7	533.6	1,561.0	4,103.3	7,121.3
2006	1,322.3	221.1	688.4	184.2	91.1	195.0	74.2	2,776.3	2,116.3	673.5	1,219.0	4,008.7	6,785.0
2007	1,039.3	240.6	731.5	188.7	96.3	162.3	379.5	2,838.1	2,240.6	599.3	1,369.2	4,209.1	7,047.2
2008	1,160.3	245.9	653.1	188.7	118.0	163.1	288.4	2,817.6	2,208.0	613.8	1,551.3	4,373.1	7,190.7
2009	1,134.3	234.8	789.9	192.3	127.3	140.4	190.0	2,809.0	2,267.3	727.2	1,413.3	4,407.8	7,216.8
2010	1,224.5	248.9	786.8	185.4	44.8	127.8	276.4	2,894.7	2,105.8	683.2	1,313.0	4,102.0	6,996.7
2011	1,163.9	228.2	855.3	188.6	21.4	158.8	246.4	2,862.5	1,955.1	694.2	1,278.1	3,927.3	6,789.8
2012	1,218.5	239.9	683.8	194.3	77.6	170.8	7.3	2,592.0	1,851.4	733.8	1,339.6	3,924.8	6,516.9
2013	1,004.5	231.3	823.8	191.4	93.5	182.4	0.0	2,526.9	1,662.2	623.8	1,006.8	3,292.8	5,819.7
2014	1,138.5	216.9	531.5	167.9	120.9	183.7	0.0	2,359.4	1,805.7	603.4	1,169.4	3,578.5	5,937.9
2015	866.0	188.5	516.3	144.1	34.6	138.1	0.0	1,887.6	1,436.9	538.0	967.6	2,942.5	4,830.1
2016	938.7	174.7	575.0	136.5	19.7	139.2	0.0	1,983.9	1,425.5	519.8	902.3	2,847.5	4,831.4
2017	823.4	175.3	688.7	141.8	80.5	133.9	0.0	2,043.5	1,439.8	492.7	827.8	2,760.3	4,803.9
2018	753.7	176.6	591.1	155.0	79.8	134.2	0.0	1,890.5	1,424.3	448.8	951.0	2,824.2	4,714.7

Table 6. Commercial harvest and discards by region in numbers of fish (x1000), 1990-2018. Source: harvest is from ACCSP, discards is from ASMFC. ^excludes inshore harvest.

Year	Ocean								Chesapeake Bay				Discards			Grand Total Removals
	MA	RI	NY	DE	MD	VA	NC^	Total	MD	PRFC	VA	Total	Ocean	Bay	Total	
1990	6.6	0.8	11.8	0.7	0.0	0.3	0.8	21.0	0.8	0.0	72.1	72.9	38.0	8.6	46.6	140.5
1991	10.8	3.6	15.1	3.1	1.2	0.4	0.4	34.6	30.8	44.5	48.6	123.9	39.2	51.3	90.4	248.9
1992	11.2	9.1	20.4	2.7	1.1	0.6	1.7	46.8	133.4	23.3	53.0	209.7	56.2	141.1	197.2	453.7
1993	13.3	6.3	11.2	4.3	0.3	1.0	3.4	39.8	211.0	24.6	39.2	274.7	41.8	75.1	116.9	431.4
1994	10.0	4.5	15.4	4.9	0.9	2.3	8.0	45.9	223.1	25.2	31.2	279.5	94.9	65.3	160.2	485.6
1995	39.9	19.7	43.7	5.6	4.0	9.9	23.4	146.1	267.0	29.3	95.0	391.3	144.4	42.8	187.2	724.6
1996	37.3	18.6	40.5	20.7	9.0	14.1	3.3	143.5	486.2	46.2	178.2	710.6	169.6	91.4	261.0	1,115.1
1997	44.0	7.1	37.6	33.2	8.4	17.3	25.8	173.4	620.3	87.6	195.2	903.1	248.8	82.6	331.4	1,407.8
1998	44.3	8.8	45.1	31.4	10.3	41.1	14.2	195.2	729.6	93.3	197.1	1,020.1	312.7	36.2	348.9	1,564.1
1999	40.9	11.6	49.9	34.8	10.2	48.7	21.1	217.2	776.0	90.6	139.8	1,006.3	298.0	34.1	332.1	1,555.7
2000	42.1	9.4	54.9	25.2	13.3	54.5	6.5	205.8	787.6	91.5	132.0	1,011.0	170.9	32.2	203.1	1,419.9
2001	45.8	10.9	58.3	34.4	11.1	42.3	25.0	227.7	538.8	87.8	77.1	703.7	136.5	38.4	174.9	1,106.3
2002	49.8	11.7	47.1	30.4	10.2	38.8	23.2	211.3	571.7	80.3	64.7	716.8	144.9	46.2	191.1	1,119.2
2003	56.4	15.5	68.4	31.5	11.6	10.5	5.8	199.6	427.9	83.1	143.7	654.7	95.0	34.8	129.8	984.1
2004	63.6	16.0	70.4	28.4	14.1	10.4	31.0	233.9	447.0	92.6	106.3	645.9	110.0	50.2	160.2	1,040.0
2005	60.5	14.9	70.6	26.3	6.1	11.3	27.3	217.1	563.9	80.6	108.9	753.3	86.2	58.9	145.1	1,115.5
2006	70.5	15.4	73.6	30.2	10.9	11.5	2.7	214.9	645.1	92.3	95.4	832.7	98.6	59.6	158.3	1,205.9
2007	54.2	13.9	78.5	31.1	11.6	10.6	16.8	216.7	587.6	86.6	124.3	798.5	96.9	69.5	166.4	1,181.6
2008	61.1	16.6	73.3	31.9	14.0	10.8	13.4	221.0	580.7	82.0	144.1	806.8	65.7	43.2	109.0	1,136.8
2009	59.4	16.8	82.6	21.6	12.5	8.9	9.0	210.9	605.6	89.7	143.8	839.1	63.5	64.7	128.2	1,178.1
2010	60.4	15.7	82.4	19.8	5.4	9.4	13.7	206.7	579.2	90.6	154.9	824.7	43.6	89.5	133.1	1,164.5
2011	58.7	14.3	87.4	20.5	2.1	12.2	10.9	206.0	488.9	96.1	153.7	738.7	37.8	50.1	87.9	1,032.7
2012	61.5	15.0	67.1	15.7	6.9	10.8	0.3	177.3	465.6	90.6	137.0	693.3	27.8	163.7	191.6	1,062.2
2013	58.6	13.8	76.2	17.7	7.6	10.0	0.0	183.8	391.5	78.0	131.0	600.5	41.9	70.2	112.1	896.5
2014	58.0	10.5	52.9	14.9	8.5	10.0	0.0	154.8	362.2	81.5	151.8	595.5	53.4	67.8	121.3	871.5
2015	42.3	12.7	45.6	11.0	2.6	7.7	0.0	121.8	298.3	71.0	132.2	501.5	37.6	63.7	101.3	724.7
2016	48.0	12.9	51.0	8.8	1.2	7.6	0.0	129.5	284.9	70.7	122.0	477.6	45.3	59.9	105.1	712.2
2017	41.2	10.1	61.6	9.5	3.5	7.6	0.0	133.5	263.6	67.5	128.0	459.2	84.4	24.1	108.5	701.1
2018	37.8	11.5	52.2	11.4	3.5	6.9	0.0	123.3	286.4	64.3	148.4	499.2	56.7	33.4	90.1	712.5

Table 7. Total recreational catch, releases, and release mortality in numbers of fish by region (x1000), 1990-2018. Source: MRIP. Estimates exclude inshore harvest from North Carolina.

Year	Harvest (A+B1)			Releases (B2)			Total Catch (A+B1+B2)			Release Mortality (9% of B2)		
	Ocean	Bay	Total	Ocean	Bay	Total	Ocean	Bay	Total	Ocean	Bay	Total
1990	234.8	344.1	578.9	3,094.5	1,825.6	4,920.1	3,329.3	2,169.7	5,499.0	278.5	164.3	442.8
1991	431.7	366.6	798.3	4,683.2	3,266.5	7,949.8	5,114.9	3,633.1	8,748.0	421.5	294.0	715.5
1992	517.4	352.4	869.8	6,932.1	3,485.8	10,417.9	7,449.5	3,838.2	11,287.7	623.9	313.7	937.6
1993	457.2	331.9	789.0	6,093.9	2,932.9	9,026.7	6,551.0	3,264.7	9,815.8	548.4	264.0	812.4
1994	495.3	560.3	1,055.5	10,446.9	4,673.9	15,120.8	10,942.2	5,234.2	16,176.3	940.2	420.7	1,360.9
1995	1,259.8	1,027.7	2,287.6	16,586.8	5,754.2	22,341.0	17,846.7	6,781.9	24,628.6	1,492.8	517.9	2,010.7
1996	1,362.0	1,125.5	2,487.4	22,384.2	6,510.6	28,894.7	23,746.1	7,636.0	31,382.2	2,014.6	586.0	2,600.5
1997	1,514.1	1,260.8	2,775.0	22,819.1	10,178.4	32,997.6	24,333.3	11,439.3	35,772.6	2,053.7	916.1	2,969.8
1998	1,647.0	1,268.4	2,915.4	29,294.5	6,918.1	36,212.6	30,941.5	8,186.5	39,128.0	2,636.5	622.6	3,259.1
1999	1,757.8	1,365.7	3,123.5	26,139.3	8,759.7	34,898.9	27,897.0	10,125.4	38,022.4	2,352.5	788.4	3,140.9
2000	2,198.3	1,604.2	3,802.5	25,090.4	8,734.0	33,824.5	27,288.7	10,338.3	37,627.0	2,258.1	786.1	3,044.2
2001	2,758.1	1,294.4	4,052.5	21,072.6	6,145.2	27,217.8	23,830.7	7,439.6	31,270.2	1,896.5	553.1	2,449.6
2002	2,756.1	1,249.0	4,005.1	23,653.3	7,371.2	31,024.4	26,409.4	8,620.2	35,029.5	2,128.8	663.4	2,792.2
2003	3,123.8	1,657.6	4,781.4	20,678.5	10,970.9	31,649.4	23,802.3	12,628.5	36,430.8	1,861.1	987.4	2,848.4
2004	3,078.1	1,474.9	4,553.0	27,868.1	12,856.7	40,724.8	30,946.2	14,331.7	45,277.8	2,508.1	1,157.1	3,665.2
2005	3,182.2	1,298.6	4,480.8	28,663.2	9,580.4	38,243.6	31,845.4	10,879.0	42,724.4	2,579.7	862.2	3,441.9
2006	2,789.0	2,094.9	4,884.0	41,238.5	12,231.8	53,470.4	44,027.6	14,326.7	58,354.3	3,711.5	1,100.9	4,812.3
2007	2,327.1	1,617.6	3,944.7	25,135.4	7,578.5	32,713.9	27,462.4	9,196.2	36,658.6	2,262.2	682.1	2,944.3
2008	3,025.4	1,355.8	4,381.2	21,878.2	4,690.7	26,568.9	24,903.6	6,046.5	30,950.1	1,969.0	422.2	2,391.2
2009	2,897.7	1,802.5	4,700.2	16,740.0	4,838.5	21,578.5	19,637.7	6,641.0	26,278.7	1,506.6	435.5	1,942.1
2010	3,905.9	1,482.6	5,388.4	13,606.5	5,957.5	19,564.0	17,512.4	7,440.0	24,952.4	1,224.6	536.2	1,760.8
2011	3,617.1	1,389.3	5,006.4	12,643.8	3,823.1	16,467.0	16,260.9	5,212.4	21,473.3	1,137.9	344.1	1,482.0
2012	3,071.5	974.8	4,046.3	11,242.0	9,290.0	20,532.0	14,313.5	10,264.8	24,578.3	1,011.8	836.1	1,847.9
2013	3,723.2	1,434.5	5,157.8	19,463.0	7,130.6	26,593.6	23,186.2	8,565.2	31,751.4	1,751.7	641.8	2,393.4
2014	2,275.5	1,758.2	4,033.7	15,106.6	9,030.6	24,137.1	17,382.1	10,788.8	28,170.9	1,359.6	812.8	2,172.3
2015	1,770.1	1,315.7	3,085.7	15,419.0	10,215.9	25,634.8	17,189.0	11,531.5	28,720.5	1,387.7	919.4	2,307.1
2016	1,817.2	1,683.2	3,500.4	17,794.0	15,333.0	33,127.0	19,611.2	17,016.2	36,627.4	1,601.5	1,380.0	2,981.4
2017	1,732.3	1,201.9	2,934.3	28,951.5	9,044.6	37,996.1	30,683.8	10,246.6	40,930.4	2,605.6	814.0	3,419.7
2018	1,194.6	1,050.1	2,244.8	22,738.7	8,668.7	31,407.4	23,933.3	9,718.9	33,652.2	2,046.5	780.2	2,826.7

Table 8. Recreational harvest by region in pounds (x1000), 1990-2018. Source: MRIP. ^Estimates exclude inshore harvest.

Year	Ocean												Chesapeake Bay			Grand total
	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC^	Total	MD	VA	Total	
1990	79	21	400	146	209	1,653	2,531	26	0	0	0	5,066	6	3,135	3,141	8,208
1991	30	8	866	350	162	4,221	2,047	134	0	0	10	7,828	718	2,095	2,813	10,641
1992	134	89	4,096	643	240	1,691	2,190	90	0	0	0	9,173	1,182	1,566	2,748	11,922
1993	28	110	1,909	416	636	2,883	1,360	284	0	84	6	7,716	858	1,590	2,448	10,164
1994	143	82	3,683	267	452	5,000	947	134	0	2	90	10,800	1,443	2,495	3,938	14,738
1995	83	127	2,739	1,049	1,331	5,594	8,587	301	0	141	232	20,184	3,115	3,773	6,889	27,072
1996	95	183	2,983	1,626	1,405	10,739	3,959	795	0	812	392	22,990	2,789	2,847	5,636	28,626
1997	223	538	5,133	1,997	2,263	8,543	2,179	374	0	1,096	865	23,211	3,203	4,203	7,405	30,616
1998	305	262	7,359	1,544	1,807	4,889	4,182	645	579	545	636	22,754	3,023	3,826	6,849	29,603
1999	196	181	4,995	1,904	1,327	7,414	9,473	312	4	110	339	26,256	2,323	4,986	7,309	33,565
2000	347	109	4,863	2,008	890	7,053	9,768	925	0	416	277	26,656	3,503	3,892	7,395	34,051
2001	446	334	7,188	2,044	1,101	5,058	12,314	695	314	382	1,082	30,959	2,928	5,376	8,304	39,263
2002	775	322	10,261	2,708	1,251	5,975	9,621	589	0	1,135	998	33,634	2,643	5,563	8,206	41,840
2003	458	466	10,252	4,052	2,666	10,788	12,066	763	14	392	966	42,882	5,246	5,964	11,210	54,092
2004	554	268	9,329	2,460	2,229	6,437	13,303	870	57	1,067	6,656	43,230	4,860	4,941	9,801	53,031
2005	546	384	7,541	3,155	3,133	11,637	14,289	680	8	487	3,947	45,808	7,753	3,860	11,614	57,421
2006	610	244	6,787	1,569	2,854	9,845	12,716	586	3	921	2,975	39,109	6,494	5,071	11,565	50,674
2007	422	93	7,010	2,077	2,786	10,081	8,390	207	0	516	1,965	33,547	5,249	4,027	9,277	42,824
2008	607	182	8,424	970	2,273	18,000	12,407	847	0	1,690	750	46,150	5,639	4,877	10,515	56,665
2009	781	222	9,410	2,185	1,458	7,991	17,040	940	138	48	187	40,399	8,672	5,340	14,012	54,411
2010	218	238	9,959	2,102	2,323	18,190	17,454	895	107	206	1,198	52,891	6,482	2,059	8,541	61,431
2011	245	659	11,953	3,066	981	13,151	15,715	605	9	308	4,467	51,157	6,220	2,214	8,435	59,592
2012	152	432	14,941	2,096	1,835	13,096	11,551	644	21	2	0	44,768	3,819	4,670	8,488	53,257
2013	331	831	9,025	4,428	4,236	16,819	19,451	1,073	1,051	67	0	57,313	5,137	2,607	7,744	65,057
2014	423	203	7,965	3,402	2,665	13,998	8,886	381	159	0	0	38,083	8,877	989	9,866	47,949
2015	132	202	7,799	1,394	2,585	8,695	9,982	340	28	0	0	31,156	7,786	957	8,743	39,899
2016	189	191	3,731	1,776	912	12,053	12,790	86	7	0	0	31,735	10,912	1,024	11,936	43,672
2017	318	394	5,666	1,652	1,557	8,825	10,880	666	0	2	0	29,960	7,309	627	7,937	37,897
2018	142	130	4,925	1,121	1,165	3,453	7,012	33	0	0	0	17,982	4,683	404	5,087	23,069

Table 9. Recreational harvest by region in numbers of fish (x1000), 1990-2018. Source: MRIP. ^Estimates exclude inshore harvest.

Year	Ocean												Chesapeake Bay			Grand Total
	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC^	Total	MD	VA	Total	
1990	6.2	0.5	20.5	6.3	7.6	68.0	123.0	2.7	0.0	0.0	0.0	234.8	1.5	342.6	344.1	578.9
1991	10.5	0.5	51.1	16.6	7.8	203.1	131.1	9.9	0.0	0.0	1.0	431.7	117.9	248.7	366.6	798.3
1992	10.6	4.4	229.2	40.0	11.7	76.7	134.6	7.6	0.0	0.0	2.7	517.4	177.9	174.4	352.4	869.8
1993	1.3	5.0	116.4	26.9	35.8	140.5	100.9	19.2	0.0	10.7	0.5	457.2	113.6	218.3	331.9	789.0
1994	6.9	8.9	159.6	13.7	23.3	200.3	67.1	8.4	0.0	0.5	6.5	495.3	228.7	331.6	560.3	1,055.5
1995	4.0	7.4	124.3	70.9	75.8	250.3	671.4	25.8	0.1	13.4	16.5	1,259.8	491.1	536.7	1,027.7	2,287.6
1996	4.1	11.0	156.6	100.6	95.9	511.6	301.2	59.7	0.0	89.6	31.7	1,362.0	564.2	561.3	1,125.5	2,487.4
1997	43.0	29.9	365.6	124.7	149.0	450.5	171.2	29.1	0.0	91.1	60.1	1,514.1	552.4	708.4	1,260.8	2,775.0
1998	65.3	14.8	500.9	91.1	114.1	383.8	289.2	51.0	24.3	71.3	41.2	1,647.0	596.2	672.2	1,268.4	2,915.4
1999	37.5	9.9	327.1	116.6	88.2	450.9	657.1	28.3	1.6	14.1	26.4	1,757.8	530.9	834.8	1,365.7	3,123.5
2000	77.3	6.0	306.2	156.8	84.0	494.6	939.8	88.3	0.0	27.2	18.1	2,198.3	810.9	793.3	1,604.2	3,802.5
2001	91.9	23.5	551.0	149.8	78.2	364.2	1,267.5	70.6	64.1	36.7	60.7	2,758.1	513.3	781.1	1,294.4	4,052.5
2002	135.2	28.1	723.5	181.5	92.5	439.3	957.6	65.7	0.0	76.4	56.3	2,756.1	464.4	784.6	1,249.0	4,005.1
2003	99.7	41.3	797.2	226.4	181.7	678.4	942.8	75.7	0.9	29.3	50.4	3,123.8	816.0	841.6	1,657.6	4,781.4
2004	118.3	22.1	666.7	159.6	134.5	458.1	1,042.1	66.6	11.0	75.9	323.2	3,078.1	657.5	817.4	1,474.9	4,553.0
2005	118.3	35.5	536.1	195.6	202.6	854.6	958.1	48.8	3.6	34.2	194.9	3,182.2	815.5	483.1	1,298.6	4,480.8
2006	140.9	20.9	483.2	129.3	168.3	614.8	972.2	44.5	0.4	80.6	134.2	2,789.0	1,342.0	753.0	2,094.9	4,884.0
2007	95.5	8.1	471.9	135.8	163.9	602.8	722.2	17.2	0.0	28.0	81.8	2,327.1	1,127.3	490.3	1,617.6	3,944.7
2008	133.4	11.9	514.1	73.4	132.8	1,169.9	791.0	67.7	0.0	94.4	36.9	3,025.4	779.7	576.1	1,355.8	4,381.2
2009	146.5	17.3	695.0	138.4	100.3	574.2	1,141.5	64.8	10.2	3.0	6.5	2,897.7	1,094.4	708.1	1,802.5	4,700.2
2010	37.3	21.4	808.2	162.0	170.2	1,449.0	1,091.4	61.4	12.5	25.3	67.1	3,905.9	1,139.3	343.2	1,482.6	5,388.4
2011	48.5	54.2	873.5	202.2	91.1	1,005.3	1,038.9	43.7	0.8	51.2	207.6	3,617.1	1,112.1	277.2	1,389.3	5,006.4
2012	31.4	37.3	1,010.6	130.7	137.1	927.5	742.4	51.3	2.9	0.3	0.0	3,071.5	716.7	258.1	974.8	4,046.3
2013	73.3	63.2	658.7	308.3	269.6	902.5	1,324.2	70.6	48.4	4.4	0.0	3,723.2	1,136.7	297.9	1,434.5	5,157.8
2014	86.4	16.5	523.5	172.0	131.8	804.5	501.9	26.2	12.6	0.0	0.0	2,275.5	1,627.0	131.2	1,758.2	4,033.7
2015	14.4	10.0	485.3	67.0	140.8	406.8	600.3	41.9	3.5	0.0	0.0	1,770.1	1,108.0	207.7	1,315.7	3,085.7
2016	14.2	17.6	230.1	128.4	63.3	697.7	659.6	5.9	0.5	0.0	0.0	1,817.2	1,545.1	138.1	1,683.2	3,500.4
2017	22.0	37.7	392.3	59.6	94.5	472.3	625.9	27.8	0.0	0.1	0.0	1,732.3	1,091.6	110.3	1,201.9	2,934.3
2018	16.0	13.4	389.5	39.2	85.5	181.7	465.3	4.2	0.0	0.0	0.0	1,194.6	993.3	56.8	1,050.1	2,244.8

Table 10. Results of 2018 Commercial Quota Accounting in pounds. Source: 2019 state compliance reports.

State	Add IV Quota	2018 Quota	2018 harvest	overage	2019 Quota
Ocean					
Maine*	188	188	-		188
New Hampshire*	4,313	4,313	-		4,313
Massachusetts	869,813	847,290	753,731		869,813
Rhode Island†	182,719	181,572	176,639		181,572
Connecticut**	17,813	17,813	-		17,813
New York	795,795	795,795	591,092		795,795
New Jersey**	241,313	215,912	-		215,912
Delaware	145,085	145,085	155,028	9,943	135,142
Maryland†	98,670	90,727	79,836		90,727
Virginia	138,640	138,640	122,929		138,640
North Carolina	360,360	360,360	0		360,360
Ocean Total	2,854,709	2,797,695	1,879,255	22,523	2,810,275
Chesapeake Bay					
Maryland	1,471,888	1,471,888	1,424,303		1,471,888
Virginia	1,064,997	1,064,997	951,092		1,064,997
PRFC	583,362	583,362	448,815		583,362
Bay Total	3,120,247	3,120,247	2,824,210		3,120,247

* Commercial harvest/sale prohibited, with no re-allocation of quota.

** Commercial harvest/sale prohibited, with re-allocation of quota to the recreational fishery.

† Ocean commercial quota reduced through conservation equivalency for MD (90,727 lbs) and RI (181,572 lbs)

Table 11. Status of Commercial Tagging Programs by state for 2018.

State	Number of Participants	Number of Tags Issued	Number of Tags Used	Point of Tag (sale/harvest)	¹ Biological Metric (Y/N)	Year, State and Unique ID on Tag (Y/N)	Size Limit on Tag (Y/N)	Tag Colors	Annual Tag Color Change (Y/N)
MA	92	53,100	37,777	Sale	Y	Y	Y	one tag color	Y
RI	23	15,390	10,121	Sale	Y	Y	N	two tag colors by gear	Y
NY	436	76,605	52,218	Harvest	Y	Y	N	One tag color	Y
DE*	260	19,155	11,356	Both	Y	Y	N	Harvest: two tag colors by gear Sale: one color	Y
MD	862	454,356	295,348	Harvest	Y	Y	N	Three tag colors by gear and permit	Y
PRFC	339	79,158	64,346	Harvest	Y	Y	N	Five tag colors by gear	N
VA	388	155,254	151,250	Harvest	Y	Y	Y	two tag colors by area	Y
NC^	88	36,766	31,147	Sale	Y	Y	Y	Three tag colors by area	N

¹ States are required to allocate commercial tags to permit holders based on a biological metric. Most states used the average weight per fish from the previous year, or some variation thereof. Actual biological metric used is to be included in State Annual Commercial Tag Reports.

* The number of tags issued represent the combined total from tags used by harvesters and weigh stations, such that each fish has two tags

^ All commercial tags were used in the internal waters of North Carolina

Table 12. Status of compliance with monitoring and reporting requirements in 2018. JAI = juvenile abundance index survey, SSB = spawning stock biomass survey, tag = participation in coastwide tagging program, Y = compliance standards met, N = compliance standards not met, NA = not applicable, R = recreational, C = commercial

Jurisdiction	Fishery-independent monitoring		Fishery-dependent monitoring		Annual reporting
	Requirement(s)	Status	Requirement(s)	Status	Status
ME	JAI	Y	composition, catch and effort (R)	NA	Y
NH	NA	NA	composition, catch and effort (R)	NA	Y
MA	tag	Y	composition, catch & effort (C&R), tag program	Y	Y
RI	NA	NA	composition (C&R), catch & effort (R), tag program	Y	Y
CT	NA	NA	composition, catch & effort (R)	Y	Y
NY	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y
NJ	JAI, tag	Y	composition, catch & effort (R)	Y	Y
PA	SSB	Y	composition, catch and effort (R)	NA	Y
DE	SSB, tag	Y	composition, catch & effort (C), tag program	Y	Y
MD	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y
PRFC	NA	NA	composition, catch & effort (C&R), tag program	Y	Y
DC	NA	NA	composition, catch and effort (R)	NA	Y
VA	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y
NC	JAI, SSB, tag	Y	composition, catch & effort (C&R), tag program	Y	Y

Figure 1. Atlantic striped bass female spawning stock biomass and recruitment, 1982-2017. Source: 2018 Benchmark Stock Assessment

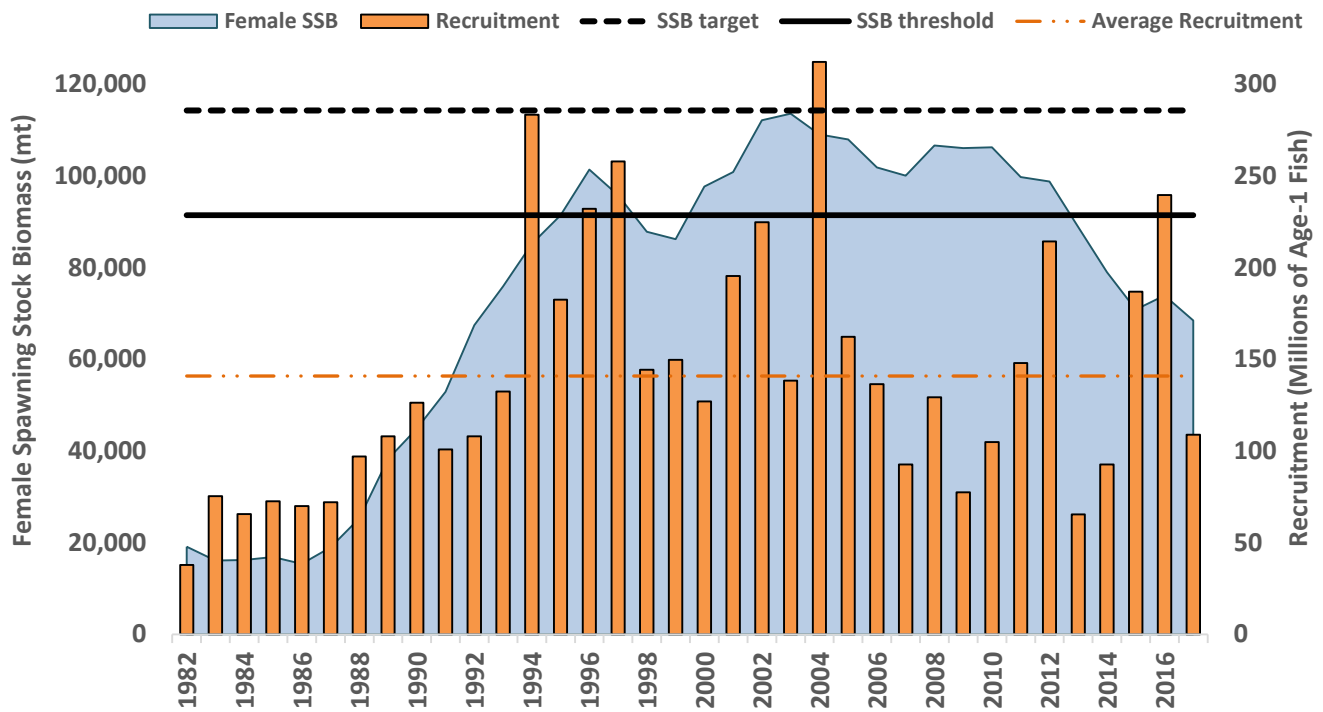


Figure 2. Atlantic striped bass fishing mortality, 1982-2017. Source: 2018 Benchmark Stock Assessment

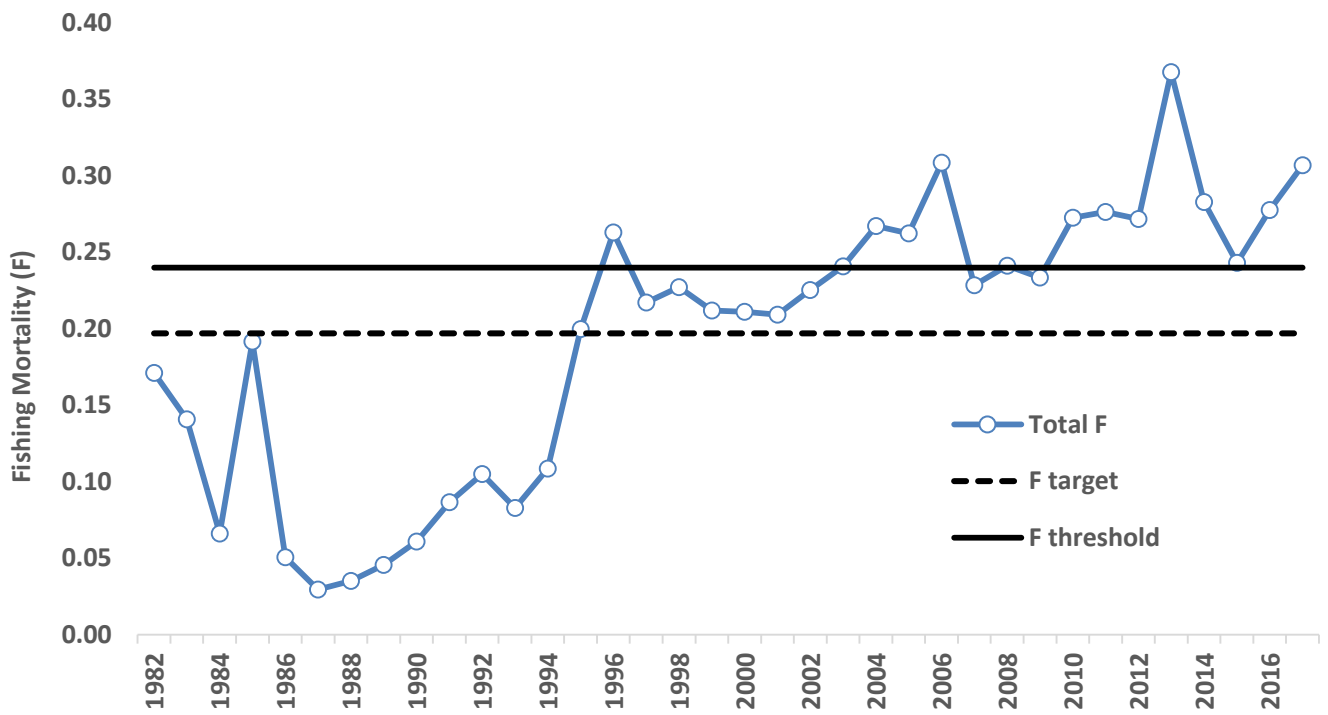


Figure 3. Albemarle Sound-Roanoke River striped bass female spawning stock biomass and recruitment (abundance of age-1), and biological reference points, 1982-2014. Source: Stock Status of Albemarle Sound-Roanoke River Striped bass, 2016

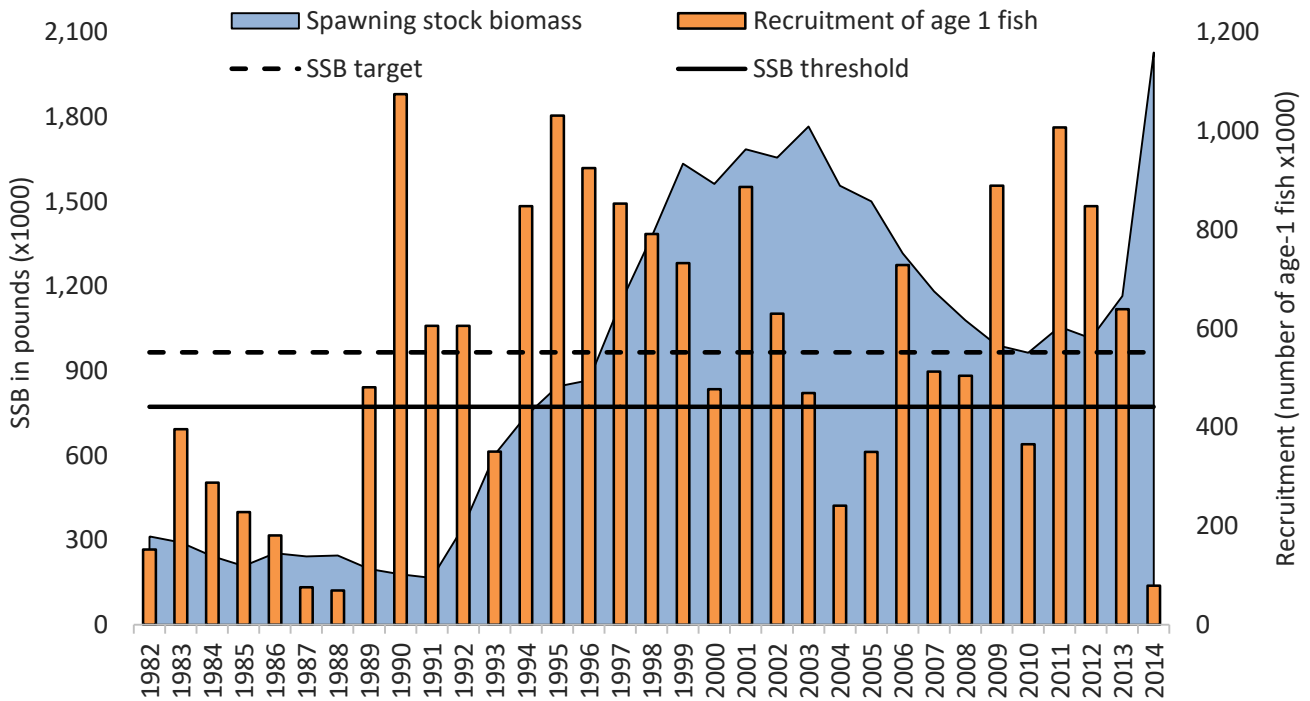


Figure 4. Albemarle Sounds-Roanoke River striped bass fishing mortality (F) estimates, and biological reference points, 1982-2014. Source: Stock Status of Albemarle Sound-Roanoke River Striped bass, 2016.

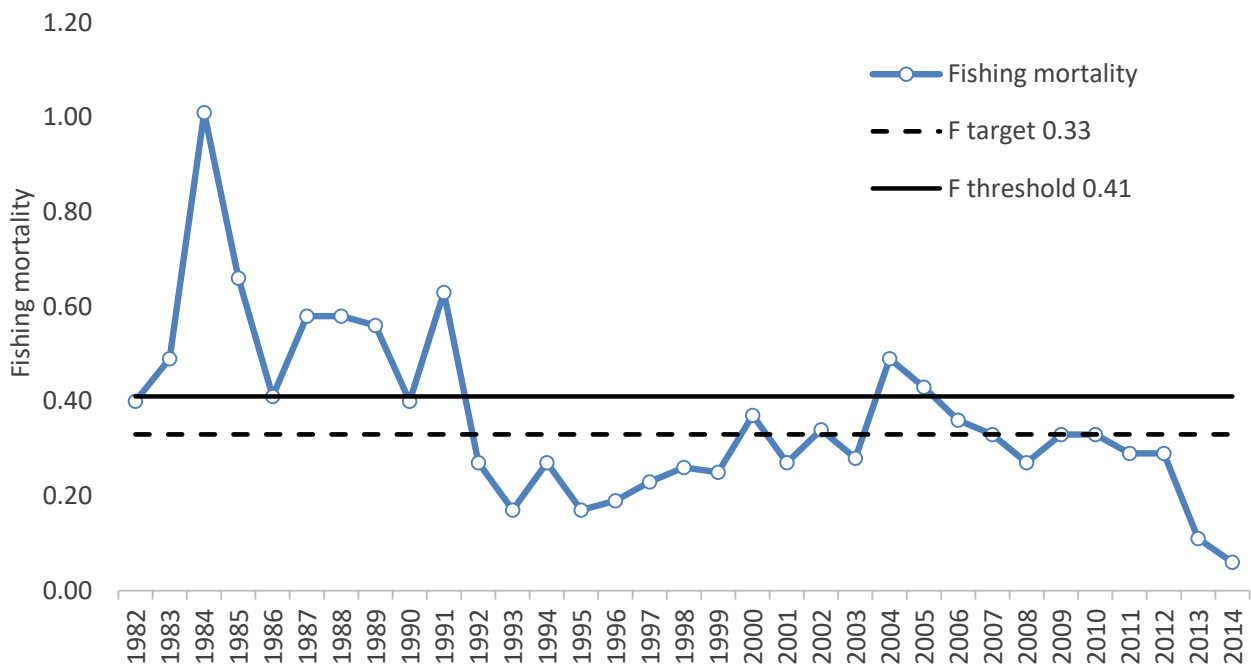


Figure 5. Total striped bass removals by sector in numbers of fish, 1982-2018. Note: Harvest is from ACCSP/MRIP, discards/release mortality is from ASMFC. Estimates exclude inshore harvest from A/R.

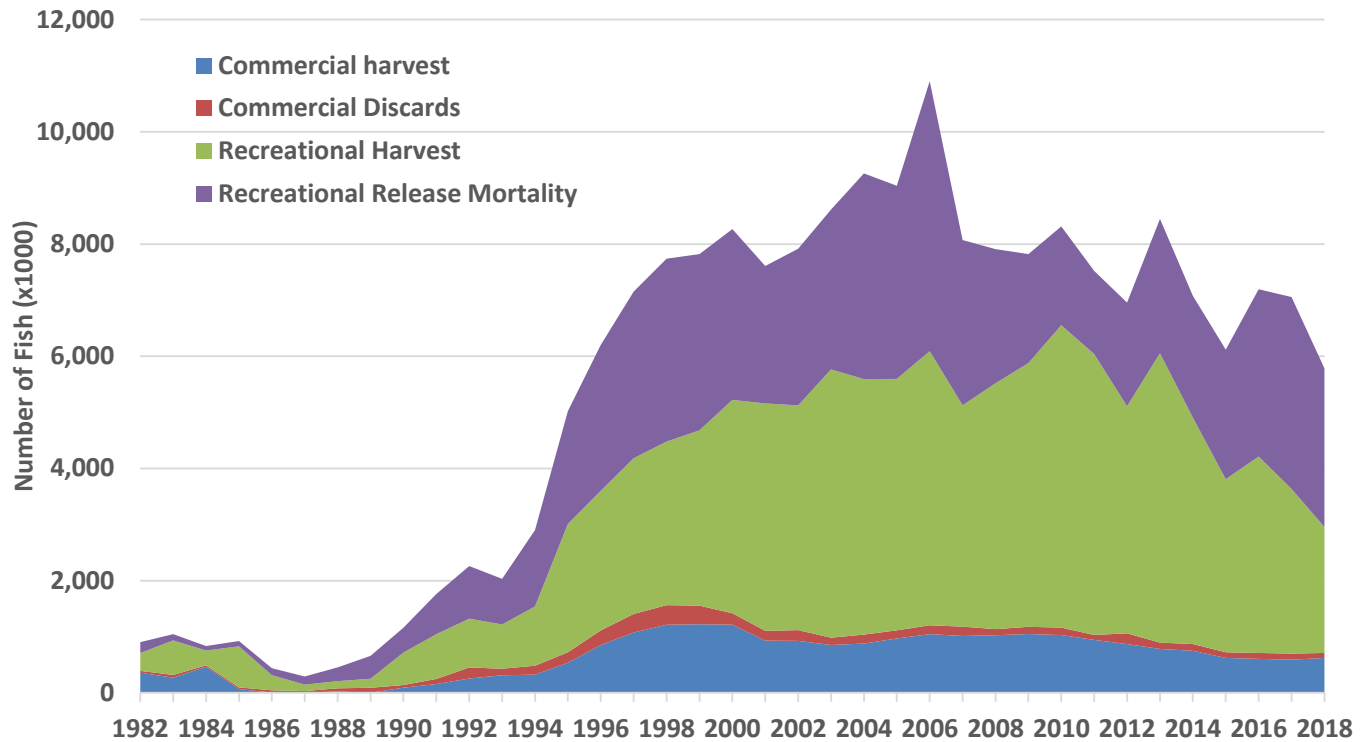


Figure 6. Commercial Atlantic striped bass landings by state in pounds, 1990-2018. Source: ACCSP. Commercial harvest and sale prohibited in ME, NH, CT, and NJ. NC is ocean only.

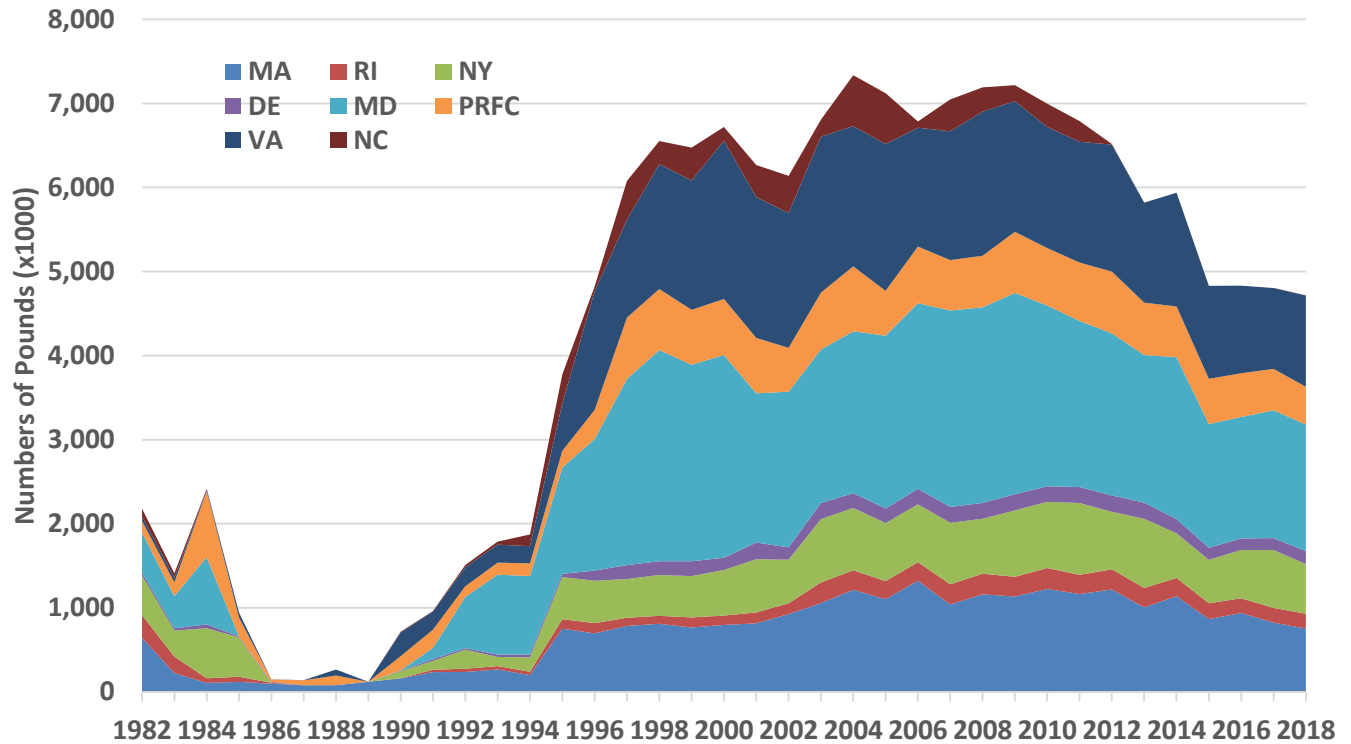


Figure 7. Total recreational catch and the proportion of fish released alive, 1982-2018. Source: MRIP/ASMFC. Estimates exclude inshore harvest from A/R.

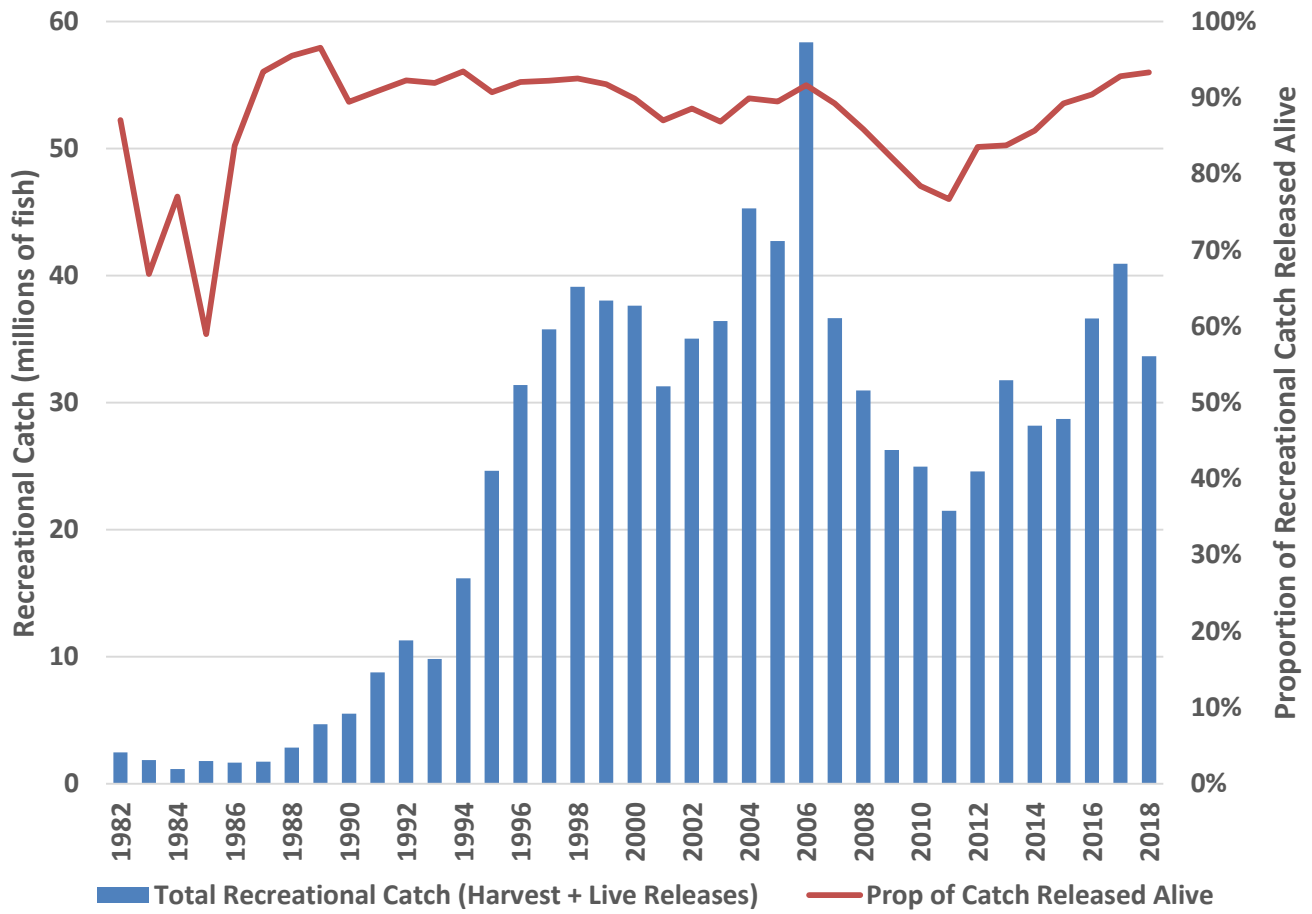


Figure 8. Juvenile abundance index analysis for Maine, New York, Jew Jersey, Maryland, Virginia, and North Carolina. Source: Annual State Compliance Reports. Q1 = first quartile. An open bar in the last three years indicates a value below the Q1 threshold.

