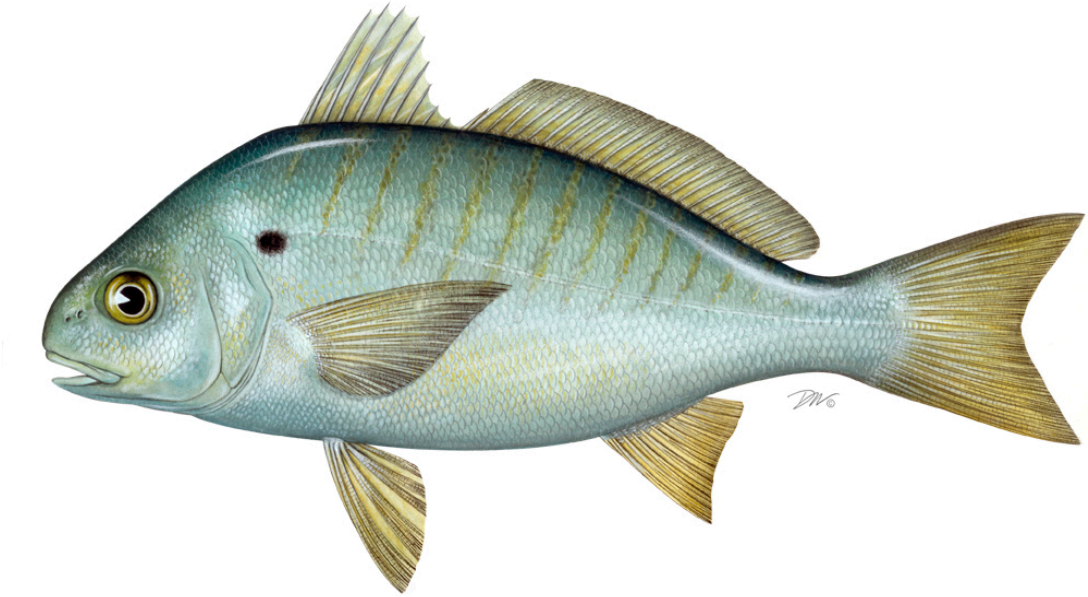
# ATLANTIC STATES MARINE FISHERIES COMMISSION

## REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

### FOR SPOT
### *(Leiostomus xanthurus)*

### 2014 FISHING YEAR



Prepared by the Plan Review Team

Approved by the South Atlantic Management Board

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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 New Jersey through Florida (ASMFC 1987). In reviewing the early plans created under the Interstate Fisheries Management Plan process, 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 The Management Board found recommendations in the plan to be vague and perhaps no longer valid, and recommended that an amendment be prepared to the Spot FMP to define the management measures necessary to achieve the goals of the FMP.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 I 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 for two consecutive years.

## II. Status of the Stock

No coastwide assessment has been completed for spot; however, a stock assessment has been initiated and is scheduled for completion in 2016.

*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 analysis. These trigger exercises compared five data sources to the 10$^{th}$ 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 10$^{th}$ percentile, the Management Board was be prompted to consider management action.

In August 2014, the Board approved Addendum I 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 abundances thresholds of 30% and 60% (proportion of red) were established in Addendum I, representing moderate and significant concern for the fishery. If thresholds for both population characteristics achieve or exceed a threshold for a two year period, then management action is enacted.

Analysis of the composite harvest index showed a general decline beginning in 2005 and a reversal of this trend after 2012 (Figure 3). The composite characteristic did not trip in 2014 with the mean red proportion of 26.5% for 2013-2014. However, the index did trip in 2013 (38.1%) and 2012 (34.8%).

The TLA composite abundance index for adult spot (NMFS and SEAMAP surveys) was run using the 1989-2014 time period since that was when the two surveys overlapped (Figure 3). The TLA composite characteristic did trigger in 2014 with a mean red proportion for 2013-2014 of 43.5%. This reflects the drop in annual catch levels in both indexes for the last two years. During past years, the index would have tripped most years from 1989 to 2004 given the proportions of red in the index above the 30% threshold.

Overall, management triggers were not tripped in 2014 since both population characteristics (harvest and abundance) were not above the 30% threshold for the 2013-2014 time period. Nonetheless, the analysis shows that there are declining trends in the fishery independent indices as well as the commercial and recreational harvests of spot.

## III. Status of the Fishery

Total landings of spot from NJ to FL in 2014 are estimated at 8.37 million pounds, an increase of over 2,000,000 lbs from 2013 and roughly 500,000 lbs over the ten-year average (7,830,652) (Tables 1 and 3). The recreational fishery harvested less than the commercial fishery (35% and 65% respectively, by pounds). This contrasts with 2012, during which recreational harvests exceeded commercial harvests by roughly 3:2.

Commercial spot landings have ranged between 1.27 and 14.52 million pounds from 1950-2014 (Figure 1), with the 2014 landings (5.4 million pounds) more than quadruple the 2012 landings. The estimated ex-vessel value of the 2014 harvest was $6.737 million (Table 1). Coastwide, the majority of commercially harvested spot are taken in gillnets (77% in 2014, Table 2). Virginia landed approximately 74% of the commercial harvest (by pounds) in 2014, followed by North Carolina with 14% of the harvest. Although small spot have been known to be a bycatch component of the haul seine, shad gillnet, and pound net fisheries in the Chesapeake Bay and in North Carolina, these mesh sizes, especially for the shad gillnet and channel net fisheries, tend to be too large to catch even large spot. Further, the shad fishery is executed in mostly freshwater, where the number of adult spot is generally low. The largest bycatch component for spot comes from the South Atlantic shrimp trawl fishery. The fate of these spot can be discards or sale, depending upon market conditions and volume.

The recreational harvest of spot along the Atlantic coast from 1981 to 2014 has varied between 3.6 and 20.1 million fish (or 1.7 and 6.9 million pounds; Tables 3 and 4). There was an increasing trend in the recreational harvest from a low in 1999 of 1.6 million fish to 15.9 million fish in 2007; however, harvest has been variable since 2007, with the 2014 catch recording 8.7 million fish (Figure 2). Anglers in Virginia were responsible for 44.8% of the total number of fish harvested in 2014, followed by anglers in North Carolina (24.2%) and Maryland (14.4%). 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 2.0 and 10.5 million fish, with 2014 releases estimated at 3.75 million fish.

## IV. Status of Assessment Advice

A formal stock assessment of spot has not been conducted. The 1987 FMP recognized the lack of biological and fisheries data necessary for stock assessment and effective management of the resource.

The Spot Plan Review Team evaluated the adequacy of data for assessment purposes in 2012, and reported the following:

- Commercial landings data appear adequate for a spot assessment; however, discard data are limited. The level of commercial biological sampling is on par with other species having assessments performed.
- The adequacy of recreational harvest and harvest length data is comparable to other species which rely primarily on MRIP data. Limited discard length data are available and discard mortality rates are unknown; however, less recreational discarding of spot occurs than for many other species, potentially due to its use as a bait fish.

- The number, time series, and distribution of fishery-independent indices appear adequate for stock assessment purposes. Biological data appear ample from several surveys, although reproductive data are limited. Further, the amount and representativeness of samples from each survey has not been investigated in detail.
- Additional investigation into the quality and quantity of commercial, recreational, and indices data for a spot stock assessment would need to take place through a data workshop.

In 2014, the PRT recommended that the Board initiate a coastwide assessment for spot. This assessment is currently underway and is expected to be completed in 2016.

## 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, and SEAMAP (covering North Carolina through Florida). These surveys, in additional 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.

*Below is a description of the fishery dependent sampling conducted by states.*
Maryland: MD DNR fisheries biologists sampled commercial pound nets bi-weekly in Maryland's portion of the Chesapeake Bay from May 27, 2014 through September 2, 2014. The spot mean length from this survey of 194 mm TL (n=420) was similar to the 2013 value of 196 mm TL, and was slightly below the mean value of 204 mm TL for the 22 year time series. In 2014, 88.5% of sampled fish were age one, 6.5% were age two, and the remaining 4.0% were age zero (161 ages and 420 lengths).
Virginia: The VMRC Biological Sampling Program collects biological data from Virginia's commercial and recreational fisheries. The lengths and weights of all samples are recorded, and otoliths are removed from selected species, including spot, for ageing.
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. Data collected in this program allows the size distribution of spot to be characterized by gear/fishery. Further sub-sampling is conducted to procure samples for age determination (whole otoliths), sex ratio, reproductive condition, and weight.
South Carolina: Fishery dependent data related to Spot has been available primarily through the SCDNR State Finfish Survey (SFS) through 2012, the National Marine Fisheries Service's Marine Recreational Information Program (MRIP), and a SCDNR-managed mandatory trip reporting system for licensed charterboat operators.

*Below is a description of fishery independent sampling conducted by the states.*

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 2014 were (0.31, 0.01, 0.06).

Delaware: Annual relative abundance estimates of spot are monitored through the Division's adult ground fish bottom trawl survey. The relative abundance of spot decreased to 6.50 (#/nm) and was the lowest estimate of abundance since 2004. 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, 0.11 per tow (geometric mean), decreased in 2014 relative to 2013 for Delaware.

Maryland: Finfish collected by Maryland's Chesapeake Bay Blue Crab Trawl Survey have been enumerated since 1980. The spot Chesapeake Bay juvenile index (JI) has been variable throughout the time series. The index increased to 16.4 in 2012, which is near the 24 year time series mean of 17.7 fish per tow, but decreased to 6.1 fish per tow in 2013 and 0.80 fish per tow in 2014. The second JI was derived from the Striped Bass Juvenile Seine Survey (JSS). The 2014 GM catch per haul was 0.37, which was below the 48 year time series mean of 1.49. A 4.9-m semi-balloon otter trawl has also been used to sample Maryland's Atlantic coastal bays since 1972. The 2012 GM of 242.7 was the highest value of the 26 year time series, but decreased to 1.1 in 2013 and 0.35 in 2014, which was the lowest value of the time series. The final juvenile index is derived from the coastal bays seine survey. The 2012 GM catch per haul was 74.9 the second highest value of the 24 year time series, but the GM declined to 2.9 fish per haul in 2013 and 1.4 fish per tow in 2014. The 2014 index value is the second lowest of the 26 year time series.

Virginia: The VIMS Juvenile Fish and Blue Crab Trawl Survey was implemented in 1955 to monitor the seasonal distribution and abundance of important finfish and invertebrate species occurring in the Chesapeake Bay and its tributaries.

North Carolina: NCDMF conducts a number of surveys that encounter juvenile and adult spot. The Pamlico Sound Survey (Program 195) is a stratified random trawl survey conducted in Pamlico Sound since 1987 to obtain juvenile abundance indices (JAI). The 2014 spot JAI was 397 (2013 JAI=793). The Estuarine Trawl Survey (Program 120) samples 105 core estuarine stations along the coast each year to produce a JAI. The 2014 spot JAI (mean number of individuals/tow) was 133 (2013 JAI=140). The Pamlico Sound Independent Gill Net Survey began in 2001 and employs a stratified-random sampling design based on area and water depth. The 2014 spot CPUE (mean number of individuals/sample) was 2.3 (2013 CPUE=2.0).

South Carolina: SC conducts four surveys. SEAMAP is shallow water (15 to 30 ft) trawl survey 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 2014 increased by 37.5% (13.5 kg/tow) over 2013 (9.8 kg/tow). The second survey is an inshore estuarine trammel net survey conducted by the SCDNR. In 2014, CPUE decreased (34.9%) from 2013, and still remained below the long term mean for a fifth year. The third survey is an electroshock survey conducted in low salinity brackish and tidal freshwater portions of different South Carolina estuaries. The CPUE value for 2014 (6.76 ± 2.35 fish per set) was an

increase over 2013 by 47%. The fourth survey is the South Carolina Estuarine and Coastal Assessment Program (SCECAP). The CPUE increased slightly in 2014 from 2013 but still remained below the series long term mean.

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 2014, 150 trammel and 216 gill net sets captured 99 and 105 spot, respectively. Average fork length of spot in trammel net was 199 mm and in the gillnet survey was 195mm. The 2014 geometric means (#/net set) from both trammel and gill (0.31 and 0.25) were slightly lower than the average geometric mean (#/net set) (0.35 and 0.31). Georgia also collects biological data through their Ecological Monitoring Survey. A total of 19,755 spot with a total weight of 446.38 kilograms were observed during this survey. Lengths ranged from 12 to 230 millimeters total length, with a mean of 118.75 millimeters total length. Geometric means (geometric mean number of fish per standard 15 minute trawl) have been steadily increasing from 1.43 in 2012, to 3.99 in 2013, to 5.12 in 2014.

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 1990, 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 6.1-m trawl samples. IOAs for YOY and sub-adult/adult spot have been low and showed little variations; except in 2010 and 2011

## 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 yield per recruit through delaying entry to spot fisheries to age one and older.

Considerable progress has been made in developing bycatch reduction devices (BRDs) and evaluating their effectiveness. Proceedings from a 1993 spot and 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 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 had an 8" minimum size in the commercial and recreational fishery to protect immature spot; however, this was removed in 2014. Georgia maintained its creel limit of 25 fish (both recreational and commercial) and South Carolina implemented an aggregate bag limit of 50 fish per day for hook and line fishing in 2014.

*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 I*
In August 2014, the Board approved Addendum I 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.

*Recent Changes in State Regulations*
Georgia: The new regulations, effective 2/25/2014 (Georgia Rules and Regulations, Department of Natural Resources 391-2-4-.04), removed the minimum size limit for spot landed in Georgia. The bag/creel limit remains 25 fish per person per day for both recreational and commercial fisheries except that there is no quantity limit for trawlers harvesting shrimp for human consumption. The season is open year round.

South Carolina: The state of South Carolina passed a regulatory measure that became effective in July 2014 which placed Spot, Atlantic Croaker, and Kingfish/Whiting (Menticyrrhus sp.) under a 50 fish per person per day aggregate bag limit for hook & line fishing. This regulation applies to any recreational or commercial angler that uses hook & line gear but does not affect other commercial gears (i.e. net gears).

*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.

*De Minimis* Requests

Georgia requests *de minimis* status. The PRT notes that Georgia meets the requirements of *de minimis*.

## VII. Implementation of FMP Compliance Requirements for 2013

All states within the management unit have submitted compliance reports for the 2014 fishing year. The PRT found no compliance issues.

## VIII. Recommendations of the Plan Review Team

Management and Regulatory Recommendation

The Spot PRT will continue to monitor the fishery through the Traffic Light Approach.

Research and Monitoring Recommendations

*High Priority*

- State monitoring and reporting on the extent of unutilized bycatch and fishing mortality on fish less than age-1 in fisheries that take significant numbers of spot.
- Evaluate the effects of mandated bycatch reduction devices on spot catch in those states with significant commercial harvests.
- Continue monitoring long-term changes in spot abundance, growth rates, and age structure.
- Continue monitoring of juvenile spot populations in major nursery areas.
- Improve spot catch and effort statistics from the commercial and recreational fisheries, along with size and age structure of the catch, in order to develop production models. This includes developing catch-at-age matrices for recreational and commercial fisheries.
- Investigate release mortality in the recreational fishery.
- Conduct age validation studies.
- Develop stock identification methods and investigate the degree of mixing between state stocks during the annual fall migration.
- Determine migratory patterns through tagging and genetic studies.

*Medium Priority*

- Cooperatively develop a yield-per-recruit analysis.
- Determine the onshore vs. offshore components of the spot fishery.
- Cooperatively develop criteria for aging spot otoliths and scales.
- Encourage agencies and institutions with archived otoliths samples (NEAMAP) to process them for age and biological information.
- Determine the effect that anthropogenic perturbations may be having on growth, survival, and recruitment.

## IX. References

Atlantic States Marine Fisheries Commission (ASMFC). 1987. Fishery Management Plan for Spot. Washington (DC): ASMFC. Fisheries Management Report #11. 90 p.

Kline LL, Speir H (editors). 1993. Proceedings of a Workshop on Spot (*Leiostomus xanthurus*) and Atlantic Croaker (*Micropogonias undulatus*). Washington (DC): Atlantic States Marine Fisheries Commission. Special Report #25. 175 p.

Spot Plan Review Team (PRT). 2012. Spot Data Availability and Stock Monitoring Report, 2009. Washington (DC): Atlantic States Marine Fisheries Commission. Report to the South Atlantic State-Federal Fisheries Management Board. 85 p.

## X. Figures

**Figure 1. Spot commercial and recreational landings (pounds), 1950-2014**
(Recreational landings available from 1981-present; see Tables 1 and 3 for state-by-state values and data sources)

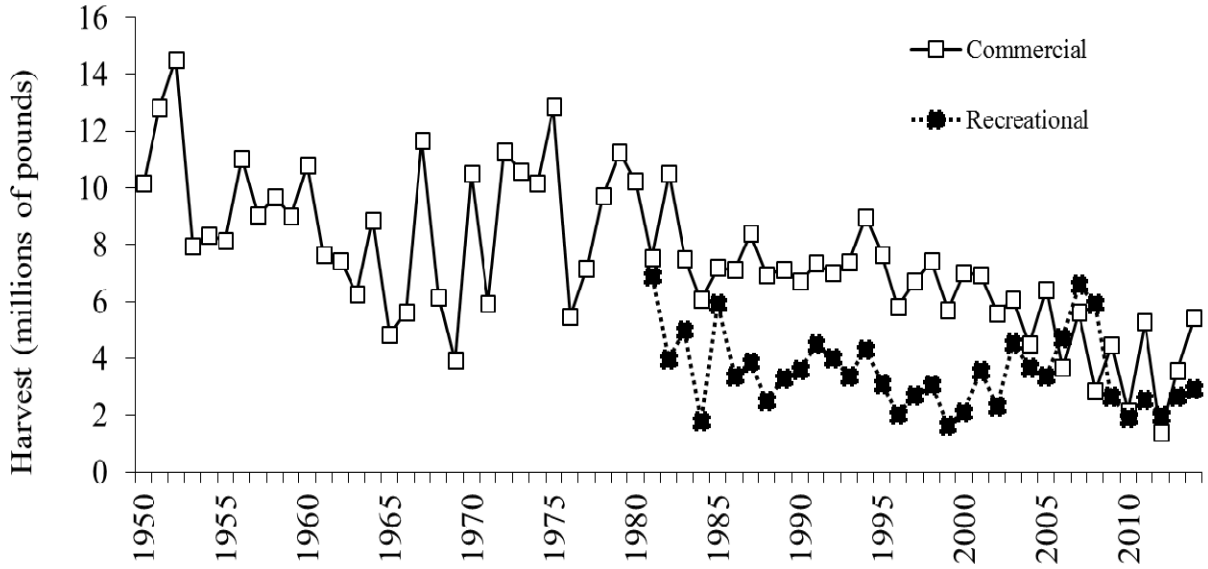



**Figure 2. Spot recreational harvest and releases (numbers of fish), 1981-2014**
(See Tables 4 and 5 for state-by-state values and data source)

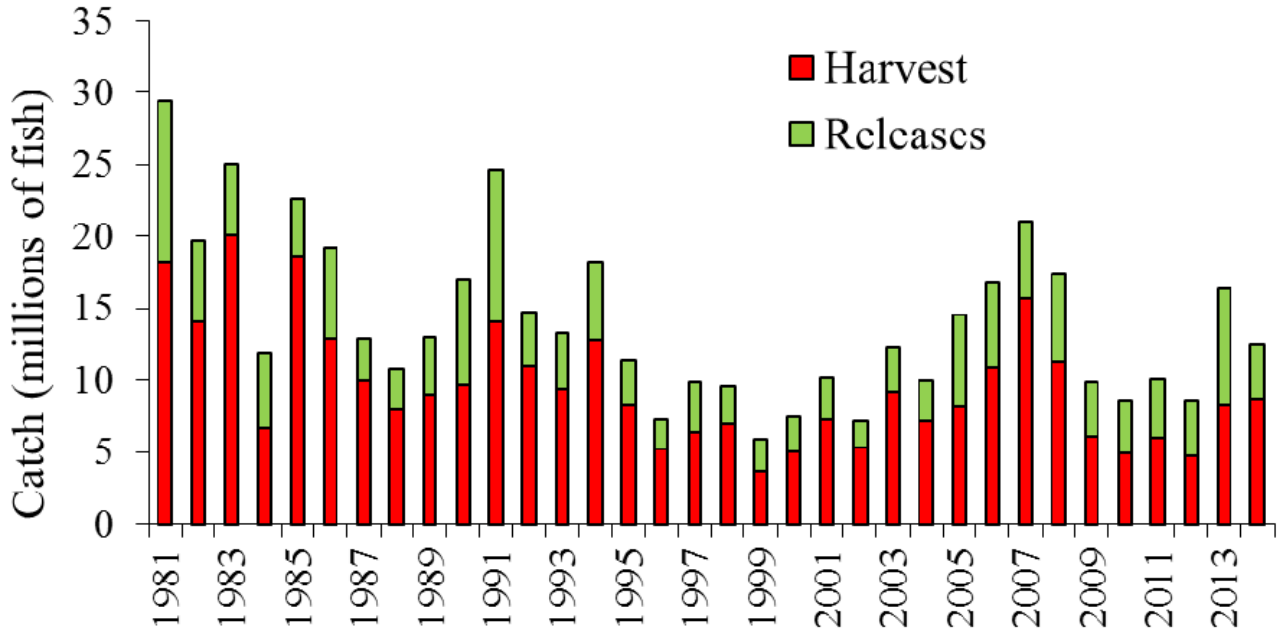
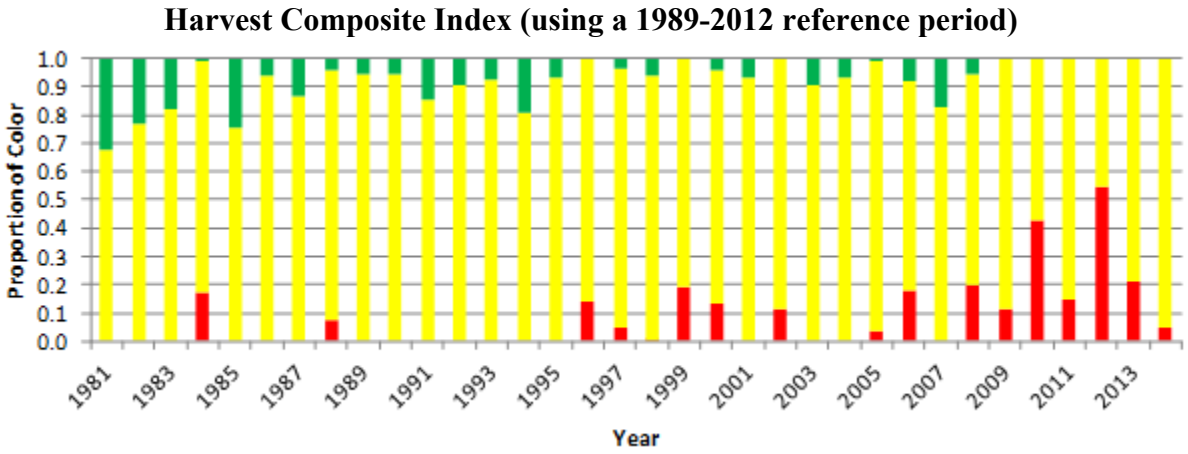
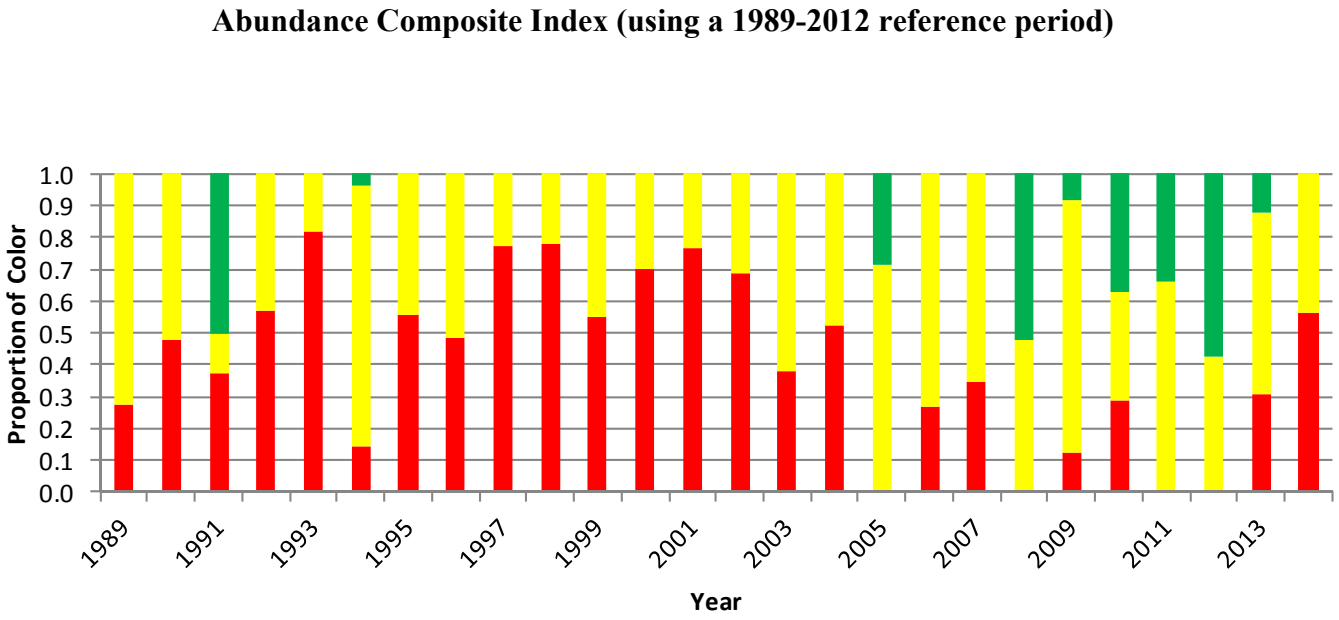


Figure 3: Traffic Light Approach for spot, 2014. Top figure shows the harvest composite index and the bottom figure shows the abundance composite index.



## XI. Tables

**Table 1. Commercial landings (pounds) by state, and estimated value (ex-vessel), 1981-2014** (Source: NMFS Fisheries Statistics Division & State Compliance Reports). Starred values are confidential.

| Year | NY | NJ | DE | MD | PRFC | VA | NC | SC | GA | FL | **Total** | **Value** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | | 6,000 | 11,100 | 14,200 | 49,899 | 1,025,800 | 3,511,574 | 127,384 | 7,721 | 2,798,881 | 7,552,559 | $1,949,238 |
| 1982 | | 1,800 | 2,500 | 6,200 | 45,946 | 1,017,100 | 4,918,763 | 62,562 | 292 | 4,431,239 | 10,486,402 | $2,629,992 |
| 1983 | | 800 | | 129,400 | 347,416 | 1,567,900 | 2,952,295 | 240,096 | | 2,266,296 | 7,504,203 | $2,034,211 |
| 1984 | | 100 | | 43,200 | 165,524 | 735,200 | 3,481,920 | 130,265 | | 1,508,552 | 6,064,761 | $1,709,041 |
| 1985 | | 2,400 | 17,237 | 7,700 | 19,912 | 1,561,739 | 4,043,843 | 142,755 | | 1,399,819 | 7,195,405 | $2,059,771 |
| 1986 | | 6,600 | 86,455 | 104,400 | 148,004 | 1,839,500 | 3,354,191 | 655,378 | 124 | 918,875 | 7,113,527 | $2,008,712 |
| 1987 | | 15,900 | 140,109 | 251,800 | 291,964 | 3,721,100 | 2,806,041 | 220,553 | 1,528 | 943,713 | 8,392,708 | $2,288,900 |
| 1988 | | 1,600 | 37,722 | 58,000 | 53,865 | 1,985,500 | 3,080,258 | 376,221 | 644 | 1,344,276 | 6,938,086 | $2,103,710 |
| 1989 | | 8,200 | 31,249 | 115,800 | 90,920 | 2,468,100 | 3,254,473 | 31,472 | 361 | 1,144,639 | 7,145,214 | $2,447,602 |
| 1990 | | 9,039 | 23,864 | 127,882 | 145,535 | 1,630,735 | 3,455,460 | 39,957 | 43 | 1,275,729 | 6,708,244 | $2,280,712 |
| 1991 | | 54,433 | 262,498 | 216,035 | 147,355 | 2,539,340 | 3,047,305 | 31,787 | | 1,051,532 | 7,350,285 | $2,341,850 |
| 1992 | | 102,213 | 112,967 | 331,837 | 226,335 | 2,497,622 | 2,826,138 | 171,959 | 261 | 740,048 | 7,009,380 | $1,903,514 |
| 1993 | 63 | 10,900 | 21,862 | 182,198 | 88,988 | 3,349,399 | 2,672,164 | 251,225 | 1,276 | 826,312 | 7,404,387 | $2,902,373 |
| 1994 | | 31,408 | 100,435 | 166,246 | 181,127 | 4,269,402 | 2,937,355 | 288,241 | 0 | 1,002,887 | 8,977,101 | $3,326,892 |
| 1995 | 22 | 30,151 | 62,324 | | 177,780 | 3,622,954 | 3,006,885 | 209,132 | 247 | 558,087 | 7,667,582 | $2,572,195 |
| 1996 | 318 | 1,149 | 80,930 | 256,711 | 101,670 | 2,982,083 | 2,290,040 | 60,574 | 0 | 56,423 | 5,829,898 | $2,237,567 |
| 1997 | 189 | 6,175 | 35,686 | 120,331 | 134,591 | 3,465,507 | 2,627,977 | 87,170 | 0 | 227,097 | 6,704,723 | $2,810,144 |
| 1998 | 579 | 27,582 | 140,363 | 225,937 | 117,580 | 4,277,256 | 2,397,025 | 63,912 | 0 | 161,205 | 7,411,439 | $2,838,921 |
| 1999 | | 7,822 | 47,770 | 223,463 | 108,326 | 2,961,890 | 2,262,213 | 9,393 | 0 | 72,973 | 5,693,850 | $2,204,565 |
| 2000 | 939 | 13,852 | 32,288 | 176,946 | 120,642 | 3,764,679 | 2,829,818 | 8,519 | 0 | 57,946 | 7,005,629 | $3,562,693 |
| 2001 | 160 | 20,034 | 74,144 | 283,488 | 176,546 | 3,248,212 | 3,093,921 | 12,950 | 0 | 33,056 | 6,942,511 | $2,835,318 |
| 2002 | 5,737 | 1,326 | 13,099 | 138,640 | 140,776 | 3,062,211 | 2,184,076 | 23,151 | 0 | 20,586 | 5,589,602 | $2,297,333 |
| 2003 | 35 | 6,003 | 74,144 | 184,437 | 277,430 | 3,471,484 | 2,043,421 | 17,181 | 0 | 9,337 | 6,083,472 | $2,747,351 |
| 2004 | 98 | 1,652 | 56,029 | 43,729 | 131,605 | 1,931,454 | 2,317,215 | 1,876 | 0 | 12,792 | 4,496,450 | $3,350,472 |
| 2005 | 435 | 769 | 125,685 | 114,987 | 95,350 | 4,335,314 | 1,714,518 | 10,468 | 0 | 21,156 | 6,418,682 | $3,310,675 |
| 2006 | 2,959 | 3,646 | 62,824 | 35,082 | 40,777 | 2,137,586 | 1,364,797 | 5,691 | 0 | 22,502 | 3,675,864 | $2,859,385 |
| 2007 | 1,080 | 4,474 | 128,207 | 389,520 | 70,514 | 4,335,314 | 879,135 | 6,357 | 0 | 14,317 | 5,637,154 | $4,258,365 |
| 2008 | 0 | 1,942 | 32,649 | 123,718 | 29,835 | 2,137,586 | 737,293 | 1,492 | 0 | 9,181 | 2,863,714 | $1,788,297 |
| 2009 | 317 | 34,063 | 71,449 | 528,625 | 63,470 | 4,014,576 | 1,006,535 | 22,557 | 0 | 22,057 | 4,456,467 | $3,239,049 |
| 2010 | 447 | 6,048 | 60,416 | 561,217 | 44,025 | 1,104,667 | 572,345 | 3,957 | 0 | 13,446 | 2,143,898 | $1,825,200 |
| 2011 | 159 | 54,890 | 93,776 | 553,010 | 60,106 | 3,763,055 | 936,993 | 12,162 | 0 | 29,031 | 5,272,523 | $1,484,039 |
| 2012 | 90,141 | 9,935 | 18,103 | 100,347 | 14,563 | 615,726 | 489,708 | 541 | 0 | 36,744 | 1,375,808 | $1,142,878 |
| 2013 | 156,751 | 48,324 | 79,157 | 336,020 | 41,286 | 2,097,666 | 768,671 | 585 | 0 | 31,248 | 3,559,708 | $3,553,436 |
| 2014 | * | 29,767 | 119,620 | 339,019 | 148,908 | 3,999,297 | 764,689 | * | * | 16,700 | 5,426,183 | $6,737,257 |

**Table 2. Commercial landings (pounds) by gear, 2014**
(Source: NMFS Fisheries Statistics Division)

| Gear | Landings (lbs) | Percent of Total |
|---|---|---|
| Gill nets | 3,927,930 | 77.0% |
| Haul Seins | 305,655 | 6.0% |
| Pound Net | 306,615 | 6.0% |
| Trawl | 34,674 | 0.7% |
| Other | 524,221 | 10.3% |
| Total | 5,099,095 | 100.0% |

**Table 3. Recreational harvest (pounds) by state, 1981-2014**
(Source: NMFS Fisheries Statistics Division)

| Year | NY | NJ | DE | MD | VA | NC | SC | GA | FL | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | 20,348 | 6,175 | 8,047 | 554,986 | 4,625,985 | 1,193,537 | 144,600 | 50,734 | 311,406 | 6,915,818 |
| 1982 | | 85,446 | 19,281 | 656,245 | 1,563,396 | 1,093,047 | 313,177 | 20,199 | 236,027 | 3,986,818 |
| 1983 | | | 4,017 | 354,788 | 2,520,125 | 1,630,882 | 293,161 | 28,023 | 167,294 | 4,998,290 |
| 1984 | | 3,768 | 5,714 | 361,850 | 404,533 | 650,386 | 169,346 | 81,758 | 122,585 | 1,799,940 |
| 1985 | 3,415 | 4,255 | | 193,266 | 1,955,039 | 3,120,532 | 441,808 | 13,071 | 213,042 | 5,944,428 |
| 1986 | 1,327 | 2,114 | 3,836 | 1,139,871 | 1,205,158 | 536,443 | 455,836 | 23,369 | 25,360 | 3,393,314 |
| 1987 | | | | 1,545,691 | 1,336,387 | 690,653 | 226,701 | 14,601 | 32,835 | 3,846,868 |
| 1988 | | 84,941 | 1,876 | 80,547 | 720,609 | 802,320 | 632,868 | 14,645 | 184,602 | 2,522,408 |
| 1989 | 132 | 606 | 10,368 | 633,150 | 1,400,728 | 929,188 | 288,591 | 7,798 | 23,254 | 3,293,815 |
| 1990 | | 5,644 | 11,821 | 791,264 | 2,103,751 | 613,904 | 50,525 | 6,259 | 1,737 | 3,584,905 |
| 1991 | | 19,528 | 48,100 | 634,894 | 2,729,698 | 727,463 | 245,661 | 1,786 | 107,256 | 4,514,386 |
| 1992 | | 8,788 | 36,799 | 724,279 | 2,278,309 | 403,775 | 397,677 | 6,978 | 167,845 | 4,024,450 |
| 1993 | 315 | 2,264 | 844 | 636,032 | 951,766 | 812,810 | 461,447 | 109,317 | 396,632 | 3,371,427 |
| 1994 | 7,198 | 20,364 | 34,795 | 676,687 | 1,217,036 | 1,842,360 | 469,518 | 2,687 | 57,234 | 4,327,879 |
| 1995 | | 1,186 | 22,919 | 485,682 | 1,067,637 | 1,247,995 | 242,973 | 7,701 | 42,851 | 3,118,944 |
| 1996 | | 10,966 | 789 | 294,404 | 492,982 | 710,086 | 494,448 | 5,445 | 26,953 | 2,036,073 |
| 1997 | | 8,609 | 50,781 | 401,275 | 1,263,447 | 722,868 | 254,794 | 2,072 | 13,962 | 2,717,808 |
| 1998 | | | 36,658 | 631,422 | 866,619 | 1,249,543 | 228,502 | 2,088 | 47,196 | 3,062,028 |
| 1999 | | | 10,886 | 272,292 | 244,499 | 646,662 | 391,402 | 2,275 | 84,511 | 1,652,527 |
| 2000 | 130,649 | 46,244 | 32,968 | 600,302 | 252,885 | 893,835 | 128,669 | 1,402 | 14,129 | 2,101,083 |
| 2001 | | | 20,110 | 629,861 | 523,202 | 1,773,671 | 346,878 | 1,720 | 284,706 | 3,580,148 |
| 2002 | | | 10,870 | 336,660 | 829,972 | 984,898 | 140,164 | 2,857 | 7,840 | 2,313,261 |
| 2003 | | | 14,386 | 1,690,502 | 875,729 | 1,714,158 | 227,821 | 5,710 | 26,504 | 4,554,810 |
| 2004 | | | 6,919 | 442,100 | 1,136,261 | 1,846,688 | 245,991 | 721 | 3,338 | 3,682,018 |
| 2005 | | 14,546 | 68,075 | 658,077 | 1,375,629 | 1,103,830 | 158,407 | 917 | 12,751 | 3,392,232 |
| 2006 | | 28,971 | 38,010 | 991,142 | 1,926,940 | 978,181 | 745,772 | 1,166 | 6,067 | 4,716,249 |
| 2007 | 952 | 0 | 74,531 | 1,282,803 | 3,237,069 | 1,378,993 | 605,024 | 2,346 | 12,899 | 6,594,617 |
| 2008 | 0 | 23,157 | 42,078 | 618,172 | 1,828,398 | 671,916 | 2,731,815 | 4,292 | 21,041 | 5,940,869 |
| 2009 | 0 | 1,882 | 48,465 | 802,395 | 829,245 | 354,375 | 589,027 | 2,493 | 22,169 | 2,650,051 |
| 2010 | | 212,616 | 74,641 | 447,575 | 563,423 | 260,757 | 322,885 | 214 | 28,033 | 1,910,144 |
| 2011 | | 755 | 52,120 | 314,032 | 1,101,847 | 411,243 | 596,679 | 171 | 62,657 | 2,539,504 |
| 2012 | | 104,028 | 21,558 | 253,103 | 410,777 | 230,259 | 933,684 | 91 | 19,090 | 1,972,590 |
| 2013 | 6,099 | 118,685 | 107,330 | 280,842 | 1,336,913 | 460,928 | 301,307 | 1,614 | 42,267 | 2,655,985 |
| 2014 | | 6,477 | 210,001 | 404,080 | 1,276,043 | 704,445 | 157,258 | 3,968 | 165,159 | 2,944,135 |

**Table 4. Recreational harvest (numbers) by state, 1981-2014**
(Source: NMFS Fisheries Statistics Division)

| Year | NY | NJ | DE | MD | VA | NC | SC | GA | FL | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | 44,278 | 28,006 | 17,508 | 948,931 | 11,662,684 | 4,023,934 | 562,750 | 124,057 | 799,226 | 18,211,374 |
| 1982 | | 387,582 | 82,094 | 2,864,603 | 4,526,847 | 4,124,465 | 1,230,253 | 84,153 | 735,398 | 14,035,395 |
| 1983 | | | 14,464 | 1,600,362 | 12,059,247 | 4,880,268 | 970,747 | 112,123 | 488,029 | 20,125,240 |
| 1984 | | 8,501 | 15,553 | 904,793 | 1,489,795 | 2,758,366 | 724,925 | 363,841 | 396,402 | 6,662,176 |
| 1985 | 15,494 | 12,692 | | 1,028,391 | 5,491,918 | 8,789,391 | 2,355,044 | 62,338 | 861,700 | 18,616,968 |
| 1986 | 3,824 | 9,587 | 12,178 | 3,789,796 | 4,229,191 | 2,646,049 | 2,007,386 | 137,782 | 96,803 | 12,932,596 |
| 1987 | | | | 3,180,704 | 3,864,151 | 2,129,146 | 599,807 | 79,487 | 73,833 | 9,927,128 |
| 1988 | | 348,593 | 2,360 | 277,964 | 2,028,768 | 2,558,322 | 1,951,157 | 57,786 | 663,681 | 7,888,631 |
| 1989 | 602 | 1,128 | 45,853 | 1,154,314 | 3,714,855 | 2,924,299 | 1,078,570 | 34,977 | 67,506 | 9,022,104 |
| 1990 | | 25,927 | 44,362 | 2,120,655 | 5,354,294 | 1,986,601 | 142,271 | 17,730 | 7,252 | 9,699,092 |
| 1991 | | 88,393 | 138,113 | 1,841,555 | 8,820,075 | 2,317,095 | 598,290 | 10,281 | 269,628 | 14,083,430 |
| 1992 | | 20,443 | 90,053 | 1,671,897 | 6,317,539 | 1,271,416 | 1,190,757 | 25,788 | 357,678 | 10,945,571 |
| 1993 | 1,168 | 7,788 | 3,263 | 1,880,043 | 2,836,534 | 2,057,440 | 1,437,809 | 228,606 | 946,757 | 9,399,408 |
| 1994 | 19,275 | 144,589 | 92,352 | 1,761,701 | 3,395,503 | 5,929,269 | 1,329,997 | 9,587 | 137,067 | 12,819,340 |
| 1995 | | 2,949 | 51,695 | 1,099,658 | 2,731,242 | 3,329,981 | 875,189 | 27,842 | 140,231 | 8,258,787 |
| 1996 | | 23,954 | 955 | 591,300 | 1,109,237 | 2,007,071 | 1,423,352 | 14,131 | 64,337 | 5,234,337 |
| 1997 | | 20,148 | 126,089 | 713,657 | 3,328,144 | 1,440,661 | 680,842 | 5,471 | 31,987 | 6,346,999 |
| 1998 | | | 96,389 | 1,327,259 | 2,023,756 | 2,865,190 | 489,068 | 6,788 | 120,389 | 6,928,839 |
| 1999 | | | 19,911 | 655,289 | 569,250 | 1,308,167 | 801,785 | 5,578 | 264,233 | 3,624,213 |
| 2000 | 498,470 | 281,481 | 65,952 | 1,389,505 | 527,259 | 1,924,108 | 246,290 | 2,950 | 40,908 | 4,976,923 |
| 2001 | 0 | 0 | 51,096 | 1,088,997 | 1,056,365 | 3,650,711 | 735,551 | 3,681 | 652,976 | 7,239,377 |
| 2002 | 0 | 0 | 22,013 | 690,515 | 1,601,837 | 2,586,313 | 393,597 | 6,987 | 25,907 | 5,327,169 |
| 2003 | 0 | 0 | 30,166 | 3,300,595 | 1,441,002 | 3,796,556 | 524,513 | 11,523 | 84,686 | 9,189,041 |
| 2004 | 0 | 0 | 17,494 | 867,589 | 1,717,416 | 3,825,768 | 729,851 | 1,563 | 6,790 | 7,166,471 |
| 2005 | 0 | 46,795 | 150,772 | 1,788,679 | 2,781,973 | 3,012,872 | 358,550 | 3,199 | 23,796 | 8,166,636 |
| 2006 | 0 | 68,168 | 110,607 | 2,895,783 | 3,584,930 | 2,978,506 | 1,170,611 | 1,761 | 7,990 | 10,818,356 |
| 2007 | 1,813 | 0 | 176,997 | 3,615,346 | 8,203,377 | 3,078,346 | 605,024 | 6,529 | 30,184 | 15,717,616 |
| 2008 | 0 | 132,472 | 133,996 | 1,892,116 | 4,398,472 | 1,843,343 | 2,731,815 | 8,903 | 58,732 | 11,199,849 |
| 2009 | 0 | 6,720 | 128,799 | 2,064,326 | 2,146,607 | 1,056,346 | 589,027 | 17,948 | 25,391 | 6,035,164 |
| 2010 | 0 | 650,260 | 214,180 | 1,164,091 | 1,669,843 | 834,561 | 322,885 | 851 | 94,671 | 4,951,342 |
| 2011 | 0 | 1,370 | 150,650 | 912,704 | 2,967,029 | 1,207,335 | 596,680 | 968 | 152,329 | 5,989,065 |
| 2012 | 39,912 | 627,664 | 65,555 | 766,145 | 1,350,153 | 784,272 | 1,001,664 | 348 | 65,598 | 4,701,311 |
| 2013 | 13,294 | 326,956 | 248,346 | 945,972 | 4,332,620 | 1,464,592 | 732,413 | 6,573 | 132,204 | 8,202,970 |
| 2014 | | 13,062 | 344,930 | 1,254,029 | 3,908,724 | 2,111,880 | 466,106 | 15,620 | 608,814 | 8,723,165 |

**Table 5. Recreational releases (numbers) by state, 1981-2014**
(Source: NMFS Fisheries Statistics Division)

| Year | NY | NJ | DE | MD | VA | NC | SC | GA | FL | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | | 25,740 | 1,502 | 1,331,316 | 8,905,412 | 735,408 | 82,035 | 5,975 | 64,344 | 11,151,732 |
| 1982 | | 974,847 | 5,061 | 1,677,415 | 1,618,065 | 806,851 | 366,650 | 44,091 | 205,387 | 5,698,367 |
| 1983 | | 57,556 | | 1,114,795 | 2,715,522 | 634,107 | 192,240 | 39,798 | 186,615 | 4,940,633 |
| 1984 | | | 13,260 | 1,150,599 | 2,607,693 | 952,816 | 346,003 | 17,897 | 130,493 | 5,218,761 |
| 1985 | 22,220 | 2,979 | | 735,873 | 2,051,793 | 429,914 | 515,106 | 17,316 | 170,060 | 3,945,261 |
| 1986 | | 79,712 | | 2,720,343 | 2,250,794 | 816,204 | 331,290 | 20,863 | 10,351 | 6,229,557 |
| 1987 | | | 1,104 | 248,973 | 1,736,228 | 593,937 | 304,127 | 28,434 | 57,437 | 2,970,240 |
| 1988 | | 110,698 | 4,501 | 716,258 | 762,504 | 995,806 | 110,498 | 16,951 | 110,003 | 2,827,219 |
| 1989 | | 4,503 | 40,193 | 730,580 | 2,519,034 | 524,897 | 138,834 | 1,630 | 22,425 | 3,982,096 |
| 1990 | | 14,504 | 10,120 | 1,811,434 | 4,441,195 | 921,849 | 13,709 | 4,079 | 30,937 | 7,247,827 |
| 1991 | | 91,991 | 59,770 | 2,123,582 | 7,041,156 | 946,564 | 100,666 | 14,629 | 168,284 | 10,546,642 |
| 1992 | | 1,324 | 12,553 | 493,597 | 2,091,001 | 841,163 | 279,044 | 16,791 | 64,738 | 3,800,211 |
| 1993 | | | 35,987 | 1,573,486 | 1,374,950 | 528,449 | 130,055 | 47,667 | 185,226 | 3,875,820 |
| 1994 | 8,140 | 160,380 | 53,078 | 1,037,498 | 2,142,198 | 1,363,884 | 320,921 | 22,434 | 335,647 | 5,444,180 |
| 1995 | | 22,162 | 14,195 | 253,827 | 1,166,428 | 1,035,361 | 331,781 | 9,799 | 268,765 | 3,102,318 |
| 1996 | 7,178 | 39,448 | 1,128 | 208,897 | 577,847 | 924,204 | 212,920 | 5,329 | 65,083 | 2,042,034 |
| 1997 | | 21,512 | 88,751 | 1,316,341 | 1,365,809 | 450,663 | 245,349 | 990 | 18,102 | 3,507,517 |
| 1998 | | 12,542 | 75,985 | 633,914 | 900,352 | 650,157 | 307,480 | 12,286 | 58,264 | 2,650,980 |
| 1999 | | | 15,789 | 618,742 | 339,988 | 633,112 | 86,894 | 10,675 | 530,849 | 2,236,049 |
| 2000 | 157,991 | 16,633 | 30,522 | 1,080,310 | 502,923 | 481,995 | 115,682 | 17,376 | 54,388 | 2,457,820 |
| 2001 | | 2,040 | 13,139 | 577,417 | 968,976 | 1,143,695 | 154,077 | 11,714 | 74,232 | 2,945,290 |
| 2002 | 2,127 | 3,331 | 27,220 | 501,111 | 481,765 | 671,669 | 103,914 | 20,038 | 44,584 | 1,855,759 |
| 2003 | | 39,049 | 13,273 | 670,382 | 933,842 | 1,132,992 | 231,612 | 31,055 | 106,918 | 3,159,123 |
| 2004 | | | 39,998 | 383,292 | 882,136 | 1,257,887 | 210,215 | 12,536 | 9,427 | 2,795,491 |
| 2005 | | 5,772 | 157,445 | 2,135,086 | 2,456,981 | 1,334,559 | 183,819 | 25,117 | 41,773 | 6,340,552 |
| 2006 | | 65,244 | 92,864 | 1,355,280 | 1,371,751 | 2,588,647 | 496,870 | 3,774 | 21,755 | 5,996,185 |
| 2007 | 535 | 119,976 | 44,455 | 1,618,690 | 2,156,839 | 1,197,005 | 151,481 | 17,600 | 26,675 | 5,333,256 |
| 2008 | | 1,166,532 | 98,304 | 1,737,665 | 1,487,665 | 1,322,408 | 188,746 | 25,908 | 128,942 | 6,156,170 |
| 2009 | | 7,691 | 140,014 | 632,595 | 1,457,588 | 1,222,053 | 326,065 | 10,486 | 40,890 | 3,837,382 |
| 2010 | | 191,745 | 72,216 | 1,155,003 | 1,155,882 | 871,054 | 166,679 | 562 | 57,924 | 3,671,065 |
| 2011 | | 1,370 | 66,661 | 296,513 | 2,245,221 | 1,000,566 | 222,623 | 9,766 | 196,294 | 4,039,014 |
| 2012 | 37634 | 477938 | 60,334 | 919,896 | 1,145,960 | 759,081 | 142,093 | 3,968 | 373,916 | 3,920,820 |
| 2013 | 332 | 746,878 | 214,067 | 2,621,931 | 2,226,300 | 1,314,199 | 957,781 | 8,623 | 110,865 | 8,200,976 |
| 2014 | | 15,323 | 78,691 | 565,679 | 1,173,748 | 890,831 | 427,049 | 27,224 | 575,251 | 3,753,796 |