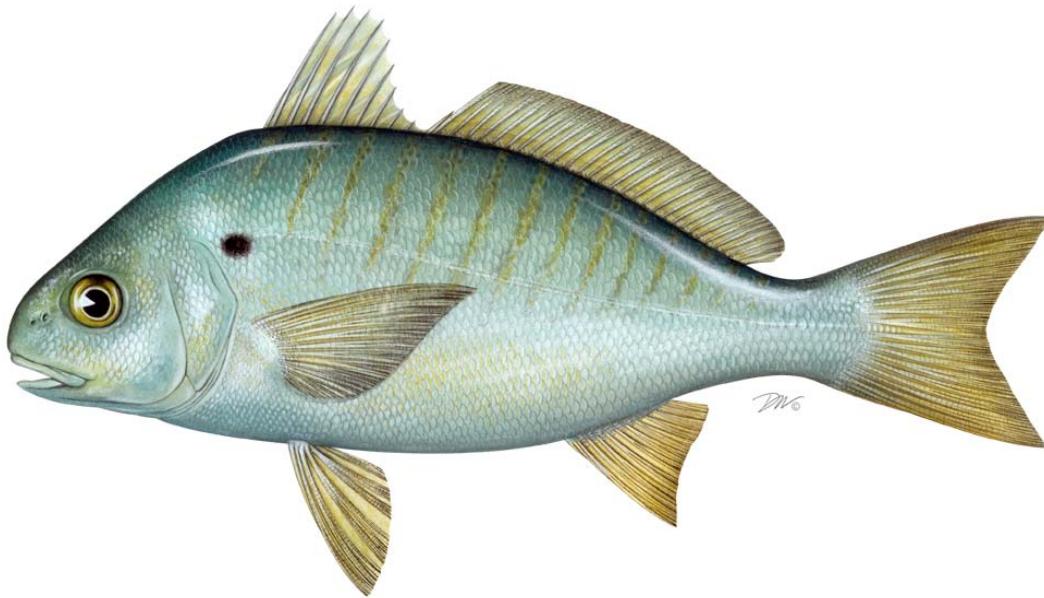


2013 REVIEW OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
FISHERY MANAGEMENT PLAN FOR

SPOT
(Leiostomus xanthurus)

2012 FISHING YEAR



The Spot Plan Review Team

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I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	October 1987; Omnibus Amendment August 2011
<u>Management Area:</u>	The Atlantic coast distribution of the resource from Delaware through Florida
<u>Active Boards/Committees:</u>	South Atlantic State/Federal Fisheries Management Board; Spot Plan Review Team; South Atlantic Species Advisory Panel; Omnibus Amendment Plan Development Team

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

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 The Management Board found recommendations in the plan to be vague and perhaps no longer valid, and recommended that an amendment be prepared to the Spot FMP to define the management measures necessary to achieve the goals of the FMP.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

II. Status of the Stock

No coastwide assessment has been performed for spot; however, spot are a target or component of multiple state surveys using trawl, gillnet, or seine net to sample. In addition to these surveys, commercial and recreational data can provide indices of relative spot abundance.

Omnibus Amendment/Annual Trigger Exercises

As part of the requirements for under the 2011 Omnibus Amendment, for years in-between benchmark stock assessments, the Spot PRT was tasked with conducting annual monitoring analysis, the results to be presented to the South Atlantic State/Federal Fisheries Management Board. This annual analysis has been known as the trigger exercises, where the following data sources are compared to the 10th percentile of the data sets' time series. These data sources are:

- Coastwide recreational landings (numbers), 1981-present
- Coastwide commercial landings (pounds), 1950-present
- SEAMAP-South Atlantic Trawl Survey catch-per-unit-effort (NC-FL data), 1989-present
- NMFS Bottom Trawl Survey catch-per-unit effort (NY-NC data), 1972-present
- Maryland DNR Chesapeake Bay Seine Survey catch-per-unit-effort, 1967-present

In conducting this annual review, if two terminal values of the five data sources- at least one of which must be fishery independent - fall below the 10th percentile, the Management Board will be prompted to consider management action. In 2012, the triggers did not trip though it was noted by the Spot PRT that commercial and recreational landings have fallen below their 10th percentile twice over the last 3 years, and once among the fishery independent indices (MD Bay Seine Program in 2011).

In 2013, for the sixth consecutive year, the Spot Plan Review Team (PRT) will compile and analyze available fishery-dependent and fishery-independent data from the following data sources: commercial harvest, effort, and biological sampling data from Maryland, Virginia and North Carolina; recreational harvest and effort data from Maryland, Virginia, North Carolina, and South Carolina; and fishery-independent survey data from New Jersey, Delaware, Maryland, Virginia, North Carolina, and South Carolina, as well as the Southeast Area Monitoring and Assessment Program (SEAMAP) survey covering North Carolina through Florida and the NMFS Trawl Survey for New York to North Carolina. The PRT developed indices of relative spot abundance from catch-per-unit effort and fishery characterization data.

III. Status of the Fishery

Total landings of spot in 2012 are estimated at 3.24 million pounds, a decrease of 59% from 2011 and a 60% decrease from the previous ten-year average (Tables 1 and 3). The commercial fishery harvested less than the recreational fishery (39.2% to 60.8% respectively, by pounds), which follows the fluctuating pattern over the last 7 years. This contrasts with 2011, during which commercial harvests exceeded recreational harvests by about 2:1.

Commercial spot landings have ranged between 1.27 and 14.52 million pounds from 1950-20012(Figure 1), with the 2012 landings (1.27 million pounds) marking the lowest landings during this time series. The estimated ex-vessel value of the 2012 harvest was \$1.4 million (Table 1). Coastwide, the majority of commercially harvested spot are taken in gillnets (78.2% in 2009, Table 2). Virginia landed over 48% of the commercial harvest (by pounds) in 2012, followed by North Carolina with 39% 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 2012 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 the low in 1999 to 15.9 million fish in 2007; however, harvest has declined since 2007, with the 2012 catch recording 4 million fish, down from 6 million fish in 2011 (Figure 2). Anglers in Virginia were responsible for 33% of the total number of fish harvested in 2012, followed by anglers in South Carolina (25%), North Carolina (19%), and Maryland (19%). 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 6.6 million fish, with the exception of a few years (Table 5). The number of fish released alive in 2012, 3.8 million, falls within this range.

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. Spot life history information and fisheries data have generally been localized and conducted at different levels of population abundance. Commercial and recreational catch and effort data have only recently begun to be analyzed to determine the relationship between landings and abundance. An additional and extremely problematic issue is the non-quantifiable incidental bycatch and discard mortality of small spot in non-directed fisheries.

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.

Given that there have been no significant increases in the monitoring of discard data, the Spot PRT's recommendations and observations from 2009, regarding the feasibility of Spot stock assessment, remain.

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. North Carolina annually ages 400-500 spot across all fisheries. Virginia has aged more than 300 spot per year since 2001, except 2006 when 228 were aged. Maryland began an ageing program in 2008. South Carolina began collecting limited otolith samples in 2010 through the SC-State Finfish Survey. While the numbers collected have not been very many (<50 per year) the age range matches the range seen in the fishery independent surveys.

Age validation study for spot in SC was completed in 2012 (J. Johnson, MS Thesis Project, College of Charleston)

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 addition to the Northeast Fisheries Science Center Bottom Trawl Survey, the Northeast Area Monitoring and Assessment Program (NEAMAP), the Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP), and the Chesapeake Bay Fishery-Independent Multispecies Survey (CHESFIMS) also collect a variety of biological data elements.

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. However, only Georgia has implemented a minimum size limit (8 inches total length, both recreational and commercial) aimed at protecting immature spot. Georgia is also the only state with a spot creel limit (25 fish, both recreational and commercial).

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. Through the Omnibus Amendment does not require specific fishery management measures in either the recreational or commercial fisheries for states within the management unit range.

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

The states of South Carolina and Georgia request *de minimis* status. The PRT notes they meet the requirements of *de minimis*.

VII. Implementation of FMP Compliance Requirements for 2012

- All states within the management unit have submitted compliance reports for the 2012 fishing year. The PRT found no compliance issues.

VIII. Recommendations of the Plan Review Team

Management and Regulatory Recommendation

The Spot PRT recommends that the Board not initiate a stock assessment for spot, given the high uncertainties in the bycatch data which would have prevented the assessment from passing a peer review. The Spot PRT will continue to monitor the fishery through the trigger exercises and may present additional analysis for consideration in 2013.

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.
- Develop fishery-dependent and fishery-independent size and sex specific relative abundance estimates.
- Cooperative coastwide spot juvenile indices should be developed to clarify stock status.
- 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.
- Conduct age validation studies.
- Cooperatively develop criteria for aging spot otoliths and scales.
- Develop catch-at-age matrices for recreational and commercial fisheries.
- Determine the effect that anthropogenic perturbations may be having on growth, survival, and recruitment.

Medium Priority

- Develop stock assessment analyses appropriate to current data.
- Cooperatively develop a yield-per-recruit analysis.
- Develop stock identification methods and investigate the degree of mixing between state stocks during the annual fall migration.
- Determine migratory patterns through tagging studies.
- Determine the onshore vs. offshore components of the spot fishery.

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), 1950-2012

(Recreational landings available from 1981-present; see Tables 1 and 3 for state-by-state values and data sources)

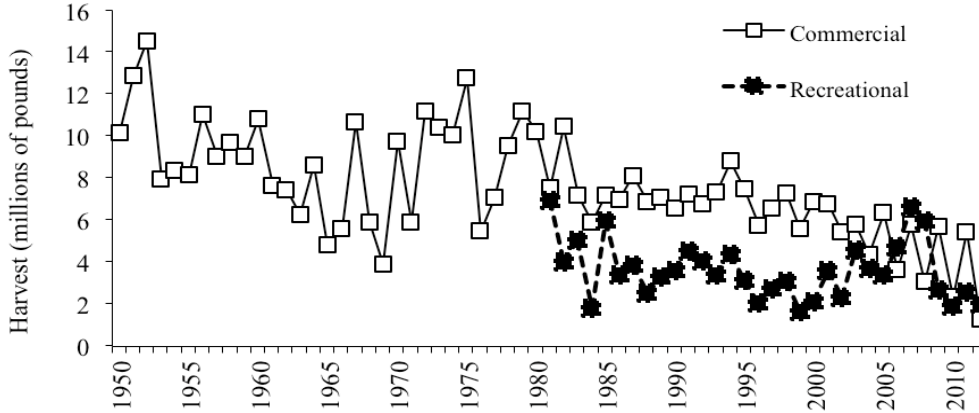
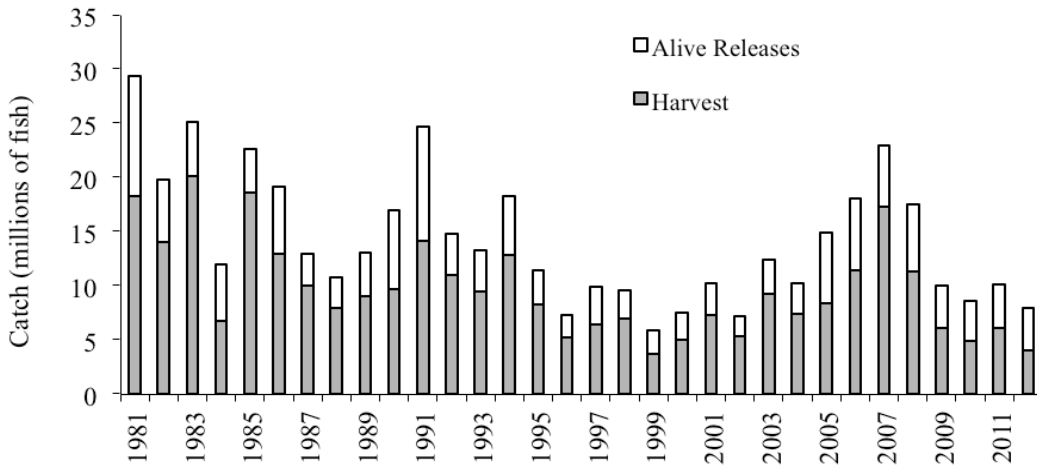


Figure 2. Spot recreational harvest and releases (numbers of fish), 1981-2012

(See Tables 4 and 5 for state-by-state values and data source)



2013 REVIEW OF THE ASMFC SPOT FMP

XI. Tables

Table 1. Commercial landings (pounds) by state, and estimated value (ex-vessel), 1981-2012
(Source: NMFS Fisheries Statistics Division & State Compliance Reports, 11/23/2013)

Year	NY	NJ	DE	MD	VA	NC	SC	GA	FL	Total	Value
1981		6,000	11,100	14,200	1,025,800	3,511,574	127,384	7,721	2,798,881	7,502,660	\$1,949,238
1982		1,800	2,500	6,200	1,017,100	4,918,763	62,562	292	4,431,239	10,440,456	\$2,629,992
1983		800		129,400	1,567,900	2,952,295	240,096		2,266,296	7,156,787	\$2,034,211
1984		100		43,200	735,200	3,481,920	130,265		1,508,552	5,899,237	\$1,709,041
1985		2,400	17,237	7,700	1,561,739	4,043,843	142,755		1,399,819	7,175,493	\$2,059,771
1986		6,600	86,455	104,400	1,839,500	3,354,191	655,378	124	918,875	6,965,523	\$2,008,712
1987		15,900	140,109	251,800	3,721,100	2,806,041	220,553	1,528	943,713	8,100,744	\$2,288,900
1988		1,600	37,722	58,000	1,985,500	3,080,258	376,221	644	1,344,276	6,884,221	\$2,103,710
1989		8,200	31,249	115,800	2,468,100	3,254,473	31,472	361	1,144,639	7,054,294	\$2,447,602
1990		9,039	23,864	127,882	1,630,735	3,455,460	39,957	43	1,275,729	6,562,709	\$2,280,712
1991		54,433	262,498	216,035	2,539,340	3,047,305	31,787		1,051,532	7,202,930	\$2,341,850
1992		102,213	112,967	331,837	2,497,622	2,826,138	171,959	261	740,048	6,783,045	\$1,903,514
1993	63	10,900	21,862	182,198	3,349,399	2,672,164	251,225	1,276	826,312	7,315,399	\$2,902,373
1994		31,408	100,435	166,246	4,269,402	2,937,355	288,241		1,002,887	8,795,974	\$3,326,892
1995	22	30,151	62,324		3,622,954	3,006,885	209,132	247	558,087	7,489,802	\$2,572,195
1996	318	1,149	80,930	256,711	2,982,083	2,290,040	60,574		56,423	5,728,228	\$2,237,567
1997	189	6,175	35,686	120,331	3,465,507	2,627,977	87,170		227,097	6,570,132	\$2,810,144
1998	579	27,582	140,363	225,937	4,277,256	2,397,025	63,912		161,205	7,293,859	\$2,838,921
1999		7,822	47,770	223,463	2,961,890	2,262,213	9,393		72,973	5,585,524	\$2,204,565
2000	939	13,852	32,288	176,946	3,764,679	2,829,818	8,519		57,946	6,884,987	\$3,562,693
2001	160	20,034	74,144	283,488	3,248,212	3,093,921	12,950		33,056	6,765,965	\$2,835,318
2002	5,737	1,326	13,099	138,640	3,062,211	2,184,076	23,151		20,586	5,448,826	\$2,297,333
2003	35	6,003	74,144	184,437	3,471,484	2,043,421	17,181		9,337	5,806,042	\$2,747,351
2004	98	1,652	56,029	43,729	1,931,454	2,317,215	1,876		12,792	4,364,845	\$3,350,472
2005	435	769	125,685	114,987	4,335,314	1,714,518	10,468		21,156	6,323,332	\$3,310,675
2006	2,959	3,646	62,824	35,082	2,137,586	1,364,797	5,691		22,502	3,635,087	\$2,843,714
2007	1,080	4,474	128,207	389,520	4,335,314	879,135	6,357	0	14,317	5,758,404	\$4,307,860
2008	0	1,942	32,649	123,718	2,137,586	737,293	1,492	0	9,181	3,043,861	\$1,821,412
2009	317	34,063	71,449	528,625	4,014,576	1,006,535	22,557	0	22,057	5,700,179	\$4,514,714
2010	37	6,048	60,416	561,217	1,104,667	572,345	3,957		13,446	2,322,133	\$1,823,273
2011	8	54,890	93,776	553,010	3,763,055	936,993	12,162		29,031	5,442,925	\$4,547,925
2012		9,935	18,103	100,347	615,726	489,708	541	0	36,744	1,271,104	\$1,142,878

Table 2. Commercial landings (pounds) by gear, 2012
(Source: NMFS Fisheries Statistics Division, 11/23/13)

Gear	Landings (lbs)	Percent of Total
Gill Nets	691,079	12.4%
Haul Seine	295,516	5.3%
Pound Net	37,973	0.7%
Trawl	47,842	0.9%
Other	225,465	4.0%
Total	1,297,875	23.2%

2013 REVIEW OF THE ASMFC SPOT FMP

Table 3. Recreational harvest (pounds) by state, 1981-2012

(Source: NMFS Fisheries Statistics Division, 11/23/13)

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

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Table 4. Recreational harvest (numbers) by state, 1981-2012

(Source: NMFS Fisheries Statistics Division, 11/23/13)

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	1,924,107	246,291	2,950	40,908	4,976,923
2001			51,096	1,088,997	1,056,365	3,650,711	735,551	3,681	652,975	7,239,376
2002			22,013	690,515	1,601,837	2,586,313	393,597	6,987	25,907	5,327,169
2003			30,165	3,300,594	1,441,002	3,796,557	524,513	11,524	84,685	9,189,040
2004			17,494	867,589	1,717,416	4,058,426	656,920	2,320	10,826	7,330,991
2005		41,324	150,772	1,788,679	2,781,973	3,125,897	464,510	2,999	41,671	8,397,825
2006		42,143	110,608	2,895,783	3,584,930	2,770,151	1,957,703	2,823	17,306	11,381,447
2007	2,756		176,997	3,615,346	8,203,377	4,268,838	911,960	8,516	36,775	17,224,565
2008		172,828	133,996	1,892,115	4,398,473	1,843,343	2,731,815	8,903	60,889	11,242,362
2009		16,651	128,799	2,064,326	2,146,607	1,056,346	589,027	7,169	58,226	6,067,151
2010		572,078	214,180	1,164,091	1,669,843	834,560	322,885	851	83,688	4,862,176
2011		568	150,650	912,704	2,967,030	1,207,335	596,680	968	221,705	6,057,640
2012			65,555	766,145	1,350,153	784,272	1,001,664	348	65,698	4,033,835

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Table 5. Recreational releases (numbers) by state, 1981-2012

(Source: NMFS Fisheries Statistics Division, 11/23/13)

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	1,237,386	252,384	12,545	20,167	2,827,908
2005		6,755	157,445	2,135,086	2,456,981	1,539,531	127,820	8,604	52,048	6,484,270
2006		42,558	92,864	1,335,280	1,371,751	3,147,254	645,379	7,233	51,929	6,694,248
2007	1,793	137,677	44,455	1,618,690	2,156,839	1,420,660	255,362	13,813	42,605	5,691,894
2008		1,166,532	98,304	1,737,665	1,487,665	1,322,408	188,746	24,979	176,570	6,202,869
2009		7,691	140,014	632,595	1,457,588	1,222,053	326,065	11,890	71,658	3,869,554
2010	1,187	191,745	72,216	1,155,003	1,155,882	871,054	166,679	651	43,242	3,657,659
2011		1,370	66,661	296,513	2,245,221	1,000,566	222,623	12,307	178,520	4,023,781
2012		477,938	60,334	919,896	1,145,960	759,081	142,093	3,968	373,916	3,883,186

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Table 6. PRT-recommended management triggers, with highlighted years indicating values below the 10th percentile based on data through 2012.

Year	ACCSP Commercial Landings (pounds)	NMFS Commercial Landings (pounds)	Recreational Landings (numbers)	Combined NMFS Survey Index	Combined SEAMAP Survey Index	MD Chesapeake Bay Seine Survey Index
1950	10,165,400	10,165,400				
1951	12,855,900	12,855,900				
1952	14,520,700	14,520,700				
1953	7,936,600	7,936,600				
1954	8,343,000	8,343,000				
1955	8,126,400	8,126,400				
1956	11,037,500	11,037,500				
1957	9,031,700	9,031,700				
1958	9,662,000	9,662,000				
1959	9,008,700	9,008,700				
1960	10,787,600	10,787,600				
1961	7,646,400	7,646,400				
1962	7,438,200	7,438,100				
1963	6,256,300	6,256,200				
1964	8,603,400	8,603,300				
1965	4,786,800	4,786,800				
1966	5,583,600	5,583,600				
1967	10,677,700	10,677,600				0.018
1968	5,895,800	5,895,800				0.596
1969	3,893,900	3,893,900				1.226
1970	9,749,100	9,749,100				0.084
1971	5,899,500	5,899,500				0.864
1972	11,169,500	11,169,500		7.70		1.160
1973	10,419,900	10,419,800		72.10		3.264
1974	10,028,000	10,028,000		92.00		2.297
1975	12,737,400	12,737,000		59.40		4.416
1976	5,461,700	5,461,600		196.70		3.195
1977	7,056,300	7,055,800		591.90		6.891
1978	9,541,925	9,541,925		183.60		3.360
1979	11,165,310	11,165,310		326.80		2.708
1980	10,215,973	10,215,973		126.20		2.529
1981	7,502,660	7,502,660	18,227,092	233.30		1.647
1982	10,440,456	10,440,456	14,119,411	45.60		2.254
1983	7,156,792	7,156,792	20,158,832	246.80		1.074
1984	5,899,725	5,899,725	6,678,762	322.90		3.428
1985	7,175,566	7,175,566	18,636,497	51.70		1.498
1986	6,965,468	6,965,468	13,097,985	256.40		1.766
1987	8,100,756	8,100,735	9,994,920	180.20		1.174
1988	6,885,199	6,885,465	7,913,748	180.20		4.495
1989	7,052,068	7,053,374	9,022,104	453.80	325.07	0.697
1990	6,561,635	6,561,641	9,712,267	102.40	538.52	1.046
1991	7,176,813	7,176,632	14,137,171	47.60	599.44	0.809
1992	6,781,052	6,765,078	11,023,214	10.10	243.39	0.441
1993	7,315,598	7,315,577	9,413,956	7.90	129.69	1.425
1994	8,795,908	8,795,939	12,871,694	411.70	218.43	1.486

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Year	ACCSP Commercial Landings (pounds)	NMFS Commercial Landings (pounds)	Recreational Landings (numbers)	Combined NMFS Survey Index	Combined SEAMAP Survey Index	MD Chesapeake Bay Seine Survey Index
1995	7,820,831	7,489,478	8,311,446	65.10	364.65	0.096
1996	5,728,189	5,647,298	5,270,362	77.40	141.63	0.283
1997	6,572,097	6,570,132	6,351,489	29.70	203.49	1.343
1998	7,293,875	7,293,919	6,989,184	17.40	105.15	0.437
1999	5,589,301	5,589,288	3,653,547	67.80	79.77	0.607
2000	6,884,987	6,884,989	4,976,923	59.00	124.53	0.828
2001	6,770,062	6,770,093	7,239,378	0.20	177.56	0.367
2002	5,449,586	5,449,507	5,327,170	60.40	76.34	0.357
2003	5,808,901	5,808,929	9,189,041	31.00	345.02	0.306
2004	6,774,521	6,730,217	7,166,471	85.00	226.22	0.805
2005	5,122,940	5,120,448	8,166,637	187.80	438.98	3.485
2006	3,193,544	3,187,897	10,818,356	144.90	276.99	0.342
2007	5,751,644	5,684,401	15,717,617	166.20	75.70	0.609
2008	2,883,533	2,883,286	11,199,849	225.20	183.92	0.867
2009	5,534,221	5,569,679	6,035,163	136.92	216.67	0.443
2010	2,235,030	2,275,959	4,951,340	635.30	317.30	2.890
2011	5,304,161	5,267,410	5,989,066	672.08	495.60	0.065
2012	1,315,141	1,315,141	4,523,375	436.13	247.00	0.827
Trigger (10th %ile)	5,159,184	5,149,840	5,270,362	17.40	87.38	0.294