

**2004 REVIEW OF THE FISHERY MANAGEMENT PLAN
FOR SPOT
(*Leiostomus xanthurus*)**

Prepared by:

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I. Status of the Fishery Management Plan

The *Fishery Management Plan (FMP) for Spot* was adopted in 1987 and includes the states from Delaware through Florida. In reviewing the early plans created under the Interstate Fisheries Management Plan process, the Spot FMP was seen by ASMFC as in need of review 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 (ASMFC Special Report #25).

Subsequent to the workshop and independent of it, the South Atlantic State/Federal Fisheries Management Board of ASMFC 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 The Board found recommendations in the plan to be too vague and perhaps no longer valid. The Board recommended that an amendment be prepared to the Spot FMP to define the management measures necessary to achieve the goals of the FMP; to date, this amendment has not been prepared. 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 order for a plan amendment to proceed, a plan development team needs to be appointed by the Management Board.

II. Status of the Stock

The area of greatest abundance on the Atlantic Coast extends from Chesapeake Bay to South Carolina. Except for Virginia, there is no specific spot stock status survey, but the species is a major component of samples in generalized trawl and seine surveys in several states. An analysis of spot catches in Maryland's juvenile seine survey showed a trend of increasing abundance from 1957 to 1976, and then, a protracted decline, punctuated by occasional high years, to very low levels in 2003. Spot young-of-year abundance in the Virginia Chesapeake Bay trawl survey conducted by VIMS, was relatively high from 1981 through 1990. Since 1992, spot young-of-the-year abundance has remained low except for a fair to moderate-sized 1997 yearclass (Figure 1). The abundance of juvenile spot in the North Carolina Pamlico Sound Survey has fluctuated without trend since 1979.

III. Status of the Fishery

Commercial landings of spot have fluctuated without trend from 5.4 to 8.8 million pounds from 1983-2003 (Table 1). Spot landings were at their highest over two decades ago, averaging over 10 million pounds from 1972-75. Small spot are a major component of the bycatch in seine, fish/shrimp trawl and pound net fisheries in the Chesapeake and in North Carolina, as well as a part of the bycatch of the South Atlantic shrimp trawl fishery.

The recreational harvest (A + B1 fish) of spot from along the Atlantic coast has varied from 3.6 million fish in 1999 to 20.1 million fish in 1983. (Table 2). The recreational harvest in 2003 was 9.1 million fish or 4.5 million pounds (Table 3). The number of spot harvested by the recreational fishery declined steadily from the early 1980's, reaching their lowest point in 1999 at 3.6 million fish. However in 2003, there was a 72% increase in the number of fish from 2002. The estimated number of spot released annually by recreational anglers from 1981 has remained relatively constant, ranging from 2.0 to 6.3 million fish with the exception of 1981 (11.1 million fish), 1990 (7.3 million fish) and 1991 (10.6 million fish) (Table 4). The number released alive in 2003 was 3.2 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. 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 been insufficient to determine the relationship between landings and abundance. An additional problem is the non-quantifiable incidental bycatch and discard mortality of small spot in non-directed fisheries.

V. Status of Research and Monitoring

Catch and effort data are collected by the commercial and recreational statistics programs conducted by the states. Fishery-independent data for spot are collected in the SEAMAP program from Cape Hatteras to Cape Canaveral. Recruitment indices are available from ongoing juvenile surveys in Delaware, Maryland, Virginia, North Carolina and Florida. Efforts are now underway to develop a comprehensive juvenile index utilizing data from many states. 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 also investigated the use of culling panels in pound nets, and found them successful and has recommended their use. North Carolina has conducted gear 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. In North Carolina, finfish reduction devices have been required in all shrimp trawls since the fall of 1992 (15A NCAC 3J.0104) and escape panels have been required (since April 1999) in the bunt nets of long haul seines in an area south and west of Bluff Shoals in the Pamlico Sound (15A NCAC 03J.0109). This rule was modified by the North Carolina Marine Fisheries Commission in August, 2003 to include more specific wording on installation and placement of the culling panels. This rule resulted from a NCDMF study on the use of culling panels in long haul and swipe nets (Gearhart 2000). At the state level, North Carolina has tested bycatch reduction devices in the shrimp trawl fishery and achieved finfish reductions of 50-70% with little loss of shrimp. North Carolina, South Carolina and Georgia require fish excluder devices in every trawl (except try nets) in the shrimp fishery. In the North Carolina flynet fishery, where a large portion of the spot catch occurs, there is a requirement for a minimum tailbag mesh of 3 1/2 inch diamond or 3 inch square. Furthermore, the state of North Carolina has banned flynet fishing in waters south of Cape Hatteras.

North Carolina also ages 400-500 spot across all fisheries to produce an annual age-length key. Age validation studies need to be conducted, as well as investigating the degree of mixing between state stocks during the annual fall migration. The CHESMAP trawl survey, being developed by Virginia Institute of Marine Science, will provide estimates of population size, distribution, food habits and seasonal length and age structure of spot in the Chesapeake Bay. The complimentary CHESFIMS survey being conducted by the University of Maryland will focus on fish in the shallow water habitat.

VI. Status of Management Measures and Issues

The Fishery Management Plan for Spot identified the following management measures (recommendation 1 as amended) for implementation:

1. Promote the development and use of bycatch reduction devices through demonstration and application in trawl fisheries.
2. Promote increases in yield per recruit through delaying entry to spot fisheries to age one and older.

Although the ISFMP Policy Board judged that FMP management recommendations were too vague and did not furnish objective compliance criteria, progress has been made on developing bycatch reduction devices (BRDs). The October 1993 spot and croaker workshop proceedings summarized much of the experimental work on bycatch reduction and examined the population implications of bycatch reduction. The Potomac River Fisheries Commission recommends large mesh bycatch reduction panels in all pound nets. It is estimated that the panels allow the release of 28% of captured spot less than six (6) inches in length. Evaluation of the beneficial effects of these BRDs to spot stocks, which are a component of a mixed species fishery and a mixed species bycatch, continues to need further study. A target reduction in bycatch of spot may be a suitable objective criteria in an amended plan. Only Georgia has a minimum size limit (Table 5). Spot are one of the most important forage species along the coast and its distribution and abundance must be considered in the coastal multispecies modeling efforts.

VII. Implementation of FMP Compliance Requirements as of October 1, 2003

There are no compliance requirements for this FMP.

VIII. Recommendations of FMP Review Team

Management and Regulatory Recommendations

- Develop an amended Spot FMP with objective compliance criteria.

Research and Monitoring Recommendations

High Priority

- In trawl fisheries or other fisheries that take significant numbers of spot, states should monitor and report on the extent of unutilized bycatch and fishing mortality on fish less than age-1.
- The effects of mandated bycatch reduction devices (BRD's) on spot catch should be evaluated in those states with significant commercial harvests.
- Fishery-dependent and fishery-independent size and sex specific relative abundance estimates should be developed.
- Cooperative coastwide spot juvenile indices should be developed to clarify stock status.
- Monitor 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, and investigate the degree of mixing between state stocks during the annual fall migration.
- Criteria should be cooperatively developed for aging spot otoliths and scales.

Medium Priority

- Develop stock assessment analyses appropriate to current data.
- A yield per recruit analysis should be cooperatively developed.
- Develop stock identification methods.
- Determine migratory patterns through tagging studies.
- Determine the onshore vs. offshore components of the spot fishery.

Table 1. Commercial landings (in pounds) of spot, 1960-2003 (source: pers. comm. NMFS Fish. Stats. & Econ. Div.).

Year	NY	NJ	DE	MD	VA	NC	SC	GA	FLEC	Total
1950	1,000	1,400	10,900	98,300	4,498,400	5,172,300	291,400		91,700	10,165,400
1951		126,900	17,700	128,600	5,030,500	4,614,500	2,646,000	1,200	280,500	12,855,900
1952		310,000	120,500	419,900	5,915,800	5,548,000	1,821,000	12,800	372,700	14,520,700
1953	2,100	86,000	44,700	283,400	3,912,300	2,814,700	440,000	8,800	344,600	7,936,600
1954	2,200	176,200	103,400	258,200	4,432,400	2,389,900	498,600	13,400	468,700	8,343,000
1955		49,200	228,100	407,600	3,948,800	1,898,000	1,130,300	103,000	361,400	8,126,400
1956		46,100	197,300	300,500	3,207,700	2,574,800	4,182,300	41,400	487,300	11,037,500
1957	6,400	172,400	132,300	589,100	3,471,200	2,157,500	2,097,900	64,400	340,500	9,031,700
1958		1,200	17,000	593,000	5,256,400	2,320,900	841,900	38,800	592,800	9,662,000
1959		11,300	19,700	85,000	3,754,500	2,264,900	1,840,700	300	1,032,300	9,008,700
1960		300	18,200	498,400	3,906,400	2,610,500	2,720,600	400	1,032,800	10,787,600
1961				9,600	1,183,900	2,055,700	3,468,500	100	928,600	7,646,400
1962		200		26,900	2,349,700	1,218,300	3,135,000	3,700	704,400	7,438,200
1963			500	15,200	1,474,800	915,500	2,719,200	4,100	1,127,000	6,256,300
1964		100		33,900	3,197,800	1,251,200	3,166,000	2,500	951,900	8,603,400
1965				600	1,750,500	912,600	1,174,000	11,000	938,100	4,786,800
1966				4,100	1,152,800	1,091,300	2,125,500	5,300	1,204,600	5,583,600
1967		100		248,300	4,253,300	3,047,900	2,219,100	10,500	898,500	10,677,700
1968				45,600	1,116,000	1,575,100	2,052,500	2,000	1,104,600	5,895,800
1969		6,400		20,700	1,048,500	1,487,800	453,500	2,400	874,600	3,893,900
1970		200		572,600	5,872,800	1,528,900	367,500	9,300	1,397,800	9,749,100
1971		3,100		20,300	503,600	1,190,100	1,285,500	5,800	2,891,100	5,899,500
1972		1,200		73,700	2,950,500	3,902,400	2,269,200	32,600	1,939,900	11,169,500
1973		9,500		27,100	2,576,000	5,397,400	1,455,300	33,900	920,700	10,419,900
1974		10,500		37,000	2,251,100	5,606,800	358,400	16,400	1,747,800	10,028,000
1975		58,500	17,000	102,900	1,918,400	8,299,800	1,490,800	8,900	841,100	12,737,400
1976	3,100	2,400	8,000	16,400	1,192,400	2,674,300	1,013,600	17,500	534,000	5,461,700
1977	5,600	20,400	11,400	16,400	1,866,600	3,805,200	294,600	7,100	1,029,000	7,056,300
1978	1,200	10,900	19,500	31,300	3,205,500	4,878,437	400,928	300	993,860	9,541,925
1979	300	1,800	18,100	10,600	2,541,000	7,303,405	418,480	250	871,375	11,165,310
1980	1,100	2,400	5,300	6,300	1,795,100	7,100,053	411,020	1,579	893,121	10,215,973
1981		6,000	11,100	14,200	1,025,800	3,511,574	127,384	7,721	2,798,881	7,502,660
1982		1,800	2,500	6,200	1,017,100	4,918,763	62,562	292	4,431,239	10,440,456
1983		800		129,400	1,567,900	2,952,295	240,096		2,266,296	7,156,787
1984		100		43,200	735,200	3,481,920	130,265		1,508,552	5,899,237
1985		2,400	17,200	7,700	1,561,739	4,043,843	142,755		1,399,819	7,175,456
1986		6,600	86,400	104,400	1,839,500	3,354,191	655,378	124	918,875	6,965,468
1987		15,900	140,100	251,800	3,721,100	2,806,041	220,553	1,528	943,713	8,100,735
1988		1,600	38,700	58,000	1,985,500	3,080,258	376,221	644	1,344,276	6,885,465
1989		8,200	29,000	115,800	2,468,100	3,254,473	31,472	361	1,144,639	7,053,374
1990		9,039	24,900	127,882	1,630,735	3,455,460	39,957	43	1,275,729	6,563,745
1991		54,433	236,200	216,035	2,539,340	3,047,305	31,787		1,051,532	7,176,632
1992		102,213	95,000	331,837	2,497,622	2,826,138	171,959	261	740,048	6,765,078
1993	63	10,900	22,000	182,198	3,349,399	2,672,164	251,225	1,276	826,312	7,315,567
1994		31,408	100,400	166,246	4,269,402	2,937,355	288,241		1,002,887	8,795,939
1995	22	30,151	62,000		3,622,954	3,006,885	209,132	247	558,087	7,489,478
1996	318	1,149		256,711	2,982,083	2,290,040	60,574		56,423	5,647,298
1997	189	6,175	35,686	120,331	3,465,507	2,627,977	87,170		227,097	6,570,132
1998	579	27,582	140,363	225,937	4,277,256	2,397,025	63,912		161,205	7,293,919
1999		7,822	51,534	223,463	2,961,890	2,262,213	9,393		72,898	5,589,213
2000	939	13,852	32,290	176,946	3,764,679	2,821,678	8,519		57,952	6,876,855
2001	160	20,034	78,272	283,488	3,248,212	3,093,921	12,950		33,056	6,770,093
2002	5,737	1,326	13,780	138,640	3,062,211	2,184,047	23,151		20,586	5,449,478
2003	35	6,003	77,031	184,437	3,471,484	2,043,421	68,148		10,332	5,860,891
Total	31,042	1,474,187	2,284,056	8,346,351	152,599,413	168,677,182	52,102,132	472,226	51,047,790	437,046,164

Table 2. Recreational harvest (numbers of A + B1 fish) of spot by state, 1981-2003 (source: pers. comm. NMFS Fish. Stats. & Econ. Div.).

Year	NY	NJ	DE	MD	VA	NC	SC	GA	FLEC	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		0	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			0	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	0	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		0	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		0	51,096	1,088,997	1,056,365	3,650,711	735,551	3,681	652,975	7,239,376
2002	0	0	22,013	690,515	1,601,837	2,586,313	393,597	6,987	25,907	5,327,169
2003		0	30,165	3,300,594	1,441,002	3,796,557	524,513	11,524	84,685	9,189,040
Total	583,111	1,411,761	1,022,418	35,882,483	90,179,493	71,304,819	22,349,951	1,433,488	7,326,612	231,494,136

Table 3. Recreational harvest (pounds of A + B1 fish) of spot by state, 1981-2003 (source: pers. comm. NMFS Fish. Stats. & Econ. Div.).

Year	NY	NJ	DE	MD	VA	NC	SC	GA	FLEC	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		0	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			0	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	0	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		0	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		0	20,110	629,861	523,202	1,773,671	346,878	1,720	284,706	3,580,148
2002	0	0	10,871	336,660	829,972	984,898	140,164	2,857	7,840	2,313,262
2003		0	14,385	1,690,503	875,729	1,714,158	227,821	5,710	26,504	4,554,810
Total	163,384	310,898	385,865	14,325,951	31,429,492	24,991,016	7,046,567	412,495	2,595,761	81,661,429

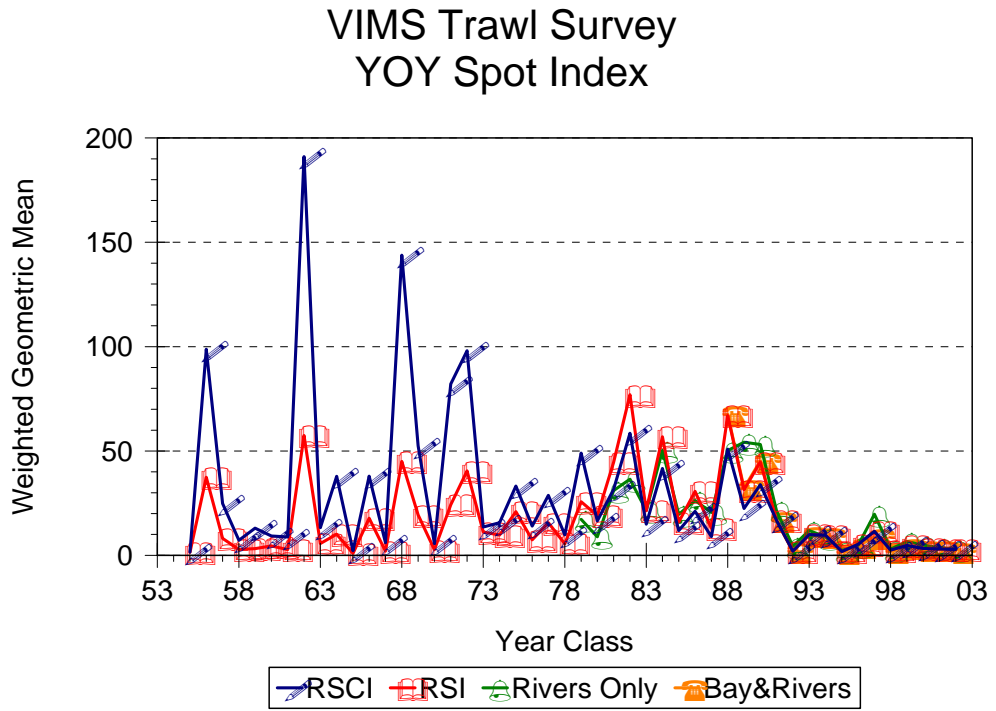
Table 4. Recreational releases (B2 fish) of spot by state, 1981-2003 (source: pers. comm. NMFS, Fish. Stats. and Econ. Div.)

Year	NY	NJ	DE	MD	VA	NC	SC	GA	FLEC	Total
1981	0	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	0	1,114,795	2,715,522	634,107	192,240	39,798	186,615	4,940,633
1984		0	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	0	79,712	0	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	0	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	0	0	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
Total	197,656	1,680,951	517,131	23,326,690	49,495,475	18,215,697	5,020,887	417,817	2,963,132	101,835,436

Table 5. Summary of current state regulations for spot.

State	Recreational	Commercial
New York	none	none
New Jersey	none	none
Delaware	none	none
Maryland	Sport fishing license is required in Chesapeake Bay, but not Maryland's Atlantic coastal waters.	State license to sell fish is required
PRFC	Sport fishing license	none
Virginia	Sport fishing license	none
North Carolina	none	none
South Carolina	Sport fishing license	none; state license required to land/sell
Georgia	8" TL; 25 fish limit and Sport fishing license	8" TL; 25 fish limit
Florida	Sport fishing license	none

Figure 1:



YOY spot random stratified (RSI), random stratified converted (RSCI), fixed transect (Rivers Only), and Bay and fixedriver station indices.