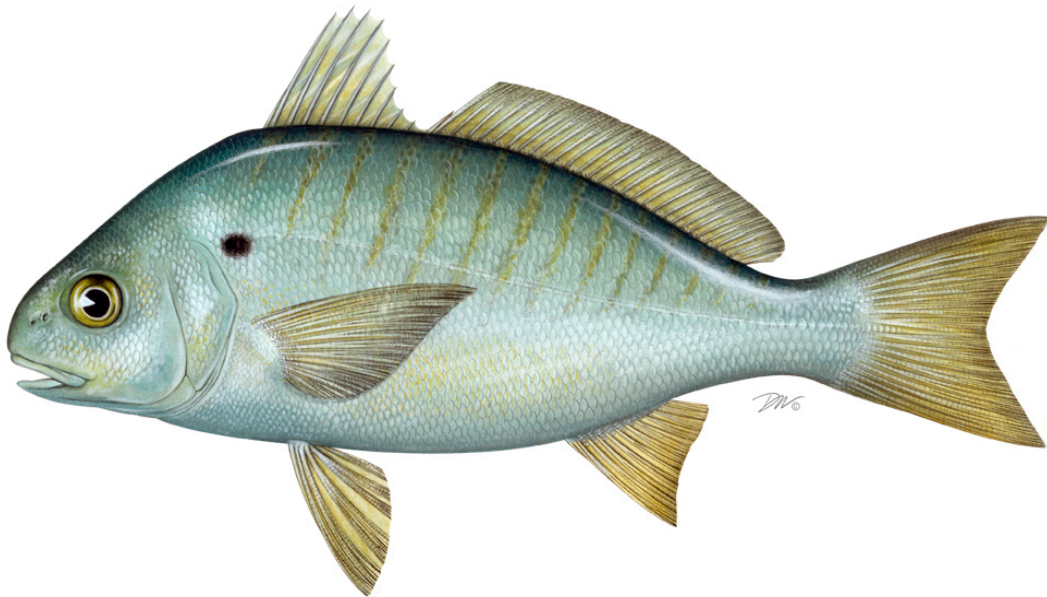


ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR SPOT
(Leiostomus xanthurus)

2015 FISHING YEAR



Prepared by the Plan Review Team

Approved by the South Atlantic Management
Board February 2017

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I. Status of the Fishery Management Plan

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

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

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

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

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 The Management Board found recommendations in the plan to be vague and perhaps no longer valid, and recommended that an amendment be prepared to the Spot FMP to define the management measures necessary to achieve the goals of the FMP.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

In August 2014, the Board approved Addendum 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

A stock assessment for spot is in progress and will be submitted to the South Atlantic Management Board in 2017. As an assessment is currently in progress, a TLA was not conducted for spot 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 10th percentile of the data sets' time series. If two terminal values of the five data sources (at least one of which must be fishery independent) fell below the 10th percentile, the Management Board would be prompted to consider management action.

In August 2014, the Board approved Addendum 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% 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 (Figure 1). This decline was driven mostly by the decline in commercial landings rather than the recreational harvest. The composite harvest index did not trip in 2013-2014. However, this index did trip in 2012-2013 with an average red percentage of 38%.

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 1). 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 for spot.

III. Status of the Fishery

Total landings of spot from NJ to FL in 2015 are estimated at 4.44 million pounds, a decrease of nearly 4,000,000 lbs from 2014 and roughly 2.8 million lbs less than the average of the last 10 years (7,189,579) (Tables 1 and 3). The recreational fishery harvested slightly more than the commercial fishery (51% and 49% respectively, by pounds). Although, historical commercial harvests were larger than recreational harvests, over the last 10 years proportions of commercial and recreational harvests have been almost equal (51% and 49% respectively, by pounds).

Commercial spot landings have ranged between 1.37 and 14.52 million pounds from 1950-2015 (Figure 2), with the 2015 landings (2.16 million pounds) being less than half of 2014 landings. Coastwide, gillnets were used to capture 47% of commercially harvested spot (Table 2). Virginia landed approximately 72% of the commercial harvest (by pounds) in 2015, followed by North Carolina with 17% of the harvest. Spot are a major component of Atlantic coast scrap landings (NCDMF 2001). A scrap fishery is one in which fish species that are unmarketable as food, due to size or palatability, are sold unsorted, usually as bait. The largest bycatch component for spot comes from the South Atlantic shrimp trawl fishery.

The recreational harvest of spot along the Atlantic coast from 1981 to 2015 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. Since then, harvest has generally declined, with a 2015 harvest of 6.1 million fish, down 2.6 million fish from 2014 (Figure 3). Anglers in South Carolina were responsible for 52% of the total number of fish harvested in 2015, followed by anglers in North Carolina (17.8%) and Virginia (14.3%). 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 1.9 and 11.2 million fish, with 2015 releases estimated at 2.49 million fish.

IV. Status of Assessment Advice

A formal stock assessment of spot has not been completed. The 1987 FMP recognized the lack of biological and fisheries data necessary for a 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 (this occurred in 2015).

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 2017.

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

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

Maryland: Maryland conducts an onboard commercial pound net survey on the Potomac River and the Chesapeake Bay, sampling once per week from May through September and collecting length and age data.

Virginia: Virginia's Marine Resources Commission collects biological data from Virginia's commercial and recreational fisheries, with total length, weight, sex, and age measured whenever possible. The fish are aged by examining otoliths, which is done by Old Dominion University's Center for Quantitative Fisheries Ecology.

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), the National Marine Fisheries Service's Marine Recreational Information Program (MRIP), and a SCDNR-managed mandatory trip reporting system for licensed charterboat operators.

Georgia: The Marine Sportfish Carcass Recovery Project, a partnership with recreational anglers along the Georgia coast, was used to collect biological data from finfish. In 2015, a total of 3,696 fish carcasses were donated through this program. Spot were not present in the list of donated species for 2015.

Below is a description of fishery independent sampling conducted by 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 2015 were: 0.63, 0.02, and 0.19 (2014 values were: 0.31, 0.01, and 0.06, respectively).

Delaware: Annual relative abundance estimates (number/nautical mile) of spot in Delaware are monitored through the Division's adult ground fish bottom trawl survey. The relative abundance of spot decreased to 3.39 (#/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, 0.42 per tow (geometric mean), increased in 2015 relative to 2014 for the Delaware Estuary and was below the time series mean and median. The Inland Bays YOY index increased to 2.46 per tow, and remained below the time series mean in 2015.

Maryland: Maryland conducted a fisheries independent gill net survey on the Choptank River once per week from June 6, 2015 to August 27, 2015, with the exception of the second week in July. Experimental monofilament gill nets with stretched mesh sizes of 2.5, 3.0, 3.5 and 4.0 inches were set at four randomly selected locations within the sampling area. The 2.5 inch mesh captured the majority of spot in each year from 2013-2015, accounting for 73 - 95% of the catch annually. Fish in 200 and 210 mm length bins accounted for over 60 % of the length frequency distributions in 2013 and 2014. The distribution shifted toward larger fish in 2015, with only 24% of captured fish in the 200 and 210 mm length groups.

Finfish collected by Maryland's Chesapeake Bay Blue Crab Trawl Survey have been enumerated since 1980, (Davis et al.1995). 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 the time series low of 0.29 fish per tow in 2015. A second JI was derived from the Striped Bass Juvenile Seine Survey (JSS). The 2015 geometric mean (GM) catch per haul was 0.06, the second lowest value of the 49-year time series. A 4.9-m semi-balloon otter trawl has also been used to sample Maryland's Atlantic coastal bays since 1972. The 2015 GM of 2.74 spot per hectare was an increase from very low values in 2013 and 2014, but was still below the 27 year time series mean of 9.48. The final juvenile index is derived from the coastal bays seine survey. The 2015 GM catch per haul was 4.59, an increase from the previous year but still below the time series mean of 7.83.

Virginia: The Virginia Institute of Marine Science (VIMS) has been conducting a monthly juvenile trawl survey since 1955 to monitor the abundance and seasonal distribution of finfish and invertebrates in the Chesapeake Bay and its tributaries. An index of age-0 spot abundance is available from 1988 up to 2015, with sampling coming from tributaries of the Chesapeake Bay (fixed and random sites) as well as the bay itself (random sites). The average index value is 13.83, and the 2015 value was the lowest in the time series.

North Carolina: North Carolina has no current fishery-independent monitoring programs specifically for spot. However, the NCDMF has conducted a stratified random trawl survey in

Pamlico Sound (Pamlico Sound Survey, Program 195) since 1987 to obtain juvenile abundance indices (JAI) for several economically important species, including spot. The 2015 spot JAI (mean number of individuals/tow) was 405.48, a slight decline from the 2014 JAI of 410.64.

South Carolina: While Spot are not necessarily a specifically targeted species for SCDNR monitoring programs or projects, they are a common component species of four fishery independent monitoring efforts conducted by the SCDNR. The Southeast Area Monitoring and Assessment – South Atlantic Program (SEAMAP-SA) is a shallow water (15 to 30 ft depth) trawl survey that monitors status and trends of numerous coastal species within the South Atlantic Bight seasonally (spring, summer and fall) from Cape Canaveral, FL to Cape Hatteras, NC. The annual stratified mean catch per tow in weight for the entire survey in 2015 was 12.3 kg/tow, a 9.2% decline from 2014 (13.5 kg/tow). The second survey is an inshore estuarine trammel net survey conducted by the SCDNR. In 2015, CPUE increased slightly (10.1%) from 2014, and remained below the long-term mean for a sixth year. The third survey was an electroshock survey conducted in low salinity brackish and tidal freshwater portions of different South Carolina estuaries. The CPUE in 2015 (4.4 ± 0.55 fish per set) declined from 2014 by 70% and was the lowest annual CPUE on record for the survey. The fourth survey is the South Carolina Estuarine and Coastal Assessment Program (SCECAP). The CPUE declined in 2015 from 2014 to the lowest value in the time series (6.9 fish per hectare) and remained well 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 2015, 150 trammel and 216 gill net sets captured 171 and 452 spot, respectively. Average fork length of spot in trammel nets was 205 mm and in the gillnet survey was 197 mm. The 2015 geometric means (#/net set) from both trammel and gill nets (0.54 and 0.89) were greater than those of 2014 (0.31 and 0.25, respectively). The monthly Ecological Monitoring Survey (EMS) samples estuarine finfish from a total of 42 stations, distributed amongst 6 estuaries, from January to December. Average fork length of spot captured in this survey was 134 mm. The 2015 geometric mean (4.41 fish/standard 15 minute trawl) was lower than the 2014 geometric mean (5.12 fish/standard 15 minute trawl), but greater than the average of the last five years.

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. However, only Georgia has implemented a spot creel limit (25 fish, both recreational and commercial, except for shrimp trawlers).

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

North Carolina: There are no direct restrictions on the commercial harvest of spot within coastal, joint, or inland waters of North Carolina. There are however numerous indirect restrictions that effect the commercial harvest and bycatch of spot in North Carolina. Changes to such restrictions for 2015 include: Gill net restrictions for Internal Coastal Waters pertaining to area closures/openings, gear modifications

and attendance rules to avoid interactions with endangered species and requiring the use of an additional BRD for shrimp trawlers (Proclamation SH-2-2015).

De minimis Guidelines

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

VII. De Minimis Requests

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

VIII. Implementation of FMP Compliance Requirements for 2015

All states within the management unit have submitted compliance reports for the 2015 fishing year. The PRT found no compliance issues.

IX. 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.
- 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

- 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.

X. 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.
- NCDMF. 2001. Assessment of North Carolina commercial finfisheries, 1997–2000. Final Report, North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Award Number NA 76 FI 0286, 1-3.
- 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: Traffic Light Approach for spot, 2014. Top figure shows the harvest composite index and the bottom figure shows the abundance composite index.

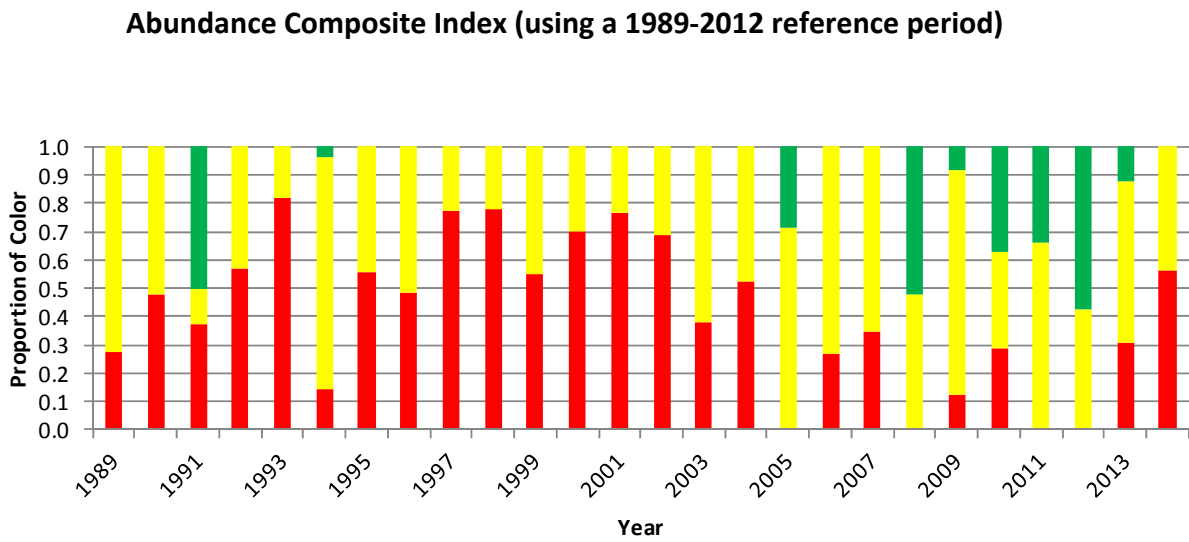
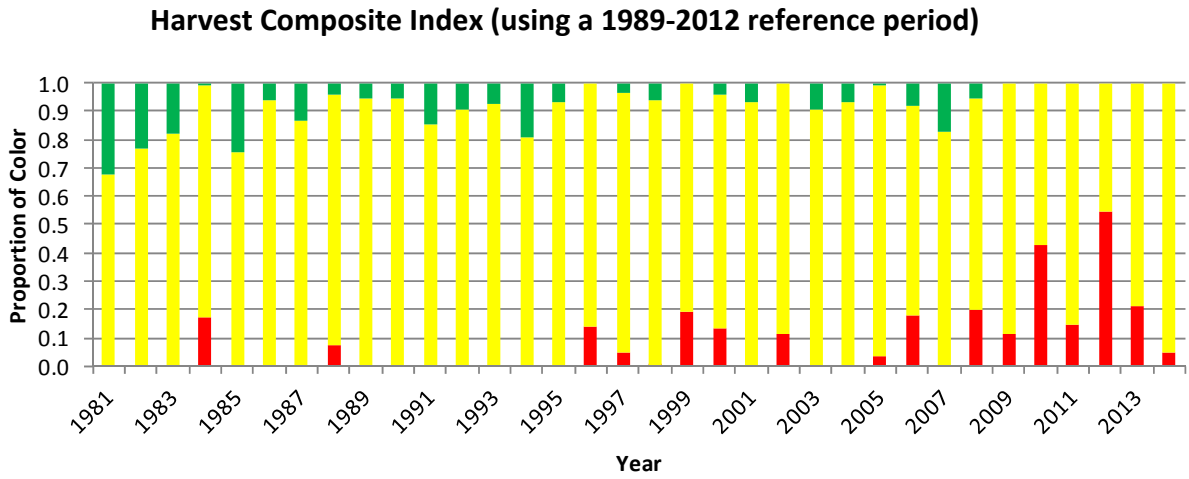


Figure 2: Spot commercial and recreational landings (pounds), 1950-2015.

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

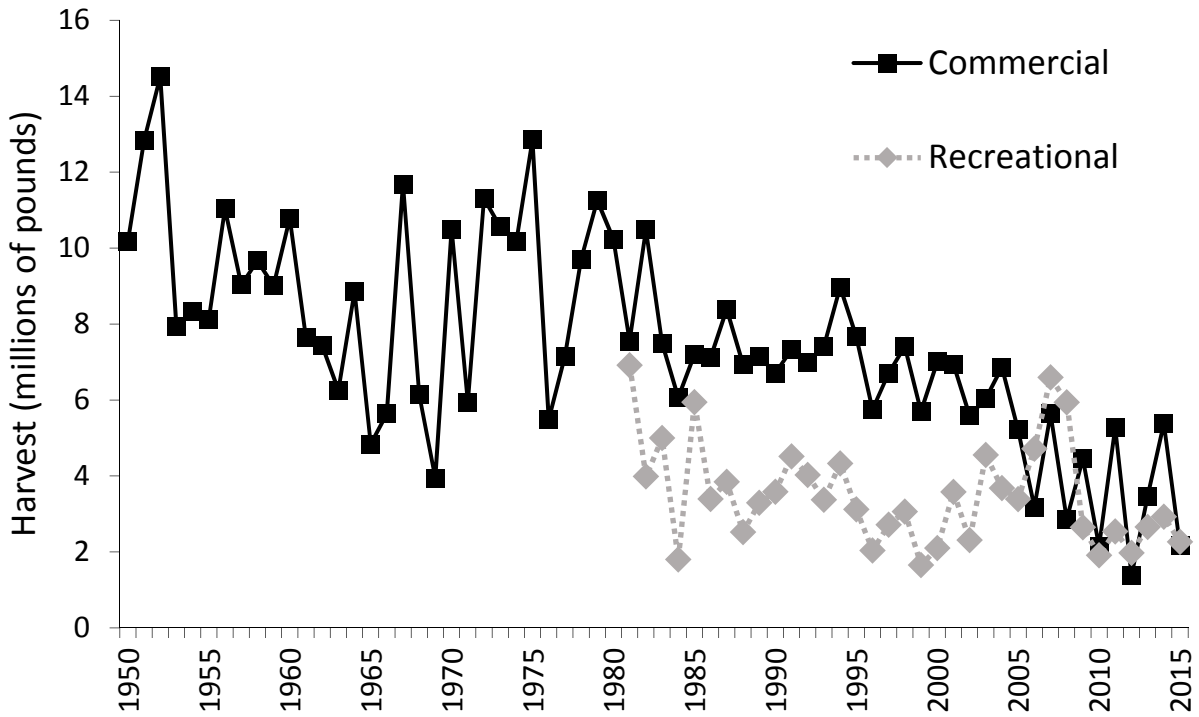
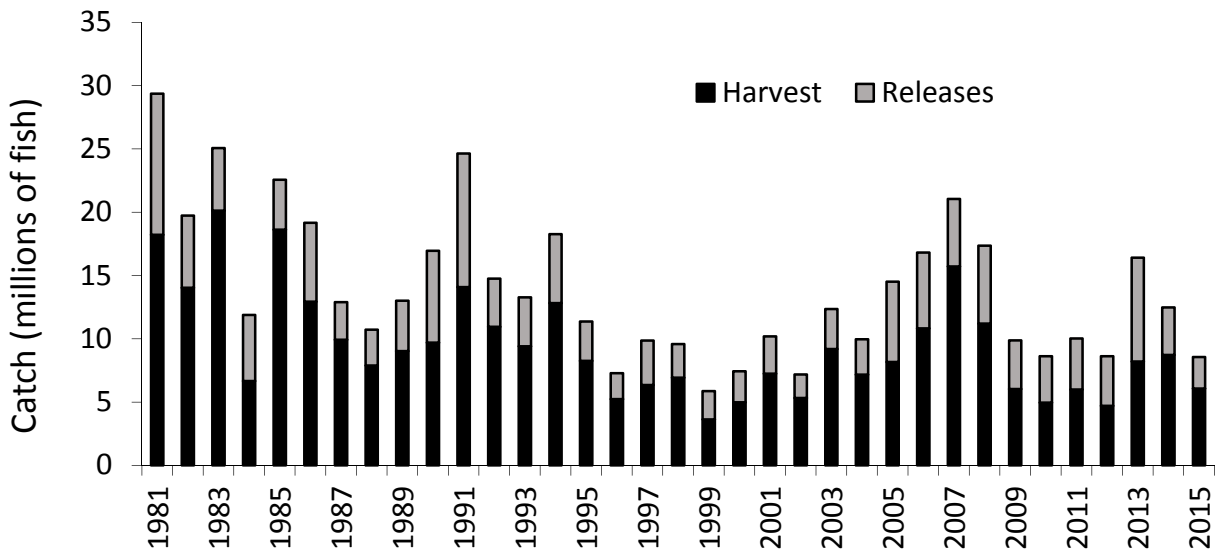


Figure 3. Spot recreational harvest and releases (numbers of fish), 1981-2015

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



XI. Tables

Table 1. Commercial landings (pounds) by state, and estimated value (ex-vessel), 1981-2015
 [Source: NMFS Fisheries Statistics Division (queried 12/19/2016) & State Compliance Reports (received 11/01/2016)]. Starred values are confidential.

Year	NY	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
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
1982		1,800	2,500	6,200	45,946	1,017,100	4,918,763	62,562	292	4,431,239	10,486,402
1983		800		129,400	347,416	1,567,900	2,952,295	240,096		2,266,296	7,504,203
1984		100		43,200	165,524	735,200	3,481,920	130,265		1,508,552	6,064,761
1985		2,400	17,200	7,700	19,912	1,561,739	4,043,843	142,755		1,399,819	7,195,368
1986		6,600	86,400	104,400	148,004	1,839,500	3,354,191	655,378	124	918,875	7,113,472
1987		15,900	140,100	251,800	291,964	3,721,100	2,806,041	220,553	1,528	943,713	8,392,699
1988		1,600	38,700	58,000	53,865	1,985,500	3,080,258	376,221	644	1,344,276	6,939,064
1989		8,200	29,000	115,800	90,920	2,468,100	3,254,473	31,472	361	1,144,639	7,142,965
1990		9,039	24,900	127,882	145,535	1,630,735	3,455,460	39,957	43	1,275,729	6,709,280
1991		54,433	236,200	216,035	147,355	2,539,340	3,047,305	31,787		1,051,532	7,323,987
1992		102,213	95,000	331,837	226,335	2,497,622	2,826,138	171,959	261	740,048	6,991,413
1993	63	10,900	22,000	182,198	88,988	3,349,399	2,672,164	251,225	1,276	826,322	7,404,535
1994		31,408	100,400	166,246	181,127	4,269,402	2,937,355	288,241		1,002,887	8,977,066
1995	22	30,151	62,000		177,780	3,622,954	3,006,885	209,132	247	558,087	7,667,258
1996	318	1,149		256,711	101,670	2,982,083	2,290,040	60,574		56,423	5,748,968
1997	189	6,175	35,686	120,331	134,591	3,465,507	2,627,977	87,170		227,097	6,704,723
1998	579	27,582	140,363	225,937	117,580	4,277,256	2,397,025	63,912		161,205	7,411,439
1999		7,822	51,534	223,463	108,326	2,961,890	2,262,213	9,393		72,973	5,697,614
2000	939	13,852	32,290	176,946	120,642	3,764,679	2,829,818	8,519		57,946	7,005,631
2001	160	20,034	78,272	283,488	176,546	3,248,212	3,093,921	12,950		33,056	6,946,639
2002	5,737	1,326	13,780	138,640	140,776	3,062,211	2,184,076	23,151		20,586	5,590,283
2003	35	6,003	77,031	184,437	227,430	3,471,484	2,043,421	17,181		9,337	6,036,359
2004	98	1,652	58,502		131,605	4,338,082	2,317,215	1,876		12,792	6,861,822
2005	435	769	155,299	114,987	95,350	3,102,816	1,714,518	10,468		21,156	5,215,798
2006	2,959	3,646	7,522	34,018	40,777	1,695,985	1,364,797	5,691		22,502	3,177,897
2007	1,080	4,474	61,637	389,514	70,514	4,327,887	879,135	6,357		14,317	5,637,154
2008	650	1,942	32,496	123,571	29,835	1,976,661	737,293	1,492		9,181	2,863,714
2009	317	34,063	60,671	521,958	63,470	3,910,221	1,006,550	22,557		22,057	4,456,467
2010	447	6,048	59,800	589,560	44,025	1,023,948	572,345	3,957		13,438	2,143,898
2011	159	54,890	81,868	612,391	60,106	3,741,879	936,993	12,162		33,879	5,272,523
2012	90,141	9,935	17,752	101,677	14,563	613,337	489,708	541		36,591	1,374,245
2013	156,752	48,324	73,191	262,692	41,286	2,084,551	768,621	2,446		31,249	3,469,112
2014	2,113	29,683	107,139	320,804	148,908	3,983,384	766,245	5,917	*	16,747	5,381,160
2015	901	355	3,546	88,117	86,972	1,577,765	377,358	1,619		27,969	2,164,602

Table 2. Commercial landings (pounds) by gear, 2015

[Source: NMFS Fisheries Statistics Division (queried 12/19/2016)]

Gear	Landings (lbs)	Percent of Total
Gill nets	1,565,746	80.4%
Haul Seins	111,182	5.7%
Pound Net	133067	6.8%
Trawl	5,698	0.3%
Other	132,819	6.8%
Total	1,948,512	

Table 3. Recreational harvest (pounds) by state, 1981-2015

[Source: State Compliance Reports (received 11/01/2016)]

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
2015		0	3,274	187,061	378,959	395,268	1,166,210	575	134,445	2,265,792

Table 4. Recreational harvest (numbers) by state, 1981-2015

[Source: State Compliance Reports (received 11/01/2016)]

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
2015		0	10,277	524,079	867,365	1,081,083	3,157,322	36,684	391,653	6,068,463

Table 5. Recreational releases (numbers) by state, 1981-2015

[Source: State Compliance Reports (received 11/01/2016)]

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
2015		0	11,404	242,912	509,194	708,122	744,532	34,884	238,078	2,489,126