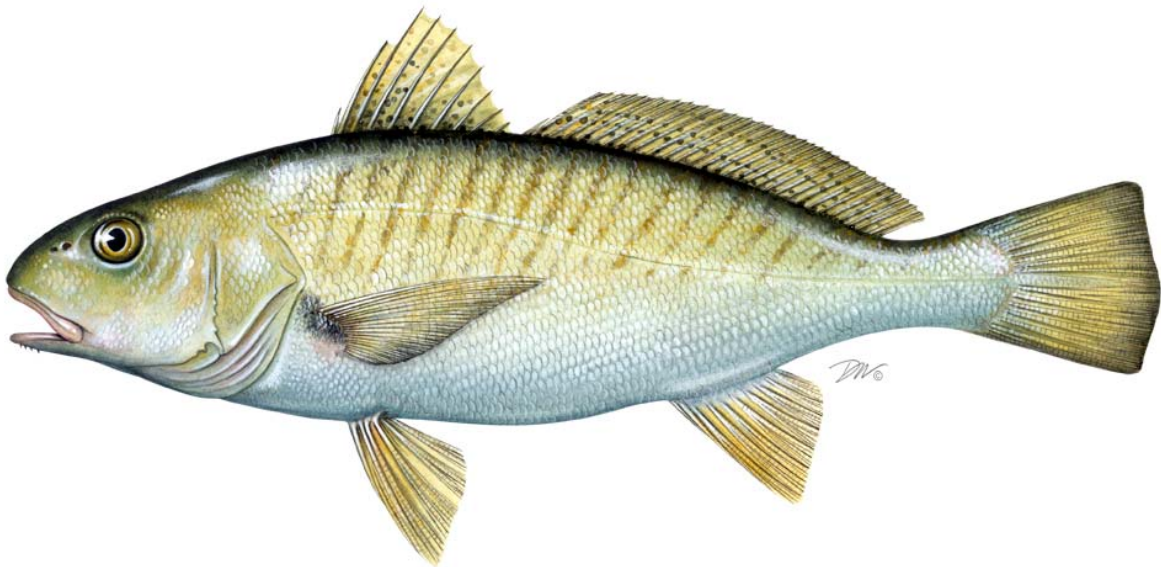


REVIEW OF THE
INTERSTATE FISHERY MANAGEMENT PLAN FOR

ATLANTIC CROAKER
(Micropogonias undulatus)

2008 FISHING YEAR



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I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	Original FMP – October 1987
<u>Amendments:</u>	Amendment 1 – November 2005 (implemented January 2006)
<u>Management Areas:</u>	The Atlantic coast distribution of the resource from New Jersey through Florida - North-Atlantic Region: New Jersey through North Carolina - South-Atlantic Region: South Carolina through Florida
<u>Active Boards/Committees:</u>	South Atlantic State/Federal Fisheries Management Board; Atlantic Croaker Technical Committee, Stock Assessment Subcommittee, and Plan Review Team; South Atlantic Species Advisory Panel

The Fishery Management Plan (FMP) for Atlantic Croaker was adopted in 1987 and included the states from Maryland through Florida (ASMFC 1987). Subsequently, the South Atlantic State/Federal Fisheries Management Board (Board) reviewed the FMP and found its recommendations to be vague and recommended that an amendment be prepared to define management measures necessary to achieve the goals of the FMP. The Interstate Fisheries Management Program Policy Board also adopted the finding that the original FMP did not contain any management measures that states were required to implement.

In 2002, the Board directed the Atlantic Croaker Technical Committee to conduct the first coastwide stock assessment of the species in preparation of developing an amendment. The Atlantic Croaker Stock Assessment Subcommittee developed a stock assessment in 2003, which was approved by a Southeast Data Assessment Review (SEDAR) panel for use in management in June 2004 (ASMFC 2005a). The Board quickly initiated the development of an amendment. In November 2005, the Board approved Amendment 1 to the Atlantic Croaker FMP (ASMFC 2005b). The amendment was fully implemented by January 1, 2006.

The goal of Amendment 1 is to utilize interstate management to perpetuate the self-sustainable Atlantic croaker resource throughout its range and generate the greatest economic and social benefits from its commercial and recreational harvest and utilization over time. Amendment 1 contains four objectives:

- 1) Manage the fishing mortality rate for Atlantic croaker to provide adequate spawning potential to sustain long-term abundance of the Atlantic croaker population.
- 2) Manage the Atlantic croaker stock to maintain the spawning stock biomass above the target biomass levels and restrict fishing mortality to rates below the threshold.
- 3) Develop a management program for restoring and maintaining essential Atlantic croaker habitat.
- 4) Develop research priorities that will further refine the Atlantic croaker management program to maximize the biological, social, and economic benefits derived from the Atlantic croaker population.

Amendment 1 expanded the management area to include the states from New Jersey through Florida. Consistent with the stock assessment, it defines two Atlantic coast management regions:

the south-Atlantic region, including the states Florida through South Carolina; and the mid-Atlantic region, including the states North Carolina through New Jersey.

Biological reference points (BRPs) were established to define overfished stock status and overfishing for the mid-Atlantic region only. Stock estimates and BRPs for the South Atlantic region were not available due to a lack of data. Mid-Atlantic overfished status is defined by a threshold female spawning stock biomass (SSB) of 44.65 million pounds, with a target SSB of 63.78 million pounds. Overfishing for the Mid-Atlantic is defined by a threshold fishing mortality rate (F) of 0.39, with a target F of 0.29. Should it be determined that the stock is overfished or that overfishing is occurring, the Management Board will take action to recover the stock to the desired target level or to reduce the fishing mortality on the stock to the desired target level. In such a case, the Management Board will determine a stock rebuilding schedule.

Amendment 1 does not require any specific measures restricting recreational or commercial harvest of Atlantic croaker. States with more conservative measures are encouraged to maintain those regulations. See Table 1 for state regulations in 2008. Through adaptive management, the Management Board may revise Amendment 1, and regulatory and/or monitoring requirements could be included in the resulting addendum, along with procedures for determining de minimis status and implementing alternative management programs via conservation equivalency. The only existing requirement is for states to submit an annual compliance report by July 1 of each year that contains commercial and recreational landings as well as results from any monitoring programs that intercept Atlantic croaker.

II. Status of the Stock

The latest stock assessment was completed in 2004 and reviewed by a SEDAR peer review panel (ASMFC 2005a). The Stock Assessment Subcommittee used an Age Structured Production Model. The assessment only accounts for the Mid-Atlantic region (North Carolina and north); there was insufficient data to assess the South Atlantic region (South Carolina through Florida). In the Mid-Atlantic region, Atlantic croaker are not overfished or experiencing overfishing.

For the base Mid-Atlantic run, the trend in population abundance indicates a step-wise increase reaching a peak of 974 million fish in 1999. Population estimates from 1999 to 2002 have ranged from 663 to 974 million fish. Spawning stock biomass (SSB) estimates exhibit a cyclical trend over the time series (Figure 1). From the early 1970s to 1983, SSB declined to its lowest level (11,746 MT). Since 1984, SSB has increased in three distinct phases, with estimates reaching a maximum of 96,686 metric tons in 1996. Between 1997 and 2002, SSB estimates range between 80,000 and 91,000 metric tons.

In the assessment, the fishing mortality rate (F) is based on the average population weighted F for ages 1-10+. From 1977 to 1979, F rose rapidly reaching a maximum of 0.5 in 1979 (Figure 2). From 1980 onwards, F rapidly declined reaching its lowest levels in 1992. Since 1993, F has gradually increased and stabilized in 2002 at around 0.11.

Between 1973 and 2002 the relationship between the different sources of removals has changed. In particular, estimates of scrap/discards peaked in 1979 (3,200 MT) and since then declined to their lowest levels in 2002 (425 MT). Between 1973 and 1995, scrap/discard removals averaged 1,687 MT per year, whereas between 1996-2002 scrap/discards averaged 595 MT per year. It

appears that the significant reduction in removals of predominantly age 1 and younger fish may have contributed to relatively stable fishing mortality and spawning stock biomass estimates since the mid-1990s.

The commercial and recreational catch-at-age data from recent years also shows an increasing age distribution, with a few fish of 12 years being observed in the commercial landings. Anecdotal evidence from the Mid-Atlantic indicates an expansion of the population at the northern part of the range. For example, in Delaware, fishery independent indices indicate a recent increase in abundance of Atlantic croaker in the region. In addition, both commercial and recreational landings from New Jersey and Delaware have increased recently. The population has benefited from good recruitment in recent years (Figure 1), which may also be tied to the regulatory changes that have affected some of the fisheries that indirectly catch Atlantic croaker.

While the assessment does not capture all of the sources of uncertainty, examination of the effects of alternate weightings of the likelihood components and alternate steepness and natural mortality estimates indicate that reference points derived from the base run are relatively robust. The reference points suggest that there was less than a 10% chance that the population is overfished or undergoing overfishing. Sensitivity analysis evaluating the inclusion/non-inclusion of shrimp bycatch estimates indicate that SSB_{msy} estimates are sensitive to the inclusion of Atlantic croaker caught as shrimp bycatch. However, increased SSB_{msy} estimates are also accompanied by higher SSB estimates. The ratio of $SSB_{2002}:SSB_{msy}$ when shrimp bycatch is included indicates that the stock is unlikely to be below the threshold estimates. Of concern would be management goals that define biomass reference points in absolute terms. There appears to be some justification for revising the reference points for the biomass target and threshold to relative terms until a more comprehensive evaluation of Atlantic croaker from shrimp bycatch can be carried out.

III. Status of the Fishery

Total Atlantic croaker harvest from New Jersey through the east coast of Florida in 2008 is estimated at 24.9 million pounds (Tables 1 and 2, Figure 3). This represents a 40 percent decline in total harvest since the peak at 41.2 million pounds in 2001 (35% commercial decline, 52% recreational decline). The commercial and recreational fisheries harvested 79 and 21 percent of the total, respectively. The vast majority of landings are from the Mid-Atlantic region (98% in 2008), and the recent decline in total landings is a result of both commercial and recreational landings declines in that region (Figure 4). Commercial and recreational landings in the South Atlantic region have been generally stable over the last decade, with an increasing trend in recreational landings in recent years.

Atlantic coast commercial landings of Atlantic croaker exhibit a cyclical pattern, with low domains in the 1960s to early 1970s and the 1980s to early 1990s, and high domains in the mid-to-late 1970s and the mid-1990s to the present (Figure 3). Commercial landings increased from a low of 3.7 million pounds in 1991 to 30.1 million pounds in 2001 (Table 2); however, landings have declined consistently since 2003 to 19.6 million pounds in 2008, although this is still above the 1960-2008 average of 13.6 million pounds. Within the management unit, the majority of 2008 commercial landings came from Virginia (61%) and North Carolina (30%). The remaining states each landed five percent or less.

From 1981-2008, recreational landings of Atlantic croaker from New Jersey through Florida have varied between 2.8 million fish (1.3 million pounds) and 13.2 million fish (11.1 million pounds), with landings general increases until 2001 before declining through 2008 (Tables 3 and 4, Figure 5). Recreational harvest in 2008 is estimated at 9.2 million fish (5.3 million pounds). Virginia was responsible for 71% of the 2008 recreational harvest, in numbers of fish, followed by Maryland (8%), and Florida (7%). The remaining states each landed five percent or less of the coastal total. The number of recreational releases has increased over the time series (Figure 5). In 2008, anglers released 13.9 million fish, about 4.7 million more fish than they landed (Table 5).

IV. Status of Assessment Advice

In 2003, the Atlantic Croaker Stock Assessment Subcommittee conducted a stock assessment for Atlantic croaker. A SEDAR Peer Review Panel reviewed this assessment in October 2003. The panel recommended additional data for inclusion in the assessment and for the Technical Committee to evaluate the use of other types of models. The Stock Assessment Subcommittee re-ran the assessment in 2004 with the changes that the SEDAR panel recommended. This assessment was reviewed by the same SEDAR panel in June 2004. The panel approved this assessment for management purposes.

The next benchmark stock assessment is underway in 2009, and will be peer reviewed through a SEDAR workshop in March 2010.

V. Status of Research and Monitoring

The following state and agency fishery dependent (other than harvest data) and independent monitoring programs were reported in the annual compliance reports.

Fishery Dependent Monitoring

- New Jersey: commercial fishery biological monitoring since 2006 (608 length measurements and 497 otolith ages in 2008)
- Maryland: commercial pound net fishery biological monitoring (1532 length measurements, 288 otolith ages, and 306 weight measurements and sex determinations in 2008); charter boat log book harvest, effort, and CPUE
- Potomac River Fisheries Commission: commercial effort data
- Virginia: commercial fishery biological monitoring (3605 length measurements, 546 otolith ages, 3604 weight measurements, and 1167 sex determinations in 2008)
- North Carolina: commercial fishery biological sampling for length, weight, otoliths, sex, and reproductive condition; recreational commercial gear fishery catch and effort data (discontinued in 2009)
- South Carolina: state finfish survey catch, effort, and length measurements
- Florida: commercial effort data, length measurements (7 fish in 2008)

Fishery Independent Monitoring

- New Jersey: nearshore ocean (within 12 nm) juvenile trawl surveys (1989-present); nearshore Delaware Bay juvenile trawl survey (1991-present); Delaware River juvenile seine survey (1980-present)
- Delaware: offshore Delaware Bay adult finfish trawl survey (1966-present); nearshore Delaware Bay and River juvenile finfish trawl survey (1980-present)
- Maryland: Atlantic coast bays juvenile otter trawl survey (standardized from 1989-present); Chesapeake Bay juvenile trawl survey (standardized from 1989-present); Maryland coastal

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bays juvenile seine survey (1972-present); Chesapeake Bay juvenile seine survey (1959-present)

- Virginia: VIMS Juvenile Finfish and Blue Crab Trawl Survey (1988-present)
- North Carolina: Pamlico Sound juvenile trawl survey (1987-present)
- South Carolina: estuarine electroshock survey for juveniles (1991-present); SEAMAP shallow water (15-30 ft) trawl survey from Cape Hatteras to Cape Canaveral (1989-present)
- Georgia: Marine Sportfish Population Health Survey (trammel and gill net, 2002-present); Ecological Monitoring Survey (trawl, 2003-present)
- Florida: juvenile seine survey (1996-present); juvenile trawl survey (2002-present); adult haul seine survey (2001-present)

The Northeast Fishery Science Center's groundfish trawl survey also samples croaker from New Jersey to Cape Hatteras. Researchers from various agencies and institutions have conducted numerous studies on Atlantic croaker. Research topics include, but are not limited to: environmental effects on recruitment, population modeling, genetic stock identification, geographic variation in life history/populations dynamics, scale-otolith age comparisons, habitat preference, and bycatch reduction gear research.

Ageing Workshop

An Atlantic Croaker Ageing Workshop was held in October 2008. Conducting a workshop to standardize the otolith sectioning and ageing procedures and the current age dataset had been a longstanding research need for Atlantic croaker, especially prior to the ongoing benchmark assessment. Representatives from New Jersey, Maryland, Virginia, North Carolina, South Carolina, Georgia and the Gulf Council attended the workshop. The resulting standardized ageing procedure will be published in an ASMFC reference document.

VI. Status of Management Measures and Issues

Fishery Management Plan

Amendment 1 was fully implemented by January 1, 2006, and provided the management requirements for the 2008 fishing year. No additional amendments or addenda are under development.

De Minimis Requests

With the implementation of Amendment 1, states are permitted to request *de minimis* status if, for the preceding three years for which data are available, their average commercial landings or recreational landings (by weight) constitute less than 1% of the coastwide commercial or recreational landings for the same three year period. A state may qualify for *de minimis* in either its recreational or commercial sector, or both, but will only qualify for exemptions in the sector(s) that they qualify for as *de minimis*. Amendment 1 does not include any compliance requirements other than annual state reporting, which is still required of *de minimis* states, thus *de minimis* status does not exempt states from any measures.

In the annual compliance reports, the following states requested *de minimis* status: Delaware (commercial fishery), South Carolina (commercial and recreational fisheries), Georgia (commercial and recreational fisheries), and Florida (commercial fishery). The commercial and recreational *de minimis* criteria for 2008 are based on 1% of the average coastwide 2006-2008

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landings in each fishery: 203,214 pounds for the commercial fishery and 75,976 pounds for the recreational fishery. The Delaware commercial fishery qualifies for *de minimis* status with an average of 14,454 pounds. The South Carolina commercial and recreational fisheries qualify for *de minimis* status with averages of 138 pounds and 31,233 pounds, respectively. The Georgia commercial and recreational fisheries qualify for *de minimis* status with averages of 1 pound and 13,566 pounds, respectively. The Florida commercial fishery qualifies for *de minimis* status with an average of 29,578 pounds.

The Board approved all *de minimis* requests on August 20, 2009.

Bycatch Reduction

Atlantic croaker is subject to both direct and indirect fishing effort. Historically, croaker ranked as one of the most abundant species in the bycatch of the south Atlantic shrimp trawl fishery. As a result, the original FMP recommended that bycatch reduction devices (BRDs) be developed and required in the shrimp trawl fishery. Since then the states of North Carolina through Florida have all enacted requirements for the use of BRDs in shrimp trawl nets in state waters, and croaker bycatch from this fishery has been reduced.

Atlantic croaker has also been the major component of the North Carolina and Virginia “scrap fishery”. A number of additional regulations instituted by North Carolina, such as a ban on flynet fishing south of Cape Hatteras, incidental finfish limits for shrimp and crab trawls in inside waters, minimum mesh size restrictions in trawls, and culling panels in long haul seines, may have indirectly reduced catches of juvenile croaker and changed the size and age distributions of the harvest. In the last stock assessment, aggregate, uncultured (“scrap”) bait fisheries landings data were included for North Carolina and Virginia, and at-sea discard data were included from gill net and trawl fisheries. Scrap landings and discards were combined in the model. Between 1973 and 1995, scrap/discards accounted for an average 20% of removals, and from 1996 to 2002, an average 3% of removals (ASMFC 2005a).

Several states have implemented other commercial gear requirements that further reduce bycatch and bycatch mortality, while others continue to encourage the use of these devices. Continuing to reduce the quantity of sub-adult croaker harvested should increase spawning stock biomass and yield per recruit.

Trigger Exercises

Amendment 1 requires the Technical Committee to conduct stock assessments every five years unless prompted by the completion of annual trigger exercises. The current primary trigger is based on landings data; however, catch-per-unit-effort (CPUE) will become the premier trigger as the quality and quantity of these data improve. A stock assessment will be triggered if the most recent year’s commercial or recreational landings are less than 70% of the previous two years’ average landings (ASMFC 2005b).

The trigger exercises with data through 2008 have not and will not be completed in 2009 because the regularly scheduled benchmark assessment began in 2009. The trigger exercises completed during the previous three years did not trigger an earlier assessment.

VII. Implementation of FMP Compliance Requirements for 2008

Amendment 1 provides the basis for determining state compliance for 2008. The amendment includes one regulatory requirement, stipulating that states submit an annual compliance report containing commercial and recreational landings and results of any monitoring programs that intercept Atlantic croaker. The PRT finds that all states within the management unit have fulfilled the requirements of Amendment 1.

VIII. Recommendations of the Plan Review Team

Management and Regulatory Recommendations

- Encourage the use of circle hooks to minimize recreational discard mortality.
- After the ongoing assessment, evaluate the need for a minimum size limit in the fisheries.
- Consider approval of the *de minimis* requests from Delaware, South Carolina, Georgia, and Florida.

Research and Monitoring Recommendations

High Priority

- Determine migratory patterns and mixing rates through cooperative, multi-jurisdictional tagging studies. Continue research and analysis of otolith microchemistry data.
- Collect bio-profile information and conduct studies on growth rates, age structure, and maturity schedule throughout the species range with a standardized protocol.
- Evaluate bycatch and discard estimates from the commercial and recreational fisheries and characterize the scrap fishery.
- Continue to examine reproductive biology of croaker with emphasis on developing maturity schedules and estimates of fecundity across the management unit.

Medium Priority

- Develop age-size data that are representative of all seasons and areas in the fisheries on an annual basis.
- Develop fishery-independent size, age, and sex specific relative abundance estimates to monitor long-term changes in croaker abundance.
- Improve catch and effort statistics from the commercial and recreational fisheries.
- Evaluate hook and release mortality under varying environmental factors and fishery practices and include in updated assessment.
- Evaluate and compile the effects of mandated bycatch reduction devices (BRDs) on croaker catch
- Evaluate the optimum utilization (economic and biological) of a long-term fluctuating population such as croaker.
- Identify essential habitat requirements.
- Determine species interactions and predator/prey relationships for croaker (prey) and other more highly valued fisheries (predators).
- Determine the impacts of any dredging activity (i.e. for beach re-nourishment) on all life history stages of croaker.
- Examine socio-economic aspects of the fishery.

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IX. References

Atlantic Coastal Cooperative Statistics Program (ACCSP). 2009. Personal communication. See: <http://www.accsp.org/dataaware.htm>. Cited 07/09/09.

Atlantic States Marine Fisheries Commission (ASMFC). 1987. Fishery Management Plan for Atlantic Croaker. Washington (DC): ASMFC. Fishery Management Report No. 10. 90 p.

ASMFC. 2005a. Atlantic Croaker Stock Assessment & Peer Review Reports. Washington (DC): ASMFC. 370 p.

ASMFC. 2005b. Amendment 1 to the Interstate Fishery Management Plan for Atlantic Croaker. Washington (DC): ASMFC. Fishery Management Report No. 44. 92 p.

National Marine Fisheries Statistics (NMFS). 2009. Personal communication with the Fisheries Statistics Division. See: <http://www.st.nmfs.gov/st1/>. Cited 07/31/09.

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X. Figures

Figure 1. Spawning stock biomass (metric tons) and age 0 recruits (millions of fish) estimates from the base mid-Atlantic model (Source: ASMFC 2005a, Section C)

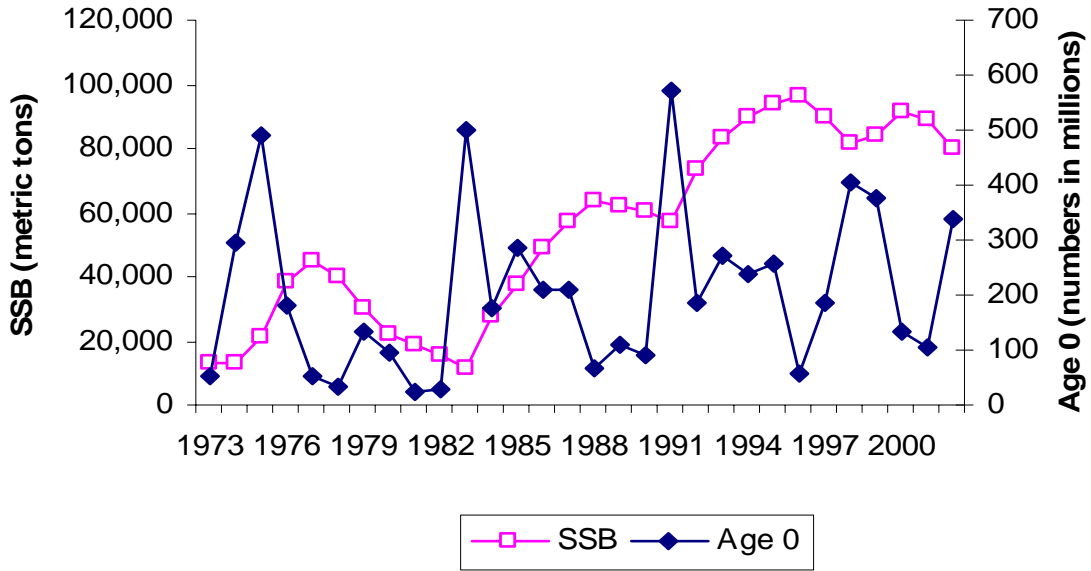
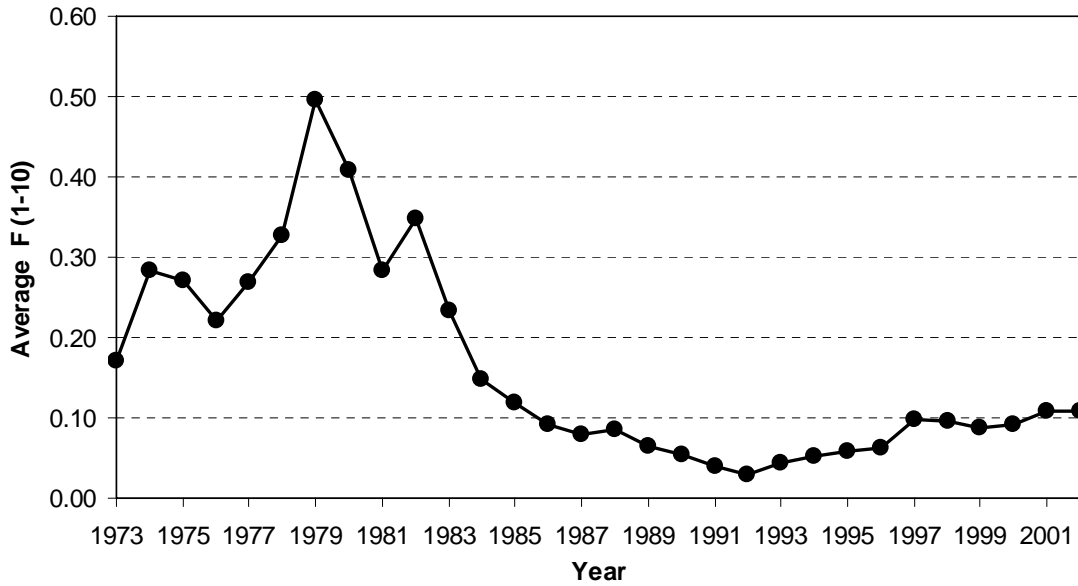
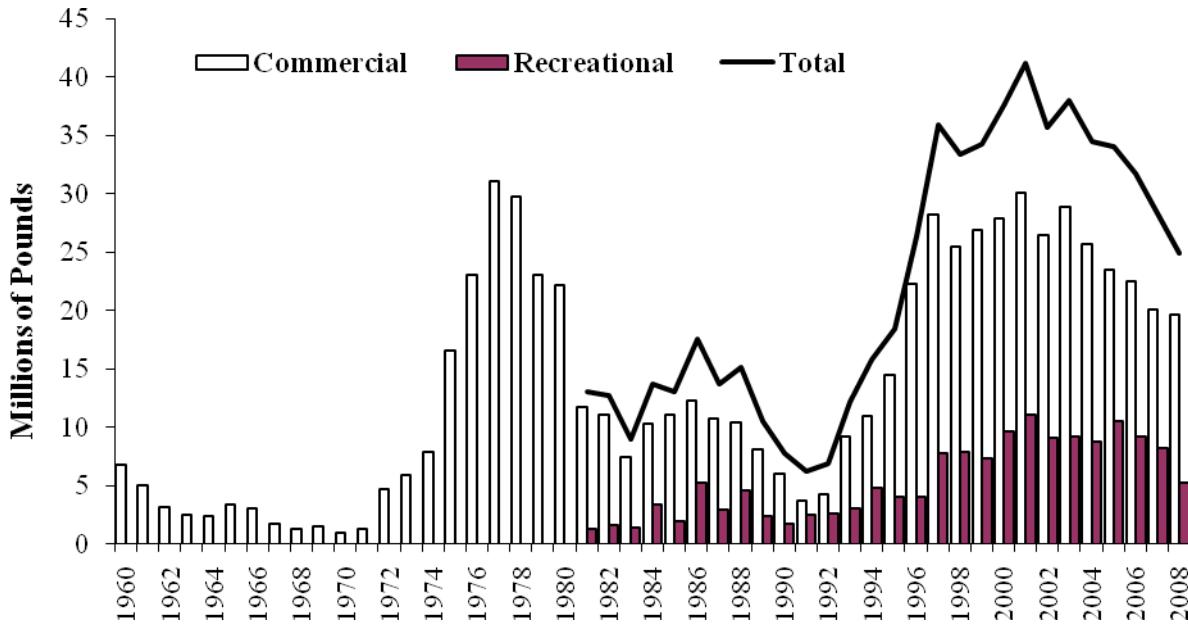


Figure 2. Average fishing mortality rates (ages 1 –10) for Atlantic croaker in the mid-Atlantic (Source: ASMFC 2005a, Section C)



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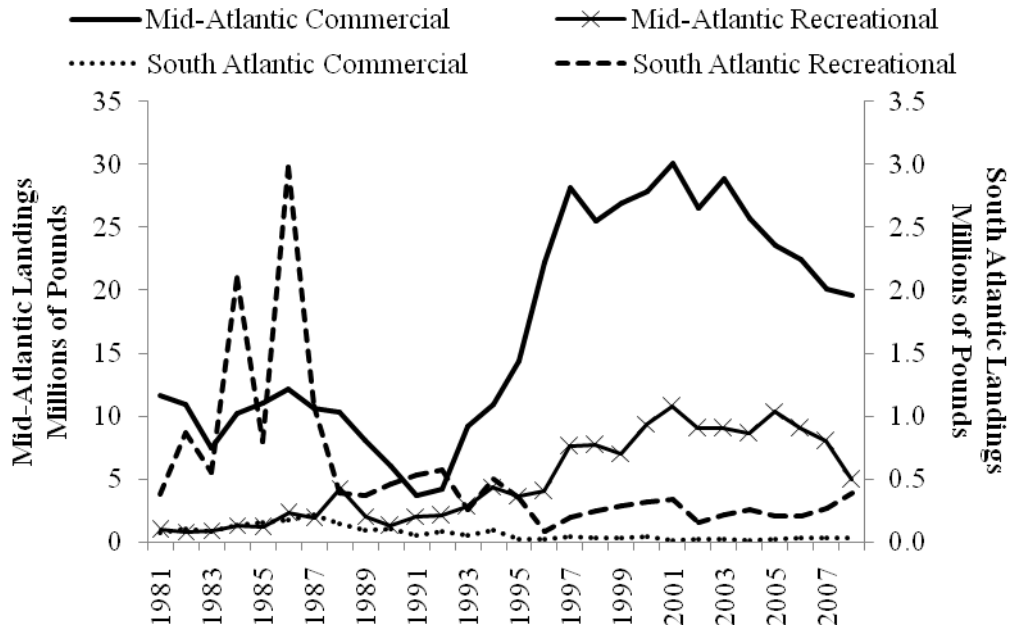
Figure 3. Atlantic croaker commercial[^], recreational*, and total harvest (pounds) (Sources: state compliance reports, ACCSP, and NMFS 2009)



[^] Commercial harvest estimate for 2008 is preliminary

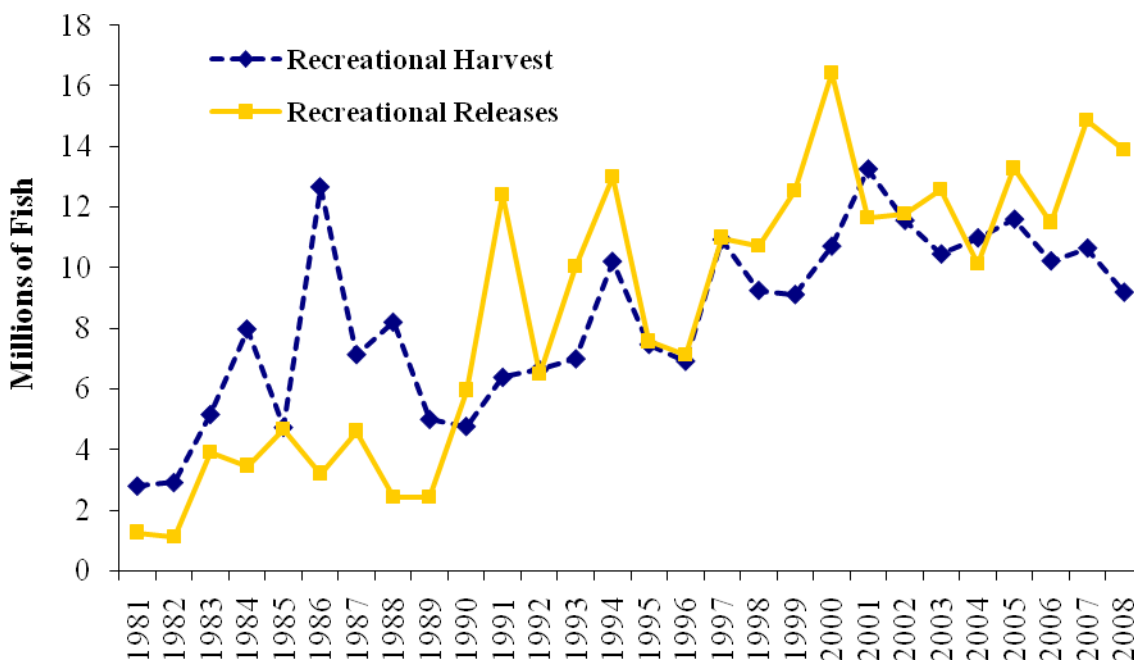
* Reliable recreational harvest estimates are not available before 1981

Figure 4. Mid-Atlantic (NJ-NC) and South Atlantic (SC-FL) Landings (pounds) (Sources: state compliance reports, ACCSP, and NMFS 2009)



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Figure 5. Recreational harvest and releases (number of fish) of Atlantic croaker, 1981-2008
(Source: NMFS 2009)



XI. Tables

Table 1. Summary of state regulations for Atlantic croaker in 2008*

State	Recreational	Commercial
NJ	none	otter/beam trawl mesh restriction for directed croaker harvest (>100 lbs in possession)
DE	8" minimum; recreational gill nets (up to 200 ft.) with license	8" minimum
MD	9" min, 25 fish/day, charter boat logbooks	9" minimum; open 3/16 to 12/31
PRFC	25 fish/day	pound net season: 2/25 to 12/15
VA	none	none
NC	recreational use of commercial gears with license and gear restrictions	
SC	mandatory for-hire logbooks	
GA	8" min, 25 fish/day	8" minimum; 25 fish/day limit except for shrimp trawls (no limit)
FL	none	none

* A commercial fishing license is required to sell croaker in all states with fisheries. For all states, general gear restrictions affect commercial croaker harvest.

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Table 2. Commercial harvest (pounds) of Atlantic croaker by state, 1981-2008 (Sources: 2009 state compliance reports and ACCSP for additional years not provided in reports)

Year	NJ	DE	MD	PRFC	VA	NC	SC	GA	FL	Total
1981	23,500	0	2,104	648	429,800	11,205,342	2,441	1,038	72,112	11,736,985
1982	100	0	7,091	188	119,300	10,824,953	386	2,177	95,357	11,049,552
1983	200	0	417	1,549	150,400	7,249,680	3,200	1,097	81,737	7,488,280
1984	57,700	0	27,072	73,701	817,700	9,170,775	3,793	434	131,375	10,282,550
1985	48,800	100	9,510	19,854	2,171,821	8,714,432	1,256		153,803	11,119,576
1986	106,000	500	135,922	99,373	2,367,000	9,424,828	924		173,531	12,308,078
1987	357,600	800	119,409	102,691	2,719,500	7,289,191	698	553	217,932	10,808,374
1988	30,100	200	98,855	12,796	1,749,200	8,434,415	2,614	304	140,033	10,468,517
1989	137,100	0	89,173	5,579	949,649	6,824,088	1,950		95,021	8,102,560
1990	644	42	2,473	5,115	201,353	5,769,512	1,190		104,402	6,084,731
1991	31,292	700	6,183	996	164,126	3,436,960	*		56,739	3,696,996
1992	51,600	800	17,050	17,692	1,339,353	2,796,612			79,040	4,302,147
1993	183,414	2,500	114,159	262,482	5,326,293	3,267,652	*		52,031	9,208,531
1994	117,256	3,000	158,918	240,271	5,759,975	4,615,754	*		96,018	10,991,192
1995	334,654	13,000	489,506	606,184	6,949,639	6,021,284	*		22,879	14,437,146
1996	621,889	9,681	792,326	1,427,285	9,409,904	9,961,834			26,045	22,248,964
1997	1,994,446	10,509	1,088,969	1,518,196	12,832,221	10,711,667	*		36,577	28,192,585
1998	1,029,332	10,368	1,006,529	610,885	11,898,586	10,865,897			26,418	25,448,015
1999	2,071,046	14,729	948,191	1,190,138	12,481,326	10,185,507			26,824	26,917,761
2000	2,130,465	11,121	902,379	1,812,130	12,822,400	10,122,627			37,953	27,839,075
2001	1,389,837	22,736	1,488,815	1,963,294	13,214,731	12,017,424		*	14,831	30,111,668
2002	1,828,484	10,732	894,879	1,421,094	12,133,834	10,189,153	*	*	17,191	26,495,367
2003	1,575,738	16,561	713,205	1,128,003	10,937,167	14,429,197	140	*	16,402	28,816,413
2004	2,067,992	32,729	1,354,982	1,631,596	8,550,574	11,993,003	*	*	11,413	25,642,289
2005	1,847,753	39,931	972,800	481,912	8,248,441	11,903,292	41	*	16,520	23,510,690
2006	1,617,144	19,277	466,833	670,276	9,293,410	10,396,554	160	*	30,272	22,493,926
2007	1,358,000	13,651	474,388	188,567	10,697,251	7,301,295	*		27,028	20,060,180
2008	981,594	10,433	527,926	337,062	11,925,676	5,791,874	116	*	31,435	19,606,116

* confidential data

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Table 3. Recreational harvest (pounds) of Atlantic croaker by state, 1981-2008 (Source: NMFS 2009)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	582	2,317		535,297	426,240	67,284	9,665	305,547	1,346,932
1982			70,276	455,250	264,607	67,015	45,161	754,956	1,657,265
1983			32,053	486,006	395,402	14,158	25,412	510,599	1,463,630
1984			86,462	634,870	584,660	161,661	80,684	1,856,599	3,404,936
1985			17,169	843,414	278,214	72,780	40,421	684,449	1,936,447
1986		2,595	116,542	2,034,337	126,888	173,028	21,504	2,783,651	5,258,545
1987			191,628	1,306,814	352,346	64,696	14,947	1,005,053	2,935,484
1988		827	926,399	2,390,573	935,460	54,313	20,313	316,900	4,644,785
1989		284	19,189	1,329,680	658,567	80,580	21,138	268,335	2,377,773
1990		112	37,873	875,427	347,183	123,795	205,352	127,525	1,717,267
1991	4,264	10,972	117,210	1,728,021	157,660	16,173	54,116	460,453	2,548,869
1992		3,291	53,556	1,768,962	233,533	28,512	132,596	407,672	2,628,122
1993	844	9,641	476,866	1,993,915	282,910	18,005	55,604	180,517	3,018,302
1994	818	2,892	991,166	3,024,118	351,230	128,306	34,048	337,474	4,870,052
1995	9,515	82,864	567,149	2,675,381	326,135	25,386	20,862	301,918	4,009,210
1996	39,099	205,526	702,037	2,716,759	346,501	14,480	21,797	50,038	4,096,237
1997	278,758	340,198	1,117,999	5,522,195	309,457	53,863	26,272	113,096	7,761,838
1998	135,733	293,560	1,150,459	5,920,436	161,117	76,821	30,966	141,756	7,910,848
1999	301,957	522,201	1,024,398	4,969,283	212,991	26,356	32,375	231,692	7,321,253
2000	1,125,730	483,963	2,672,996	4,888,910	201,306	13,457	62,390	242,912	9,691,664
2001	1,132,214	304,127	1,278,699	7,674,759	355,009	10,750	7,844	320,487	11,083,889
2002	268,423	250,899	1,162,278	7,075,130	242,184	29,343	10,622	117,880	9,156,759
2003	682,698	262,114	2,069,176	5,674,111	317,606	59,399	71,881	79,396	9,216,381
2004	1,151,926	342,335	1,016,801	5,792,487	267,455	53,563	17,785	179,018	8,821,370
2005	1,189,849	846,084	942,702	7,240,971	143,963	42,088	13,913	147,117	10,566,687
2006	765,867	757,082	884,082	6,460,336	151,403	19,010	11,371	176,886	9,226,037
2007	409,392	334,850	1,056,471	6,111,612	87,013	39,368	13,624	207,821	8,260,151
2008	422,833	266,787	458,671	3,612,065	154,937	35,322	15,703	340,304	5,306,622

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Table 4. Recreational harvest (numbers) of Atlantic croaker by state, 1981-2008 (Source: NMFS 2009)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	1,054	3,003	0	964,013	1,043,240	165,742	35,591	598,896	2,811,539
1982			10,452	273,039	596,493	193,554	169,749	1,682,619	2,925,906
1983			108,355	2,154,133	1,620,909	60,811	75,173	1,148,227	5,167,608
1984			211,035	2,047,720	2,147,871	588,114	202,364	2,781,742	7,978,846
1985			21,276	2,284,334	723,933	260,265	144,341	1,306,955	4,741,104
1986		4,694	123,578	6,384,966	356,742	599,442	69,887	5,118,552	12,657,861
1987	0	0	208,488	3,234,224	904,030	166,978	44,783	2,580,727	7,139,230
1988		1,186	1,005,452	4,048,690	2,256,128	144,057	64,093	685,778	8,205,384
1989		478	22,871	2,203,504	2,131,763	217,023	72,598	359,417	5,007,654
1990		281	100,673	2,374,679	1,063,452	346,631	585,380	304,064	4,775,160
1991	16,235	37,500	288,471	4,298,542	434,067	100,816	184,435	1,030,115	6,390,181
1992	0	9,854	117,427	4,524,040	723,823	74,051	440,185	754,595	6,643,975
1993	2,552	19,352	805,560	4,990,098	755,998	32,700	89,734	304,067	7,000,061
1994	1,567	5,718	1,633,581	6,494,691	1,179,735	188,520	102,974	599,032	10,205,818
1995	15,184	136,865	827,183	5,029,708	850,606	75,422	100,826	438,076	7,473,870
1996	35,037	235,389	775,115	4,997,021	662,240	37,464	61,957	116,575	6,920,798
1997	342,089	385,586	1,053,232	8,066,926	661,116	118,428	64,050	235,430	10,926,857
1998	143,404	391,231	1,126,058	6,730,181	387,427	170,528	64,953	234,360	9,248,142
1999	357,261	662,724	1,209,572	5,881,671	442,185	54,761	104,438	403,982	9,116,594
2000	1,023,442	517,886	2,674,880	5,486,159	391,056	32,332	128,922	455,870	10,710,547
2001	1,177,813	312,005	1,319,928	9,335,313	635,552	19,802	21,503	426,264	13,248,180
2002	253,472	261,634	1,223,385	9,129,060	408,944	66,409	36,497	177,751	11,557,152
2003	692,391	341,174	1,619,766	6,695,192	490,399	198,339	248,853	165,459	10,451,573
2004	1,172,210	494,104	870,844	7,292,880	474,180	135,842	44,825	497,921	10,982,806
2005	1,254,957	934,207	809,894	7,791,125	292,629	128,956	40,094	343,647	11,595,509
2006	698,428	863,288	833,190	7,069,449	434,735	38,682	40,378	247,383	10,225,533
2007	355,067	400,518	1,092,784	7,753,422	397,702	131,686	46,966	469,232	10,647,377
2008	475,373	349,229	689,154	6,524,884	372,778	100,460	45,598	636,050	9,193,526

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Table 5. Recreational releases (number) of Atlantic croaker by state, 1981-2008 (Source: NMFS 2009)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981			16,233	324,238	704,259	128,192	13,481	85,740	1,272,143
1982				77,756	641,327	107,340	111,630	188,277	1,126,330
1983			1,507,184	1,410,151	424,562	119,036	70,499	379,021	3,910,453
1984			70,192	673,080	1,701,418	746,905	37,573	236,432	3,465,600
1985			13,132	1,616,052	1,596,901	238,678	66,649	1,146,582	4,677,994
1986		1,757	43,399	2,578,268	137,841	84,335	40,623	318,511	3,204,734
1987	1,374	861	32,074	2,056,580	560,853	108,366	76,908	1,770,697	4,607,713
1988		582	273,231	832,284	984,219	112,271	20,021	200,630	2,423,238
1989		1,307	41,822	1,342,169	891,926	58,642	17,632	72,822	2,426,320
1990		1,268	88,688	3,922,564	1,351,152	111,085	317,497	168,144	5,960,398
1991	91,633	75,319	3,352,190	7,418,045	669,385	25,168	140,402	647,824	12,419,966
1992	4,103	43,583	856,292	4,167,137	954,494	26,729	178,267	251,343	6,481,948
1993	5,799	13,194	2,504,362	5,795,479	1,499,217	16,949	83,203	138,875	10,057,078
1994	17,253	14,069	1,628,824	7,676,780	3,110,528	141,513	99,026	331,736	13,019,729
1995	31,019	41,574	496,046	5,494,289	1,172,716	108,345	89,609	141,732	7,575,330
1996	17,585	76,851	403,776	5,151,206	1,218,799	64,494	60,282	126,300	7,119,293
1997	111,468	384,233	1,497,670	7,275,160	1,443,568	138,107	25,630	116,276	10,992,112
1998	221,324	839,932	3,021,780	4,990,541	1,060,928	266,068	159,928	152,744	10,713,245
1999	860,325	1,017,499	2,483,800	5,668,925	1,368,478	116,826	57,567	967,894	12,541,314
2000	688,746	694,813	4,967,856	7,811,048	1,569,385	96,402	169,903	428,131	16,426,284
2001	853,621	285,123	1,585,806	7,086,706	1,256,807	115,284	192,362	282,461	11,658,170
2002	369,003	361,355	2,523,276	7,107,656	925,806	92,498	194,474	217,054	11,791,122
2003	833,508	654,697	1,393,224	6,543,524	1,552,315	440,446	965,496	192,356	12,575,566
2004	834,774	483,358	819,473	5,790,892	1,346,147	446,843	164,791	239,198	10,125,476
2005	1,280,075	761,136	950,695	8,144,430	1,289,279	327,215	265,542	271,001	13,289,373
2006	634,663	1,033,973	1,791,610	4,598,534	2,288,461	643,834	310,877	196,377	11,498,329
2007	572,164	617,811	1,630,587	9,510,502	1,538,050	336,816	221,902	443,928	14,871,760
2008	1,809,786	609,057	2,068,910	7,034,592	1,386,713	191,941	336,635	457,469	13,895,103