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1998 Annual Review of Interstate Fishery Management Plans

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1998 Review of Interstate Fishery Management Plans

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Preface

Section 7 of the Atlantic States Marine Fisheries Commission (Commission) Interstate Fisheries Management Program (ISFMP) Charter specifies that each Commission fishery management plan (FMP) be reviewed at least annually to ensure full and effective implementation and compliance with the requirements of the FMPs. This report contains the 1998 annual reviews for the Commission's 19 FMPs and Amendments. Unless otherwise noted, all of the FMP reviews contained in this document have been reviewed and approved by the relevant species management board and the ISFMP Policy Board in the fall of 1998.

Acknowledgements

This report was prepared through the efforts of the Commission staff and the Plan Review Teams for American Lobster, Atlantic Croaker, Atlantic Menhaden, Atlantic Sea Herring, Atlantic Striped Bass, Atlantic Sturgeon, Black Sea Bass, Bluefish, Northern Shrimp, Red Drum, Scup, Shad & River Herring, Spanish Mackerel, Spot, Spotted Seatrout, Summer Flounder, Tautog, Weakfish, and Winter Flounder.

Acronyms

ABC	accepatble biological catch
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
AMAC	Atlantic Menhaden Advisory Committee
ASMFC	Atlantic States Marine Fisheries Commission
BRDs	bycatch reduction devices
CDFR	Captains Daily Fishing Reports
CPT	catch per tow
CTDEP	Connecticut Department of Environmental Protection
DCL	dorsal carapace length
EEZ	exclusive economic zone
EPR	eggs per recruit
ESA	Endangered Species Act
F	fishing mortality rate
FMP	Fishery Management Plan
GBS	Georges Bank and South
GOM	Gulf of Maine
ISFMP	Interstate Fisheries Management Program
IWP	Internal Waters Processing
LCMT	Lobster Conservation Management Teams
M	natural mortality rate
MA	Mid-Atlantic
MADMF	Massachusetts Division of Marine Fisheries
MAFMC	Mid-Atlantic Fishery Management Council
MRFSS	Marine Recreational Fishery Statistics Survey
MSAP	Mackerel Stock Assessment Panel
MSP	maximum spawning potential
MSY	maximum sustainable yield
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NMFS	National Marine Fisheries Service
NYDEC	New York Department of Environmental Conservation
PDT	Plan Development Team
PRT	Plan Review Team
RIDFW	Rhode Island Division of Fish and Wildlife
SAFMC	South Atlantic Fishery Management Council
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SCCLIS	South of Cape Cod to Long Island Sound
SEAMAP	Southeast Area Monitoring and Assessment Program
SEFSC	Southeast Fisheries Science Center
SNE	Southern New England
SPR	spawning potential ratio
SSBR	spawning stock biomass per recruit
TAC	total allowable catch
TAL	total allowable landings
TEDs	turtle excluder devices
TL	total length
USFWS	U.S. Fish and Wildlife Service
VIMS	Virginia Institute of Marine Science
VPA	virtual population analysis

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(*Homarus americanus*)

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1998 REVIEW OF AMENDMENT 3 TO THE AMERICAN LOBSTER FISHERY MANAGEMENT PLAN
(*Homarus americanus*)

I. Status of the Fishery Management Plan

The American Lobster Management Board approved *Amendment 3 to the American Lobster Fishery Management Plan* in December 1997. With this Amendment, the states, through the Commission, resume a lead role for management of the lobster fishery. The Amendment currently contains the following coastwide requirements: (1) prohibition on the possession of berried females; (2) prohibition on possession of lobster parts; (3) prohibition on the possession of speared lobsters; (4) V-notch protection for female lobsters; (5) ghost panels are required for non-wooden traps; (6) minimum gauge size of 3-1/4" carapace length; and (7) landings for non-trap fishermen are limited to 100 lobsters per day with a 500 lobster maximum for trips 5 days or longer.

The Amendment contains measures applicable to all states and areas along the Atlantic coast. These measures include an increase in the vent size to 1-15/16" and a maximum trap size. In addition, all commercial fishermen must have a permit to possess or land American lobsters. The Amendment also contains measures applicable to commercial fishing in lobster management areas, and establishes lobster conservation management teams (LCMT).

The management unit extends from Maine through North Carolina. States between Maine and North Carolina, with the exception of Pennsylvania and Virginia, have a declared interest in the Plan. The Commission American Lobster Management Board, Technical Committee, and Advisory Panel remain active. In addition, the newly formed LCMTs have formed according to Amendment 3.

II. Status of the Stocks and the Fishery

22nd Northeast Stock Assessment Workshop

The stock assessment for lobster was last reviewed at the 22nd Stock Assessment Workshop (SAW-22) during summer 1996. The SAW document represents an analysis of the lobster stocks through 1994 and this subsection is summarized from that report. Overall, the SAW stated that fishing effort is intense throughout the range of the species and that the stock is overfished and vulnerable to collapse.

For assessment purposes, the lobster population is split into three regions: Gulf of Maine (GOM), George's Bank and South (GBS), and South of Cape Cod to Long Island Sound (SCCLIS). The quality and quantity of data do not currently permit the lobster population to be assessed at a greater level of detail.

Total landings were relatively constant at 14,000 metric tons (mt) through the late 1970s. Since then, landings have more than doubled, reaching a peak of nearly 32,256 mt in 1997. Landings in Maine and Massachusetts consistently constitute about one-half and one-quarter of yearly totals, respectively. Relative proportions of landings among states have remained fairly stable over the past decade; however, landings from Connecticut and New York have increased steadily in recent years.

The fishery remains dominated by landings from traps; in 1994, less than 1.3 percent of lobsters were landed by gear other than traps. The average percentage of landings from the non-trap sector for the last thirty years (1964-1994) was 5.74 percent; the average percentage of landings from the non-trap sector for the last ten years (1984-1994) was 2.33 percent.

All areas show the trend of an ever-increasing proportion of egg production coming from a smaller range of size classes. In the Gulf of Maine, egg production within one molt of legal size has increased from under 10 percent in the mid-1970s to roughly 60 percent in the 1990s. For the GBS stock, egg production within one molt of legal size has increased from roughly 10 percent in the mid-1970s to roughly 15-20 percent in the early 1990s. In Central and Western Long Island Sound, egg production within one molt of legal size consistently has been above 95 percent since the mid-1980s. Collectively, the analyses of potential egg production and catch composition imply increasing risk to the population by compression of spawning potential into an increasingly narrow size range and, by inference, age range. Furthermore, landings indicate an increasing reliance on newly molted lobsters to support the fishery.

In the GOM assessment area, fishing mortality rates on fully recruited females have ranged from 0.89 - 2.04 (roughly 59-87 percent annual exploitation rate), but have decreased to roughly 0.9 (roughly 59 percent annual exploitation rate) in the last two years. In the GBS assessment area, fishing mortality rates on fully recruited females have ranged from 0.45 - 1.09 (roughly 36-67 percent annual exploitation rate). In the SCCLIS assessment area, fishing mortality rates on fully recruited females have ranged from 1.18 to well over 4.0 (roughly 70 to well over 95 percent annual exploitation rate). In Central and Western Long Island Sound, fishing mortality rates on fully recruited females have ranged from 2.18 -5.41 (well over 95 percent annual exploitation rate).

Biological reference points for the lobster populations were calculated for the GOM, GBS, and SCCLIS assessment areas. The fishing mortality rate resulting in maximum yield per recruit was 0.24, 0.15, and 0.33 for GOM, GBS, and SCCLIS, respectively. The level of fishing mortality resulting in egg production per recruit of 10 percent of the maximum was 0.32, 0.36, and 0.44 for GOM, GBS, and SCCLIS, respectively.

A Review of the Population Dynamics of American Lobster in the Northeast

The National Marine Fisheries Service (NMFS) and the Commission jointly sponsored a panel of independent scientists to review the population dynamics of American lobster. The panel met during March 25-29, 1996 in Warwick, Rhode Island and issued their final report in July 1996 (NMFS and ASMFC 1996). The panel provided advice on six broad areas to NMFS and the Commission: stock structure, the stock assessment, changes in abundance, management, and benthic ecology.

III. Status of the Fishery

American lobster landings rose to a peak level in 1991 (29,000 mt) from 15-20,000 mt during the period 1978-1987 before declining to 25,000 mt in 1992. Landings continued to increase to 31,700 mt in 1996 (Table 1). Maine and Massachusetts accounted for 74 percent of the commercial landings, 52 percent and 22 percent respectively (Table 2). Based on preliminary data, the 1997 landings reached a historical level of 32,300 mt.

The magnitude of recreational landings is unknown.

Table 1. Total commercial landings in metric tons. (Based on NMFS landings data)

Year	Metric tons	Pounds
1988	22,210	48,963,602
1989	23,843	52,564,851
1990	28,297	62.383,125
1991	29,073	64,093,998
1992	25,978	57,270,826
1993	26,290	57,958,940
1994	31,744	69,982,703
1995	29,759	65,606,773
1996	31,734	69,959,999
1997	32,256*	71,111,517

Preliminary data

Table 2. Landings of American lobster by the states of Maine through New Jersey from 1980-1997 (pounds). The 1997 values are preliminary (Massachusetts reported landings have not been submitted). (Source, NMFS Commercial Fisheries Statistics Web Page)

Year	Maine	Massachusetts	Rhode Island	New York	Connecticut	New Hampshire	New Jersey
1985	20,125,000	16,295,100	5,140,100	1,240,900	1,676,000	1,193,881	1,079,600
1986	19,704,400	15,057,600	5,667,900	1,407,100	1,656,100	941,100	1,123,000
1987	19,747,800	15,116,800	5,317,100	1,146,700	1,735,591	1,256,170	1,397,100
1988	21,738,800	15,866,312	4,759,100	1,779,890	2,053,800	1,118,900	1,557,300
1989	23,368,800	15,444,300	5,725,800	2,345,051	2,096,900	1,430,400	2,059,600
1990	28,068,238	17,054,434	7,258,175	3,431,111	2,645,800	1,658,200	2,198,867
1991	30,788,646	16,528,168	7,445,172	3,128,246	2,674,000	1,802,035	1,673,031
1992	26,830,448	15,823,077	6,763,087	2,651,067	2,439,600	1,529,292	1,213,255
1993	29,926,464	14,336,032	6,228,470	2,667,107	2,177,022	1,693,347	906,498
1994	38,948,867	16,100,264	6,474,399	3,954,634	2,256,000	1,650,751	581,396
1995	37,208,324	15,771,981	5,363,810	6,653,781		1,834,794	606,016
1996	36,083,443	15,330,377	5,579,874	9,408,689	2,888,683	1,632,829	640,207
1997	46,951,534	*	5,730,787	10,868,886	3,468,051	1,414,368	858,426

*Massachusetts landings not yet reported.

IV. Status of Research and Monitoring

Ongoing research and monitoring efforts in states from Maine to New York are focused on recruitment parameters. NMFS and all states from Maine to North Carolina, except Virginia and New Jersey monitor fishery statistics.

Fishery independent surveys were used to estimate the relative abundance of lobsters in each of the assessment areas. The Northeast Fisheries Science Center's (NEFSC) bottom trawl survey was the

primary source of abundance indices. The Commonwealth of Massachusetts' bottom trawl survey was also used for the GOM assessment area and the inshore trawl surveys from Connecticut and Rhode Island were used for the SCCLIS assessment area. All of the surveys are ineffective at sampling lobsters on hard-bottom lobster habitat. In addition, the high density of fishing gear in some areas (most notably Long Island Sound) can affect the sampling effectiveness for some of the surveys.

V. Status of Management Measures

Amendment 3 established management measures required coastwide and measures applicable to commercial fishing in lobster management areas. The coastwide requirements are summarized in Table 3.

Table 3. Coastwide requirements and prohibited actions

- Prohibition on possession of berried or scrubbed lobsters
- Prohibition on possession of lobster meats, detached tails, claws, or other parts of lobsters
- Prohibition on spearing lobsters
- Prohibition on possession of v-notched female lobsters
- Requirement for biodegradable "ghost" panel for traps
- Minimum gauge size of 3-1/4"
- Limits on landings by fishermen using gear or methods other than traps to 100 lobsters per day or 500 lobsters per trip for trips 5 days or longer
- Requirements for permits and licensing
- All lobster traps must contain at least on escape vent with a minimum size of 1-15/16" by 5-3/4"
- Maximum trap size of 22,950 cubic inches in all areas except Area 3, where traps may not exceed a volume of 30,100 cubic inches.

The measures applicable to commercial fishing in lobster management areas are summarized in Table 4. Amendment 3 also established seven LCMTs, each of which coincides with a management area. Currently the LCMTs are working on proposals for management within their areas based on conservation equivalency, which will supercede the measures within Amendment 3 upon Board approval. The conservation equivalency is based on the goals and objectives specified in Section 2 of the plan and the egg production rebuilding schedule.

Table 4. Measure applicable to commercial fishing in management areas.

Measure	*Area 1*	*Area 2*	*Area 3*	*Area 4*	*Area 5*	*Area 6*	*Outer Cape*
Number of traps per vessel	1998: 1200 1999: 1000 2000: 800	1998: 1200 1999: 1000 2000: 800	1999: 2000	Investigate the need for trap reductions	Investigate the need for trap reductions	Investigate the need for trap reductions	1998: 1200 1999: 1000 2000: 800
Other	5" max. gauge size; proposal for area closure with Area 3		proposal for area closure with Area 1	Investigate the need for other measures to achieve egg production rebuilding schedule	Investigate the need for other measures to achieve egg production rebuilding schedule	Investigate the need for other measures to achieve egg production rebuilding schedule	

VI. Current State-by-State Implementation per Compliance Requirements as of September 1, 1998

All states are currently in compliance with all required measures under Amendment 3.

One sign of concern is New Jersey's regulation that allows the possession of lobster parts. Amendment 3 prohibits the possession of any lobster parts, including detached claws and tails. Federal regulations also contain such prohibitions under the mutilation provisions.

VII. Status of Assessment Advice

The last quantitative assessment was completed in June 1996 during the 22nd SAW. An external review of the population dynamics and stock assessment methodology of American lobsters in the northeast was completed in March of 1996, jointly sponsored by the NMFS, Office of the Senior Scientist and the Commission.

Incorporating the sum of fishery-dependent and -independent data, two models were used to assess fishing mortality in the lobster population: Length Cohort Analysis and modified DeLury model. The stock assessment also used an egg per recruit model to determine egg production for the stock.

The American lobster should be a high priority on the ISFMP Policy Board list for review of assessment. The lobster technical committee is moving forward with gathering data necessary for an assessment during the spring of 1999.

VIII. Recommendations

The following are recommendations from the Plan Review Team (PRT):

1. New Jersey should adopt regulations that prohibit the possession of lobster parts, limit landings of fishermen using gear or methods other than traps, and develop a lobster permit system that can control effort and provide statistical data needs for management that may not be available through the Atlantic Coastal Cooperative Statistics Program.

2. On July 1, 1998, the moratorium on new commercial licenses in Rhode Island was lifted. The PRT encourages Rhode Island to take the necessary steps to cap or limit the sales of new commercial licenses.

3. An important and influential input to the egg-per-recruit model relates to maturity and the egg extrusion cycle. Data on this subject is either lacking or incomplete. The PRT recommends research on this subject along the entire coast.

Under Amendment 3, the Board deferred action on monitoring and reporting until the Atlantic Coastal Cooperative Statistics Program had made recommendations on a coastwide statistics program. The information collected under this program will play an integral role in area management. The PRT encourages the implementation of this program as soon as possible.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC CROAKER
(Micropogonias undulatus)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC CROAKER
(Micropogonias undulatus)

I. Status of the Fishery Management Plan

The *Fishery Management Plan (FMP) for Atlantic Croaker* was adopted in 1987 and includes the states from Maryland through Florida. In reviewing the early plans created under the interstate fisheries management planning process, the Atlantic Croaker Plan was seen by the Atlantic States Marine Fisheries Commission (Commission) as in need of review and possible revision. A Wallop-Breaux grant from U.S. Fish and Wildlife Service was provided to conduct a comprehensive data collection workshop for croaker and spot that would lay the groundwork for a major amendment to the 1987 FMP. The October 1993 workshop at the Virginia Institute of Marine Science (VIMS) 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.

Subsequent to the workshop and independent of it, the South Atlantic State/Federal Fisheries Management Board of Commission 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 croaker plan to be vague and no longer valid. The Board recommended that an amendment be prepared to the croaker FMP to define management measures necessary to achieve the goals of the FMP. In their final schedule for compliance under the ACFCMA, the Interstate Fisheries Management Program (ISFMP) Policy Board adopted the finding that the current Croaker FMP does not contain any management measures that states are required to implement.

A Technical Committee was appointed in 1997 and will begin compiling data during the summer of 1998, the first step in preparing a stock assessment. The 1993 workshop proceedings will provide the basis for a plan revision along with data collected by the states and federal agencies since then. The Technical Committee should meet in late August 1998 to review the data and prepare a presentation for the South Atlantic Board in October, during the Commission's Annual Meeting. A Plan Development Team will also need to be appointed by the South Atlantic Board in order to begin preparation of the amendment.

II. Status of the Stock

The area of greatest abundance on the Atlantic coast extends from Chesapeake Bay to Florida, although significant catches are made in some years as far north as New York. The species is a major component in generalized fishery independent trawl and seine surveys in several states. Annual recruitment is highly variable and dependent on natural environmental conditions. Mean density of croaker from the Southeast Area Monitoring and Assessment Program (SEAMAP) spring shallow water trawl survey in the South Atlantic Bight averaged 71.6 individuals per hectare from 1989-1994. The mean density decreased to 39.9 individuals/ha in 1995, and then to 18.9 individuals/ha in 1997. North Carolina Estuarine Trawl Survey juvenile indices were low during the mid-80s with a 14 year low in 1991, followed by several good yearclasses in 1993, 1995 and 1997. Virginia surveys indicate high juvenile abundance in the mid-70s with good yearclasses in 1984 and 1985. Juvenile abundance was low in Virginia rivers during 1991 and 1993 but was high in 1996. Maryland surveys indicate large yearclasses in 1993, 1996 and 1997. A

total mortality rate of 55-60 percent has been calculated for Chesapeake Bay stocks. Analyses done at VIMS indicate that croaker stocks in Chesapeake Bay may have a biological capacity to resist growth overfishing. North Carolina recently declared croaker to be stressed-recovering stating a concern with lack of fish in sounds and uncontrolled catches in ocean waters. Stressed-recovering stock status is defined as those stocks that were once considered to be declining or depressed which show measurable and consistent improvement.

IX. Status of the Fishery

From 1979 to 1997, the recreational catch of croaker from New Jersey through the Florida Atlantic coast has varied from 3.6 to a high of 23 million fish in 1994. Commercial landings from New York to Florida have varied from one million pounds in 1970 to 64 million pounds in 1945. Preliminary commercial landings in 1997 were 27.3 million pounds. Commercial landings have increased steadily each year from a recent low of 3.7 million pounds in 1991 to last year's total. North Carolina landings have continued to grow after experiencing some steady catches in 1991-1994; however, the largest increase in landings has occurred in Virginia, where only 164,000 pounds were reported in 1991, but 13.1 million pounds were landed in 1997. Croaker remain a major component of the seine, fish trawl, and pound net fisheries in Virginia, North Carolina and Maryland. In Georgia, trawl-caught croaker is sold as unsorted mixed fish along with spot, whiting, and small flounder, therefore, commercial landings are a tenuous measurement there. Small croaker were previously a major part of the bycatch of the South Atlantic shrimp trawl fishery, however the use of turtle excluder devices (TEDs) and bycatch reduction devices (BRDs) has reduced this bycatch.

X. Status of Assessment Advice

A quantitative assessment of Atlantic croaker has not been conducted. The current management plan (1987) identified the lack of data needed for a stock assessment as one of the major problems facing management of this species. The current effort to compile and analyze available data should lead to a formal assessment sometime in 1999. Due to the lack of an assessment, the ISFMP Policy Board has not considered this species for peer review prioritization.

XI. Status of Research and Monitoring

Catch and effort data are collected by state commercial and recreational statistics programs. Fishery-independent data, from Cape Hatteras to Cape Canaveral, are collected in the SEAMAP program. Recruitment indices are available from ongoing juvenile surveys in Delaware, Maryland, Virginia, North Carolina, Florida and through the SEAMAP program. Researchers at VIMS have conducted studies on temperature tolerance, developed a juvenile recruitment model based on the effect of winter water temperature and offshore wind velocities, and developed population dynamics parameters to evaluate growth overfishing potential. The Virginia Marine Resources Commission and state of North Carolina began to evaluate the use of culling panels in pound nets for the release of small spot and croaker. The Maryland Department of Natural Resources conducted a hook and line release mortality study. Gear research for bycatch reduction in shrimp trawls may continue in the future under interstate and federal sponsorship.

XII. Status of Management Measures and Issues

The Atlantic Croaker FMP identifies the following management measures (recommendation 1 as amended) for implementation:

1. Promote the development and use of BRDs through demonstration and application in trawl fisheries.

2. Promote increases in yield per recruit through delaying entry to croaker fisheries to age one and older.

Although the ISFMP Policy Board judged that the FMP management recommendations were too vague and did not furnish objective compliance criteria, progress has been made on developing BRDs. The October 1993 Spot and Croaker Workshop Proceedings summarizes experimental bycatch reduction work and examines the population implications of bycatch reduction. It is clear that there are economically viable shrimp gears that reduce finfish bycatch. At the state level, North Carolina has been testing bycatch reduction devices in the shrimp trawl fishery and has achieved finfish reductions of 50-70 percent with little loss of shrimp. North Carolina requires fish excluder devices in every trawl (except try nets) in the shrimp fishery (commercial and recreational) (Table 5). In the North Carolina flynet fishery, where a large portion of the croaker catch occurs, there is a requirement for a minimum tail-bag mesh of 3.5-inch diamond or 3-inch square mesh. Also, North Carolina banned flynet fishing in waters south of Cape Hatteras. This requirement should reduce the catch of small croaker.

Table 5. Current state regulations

State/Agency	Recreational	Commercial
New Jersey		trawling prohibited from 0-2 miles from shore
Delaware	8"	8"
Maryland	9"; 25 fish limit	9"; trawling restricted in Chesapeake Bay
PRFC	10"; 20 fish limit	10"
Virginia		trawling prohibited in state waters
North Carolina		gear-related restrictions; TED/BRD requirements
South Carolina		gear-related restrictions; TED/BRD requirements
Georgia	8"; 25 fish limit	8"; 25 fish limit; BRD requirement; no trawling in sounds
Florida		net ban in state waters
Federal (EEZ waters)		

The States of Florida through North Carolina have promoted and require the use of TEDs and BRDs in state waters. None of the states have minimum trawl mesh sizes or culling panels in directed gears. Evaluation of the beneficial effects of BRDs to croaker stocks which are a component of a mixed species fishery, may be available from work conducted on weakfish during preparation of Amendment 3 to that FMP and should be compiled. A target reduction in bycatch of croaker may be a suitable objective criteria in an amended plan. Size limits that are in place in the states have been there for several years and do not represent a response to the FMP.

XIII. Current State-by-State Implementation of FMP Compliance Requirements as of June 1, 1998

There are no regulatory compliance requirements in the 1987 Atlantic Croaker FMP.

XIV. Recommendations of FMP Review Team

A. General

Compile and analyze existing data in preparation for a quantitative stock assessment.

B. Regulatory Recommendations

Management recommendations in the 1987 Croaker FMP should be adopted and implemented by appropriate regulations or legislation. They are as follows:

1. Promote the development and use of trawl efficiency devices (TEDs and BRDs) through demonstration in the southern shrimp fishery, and fish separators in the finfish trawl fishery.

2. Promote increases in yield per recruit through delaying entry to croaker fisheries to age one or older.

C. Amendments

Develop an amended Atlantic croaker FMP with objective compliance criteria.

D. Research and Monitoring Recommendations

<u>High Priority</u>

- The effects of mandated BRDs on croaker catch should be evaluated and compiled.

- Fishery dependent and independent size, age and sex specific relative abundance estimates should be developed to monitor long term changes in croaker abundance.

- Criteria should be cooperatively developed for aging croaker otoliths.

- Conduct studies of croaker growth rates and age structure throughout the species range.

- Age-length keys that are representative of all gear types in the fishery should be developed.

Medium Priority

- Cooperative coastwide croaker juvenile indices should be developed and validated to clarify stock status.

- Improve catch and effort statistics from the commercial and recreational fisheries, along with size and age structure of the catch.

- Determine the onshore vs. offshore components of the croaker fishery.

- Examine reproductive biology of croaker with emphasis on developing maturity schedules and estimates of fecundity.

- Cooperatively develop a yield per recruit analysis to establish a minimum size that maximizes yield-per-recruit.

- In trawl fisheries or other fisheries that historically take significant numbers of croaker, states should monitor and report on the extent of unutilized bycatch and fishing mortality on fish less than age-1.

- Conduct stock identification research on croaker.

- Continue monitoring of juvenile croaker populations in major nursery areas.

- Evaluate hook and release mortality under varying environmental factors and fishery practices.

Low Priority

- Determine migratory patterns and mixing rates through cooperative, multi-jurisdictional tagging studies.

- The optimum utilization (economic and biological) of a long term fluctuating population such as croaker should be evaluated.

E. Additional Un-prioritized Recommendations

- 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.

F. Identified Management Issues

There are none listed for this species at this time.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC MENHADEN (*Brevoortia tyrannus*)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC MENHADEN
(Brevoortia tyrannus)

I. Status of the Fishery Management Plan

The 1992 revision of the 1981 Fishery Management Plan (FMP) was approved at the 1992 Annual Meeting of the Commission. Management authority is vested in the states because the vast majority of landings come from state waters. There is a single stock that migrates along the Atlantic coast. All Atlantic coast states except Pennsylvania have declared an interest in the menhaden management program. The Commission menhaden management program operates under the direction of the Atlantic Menhaden Board, with technical and advisory expertise provided by the Atlantic Menhaden Advisory Committee (AMAC). The goal of the FMP is "to manage the Atlantic menhaden fishery in a manner that is biologically, economically, and socially sound while protecting the resource and its users". The 10 objectives of the FMP include use of the best scientific information as the basis for regulations, support for high quality habitat, maintenance of the stock, optimum utilization, public education, product research, maintenance of the long-term database, improvement of data collection, enhancement of the Captains Daily Fishing Report, and promotion of cooperative research.

The fishery is managed on the basis of an annual review of three specific items conducted by AMAC each spring: (1) status of the stock and fishery; (2) evaluation of requests for allocations by states for harvest under Internal Waters Processing (IWP) arrangements; and (3) state management actions which may affect the fishery. Following its review, the AMAC sends a report to the Atlantic Menhaden Board, which reports to the Interstate Fisheries Management Program (ISFMP) Policy Board. The Commission forwards the Board's IWP recommendations directly to the Governors of states that apply for allocations.

XV. Status of the Stock

The status of the stock is considered to be healthy, with 7 age classes represented in 1997. Natural mortality is considered to be M = 0.45. Overall fishing mortality (F) is currently estimated to be 0.94 (for ages 1-8), with age-specific values ranging from F = 1.2 (age 2 and older) to F = 0.015 for age-0. Recruitment to age-1 was good to excellent from the mid-1970s to the late 1980s. Estimates of recruitment to age-1 have declined since 1990, with the three-year running average of 1.9 billion fish for 1995-97 falling below the minimum acceptable level of 2.0 billion fish. Average estimated spawning stock biomass (mature females) for 1995-97 was 73,000 metric tons (mt), over four times the minimum level (17,000 mt) considered acceptable by the FMP. Maximum spawning potential (MSP) during 1995-97 averaged 10.6 percent, a level more than three times the minimum provided for in the FMP (exceeds the 75th percentile for 1965-90). Since recruitment to age-1, spawning stock biomass, and MSP are all based on virtual population analysis (VPA) results, and VPA values for the most recent years are the least reliable, these figures must be considered as preliminary estimates. Age composition of fish in the 1997 reduction landings coastwide (numbers of individual fish) was age-0 (2.5 percent), age-1 (24.7 percent), age-2 (42.9 percent), age-3 (23.8 percent), and age-4+ (6.1 percent). Age-2 fish made up 39.8 percent of the South Atlantic catch, and 43.9 percent of the Chesapeake Bay harvest, which includes coastal Virginia waters from Chincoteague, Virginia to Avon, North Carolina. Landings from the Mid-Atlantic area were age-2 (53.1 percent), age-3 (27.7 percent), and age-4+ (19.3 percent). No landings were made in the Gulf of Maine last year.

XVI. Status of the Fishery

The 1997 harvest for reduction was 259,100 mt, about 12 percent below the 1996 level of 292,900 mt, and about 15 percent below the average of the five previous years of 304,036 mt. Nominal effort (vessel-weeks) in 1997 increased 16.7 percent from 528 to 616 vessel weeks over 1996 levels. Nominal effort during 1996 was decreased due to adverse weather conditions. A total of 23 vessels landed menhaden during the 1997 season; the small purse seine vessels from the Gulf of Maine did not fish for menhaden in 1997. Three shoreside plants operated in 1997 -- one in Beaufort, North Carolina and two in Reedville, Virginia. The Chesapeake Bay fishery dominated the landings. Bait landings are estimated at about 23,300 mt for 1996, the last year for which data are available for all Atlantic coast states. The bait fishery is becoming increasingly more important from North Carolina to New England. The current levels of bait landings are conservatively estimated at 10 percent of the total Atlantic menhaden harvest on an annual basis.

Late in 1997, AMPRO Fisheries in Reedville, Virginia, was purchased by Zapata Protein (now Omega Protein). For 1998, Omega Protein has stated that the 1997 reduction fleet of 20 vessels will be reduced to 13 vessels, based at their one remaining processing plant in Reedville. This represents a 35 percent reduction in the Virginia menhaden fleet for 1998, and with two vessels active at the Beaufort, North Carolina plant, total fleet size will be 15 vessels. A decrease of 30 percent in the effective fishing effort from 1997 levels has been estimated based on the catch histories of the remaining vessels.

XVII. Status of Assessment Advice

The Atlantic menhaden resource is assessed each spring prior to the annual AMAC review meeting. The most recent assessment was performed by the National Marine Fisheries Service (NMFS) Menhaden Team in March 1998 and was reviewed (internally) by AMAC in April 1998. A Murphy Virtual Population Analysis (VPA) is used to assess menhaden. Possible sources of uncertainty in the assessment include the accuracy of the bait landings, the absence of abundance indices for juveniles as well as adults (multi-age), and the application of a coastwide assessment to answer questions of stock abundance in subareas (i.e. Chesapeake Bay). In October, 1997, the ISFMP Policy Board recommended that Atlantic menhaden continue to be reviewed internally by AMAC.

XVIII. Status of Research and Monitoring

The Menhaden Team of the NMFS laboratory in Beaufort, North Carolina has the principal research and monitoring responsibility for the Atlantic menhaden fishery. Their monitoring and analytic work is expected to continue. Several states have improved their juvenile monitoring programs, which include data on menhaden. The industry continues to cooperate by providing set-by-set data through the Captains Daily Fishing Reports (CDFR). Beaufort Menhaden Team personnel are entering current year and historical (since 1985) CDFR data into a database for analysis. A bait fishery sampling program has been conducted since 1994 in Massachusetts, New Jersey, Virginia, and North Carolina. Some differences in age composition between bait and reduction catches have been noted, but sample sizes are small. The Menhaden Team continues to gather samples and analyze age composition of bait samples from along the Atlantic coast for possible future inclusion in the catch-at-age matrix.

XIX. Status of Management Measures and Issues

There are no regulatory recommendations stemming from the FMP. Commission staff is currently compiling an updated list of state-by-state management measures pertaining to menhaden.

XX. Current State-by-State Implementation of FMP Compliance Requirements as of June 1, 1998

There are no regulatory compliance requirements in the Menhaden FMP.

XXI. Recommendations of FMP Review Team

A. General

The menhaden factsheet will undergo another revision and should be published during the 1998 fishing season. University researchers are urged to evaluate use of coastal power plant impingement data as a possible means to estimate young-of-the-year abundance. This issue is being addressed by the Commission's Management and Science Committee who will then forward a report to the ISFMP Policy Board. An external peer-review of the menhaden assessment and management program was recommended by the ISFMP Policy Board during the Commission's Spring Meeting in June 1998. This review is scheduled to be conducted in late 1998.

B. Regulatory Recommendations

Because the stock is considered healthy, there are no recommendations from the PRT for additional restrictions on the fishery.

C. Amendments

No amendments to the current plan are in development. The AMAC has recommended that an addendum be prepared during 1999 which would address the following issues: (1) reformatting the current FMP to follow the current approved ISFMP outline; (2) update the Habitat section; and (3) to evaluate the trigger levels in light of changes in the fishery.

D. Research and Monitoring Recommendations (taken from ASMFC Special Report No. 62; number in parentheses reflects ranking with 1 being highest priority)

- Evaluate effects of selected environmental factors on growth, survival and abundance of juvenile and adult Atlantic menhaden (1).
- Develop and test methods for estimating size of recruiting year-classes of juveniles using fishery-independent survey techniques (1).
- Determine how loss/degradation of critical estuarine and nearshore habitat affects growth, survival and abundance of juvenile and adult Atlantic menhaden abundance (1).
- Monitor landings, size, age, gear and harvest area in the reduction and bait fisheries, and determine age composition by area (1).

- Study the ecological role of menhaden (predator/prey relationship, nutrient enrichment, oxygen depletion, etc.) in major Atlantic coast embayments and estuaries (1).

- Evaluate use of coastal power plant impingement data as a possible means to estimate young-of-the-year abundance (2).

- Determine the effects of fish diseases (such as ulcerative mycosis and toxic dinoflagellates) on the menhaden stock (3).

- Evaluate the effects of regulations on the fishery, the participants and the stock (3).

- Monitor fish kills along the Atlantic coast and use the NMFS Beaufort Laboratory as a repository for these reports (4).

- Develop bycatch studies of menhaden by other fisheries (5).

- Periodically monitor the economic structure and sociological characteristics of the menhaden reduction industry (6).

E. Identified Management Issues

Make annual prediction for the Atlantic coast fishery.

Analyze vessel catch records.

F. Completed

Analyze CDFR to improve estimates of catch matrix for VPA and in relating temporal-spatial distributions to environmental conditions. (Vaughan, D.S. 1997. Trigger Variables for Atlantic Menhaden, unpubl. report for 1996 fishery)

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC SEA HERRING
(Clupea harengus harengus)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC SEA HERRING
(Clupea harengus harengus)

I. Status of Fishery Management Plan

The Atlantic States Marine Fisheries Commission's (Commission) *Atlantic Herring Fishery Management Plan* (FMP) was approved in 1994 and established a management goal and eight management objectives for the U. S. Atlantic herring (*Clupea harengus*) resource. Some of these objectives can be achieved in this plan and some can only be reached through either a joint Commission/New England Fishery Management Council (NEFMC) or complementary federal FMP.

The FMP defines overfishing for the sea herring coastal stock complex on the basis of the fishing mortality rate (F) which will reduce the stock to 20 percent of its maximum spawning potential (MSP) and provides a procedure for determining annual internal waters processing (IWP) allocations between three management areas based on the target fishing mortality. It also proposes an institutional framework for developing and implementing future management action involving the Commission, the New England and Mid-Atlantic Councils, and (possibly) Canada, maintains existing state spawning closure regulations, and recommends a number of measures intended to prevent damage to herring spawning habitat and egg beds.

The overfishing definition established in this FMP is strictly for the purpose of making IWP allocations. In the event that the stock becomes over-exploited in the future, adult and/or juvenile catch limits may be needed within individual areas according to guidelines which will be developed by the Atlantic Herring Section (Section) and Plan Development Team (PDT), based on advice from the Atlantic Herring Technical Advisory Committee.

Amendment 1 to the Commission FMP is being developed in conjunction with the development of a FMP for federal waters by the NEFMC. Management measures in both plans will be designed to complement each other in order to minimize regulatory differences in fisheries conducted in state versus federal waters. The proposed management scheme will rely on an overall total allowable catch (TAC) with effort control measures to avoid overfishing the resource. TACs may be designed for specific management areas to reflect the current state of knowledge concerning migratory behavior and mixing rates of the various sub-components. Effort controls may include specific days out of the fishery in order to slow catch rates and extend the fishing season.

II. Status of the Stock

The U.S. Atlantic herring coastal stock complex includes two distinct spawning stocks which occupy discrete areas on Georges Bank and Nantucket Shoals and in the Gulf of Maine in the summer and fall. Fish belonging to these two stocks, and to smaller spawning populations within each stock, migrate to continental shelf waters south of Cape Cod after spawning, then move northward in the spring to summer feeding grounds north and east of the Cape before eventually returning to their natal spawning grounds. Herring deposit eggs on gravel bottom in relatively shallow, tidally-mixed coastal waters and offshore banks.

The coastal stock complex which occupies the management area covered by this FMP (Cape Hatteras to New Brunswick) has grown rapidly since the early 1980s. Total stock biomass at the beginning of 1997 was estimated as three million metric tons (mt). This increase is due largely to the recovery of the Georges Bank/Nantucket Shoals components of the stock complex which supported a large foreign fishery during the 1960s and early 1970s, but collapsed in the mid-70s as a result of over-exploitation. Current stock size estimates are twice what they were in the late 1960s. Annual fishing mortality rates exceeded 50 percent for a number of years following the collapse of the Georges Bank stock and have declined rapidly during the last ten years. The fishing mortality rate in 1997 was only 0.05 (5 percent).

Population size and fishing mortality rate estimates for the Atlantic coastal stock complex are based on a virtual population analysis that relies on catch at age estimates and spring and winter trawl survey abundance indices by age that are available since 1968 (trawl survey data are used to select the terminal fishing mortality rates for the VPA in a process that is called "tuning"). Fall trawl survey data for Atlantic herring cannot be used because they are too variable from tow to tow, the result of the aggregation of adults in certain locations, and their low abundance elsewhere, during the spawning season. Trawl surveys conducted in winter and spring, after spawning is over, are not prone to this problem, but adult herring belonging to different spawning stocks are mixed at this time of year (primarily in southern New England and the mid-Atlantic region) and cannot be distinguished from each other. For this reason, separate "tuned" VPA's for the two principal spawning stocks cannot be performed. Larval survey data collected every year between 1971 and 1994 were used in the past as a second tuning index for the stock complex VPA, but are no longer available.

VPA-derived population size and fishing mortality rate estimates for the stock complex are substantially over-estimated for the most recent years of the time series. To illustrate the nature of the problem, in 1995, the previous time an assessment of this resource was completed, the mean 1994 biomass was 3.6 million mt. In 1998, with the addition of three more years of catch at age and survey data to the analysis, the 1994 biomass estimate dropped by 2/3, to 1.1 million mt. Projected 1999 and 2000 spawning stock size estimates at different levels of fishing mortality (NEFSC 1998) are overly optimistic because they are based on an over-estimated 1997 stock size. A more realistic stock size estimate for the complex is 1.92 million mt, an estimate that was derived from a surplus production model that relies solely on total annual catch figures and trawl survey data (mean kg/tow for all ages combined). The results of this model were endorsed by the Overfishing Definition Review Panel that was convened to advise the New England and Mid-Atlantic Fishery Management Councils on overfishing definitions for 42 stocks managed by these two Councils (NEFMC 1998), but were not reviewed by the Stock Assessment Review Committee (SARC) in the spring of 1998.

There is limited information currently on the relative size of the two principal spawning stocks that make up the stock complex. Historical assessment information indicates, however, that the Gulf of Maine stock was much smaller than the Georges Bank/Nantucket Shoals stock during the 1960s and 1970s. With the recovery of the Georges Bank/Nantucket stock in recent years, the same situation is believed to prevail today. Analysis of the National Marine Fisheries Service (NMFS) fall trawl survey data gives some indication as to the relative size of each component. An examination of the fall trawl survey data by the 27th Stock Assessment Workshop – SAW 27 (NEFSC 1998) resulted in estimates of minimum population size for each of the three areas for the time periods 1988-97 and 1993-97. Coastal Maine accounted for 27 percent of the population during 1988-97, and 26 percent in the more recent time period. Nantucket Shoals accounted for 63 percent of the population from 1988-97 and 57 percent during 1993-97. Georges Bank accounted for 10 percent of the biomass in 1988-97 and 17 percent in the recent period, a reflection of the increased amount of spawning on Georges Bank during the last five years. These data indicate that

the Gulf of Maine spawning stock accounts for about 25 percent of the total spawning stock biomass and the Georges Bank-Nantucket Shoals stock for the remaining 75 percent.

Larval and bottom trawl surveys conducted by NMFS during the past 30 years clearly document the collapse of the offshore portion of the stock complex in the early 1970s and its recovery over the past ten years. Larval catch rates on Georges Bank and Nantucket Shoals were high in the early 1970s, then declined to very low levels until the late 1980s and early 1990s. Catch rates of herring in the spring bottom trawl survey south of Cape Cod started to increase in the mid-1980s and reached record high levels in 1996 and 1997. Catch rates of two year-old herring were particularly high in 1996, as were three year-olds in 1997, indicating that the 1994 yearclass is large and that the stock may continue to increase in size.

Despite the continued growth and large size of the stock complex, the fishery is still primarily conducted as a near shore fishery in the Gulf of Maine, on the smaller Gulf of Maine spawning stock and migrants from the Georges Bank stock which occupy this area to some extent in the spring. Concerns have been expressed by the scientific community that current levels of exploitation could threaten smaller localized spawning populations in the Gulf of Maine.

Currently, the stock complex is large and underutilized. It may increase in size even further in the near future under current exploitation and recruitment patterns.

III. Status of the Fishery

Commercial fisheries for Atlantic herring along the U.S. east coast and in New Brunswick, Canada, only remove about 120,000 mt a year, or 4 percent of the population. Over 90 percent of the total commercial harvest is taken in the Gulf of Maine, primarily with purse seines and midwater trawls (mobile gear) and to a lesser extent with stop seines and weirs (fixed gear). Primary domestic uses of the resource are for canning and bait. Total wholesale value of canned herring products in Maine in 1996 was about $100 million.

Under a provision of the Magnuson Fishery Conservation and Management Act, sales of herring to foreign processing ships operating in state internal waters have been conducted in Massachusetts, Maine, Rhode Island, New York and New Jersey through the issuance of Internal Waters Processing (IWP) permits. These IWP sales continue to provide an alternative market opportunity for U.S. fishermen. In general however, the fishery remains market limited. The surplus adult biomass available for IWP allocation was 425,000 mt for the fishing year July 1, 1996 through June 30, 1997. This amount was allocated among the Commission management areas with 106,250 mt for Area 1 (Gulf of Maine), 212,500 mt for Area 2 (southern New England and the Mid-Atlantic), and 106,250 mt for Area 3 (Georges Bank).

For the current fishing year (1996-97), the Commission's Atlantic Herring Section allocated 13,000 mt to Maine and 8,000 mt to Massachusetts for IWP operations and allocated the remaining tonnage of 85,250 mt to reserve. Rhode Island was allocated 42,000 mt in Area 2, with New York and New Jersey each receiving 5,000 mt. The remaining 160,500 mt was put in reserve. The logic for these decisions was that if a state's IWP(s) operation is successful (e.g., a foreign vessel is anchored in state waters and the fishery is strong), the reserve can be used. Additionally, the Section recommended an allocation of 20,000 mt for Area 3 in the event that a Preliminary Management Plan (PMP) could be developed in time to allow Joint Venture Processing on Georges Bank (A federal PMP was approved in the summer of 1996 which established a total joint venture processing limit of 40,000 mt in federal waters of Areas 2 and 3 only,

with no more than 20,000 mt in Area 3. The federal PMP also removed Atlantic herring from the prohibited species list.)

IV. Status of Assessment Advice

The most recent assessment of the Atlantic herring Coastal Stock Complex was completed in 1998 and reviewed by the SARC during the 27th SAW (NEFSC 1998). An analytical assessment (VPA-ADAPT methodology) of commercial catch-at-age was conducted. Catch data from US commercial fisheries, New Brunswick (Canada) fixed-gear fisheries, distant water fleets, IWP, and discards from U.S. mackerel joint venture fisheries were used to develop catch-at-age. Mean weights-at-age were determined from U.S. coastal fisheries only. Information on abundance and size of the spawning stock was taken from NEFSC spring and winter surveys of catch per tow dis-aggregated by age. In addition, an untuned VPA for the Gulf of Maine stock component has been developed and accepted by the SARC. This assessment indicates that this portion of the stock complex may currently be fully or over-exploited. Although fishing pressure on the stock complex can be increased, the SARC recommended that it be increased gradually due to the uncertainty in the current estimates of fishing mortality and spawning stock biomass. Additional sources of uncertainty include stock identification and resolution, the lack of an appropriate abundance survey for pelagic resources, and reliability of historical landings data.

V. Status of Research and Monitoring

(Not included in this review; see list of prioritized research and monitoring recommendations)

VI. Status of Management Measures and Issues

Atlantic herring have been managed on the U.S. east coast by means of an agreement between the states of Maine, New Hampshire, Massachusetts and Rhode Island which established annual three to four week spawning closures. The agreement was adopted in 1983 and endorsed by the Commission. The agreement replaced a federal management plan which was implemented in 1978 and withdrawn by the Secretary of Commerce in 1982 once it became clear that catch quotas for adult herring in the Gulf of Maine were not going to be enforced in state waters. In the absence of a federal FMP for Atlantic herring, it was then placed on the prohibited species list, which eliminated directed fisheries by foreign nationals or joint ventures for herring in the U.S. exclusive economic zone (EEZ).

With the development of IWP fisheries in the mid-1980's, it became clear that the 1983 interstate agreement was no longer adequate to manage the U.S. Atlantic herring resource. This agreement was not comprehensive enough to manage the resource, primarily because an allocation process was needed to equitably divide IWP shares between states receiving IWP applications. To address this problem the affected states, working through the Commission Atlantic Herring Section, developed an IWP allocation process which is now established as part of the present FMP. In addition, a second memorandum of understanding was circulated for signature to the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York and New Jersey in 1983 to demonstrate the intent of these states to cooperatively manage Atlantic herring.

In addition to IWP's, there have been other changes in the fishery and in resource assessment procedures which require a new approach for managing this resource throughout its range. With the dramatic growth of the stock, particularly offshore and in southern New England and Mid-Atlantic coastal waters, more states have declared an interest in IWP opportunities and in the management of the resource. Indeed, as a transboundary stock, both the U.S. and Canada should develop complementary management objectives.

In addition, assessment biologists from both countries should continue to work together to provide the best scientific advice for the entire resource.

For management purposes, the current FMP established three management areas within U.S. waters of the northwest Atlantic. Areas 1 and 2 include state and Federal waters north and south of Cape Cod, and Area 3 includes only federal waters on Georges Bank. A procedure is defined by which the Commission Herring Technical Committee, working with the NMFS, and if necessary, the Canadian Department of Fisheries and Oceans, will annually assess the coastal stock complex (defined as extending from New Brunswick to its southernmost extension on the U.S. Atlantic coast), estimate the total surplus adult biomass available for harvest, and recommend to the Commission Herring Section how much of the surplus to hold in reserve and how much to allocate for IWP harvest. The Section will act on these recommendations and divide the total IWP allocation between the three management areas and the individual states within each area, with no single area receiving more than 50 percent of the total. This FMP further recommends that each state ensure the monitoring of the IWP landings through the use of trained observers placed aboard IWP processing vessels or through the use of log books.

This FMP is a Commission plan. Since it is not a joint NEFMC/Commission plan, it cannot be (nor is it intended to be) fully implemented in federal waters without the cooperation of the New England and Mid-Atlantic Fishery Management Councils, and the development and implementation of a federal FMP. However, until such time as a joint Commission/NEFMC FMP, or federal FMP is completed and adopted which will allow full management of the resource throughout the EEZ and state waters, the management authority embodied in this plan will reside with the Commission, and be implemented through the states' authority to regulate domestic landings of fish caught inside or outside of state waters. The existing Commission management plan does not place any new restrictions or controls on the domestic herring fishery.

VII. Current State-by-State Implementation of FMP Compliance Requirements as of August 1, 1998

There are no compliance requirements set forth in the current FMP.

VIII. Recommendations of FMP Review Team

A. Regulatory Recommendations

Regulatory recommendations will be addressed in Amendment 1 to the current FMP.

B. Amendments

Amendment One to the Atlantic Sea Herring FMP will began development during 1997 in conjunction with the development of a Federal FMP through the NEFMC and NMFS. Although not considered to be a joint plan, both the Commission and Council will coordinate efforts through a joint planning process in order to reduce duplication and avoid confusion to both fishermen and the public. The amendment is scheduled to be adopted by the Commission during the Annual Meeting in October 1998.

C. Research and Monitoring Recommendations (taken from ASMFC Special Report No. 62; number in parentheses reflects ranking with 1 being the highest)

- Identify known spawning areas where herring deposit eggs (1).

- Develop a long-term strategy for assessing individual spawning stocks as a basis for more effective management of any heavily exploited portion(s) of the stock complex. Evaluate the merit of acoustic surveys and other techniques to achieve sub-stock complex monitoring (1).

- Develop economic analyses necessary to evaluate the costs and benefits associated with different segments of the industry (2).

- Pursue the development of a dedicated pelagic survey technique utilizing hydroacoustic and trawling methods to provide another direct and independent means of estimating stock sizes (2).

- Reinvestigate the estimation of age-3 herring, the natural mortality rate assumed for all ages, the use of catch-per-unit-effort tuning indices, and the use of NEFSC fall bottom trawl survey tuning indices in the analytical assessment of herring (2).

- Develop new approaches to estimating recruitment (i.e. juvenile abundance) from fishery-independent data (3).

- Consider using NEFSC fall survey mean weights at age as the spawning stock mean weight at age in the estimation of biological reference points (3).

- Investigate alternative methods of estimating mean weight at age used to determine the age composition of U.S. and Canadian landings from the coastal stock complex (3).

- Conduct a retrospective analysis of herring larval and assessment data to determine the role larval data plays in anticipating stock collapse and as a tuning index in the age-structured assessment (3).

- Establish critical spawning habitat areas or special management zones to protect spawning aggregations of herring and/or demersal egg masses (4).

- Continue resource monitoring activities, especially larval surveys to indicate the relative importance of individual spawning areas and stocks and the degree of spawning stock recovery on Georges Bank and Nantucket Shoals (4).

- Develop socio-economic analyses appropriate to the determination of optimum yield (5).

- Evaluate the concept of a minimum biologically-acceptable level biomass (MBAL) for the herring coastal stock complex. Determine the adequacy of present methods and data to determine MBAL if appropriate (5).

- Evaluate the concept of a fixed spawning stock size or spawning target for the herring coastal stock complex. Determine the adequacy of present methods and data to set a target if appropriate (5).

- Investigate the effects of averaging maturity rates over blocks of years to help smooth some of the interannual variability in the calculation of spawning stock biomass (5).

- Consider potential discards if fishing mortality increases in the future (6).

- Ensure the monitoring of the IWP landings through the use of trained observers placed aboard IWP processing vessels or through the use of log books (7).

D. Identified Management Issues (taken from ASMFC Special Report No. 62)

- Assure that the Clean Water Act (Section 319) Non-Point Source Plans and coastal Non-Point Pollution Control Plans are developed and implemented such that adverse impacts of non-point source pollutants on Atlantic herring are minimized.

- Strengthen enforcement of sewage discharge, or National Pollutant Discharge Eliminations System permit effluent limits from treatment plants, and ensure proper maintenance and operation of domestic septic systems.

- Implement effective oil and toxic chemical spill prevention and control programs to prevent accidental release, and prioritize cleanup plans to protect areas where Atlantic herring spawn or areas inhabited by Atlantic herring at different stages of their life history.

- Establish and enforce vessel “non-discharge zones”, and promote education of recreational boaters to reduce contamination of nearshore waters from chronic fuel spills and waste disposal.

- Prohibit dredging activities, including disposal of dredge spoil, in areas where herring are known to deposit eggs.

- Assist industrial siting councils in siting new power plants so that impingement and entrainment of Atlantic herring are minimized.

- Organize annual U.S.-Canada workshops to coordinate stock assessment activities and optimize cooperation in management approaches between the two countries.

1998 REVIEW OF AMENDMENT 5 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR ATLANTIC STRIPED BASS
(Morone saxatilis)

Prepared by

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1998 REVIEW OF AMENDMENT 5 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR ATLANTIC STRIPED BASS (*Morone saxatilis*)

I. Status of the Fishery Management Plan

Date of FMP approval:	Original FMP: October 1981 Amendment 5 (active): March 1995
Management unit:	Migratory stocks of Atlantic striped bass from Maine through North Carolina
States with declared interest:	Maine through North Carolina
List of Active Boards/Committees:	Striped Bass Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Tagging Workgroup, Plan Review Team, Plan Development Team

Jurisdictions with a declared interest in striped bass are from Maine through North Carolina, including Pennsylvania, the Potomac River Fisheries Commission, and the District of Columbia. Under the Atlantic Striped Bass Conservation Act (P.L. 98-613), implementation of the Fishery Management Plan (FMP) is mandatory. Implementation of the FMP is monitored by the Commission's Striped Bass Board (Board) and Striped Bass Plan Review Team (PRT).

Under the Amendment, standard minimum sizes for Atlantic striped bass are now 20 inches in bays and estuaries (producer areas), and 28 inches along the coast. In coastal jurisdictions, standard recreational regulations are two fish per day and a 365 day fishing season. No annual harvest quotas or caps are mandated for the recreational fishery. Commercial fisheries are regulated through the same size limit standards as the recreational fishery, and quotas are allocated by percentage of coastwide reported commercial landings from 1972-1979.

States are granted flexibility to deviate from these standards upon review by the Striped Bass Technical Committee and Advisory Panel and approval by the Management Board. Alternative proposals must be "conservationally equivalent" to the standards in Amendment 5, which has resulted in a wide variety of regulations between states (Tables 6 and 7).

Table 6. 1998 Commercial Fishery Regulations - Atlantic Striped Bass*

All regs subject to change. Readers should contact their state fisheries offices for detailed regulations
TBA: To be announced
***** State is in compliance with standard regulations or has approved alternative in place

STATE	SIZE LIMITS	SEASONAL QUOTA (LB)	OPEN SEASON
ME*	no fishery		
NH*	no fishery	4,000	
MA*	34" min.	750,000	7 July until quota reached (3 weeks open, 1 week closed, 3 weeks open)
RI*	36" min. (H&L) 24" (trap net)	95,138 (hook & line) 55,863 (trap net)	1 June - July (3 fish, H&L) Aug. till quota reached (2 fish, H&L)
CT*	no fishery		
NY*	24" - 36"	590,155	July 1 - December 31
NJ*	no fishery	Bonus fishery of 225,000 lbs. from commercial cap	
PA*	no fishery		
DE*	20"	184,046 lb. (100 lb./day hook & line)	1 March - 30 April, 1-30 December (gillnet) 1 October - 31 December (hook/line) Spawning grounds: 1 June - 31 March
MD*	Bay & Rivers: 18" min. Ocean: 24" min.	Bay & Rivers: portion of 10.5 million lb. bay-wide quota Ocean: 91,000	Bay & Rivers: 1 June 98 - 28 February 99 Ocean: 1 November 98 - 30 April 99
PRFC*	18"	portion of 10.5 million lb. bay-wide quota	Seasons for fyke nets, haul seines, gillnets, poundnets, and hook/line fisheries to be established between June 98- March 99.
DC*	no fishery		
VA*	Bay & Rivers: 18" Ocean: 28" min.	portion of 10.5 million lb. bay-wide quota	1 February - until quota reached
NC*	Albemarle Sound 18" min. Ocean: 28"	Albemarle Sound 125,440 Ocean: 336,000	Albemarle Sound Spring and Fall seasons Ocean: December 1 till quota met

Table 7. 1998 Recreational Fishery Regulations - Atlantic Striped Bass*

All regs subject to change. Readers should contact their state fisheries offices for detailed regulations

TBA: To be announced

* State is in compliance with standard regulations or has approved alternative in place

STATE	SIZE LIMITS	DAILY CREEL LIMIT	SEASONAL QUOTA (LB)	OPEN SEASON
ME*	20-26" 40"	1 1 per day ≥40"	none	10 June - 15 October Catch & release only, spawning areas: 1 May - 30 June
NH*	32" min.	1	none	All year
MA*	28" min.	1	none	All year
RI*	28" min.	2	none	All year
CT*	28" min.	2	none	All year
NY*	Hudson River: 18" min. Ocean And Delaware R.: 28" min.	Hudson River: 1 Ocean: 1 Charter & Delaware R.: 2	none	Hudson River: 15 March - 30 November Ocean: 1 April - 31 December Delaware River: All year
NJ*	28" min. Bonus: 28" min.	2 Bonus: 1/day in addition to regular fishery	Bonus fishery of 225,000 lbs. from commercial cap	Delaware R. spawning grounds: 1 June – 31 March Other Rivers: 1 March - 31 December
PA*	28" min.	2	none	Non-tidal: all year Tidal Del. River: March, 1 June - 31 December
DE*	28" min.	2	none	All year, except Delaware R. spawning grounds: 1 June - 31 March
MD*	Spring: 28" Summer/Fall: 18" Ocean: 28"	Spring: 1 Summer/Fall: 2 Ocean: 2	Spring: Portion of 30,000 Fish Cap Summer/Fall: Portion of 10.5 Million lb. Bay-Wide Quota Ocean: None	Spring: 24 April - 14 June Summer: 15 June- 5 July Fall: 15 August - 30 November Ocean: All Year
PRFC*	Spring: 28" Summer/Fall: 18"	Spring/Summer: 1 Fall: 2	Spring: Portion of 30,000 fish cap Summer/Fall: portion of 10.5 million lb. bay-wide quota	Spring: Limited days 26 April - 30 June Summer: Limited days June – December
DC*	18" min. 36" max.	1	none	3 June - 31 July 1 September - 16 November
VA*	Spring: 18"-28" Trophy: 32" Fall: 18" min. Ocean: 28" min.	Spring: 2 Trophy: 1 Fall: 2 Ocean: 2	Trophy: Portion of 30,000 fish cap Spring/Fall: Portion of 10.5 million lb. bay-wide quota	Spring: 16 May - 15 June Trophy: 1-15 May Fall: 4 October - 31 December Ocean: 16 May - 31 December
NC*	Roanoke River: 18" min. but no fish between 22"-27"April-May Sounds/Rivers: 18" min. Ocean: 28" min.	Sounds & Rivers: 3 Ocean: 2	Roanoke River: 62,720 Albemarle Sound: 31,360 spring/31,360 fall Other Areas: none Ocean: none	Roanoke River: February till quota Met; Albemarle Sound: Wednesday, Saturday, Sunday till quota met Other Areas: All year Ocean: Year round

These management measures are intended to maintain fishing mortality (F) at or below the target of F = 0.31. Since 1995, two addenda have been approved to perpetuate these regulations in 1997 and 1998. Addendum III is slated for approval in October 1998 to perpetuate the "status quo" regulations for another two years, 1999-2000. During this time period, the Management Board will review broad policy issues such as new standard size limits, quota allocation, and "quality" fisheries. If these discussions lead to substantial revisions of the FMP, the states may consider a sixth Amendment to the original 1981 plan.

The exclusive economic zone (EEZ) remains closed to striped bass harvest and possession by both commercial and recreational fishermen.

II. Status of the Stocks

Stock abundance of Atlantic striped bass remained high in 1997, with estimated stock numbers of 43 million fish in 1997 and 40 million fish in 1998 (ages 3-15+). Recruitment in 1998 was near the time series average, and the estimated cohort size at age 1 (coastwide) was 7.4 million fish. Female spawning stock biomass increased from 1996 estimates of 14,500 mt to 15,400 mt in 1997.

The Technical Committee recommends that the target fishing mortality rate (F = 0.31) and F_{msy} = 0.38. remain at current values. Fishing mortality rates were above the target F rate for fully recruited age groups (ages 3-15+). Fishing effort continues to increase in the recreational sector. Fishing rates in 1998 may increase over 1997 values and may continue to exceed the target rates . Therefore, the Technical Committee recommended that states maintain the status quo catch levels. Steady increases in the intensity of capture-to-encounter rate in recent years observed in both scientific and volunteer tagging studies, coupled with increased recreational trip estimates, indicate increased fishing pressure. This increase in effort may outstrip the gains associated with established size and possession limits and result in increased fishing mortality rates in 1999 and 2000.

The Roanoke River/Albemarle Sound (North Carolina) stock of striped bass was declared recovered by the Management Board in October, 1997. This finding was based on the recommendation of the Technical Committee and assessment data compiled by the state of North Carolina. These data suggest that spawning stock biomass in the Albemarle/Roanoke system has recovered to historical levels observed in the 1960's, and indicate that regulatory relaxation is permissible in certain areas. North Carolina received approval to fish at higher target mortality levels (up to 0.28 at 18 inches minimum size) in 1998, and must submit another proposal for fishing years 1999-2000 since Amendment 5 contains no standard regulatory framework for the Albemarle/Roanoke producer area.

The Delaware River stock of striped bass may also have recovered to historical levels. Personnel with Delaware Division of Fish and Game submitted a report to the Technical Committee which indicated promising trends in recruitment, age structure, and fishing mortality for the Delaware River stock. The Management Board will solicit input from the Delaware River Basin Commission on these findings, and may declare the stock restored under Addendum III (see above). This may have little effect on Delaware Bay regulations, however, since local jurisdictions have always been permitted to implement the same regulations and target F (0.31) imposed on the rest of the migratory stock.

III. Status of the Fishery

Total coastwide catch (landings and discards, combined) from recreational and commercial fisheries was estimated at 4,094,493 striped bass (25.7 million pounds or 11,700 mt) in 1997 and represents a 19 percent increase in number from 1996. Estimates of discard losses equaled 37.1 percent of the total catch

in 1997, compared to 41 percent in 1996. Total 1997 landings included 1.06 million fish (5.9 million pounds) from the commercial fishery and 1.52 million fish (15.9 million pounds) from recreational fisheries. The total landings are approximately 1 million pounds higher than the harvest recommended by virtual population analysis for 1998. Recreational landings increased by 19 percent and commercial landings increased by 38 percent between 1996 and 1997. For 1997, recreational discard mortality (1.3 million fish) increased by 29 percent from 1996 levels while commercial discard mortality levels decreased from 0.39 million fish in 1996 to 0.2 million fish in 1997.

IV. Status of Research and Monitoring

All jurisdictions with commercial fisheries (Massachusetts, Rhode Island, New York, Delaware, Maryland, Virginia, Potomac River Fisheries Commission (PRFC) and North Carolina) are required to define the catch composition (age, length, sex) of these fisheries. Jurisdictions with significant commercial fisheries (Massachusetts, New York, Maryland, Virginia, and PRFC) are required to collect catch/effort data. States with significant recreational fisheries (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Maryland, Virginia and PRFC) are required to follow specific guidelines for collecting catch composition and catch/effort information from these fisheries.

Amendment 5 also required fishery independent monitoring programs in some states. Juvenile abundance indices are determined by Maine, New York, New Jersey, Maryland, Virginia, and North Carolina. Spawning stock assessments are performed by New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. Tagging is conducted by state and federal agencies to determine survivorship and migration patterns in the coastal migratory stock. The tagging is done by personnel with the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS) and marine fisheries agencies in Massachusetts, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina.

V. Status of Management Measures

In 1997 and 1998, Amendment 5 mandated a target mortality rate of 0.31. In order to achieve this target, the plan calls for a minimum size of 20 inches in bays and estuaries and 28 inches in ocean waters. Standard creel limits are generally 2 fish per day, and a 365 day season in coastal waters. The Chesapeake Bay, Delaware Bay, and Hudson River jurisdictions have slightly different recreational standards. States could vary their regulations yearly as long as the Technical Committee and Management Board accepted that a state's proposal was conservationally equivalent to the Amendment 5 guidelines.

NMFS maintains a ban on striped bass fishing activity and possession of striped bass in the EEZ, with the exception of a defined route to and from Block Island in Rhode Island.

VI. Current State-by-State Implementation of FMP Compliance Requirements as of September 21, 1998

The FMP has several compliance requirements, which involve both the monitoring and regulatory aspects of state striped bass management programs (see above), and are enforceable through the Atlantic Striped Bass Conservation Act.

Amendment 5 also dictated that states submit semi-annual law enforcement activity reports. These reports, in a standardized format, detailed the effort and success involved in enforcing striped bass

regulations in each jurisdiction. State compliance with the law enforcement reports is summarized in Table 8 under "Annual reporting".

All states must submit an annual harvest report for the previous year by April 1. The report summarizes the activity and results of monitoring programs required by the FMP, the regulations in effect, and estimates of harvest/nonharvest losses.

State compliance with reporting law enforcement activity, harvest, and monitoring results is summarized in Table 8 under "Annual reporting".

Table 8. Status of compliance with monitoring and reporting requirements
(Y = compliance standards met, N = compliance standards not met, N/A = not applicable)

State	Fishery-independent monitoring	Fishery-dependent monitoring	Annual reporting
ME	Y	N/A	Y
NH	N/A	N/A	Y
MA	Y	Y	Y
RI	N/A	Y	Y
CT	N/A	Y	Y
NY	Y	Y	Y
NJ	Y	Y	Y
PA	Y	N/A	Y
DE	Y	Y	Y
MD	Y	Y	Y
PRFC	N/A	Y	Y
DC	N/A	Y	Y
VA	Y	Y	Y
NC	Y	Y	Y

VII. Recommendations

1. Continue implementation of 1998 regulations in 1999 and 2000 through Addendum III.

2. Re-evaluate biological reference points and fishing mortality targets as they relate to stock characteristics and future definitions of quality fisheries.

3. Complete discussions over allocation, size limits, and other large policy questions during 1999-2000 while preparing for possible new FMP amendment in 2001.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR ATLANTIC STURGEON
(Acipenser oxyrhincus)

Prepared by:

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1998 REVIEW OF AMENDMENT 1 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR ATLANTIC STURGEON *(Acipenser Oxyrhincus)*

I. Status of the Fishery Management Plan

Year of plan's adoption:	1990
Amendments:	Amendment 1 (June, 1998)
Management unit:	Migratory stocks of Atlantic sturgeon from Maine through Florida
States with a declared interest:	Maine through Florida, including District of Columbia, Potomac River Fisheries Commission
Active committees:	Sturgeon Management Board, Plan Review Team, Technical Committee, Stock Assessment Subcommittee, Advisory Panel.

In 1995, the states determined that the original 1990 Fishery Management Plan (FMP) was insufficient for conservation and restoration of Atlantic sturgeon stocks, and initiated development of Amendment 1. The amendment was approved in June 1998 by the Commission, and its goal is to restore Atlantic sturgeon spawning stocks to population levels which will provide for sustainable fisheries, and ensure viable spawning populations. Specific objectives include:

- Establish 20 protected yearclasses of females in each spawning stock;
- Close the fishery for a sufficient time period to reestablish spawning stock s and increase numbers in current spawning stocks;
- Reduce or eliminate bycatch mortality of Atlantic sturgeon;
- Determine the spawning sites and provide protection of spawning habitats for each spawning stock;
- Where feasible, reestablish access to historical spawning habitats for Atlantic sturgeon; and
- Conduct appropriate research as needed, especially to define unit stocks of Atlantic sturgeon

To achieve this goal, states must maintain complete closure, through prohibiting possession of Atlantic sturgeon, and any and all parts thereof including eggs, and of any directed fishery for and landings of Atlantic sturgeon until the fishery management plan is modified to reopen fishing in that jurisdiction.

In addition, states must report annually (beginning October 1, 1999) on the following topics to Commission:

- Results of bycatch monitoring for Atlantic sturgeon in other fisheries

- Monitoring results (tagging, juvenile abundance indices, etc.)

- Habitat status (restoration efforts, Federal Energy Regulatory Commission relicensing studies, etc.), in accordance with the recommendations in the FMP; and

- Aquaculture operations authorized, status of regulations, disease-free certification status, etc.

II. Status of the Stock[1]

Reported landings peaked in 1890 at 3.4 million kg and declined precipitously thereafter. Currently, populations of Atlantic sturgeon throughout the species' range are either extirpated or at historically low abundance. Recruitment is variable at low levels in all regions. Survival of Atlantic sturgeon during the 20th century implies that enough spawning and nursery habitats exist to perpetuate the species. In the absence of major threats to existing habitat, reduced fishing mortality is of greater importance to stock restoration efforts than habitat limitations.

The target fishing rate was defined as that level of F that generated an eggs-per-recruit (EPR) equal to 50 percent of the EPR at F = 0.0 (i.e., virgin stock). This rate (F_{50}) equals 0.03 (annual harvest rate of 3 percent) for a restored population. This target is far below recent estimates of F prior to enactment of fishing moratoria, which ranged from 0.01 - 0.12 for females and 0.15 - 0.24 for males in the Hudson River.

III. Status of the Fishery

Currently, all states have enacted bans on harvest and possession of Atlantic sturgeon and sturgeon parts. As per Amendment 1, these moratoria will remain in effect until stocks at least exhibit 20 protected yearclasses of spawning adults and the FMP is modified to permit harvest and possession.

Importation of Atlantic sturgeon and sturgeon parts from Canada is currently not allowed under all state regulations, but could be permitted through the adaptive management process (i.e., addenda).

IV. Status of Research and Monitoring

Amendment 1 does not require any research or monitoring initiatives in participating jurisdictions. Nonetheless, several state and federal agencies are conducting or have completed research projects on Atlantic sturgeon to further understand the species' life history, genetics, behavior, and aquaculture. Some of these include:

- Reproductive conditions of Hudson River stock (University of California/Davis - Hudson River Foundation)

- Diet in marine waters (National Biological Service, assisted by New Jersey Department of Environmental Protection)

[1] Portions of this report were taken from "Atlantic States Marine Fisheries Commission: American Shad and Atlantic Sturgeon Stock Assessment Peer Review: Terms of Reference and Advisory Report." ASMFC, Wash., D.C. 29 pp.

- Hydroacoustic surveys in Connecticut River and Hudson River (National Biological Service - U.S. Fish and Wildlife Service)
- Mitochondrial DNA analysis to delineate subspecies (New York University and Hudson River Foundation)

- mtDNA analysis to determine stock contributions in New York fishery (New York University and Hudson River Foundation)

- Behavior and diet studies in early life history stages (National Biological Service)

- Juvenile sturgeon habitat use in Hudson River (University of Massachusetts and NMFS, Cornell University)

- Ultrasonic telemetry studies of sturgeon movement (National Biological Service, Hudson River Foundation, Cornell University)

- Fin ray aging studies (Chesapeake Biological Laboratory and University of California/Davis)

- Sturgeon bycatch in Winyah Bay shad fisheries (South Carolina Department of Natural Resources)

- Tagging of juvenile and adult Atlantic sturgeon in the Delaware and Hudson Rivers (National Biological Service and Delaware Department of Natural Resources & Environmental Control)

- Survival of juvenile Atlantic sturgeon with pectoral spine and barbel South Carolina Department of Natural Resources)

- Seasonal abundance of juvenile Atlantic sturgeon in lower Edisto River (South Carolina Department of Natural Resources)

- Movement and distribution of stocked Atlantic sturgeon in Nanticoke River, Maryland, through the use of sonic tags (Chesapeake Biological Laboratory, Maryland Department of Natural Resources, National Biological Service)

- Release of approximately 3,500 coded wire tagged juvenile Atlantic sturgeon of Hudson River parentage in Nanticoke River, Maryland (Chesapeake Biological Laboratory, Maryland Department of Natural Resources, National Biological Service)

- Tagging program/rewards for live Atlantic sturgeon captured in Chesapeake Bay (U.S. Fish and Wildlife Service, Virginia Marine Resources Commission, Maryland Department of Natural Resources)

- Tagging of juvenile Atlantic sturgeon in A.C.E. (Ashepoo-Combahee-Edisto) Basin, South Carolina (South Carolina Department of Natural Resources)

In addition, identification of genetic diversity in Atlantic sturgeon using microsatellite markers is underway at the Leetown Science Center (USGS-BRD). Several researchers are working on identifying sturgeon habitat needs and preferences, and conducting tagging and tracking studies.

The USFWS continues work on development of a culture manual for Atlantic sturgeon including evaluation of diets, rearing densities, handling, and mass-marking techniques at the Northeast Fishery

Center in Lamar, Pennsylvania. In 1998, captive males at Lamar were induced to spermiate and eggs were taken by streamside spawning on the Hudson River. Cultured progeny have been provided for numerous research projects, including contaminant uptake analysis at the USGS Science Center in Columbia, Missouri.

V. Status of Management Measures and Issues

Mandatory management measures include:

- Complete closure, through prohibiting possession of Atlantic sturgeon, and any and all parts thereof including eggs, and of any directed fishery for and landings of Atlantic sturgeon until the fishery management plan is modified to reopen fishing in that jurisdiction.

- In addition, states shall implement any restrictions in other fisheries as outlined in bycatch reduction sections of the FMP.

- States may grant limited specific exceptions to prohibitions on possession for imports of non-U.S. Atlantic sturgeon and/or cultured Atlantic sturgeon upon adoption of FMP addenda that specify the terms, limitations, and enforcement requirements for each such exception. It is intended that each such addendum shall be developed by a PRT, in consultation with representatives of the Commission federal partners, applicable state aquaculture authorities, the Commission Law Enforcement Committee, the state(s) for which shipments are intended, and the party (ies) requesting the exception.

In addition to these mandatory regulations, states are implementing several recommendations in the FMP including development of a coastwide tagging database, culture techniques, incorporation of shortnose sturgeon issues in Atlantic sturgeon research (and vice versa), and stock identification.

On September 21, 1998, the Secretaries of Commerce and Interior determined that listing of Atlantic sturgeon under the Endangered Species Act (ESA) is not warranted. This finding was in response to a petition filed on June 2, 1997 for listing the species as endangered or threatened under ESA. Additionally, the National Marine Fisheries (NMFS)Service is moving forward with rulemaking to impose a harvest and possession moratorium on Atlantic sturgeon in the exclusive economic zone (EEZ).

VI. Current State-by-State Implementation of FMP Compliance Requirements as of September 23, 1998.

Compliance requirement: Complete closure, through prohibiting possession of Atlantic sturgeon, and any and all parts thereof including eggs, and of any directed fishery for and landings of Atlantic sturgeon until the fishery management plan is modified to reopen fishing in that jurisdiction.

ME	NH	MA	RI	CT	NY	NJ	PA	DE	MD	PRFC	DC	VA	NC	SC	GA	FL
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = State is in compliance

VII. Recommendations/Findings of FMP Review Team

1. Continue implementation of Amendment 1 to the Atlantic Sturgeon FMP.

2. Encourage NMFS and the Secretary of Commerce to expedite moratorium on Atlantic sturgeon possession and harvest in the EEZ.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR BLACK SEA BASS
(Centropristis striata)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR BLACK SEA BASS
(Centropristis striata)

I. Status of the Fishery Management Plan

Commission management of black sea bass was initiated as one component of a multi-species fishery management plan (FMP) addressing summer flounder, scup and black sea bass. In 1990, summer flounder was singled out for immediate action under a joint Commission and Mid-Atlantic Fishery Management Council (Council) Plan. Further action on the scup and black sea bass plan was delayed until 1992 to expedite the summer flounder FMP and a series of amendments, which followed. Work continued on the joint Commission/ Council Black Sea Bass FMP in 1996. The Commission approved the Fishery Management Plan for Black Sea Bass in October 1996. The Council approved regulations for black sea bass as Amendment 9 to the Summer Flounder FMP in May 1996. Amendment 12 to the Summer Flounder FMP, which establishes revised overfishing definitions, identification and description of essential fish habitat, and defines the framework adjustment process, is currently out for public comment.

The management unit of the joint Commission/Council Black Sea Bass FMP includes all black sea bass in U.S. waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the Canadian border. The objectives of the plan are to reduce fishing mortality to assure overfishing does not occur, reduce fishing mortality on immature black sea bass to increase spawning stock biomass, improve yield from the fishery, promote compatible regulations among states and between federal and state jurisdictions, promote uniform and effective enforcement, and to minimize regulations necessary to achieve the stated objectives. Overfishing is defined as fishing in excess of Fmax, which is equal to F=0.29. This represents an annual exploitation rate of 23 percent. The plan intends to reduce fishing mortality over an 8 year period. Amendment 12 proposes changing the overfishing definition, with Fmax serving as a proxy for Fmsy. Under current stock conditions Fmax is 0.32.

Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina have declared an interest in black sea bass. The Commission's Summer Flounder, Scup, and Black Sea Bass Management Board and the Council Demersal Species Committee guide development of the Plan. Technical issues are addressed through the Summer Flounder, Scup, and Black Sea Bass Technical Committee, annual review and monitoring is handled by the Black Sea Bass Plan Review Team, and industry input and advice is provided by the Scup and Black Sea Bass Advisory Panel.

II. Status of the Stocks

Black sea bass were last assessed at the 27th Stock Assessment Workshop (27th SAW) in June 1998. The Stock Assessment Review Committee (SARC) found that the stock is over-exploited and at a low biomass level. Recent catches have been well below the historical average, age and size structure is truncated, and survey biomass indices since the late 1980s have been one-tenth of those observed in the late 1970s. Estimated fishing mortality rates during 1984-1997 have been well above Fmax (F=0.32), with a mean value of F=0.68 over the period. Spawning stock biomass appears to have been relatively stable during 1984-1995, with an increase in 1996. Recruitment in 1997, as indicated by survey indices, was well below the 1972-1996 average. In spite of a potential maximum age of 15 years, the age structure is highly truncated. Since most black sea bass begin life as females and change to males between ages 2 and 5, the truncated age structure may result in a shortage of males and ultimately disrupt

reproduction. Fishing mortality on fully recruited fish has been far in excess of all biological reference points defined for this stock and should be substantially reduced. The high exploitation rates on younger fish must be reduced to allow these fish to mature and change sex to contribute to future SSB.

The SARC concluded that the available data were inadequate to provide the basis for conducting an assessment using either age-based or surplus production models. The biggest obstacles to development of an age-based assessment are inadequate estimation of discards and insufficient sea sampling. Neither observer nor VTR data was considered reliable for estimating the magnitude of discarding, and sea sampling was not sufficient to characterize the length distribution of discards. Length and age composition of the catch is poorly estimated due to a lack of adequate biological sampling.

III. Status of the Fishery

Commercial landings have been relatively constant in recent years, with the 1997 landings of 3.174 million pounds falling within the range of the 2 to 4 million pounds that has been landed annually over the last 20 years (Table 9). Most commercial landings are taken in otter trawls and fish pots and traps, and in the states of New Jersey and North Carolina. Black sea bass are an important recreational species along the mid-Atlantic, however, recreational landings in 1997 decreased more than 1.6 million pounds below 1995 and 1996 levels. About two-thirds of the recreational harvest has been taken in New Jersey in recent years, with Virginia and Maryland a distant second and third place in annual landings (Table 10).

Table 9. Black Sea Bass commercial landings, 1985-1997, by state in thousands of pounds.

Note: 1997 was the first year in which NMFS compiled commercial landings data for Delaware

State	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
MA	311.9	417.5	323.3	476.9	351.3	435.928	244.169	43.123	39.459	20.8	41.525	39.646	91.005
RI	671.4	607.7	358.1	220.9	208.4	198.273	73.918	140.879	221.853	86.616	89.075	157.084	178.039
CT	12.9	4.3	77.1	59.3	10.9	13.935	9.4	4.8	4.663	4	8.501	16.826	11.972
NY	131.5	208.5	245.7	121	77.3	71.928	91.679	111.798	125.37	121.519	192.727	259.575	269.565
NJ	642.5	798	1109.5	1180.3	840.6	990.161	1034.13	1244.93	1380.59	956.917	797.096	1,221.896	705.249
DE													152.229
MD	220.9	435.1	492.8	394.7	295.7	342.522	481.027	468.231	361.533	334.066	302.565	546.487	513.177
VA	605.938	1044	1205	792.7	648.1	885.879	498.916	580.015	743.831	386.584	348.717	789.802	485.904
NC*	1216.05	1096.27	458.74	1229.27	778.205	1031.47	707.189	790.763	712.547	704.315	491.132	778.467	766.867
Total	3813.09	4611.37	4270.24	4475.07	3210.51	3970.1	3140.43	3384.54	3589.85	2614.82	2271.34	3,809.783	3,174.007

* Includes all landings from North Carolina, both North and South of Cape Hatteras.

Table 10. Black Sea Bass recreational landings by state, 1985-1997, in thousands of pounds. Data from MRFSS online query.

State	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
ME	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
MA	10.2	612.3	66.2	214.5	47.7	36.4	46.6	8.7	13.5	10.6	6.7	22.4	21.0
RI	17.8	16.1	70.9	10.7	24.5	9.3	12.9	15.9	28.5	26.2	53.7	55.1	44.9
CT	19.5	10.8	4.0	19.7	25.6	0.8	2.6	5.5	7.0	0.0	3.8	7.8	1.3
NY	168.0	442.3	608.6	241.6	756.4	307.9	141.6	220.0	312.1	107.1	48.7	78.6	153.1
NJ	961.9	9,509.7	444.4	572.3	1,460.7	1,037.9	1,645.8	1,218.6	3,344.3	1,627.4	3,409.9	4,479.1	2,893.6
DE	76.2	117.8	18.5	91.5	153.5	71.5	235.4	102.1	151.8	36.0	156.0	57.5	77.1
MD	176.0	319.7	203.6	766.4	312.9	318.8	423.9	469.5	481.0	215.9	1,811.7	376.8	370.9
VA	654.1	1,355.9	501.7	937.8	498.7	968.6	1,623.8	559.8	486.7	903.2	672.8	820.4	683.1
NC*	456.6	76.4	473.6	1,090.3	340.8	295.8	182.9	314.2	159.7	127.3	141.3	141.6	150.4
Total	2,540.4	12,461	2,391.6	3,944.8	3,620.7	3,047.0	4,316.0	2,914.1	4,984.7	3,053.6	6,304.6	6,039.3	4,395.4

*Includes all landings from North Carolina, both North and South of Cape Hatteras.

IV. Status of Research and Monitoring

Commercial landings information is collected by the Vessel Trip Reporting system and dealer reports. States are also required to collect and report landings data. Sea sampling data from the Northeast Fisheries Science Center (NEFSC) sea sampling program is used to estimate discards. Commercial age and length information is provided by the NEFSC weighout program and the State of North Carolina. Recreational landings and discards are estimated through the Marine Recreational Fisheries Statistics Survey. Recreational length frequency information for kept and discarded information is available only from the New York party boat survey.

Fishery independent surveys are conducted in Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Virginia, and North Carolina. Recruitment and stock abundance data are provided by the NEFSC spring, autumn, and winter trawl surveys.

As indicated above, the currently available information on the sea bass fishery is inadequate. Significant additional research and monitoring is required to allow development of an analytical age based assessment.

V. Status of Assessment Advice

The 27th Stock Assessment Review Committee concluded that the available data were inadequate for conducting either an age-based or surplus production model assessment. The status of the resource was evaluated from NEFSC spring and autumn survey indices. Fishing mortality was estimated using two different length based methods applied to length distribution of commercial and recreational landings.

VI. Status of Management Measures and Developing Issues

The management strategy for black sea bass calls for a reduction in fishing mortality to the target exploitation of Fmax, currently 0.32, over an 8 year time frame (Table 11). In years and 2 (1996 and 1997) minimum fish sizes and commercial gear restrictions are implemented. A commercial quota and recreational harvest limit are added in years 3 through 5 (1998-2000) to achieve the targeted 48 percent exploitation rate. The commercial quota is allocated coastwide into quarterly segments and may include trip limits if necessary. The recreational harvest limit can be regulated through size limits, possession limits, and seasonal closures. In years 6 and 7 (2001-2002) the target exploitation rate drops to 37 percent. In year 8 and beyond, the target exploitation rate is Fmax. The FMP also requires federal dealer and vessel permitting and reporting.

Table 11. Black Sea Bass Rebuilding Schedule

Year	FMP Year	Target
1996	1	none
1997	2	none
1998	3	48%
1999	4	48%
2000	5	48%
2001	6	37%
2002	7	37%
2003 +	8 +	23%

Black Sea Bass Compliance Criteria

Commercial Fishery

The following management measures may change annually. 1998 requirements are indicated.

- Minimum size of possession: 10”
- Minimum mesh and threshold 4” after 1,000 pounds
- Maximum roller rig trawl roller diameter: 18”
- Pot and trap escape vents: 2” round, 1.5” square, 1 $^{1}/_{8}$” x 5 $^{3}/_{4}$” rectangular.
- Pot and trap degradeable fastener provisions: (a) untreated hemp, jute, or cotton string 3/16” (4.8 mm) or smaller; (b) magnesium alloy timed float releases or fasteners; (c) ungalvanized, uncoated iron wire of 0.094” (2.4mm) or smaller. The opening covered by a panel affixed with degradable fasteners would be required to be at least 3” x 6”.
- Commercial quota: 3.025 million pounds
- Trip limits: 11,000 lbs quarter 1; 7,000 lbs quarter 2; 3,000 lbs quarter 3; 4,000 lbs quarter 4.

The following measures are not subject to annual adjustment:

Commercial quota: (*see note under "Developing Issues")* A quarterly quota system was implemented in year 3 (1998). States must prohibit fishing for, and possession of, black sea bass if and when NMFS determines that a quarter's share is landed. States must report all landings from state waters to the NMFS.

Pot and trap definition: A black sea bass pot or trap is defined as any pot or trap used by a fisherman to catch and retain black sea bass.

Recreational

The following measures may change annually.

- Minimum size of possession: 10"; change will be considered, December 1998.
- Possession limit: States may opt to implement either a closure from August 1-15 or a 20 fish limit**,** changes will be considered in December 1997.
- Seasonal closure: Changes will be considered to the above seasonal closure in December 1998.
- Recreational harvest limit: 3.148 million pounds

The Commission Summer Flounder, Scup, and Black Sea Bass Management Board and the Mid-Atlantic Fisheries Management Council are not recommending any changes to the total allowable landings, commercial size limit, minimum mesh requirements, mesh threshold, escape vent sizes, or quarterly trip limits for 1999.

Other Measures

Reporting: States are required to submit an annual compliance report to the Chairman of the Black Sea Bass Plan Review Team by June 1. This report must detail the state's management program for the current year and establish proof of compliance with all mandatory management measures. It should include landings information from the previous year, and the results of any monitoring or research programs.

This summary of compliance criteria is intended to serve as a quick reference guide. It in no way alters or supersedes compliance criteria as contained in the Black Sea Bass FMP and any Amendments thereto. Also please note that the management measures that change annually may be altered if Amendment 12 is approved

Developing Issues

The Commission and Council originally planned to develop and implement a commercial quota management system during years 1 and 2 (1996 and 1997). Since this activity was not completed, the commercial quota default system, a quarterly coastwide allocation with trip limits, was be implemented on January 1 1998. However, since the Board intended to address quota management during 1996 and 1997, compliance criteria and dates for quota management measures were not established under the original FMP.

A major criticism of the quarterly quota system is its impact on fixed gears. If the quota is landed in a given period, no black sea bass may be landed and no directed black sea bass fishing would be allowed.

Depending upon how the closure rule is developed and interpreted, fishermen using pots and traps that catch black sea bass could be required to remove their gear. Conceivably, pot and trap fishermen could be required to remove their gear from the water 4 times a year, resulting in a substantial burden.

In 1998 some of the Management Board members expressed concern that the black sea bass fishery may be closed during the economically important months of June and December. The months of June and December currently fall at the end of a quota period and therefore the quota may be filled prior to these months. The Summer Flounder, Scup, and Black Sea Bass Technical Committee proposed implementing three 4-month quota periods (Jan.-April, May-August, Sept.-Dec.). The Management Board and the Mid-Atlantic Fishery Management Council will further discuss this proposal in 1999.

An age based assessment (VPA) was rejected by the SARC due to insufficient and inadequate input data, therefore no formal projections were prepared for the black sea bass stock. Such projections are crucial in determining annual quotas and harvest limits. An age based assessment cannot be prepared until there is adequate sampling of landings and discards in both the commercial and recreational fisheries. Several years of sampling at appropriate levels are required to correct the current shortcomings in the black sea bass database.

VII. Compliance

States and jurisdictions required to comply with the provisions of the Black Sea Bass FMP are: Massachusetts**,** Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Potomac River Fisheries Commission, Virginia, and North Carolina.

1997 - 1998 Black Sea Bass FMP Compliance Schedule

COMMERCIAL	
Size limit (9”)	1/1/97
Size limit (10”)	1/1/98
Minimum mesh and threshold provisions	1/1/97
Pot and trap escape vents and degradable fasteners	1/1/97
Roller diameter restriction	1/1/97
Quota Measures	
States must report to NMFS all landings from state waters	1/1/98
RECREATIONAL	
Size limit	1/1/97
Harvest limit	1/1/98
Ability to implement possession limits and seasonal closures	1/1/98
GENERAL	
Annual compliance report	Annually, 7/1

The Management Board reviewed state compliance with the FMP in August 1998 and found that the States of Connecticut, New York, Delaware, Maryland, Potomac River Fisheries Commission, and North Carolina were all in compliance with the FMP. The annual compliance reports from Massachusetts, Rhode Island, New Jersey, and Virginia have been reviewed by the Plan Review Team and are waiting final approval by the Management Board.

Several states failed to submit annual compliance reports in a timely manner. As indicated in the above list, submission of the annual compliance report is a specified compliance item in the Black Sea Bass FMP. States are encouraged to submit reports on time in 1998. Failure to do so could result in a finding of non-compliance.

VIII. Recommendations

The PRT encourages collection of the data that is needed to complete an age based assessment of black Sea Bass.

The PRT recommends that otter trawl mesh selectivity studies for black Sea Bass be conducted. Some insight may be gained by examining landings of Sea Bass in directed scup trips using 4.5" mesh. A thorough evaluation of the interaction of mesh threshold limits, mesh size restrictions, and trip limits in both directed and bycatch (primarily small mesh loligo trips) fisheries is needed

The PRT recommends that all states submit annual compliance reports by the July 1 deadline, and that these reports include landings, regulatory, and enforcement information, as well as the results of any ongoing research and monitoring programs.

A. SARC Data Recommendations

- Increase sea sampling, particularly in the fish pot fishery of the Mid-Atlantic
- Obtain commercial length frequency data, by market category, from North Carolina from 1984-1993 and 1997
- A tagging program should be initiated through state fisheries agencies. The objective would be to tag several thousand black sea bass per state each year for several years. The information from tag returns would allow calculation of survival estimates independent of survey data. Use of several high reward tags or lottery-type system may be considered to evaluate tag reporting rate.
- Aging should be updated to include the most recent biological samples.
- A study further investigating the size/age and density effects on sex changes in black sea bass would be valuable in stock assessments. Studies on sex-specific mortality rates and growth are also needed.
- A study determining the value of artificial reefs for increased production of black sea bass would be valuable in estimating potential yield.
- Consideration should be given to a pot survey for an index because of the catchability problems in the trawl survey for a species such as black sea bass that is structure oriented.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR BLUEFISH
(Pomatomus saltatrix)

Prepared by:

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR BLUEFISH
(Pomatomus saltatrix)

I. Status of the Fishery Management Plan

The *Fishery Management Plan (FMP) for the Bluefish* was adopted by the Commission's member states in October, 1989 and approved by the Secretary of Commerce in March, 1990. This FMP, the result of a joint effort by the Commission and the Mid-Atlantic Fishery Management Council (Council), is unique in that it represents the first management plan to be jointly developed by an interstate commission and a regional fishery management council. The goal of the FMP is to conserve the bluefish resource along the Atlantic coast. Five objectives have been adopted:

1. Increase understanding of stock and fishery.

2. Provide highest availability to U.S. fishers; maintain, within limits, traditional uses (commercial fishery not exceeding 20 percent of total catch).

3. Enhance management throughout the range.

4. Prevent recruitment overfishing.

5. Reduce waste.

States with a declared interest in the Bluefish FMP include all member states except Pennsylvania and the District of Columbia. Management issues are addressed through the Commission Bluefish Management Board and the Council Coastal Migratory Species Committee. Technical advice is provided by a Commission Bluefish Technical Committee, annual plan monitoring and framework adjustment recommendations are the responsibility of a joint Commission/Council Technical Monitoring Committee, and stock assessment issues are handled by the Commission Stock Assessment Subcommittee. The Commission and the Council have approved the Public Hearing Document for Amendment 1 to the FMP. The public comment period closed on September 15, 1998. The Commission Bluefish Management Board and the Council Coastal Migratory Species Committee will meet on October 7, 1998 to review public comment and consider final approval of the Amendment. The Amendment is intended to prevent overfishing and rebuild the stock to a biomass level that will provide the maximum sustainable yield.

II. Status of the Stock

The stock is considered to be over-exploited and at a low level of abundance for the period in which recreational catch and survey abundance indices are available (1974-1997). Present recreational catch levels (16.7 million pounds-1997) are about 20 percent of the catch levels of the early 1980s. According to Gibson and Lazar (1998) fishing mortality rates (F) for bluefish increased from about 0.32 in 1978 to about 0.93 and 0.94 in 1987 and 1991, respectively. The assessment indicates that fishing mortality rates on bluefish have decreased steadily since 1991 to F=0.51 in 1997. Fishing mortality rates have been above F_{MSY} since 1979. Stock biomass declined from 216.3 million pounds in 1979, the historic high, to 36.0 million pounds in 1994, a decrease of 83 percent. Recruitment varied from 75 to 87 million fish during 1982-1984, but has declined substantially since then, with the best recent year classes recruiting to

the stock in 1988 and 1989. Recruitment since 1989 has been below average, and the 1993 year class of 4 million fish is the poorest in the time series. The Northeast Fisheries Science Center (NEFSC) autumn inshore bottom survey (Cape Cod to Cape Hatteras) is used to predict recruitment. The survey indicated an increase in recruitment from 1994 to 1996, with 1997 having relatively poor recruitment.

The Bluefish Technical Committee recognized shortcomings of the assessment but concluded that it represents the "best scientific" characterization of the Atlantic bluefish stock given the currently available data. An important caveat to this assessment discussed at length by many scientists and stakeholders is that the sharp decline in landings and inshore surveys may be due to migration of adult bluefish to offshore areas presumably in response to environmental and fish population alteration in coastal areas. If indeed the epicenter of the bluefish stock has shifted to offshore waters, then inshore survey abundance for bluefish would be biased low and fishing mortality estimated by the biomass production model would be estimated high. The lack of scientific data to prove stock displacement coupled with recruitment failures observed by several monitoring surveys since 1990 suggested to take a conservative approach by the National Marine Fisheries Service (NMFS), the Commission, and the Council regarding the status of the Atlantic stock.

Gibson and Lazar (1998) using a biomass dynamic model most recently assessed the status of the bluefish stock. This assessment was reviewed and accepted by the Council's Science and Statistical Committee.

III. Status of the Fishery

Commercial bluefish landings, which had declined by over 34 percent to 10.3 million pounds in 1989, increased to 13.7 million pounds in 1990 and then dropped to the lowest value in the time series 7.9 million pounds in 1995. The recreational bluefish catch declined steadily from a 1986 value of 114.7 million pounds to 15.9 million pounds in 1995, the lowest value in the time series. The recreational landings increased slightly from 1995 to 1997, with 16.7 million pounds being landed in 1997. Both the 1997 commercial landings and recreational catch were below the 1979 to 1997 average of 12.5 and 53.6 million pounds, respectively.

Five States -- Massachuasetts, Rhode Island, New York, New Jersey, and North Carolina -- accounted for over 85 percent of the commercial landings in 1994 with most landings occurring in the states of North Carolina (44 percent), New York (17 percent), and New Jersey (14 percent).

The Marine Recreational Fisheries Statistics Survey (MRFSS) estimates indicate that by number, recreational catches dropped to a series low of 9.8 million fish in 1996 (Table 12). Catches increased in 1997 to 12.5 million fish but were still below the 1979 to 1997 average of 19.3 million fish.

Table 13 provides bluefish commercial landings and recreational catch comparisons.

Table 12. Estimated number of bluefish caught and the estimated number of bluefish landed by marine recreational fishermen each year, 1981 to 1997.

State	Catch ('000)	Landing ('000)
1981	31,261	23,888
1982	27,220	23,724
1983	30,137	24,884
1984	26,508	20,798
1985	22,474	19,246
1986	30,411	24,441
1987	27,603	21,076
1988	13,365	9,905
1989	18,637	13,600
1990	16,446	11,365
1991	18,292	11,943
1992	11,400	7,158
1993	9,925	5,725
1994	11,920	5,768
1995	10,476	5,128
1996	9,899	4,570
1997	12,498	5,386
Average	19,322	14,036

Table 13. Bluefish commercial landings and recreational catch (thousands of pounds) for the period of 1979 to 1997.

Year	Commercial	Recreational	Total	% Commercial
1979	12,550	140,565	153,115	8.2
1980	15,118	153,468	168,586	9.0
1981	16,454	101,709	118,163	13.9
1982	15,430	86,660	102,090	15.8
1983	15,799	99,905	115,704	13.7
1984	11,863	74,695	86,558	13.7
1985	13,501	59,632	73,133	18.5
1986	14,677	114,554	129,231	11.3
1987	14,504	98,484	112,988	12.8
1988	15,790	61,446	77,236	20.4
1989	10,341	53,431	63,772	16.2
1990	13,771	43,630	57,401	24.0
1991	13,581	50,428	64,009	21.2
1992	11,478	39,259	50,737	22.6
1993	10,122	31,682	31,804	24.2
1994	9,453	27,625	37,078	25.5
1995	7,847	26,148	33,995	23.1
1996	9,288	27,666	36,954	25.1
1997	9,048	32,013	41,061	22.0
Average	12,664	69,632	82,296	18.0

Source: NMFS General Canvass and MRFSS data.

IV. Status of Assessment Advice

The most recent quantitative stock assessment was conducted by Mark Gibson (Rhode Island Fish and Wildlife) and Najih Lazar (Commission) in March 1998. The assessment used the dynamic population model (ASPIC) tuned to the NMFS inshore survey and the recreational catch-per-unit of effort from 1979 to 1997. The major source of uncertainty in this assessment was the lack of reliable data to characterize the state of abundance in the offshore portion of the stock.

After a series of peer reviews of bluefish assessment models the Council's Scientific and Statistical Committee adopted the biomass dynamic model to reflect the best information on the status of the stock. Results were therefore adopted for the development of Amendment 1 to the Bluefish Fishery Management Plan.

V. Status of Research and Monitoring

Many states and the NMFS conduct fishery-independent surveys. Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Maryland, Virginia, North Carolina, and South Carolina use trawls to monitor adults and juveniles. New York, Maryland, and Virginia conduct haul seine surveys. Year class strength is monitored through the NMFS autumn trawl survey.

The NEFSC fall offshore index was explored as a possible indicator of offshore abundance of bluefish by Mark Gibson and Najih Lazar. However, the bluefish catches in the offshore survey were low and the survey showed no significant trend and high variance for the 1974-1997 period.

Commercial landings information is collected by most states through dealer or fisherman reporting programs, and fishermen in the EEZ are required to report their landings to the NMFS. North Carolina is the only state that significantly samples bluefish commercial fisheries to determine the size and age composition of the catch. Recreational harvest is monitored by the MRFSS.

Due to concerns about the ability of the North Carolina age key to properly characterize the coastwide bluefish stock and ageing errors associated with ageing by scales, the Technical Committee began a preliminary study during 1996 comparing scale and otolith ages of bluefish collected in each state. Each state will attempt to collect scales and otoliths of 10 fish from each 5 inch length increment between 5 and 40 inches. The results will be compiled and reviewed by the Technical Committee, which will recommend what changes, if any, are justified.

VI. Status of Management Measures and Issues

The FMP allows a commercial quota and recreational possession limit to reduce fishing mortality. Both are adjusted annually by the Commission and Council through adaptive management or framework provisions. States are encouraged to license commercial fishermen who harvest bluefish.

The Bluefish FMP limits the commercial fishery to 20 percent of the total catch (recreational catch plus commercial landings) each year through a commercial quota intended to maintain the traditional uses of bluefish and protect the stock from a rapid increase in commercial harvest. Implementation of the commercial quota is based on two indices. Index A is a projection of the commercial share for the upcoming year based on a three year moving average of both the commercial landings and total bluefish catch, and Index B is the percent difference in the commercial share from one year to the next.

Based on 1979 to 1997 data, the projected 1999 commercial share (Index A) would be 27.2 percent, and from 1996 to 1997 the commercial share (Index B) decreased by 7.9 percent. Since Index A is greater than 20 percent, the FMP requires a commercial quota for 1999. In 1995 a quota of 9.583 million pounds was allocated to the states based in commercial landings data for 1983 to 1992. Initially, both the Council and the Commission Board had proposed a quota of 7,938,500 pounds for 1996. However, after extensive deliberation the Commission decided to maintain the 1996 quota at the 1995 level of 9.583 million pounds. In 1997 the Council and Commission approved a coastwide quota of 9.583 million pounds

The total coastwide landings were below the coastwide quota from 1994 to 1997. However, during each of these years some states exceeded their quotas.

The Technical Monitoring Committee is responsible for reviewing the best available data and recommending an annual commercial quota and recreational possession limit. Due to the fact that the management measures included in Amendment 1 may be implemented in 1999, the Technical Monitoring Committee did not recommend any changes to the commercial quota or recreational possession limit for 1999. Both the Council and Commission accepted the recommendations of the Committee and voted to maintain the commercial quota of 9.583 million pounds (Table 14) and recreational 10 fish possession limit.

Table 14. State-by-state commercial bluefish quotas for 1998 based on a coastwide quota of 9.583 million pounds and 1983-1992 NMFS General Canvass Data (Quotas unchanged since 1995).

State	1983-1992 Total	%	Quota
ME	868,083	0.641	61,433
NH	972,365	0.718	162,000*
MA	9,696,199	7.160	686,189
RI	12,019,880	8.876	850,634
CT	1,718,865	1.269	121,642
NY	15,011,672	11.086	1,062,359
NJ	22,023,645	16.264	1,558,589
DE	2,277,700	1.682	161,190
MD	3,877,024	2.863	274,373
VA	12,912,278	9.536	913,788
NC	41,590,251	30.714	2,943,296
SC	37,436	0.028	2,649
GA	10,030	0.007	710
FL	12,397,189	9.155	877,335
Total	135,412,617	100.000	9,583,000

*New Hampshire's quota allocation was increased by Board motion in 1994. If the entire coastal quota is landed in a given year, New Hampshire must deduct any landings in excess of their original 0.718 percent share from their next year's quota. If the coastal quota is not met, then the additional allocation to New Hampshire is deducted from the underage.

VII. Current State-by-State Implementation of FMP Compliance Requirements as of August 1, 1994

These states or jurisdictions are required to comply with the provisions of the Bluefish FMP: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Potomac River Fisheries Commission, Virginia, North Carolina, South Carolina, Georgia, and Florida.

The following are specific FMP compliance requirements:

1. Each state must restrict the possession of bluefish by anglers to not more than ten fish per day, or have a Commission-approved equivalent conservation program (Table 15).

   Compliance required by: September 1, 1994

2. Each state must restrict its commercial fishery to the quota adopted under procedures specified in the FMP.

   Compliance required by: Immediate

The Commission's Bluefish Management Board reviewed state commercial quota implementation proposals during the July 27, 1994 meeting in Providence, Rhode Island. The States of Maine, South Carolina, and Georgia were granted exemptions from the commercial quota requirements under the following provisions:

> "The States of Georgia, South Carolina, and Maine be exempted from the commercial quota requirements of the Bluefish FMP, provided that these states monitor their annual landings and landings not exceed 100,000 pounds in Maine and 20,000 pounds in the other states. These states will provide annual monitoring reports for their commercial quota. This question will be further reviewed and addressed in Amendment 1 to the Bluefish FMP."

The Commission Bluefish Technical Committee reviewed state commercial and recreational management measures during Summer 1997 and recommended to the Bluefish Management Board that all states were in compliance with the provisions of the Plan. The Management Board also reviewed state regulations during summer 1997 and determined that each state was in compliance with the provisions outlined in the plan. The Commission Bluefish Technical Committee and the Management Board will review all of the 1998 state compliance reports during Fall 1998 to determine if each state management program is consistent with the FMP.

VIII. Prioritized Research Needs

1. Size and age composition of the fisheries by gear type and statistical area should be collected.

2. Commercial and recreational landings of bluefish should be targeted for biological data collection wherever possible.

3. Explore alternative methods for assessing bluefish, such as length-based and modified DeLury models.

4. Measures of catch per unit effort under different assumptions of effective effort should be evaluated to allow evaluation of sensitivity of results.

5. Conduct research to determine the timing of sexual maturity and fecundity of bluefish.

6. Scientific investigations should be conducted on bluefish to develop an understanding of the long term, synergistic effects of combinations of environmental variables on various biological and sociological parameters such as reproductive capability, genetic changes, and suitability for human consumption.

7. Conduct research on oceanographic influences on bluefish recruitment.

8. Initiate research on species interactions and predator/prey relationships.

9. Studies on the interactive effects of pH, contaminants, and other environmental variables on survival of bluefish.

Table 15. Status of Bluefish Fishery Management Plan Implementation by States as of August 1997.

State	10 Fish Recreational Limit	Date Adopted
ME	Yes	5/09/92
NH	Yes	2/27/90
MA	Yes	8/22/90
RI	Yes	3/11/91
CT	Yes*	4/22/94
NY	Yes	9/01/91
NJ	Yes	2/06/95
PA	***	---------
DE	Yes	10/23/90
MD	Yes	5/01/90
PRFC	Yes	7/01/90
VA	Yes	5/01/90
NC	Yes	7/13/94
SC	Yes	4/10/92
GA	Yes**	9/13/89
FL	Yes	6/17/93

* Connecticut implemented a 10 fish possession limit for bluefish > 12" TL. Possession of bluefish less than 12" in length (snappers) in Connecticut was unlimited. Connecticut's regulation was determined not to have conservation equivalency to the FMP (1991). On April 22, 1994 Connecticut amended their creel limit regulations on bluefish to include snapper bluefish. Connecticut's regulation was approved as equivalent to the FMP (1994).

** Georgia implemented a 15 bluefish creel limit, a minimum size limit of 12" FL. Georgia's regulation determined to have conservation equivalency to the FMP (l990).

*** Exempted from compliance by the ISFMP Policy Board.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR NORTHERN SHRIMP (*Pandalus borealis*)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR NORTHERN SHRIMP (*Pandalus borealis*)

I. Status of Fishery Management Plan

Date of FMP approval:	October 1986
Lead agency and group with purview:	Commission Northern Shrimp Section
Management unit:	Western Gulf of Maine Northern Shrimp Stock
States with declared interest:	Maine, New Hampshire, Massachusetts
States added /deleted since last review:	None
List of active boards / committees:	Northern Shrimp Section, Northern Shrimp Technical Committee, Northern Shrimp Advisory Panel.

This plan presents a management approach for the western Gulf of Maine northern shrimp stock, which is intended to generate the greatest possible economic and social benefits from its harvest over time. Regulatory measures have been designed to optimize yield, recognizing that natural fluctuations in abundance will occur. The regulatory measures available to the Section are season length and gear type, both limited devices for controlling a fishery during times of low abundance and possible higher than normal effort. The industry would be better served by providing the Section with the ability to manage effort more directly in response to fluctuations in stock abundance.

II. Status of the Stock

In addition to previously used traditional methods of assessing the stock (i.e. landings data, commercial effort and catch per unit effort estimates, indices of abundance, etc.) more innovative, quantitative tools, the DeLury, ASPIC surplus production, yield per recruit and eggs per recruit models were introduced last year and continue to be used to provide guidance for management of the stock. These new assessment methods, based on models that incorporate several aspects of the fishery and survey data available, now provide an integrated approach to understanding the dynamics of the stock and fishery.

The technical committee has developed indices of abundance and biomass (stratified mean catch per tow (CPT) in numbers and weight) from summer trawl survey data (1984-1998). Index values for both numbers and weight for shrimp over 22mm dorsal carapace length (DCL) (those that will recruit to the fishery in the following season) peaked in 1985,1990 and 1995 with recruitment, growth and subsequent passage of the strong 1982,1987 and 1992 year classes through the fishery. The CPT in numbers and weight of shrimp over 22mm DCL in the 1998 survey are both down over previous years, indicating the strong 1992 and 1993 year classes have left the fishery and that the next three years will be dominated by weak year classes with the exception of the 1996 year class which shows moderate strength. The 1997 year class is the smallest on record since the beginning of the survey in 1983.

The analytical stock assessment's results mirror those of the index based assessment by showing that the biomass in 1998 is at its lowest level in the time series and that while fishing mortality is down in 1998 from a series high of 0.85 in 1997 to 0.57, this level is still too high and is associated more with the levels that caused the stock collapse in the early 1970s than with the period of relative stock stability in the 80s and early 90s (F = 0.34).

III. Status of the Fishery

Most of the shrimp fishing in the Gulf of Maine is conducted by otter trawling, although a small trap fishery is employed off the central Maine coast during the winter. The vessel participation indicates a high degree of opportunism in the fishery. The number of vessels estimated to have participated in the fishery varies from around 250 to between 300 and 400 depending upon the abundance of shrimp and market conditions. The number of vessels in the 1995-1997 fishery is not well established, but was around 300 and this number declined to the low 200's in 1998. The number of fishing trips rose steadily in the '80's to a peak of 12,300 trips in 1987. Effort averaged 9,520 trips over the next three years and then declined steadily to 5,990 trips in 1994. Effort increased steadily to 11,791 trips in 1996 and has since declined steadily to 6606 in 1998.

Annual landings of Gulf of Maine northern shrimp declined from an average of 11,400 metric tons (t) during 1969-72 to about 400 t in the late 70s. In the 1980s and early 1990s, landings rose and fell twice as individual strong year classes spawned in 1982 and 1987 moved through the fishery. Peak landings were in the neighborhood of 4,000 to 5,000 t and the lows were around 2,000 to 3,000 t. After a low of 2,143 t from 6,138 trips in 1993, landings increased steadily to slightly over 9,166 t from 11,791 trips in 1996 and then dropped to less than 3,947 t from 6,606 trips in 1998.

It is expected that effort and landings will continue to decline and remain at a low level over the next three years due to low abundance.

IV. Status of Research and Monitoring

The Technical Committee continues to conduct the northern shrimp trawl survey each August aboard the National Marine Fisheries Service (NMFS) research vessel, R/V GLORIA MICHELLE. Both state and federal agents sample the commercial catch coastwide to provide information on age and sex composition; federal efforts are relied on to collect catch and effort statistics. Since 1989, the NMFS Domestic Sea Sampling Program has provided valuable insight into the magnitude of demersal finfish bycatch that occurs in the Gulf of Maine northern shrimp fishery. This effort was enhanced in 1993 by additional sea-sampling conducted by the Massachusetts Division of Marine Fisheries. Hopefully, future work in this area will lead to development of definitive estimates on a species by species basis.

Trawls are designed to reduce mortality on non-targeted finfish species have become a key management tool in this fishery. Finfish separator and excluder devices (the Nordmore Grate) are currently regulates, while testing of gear refinements continues. It is crucial to the longevity of this fishery and to those fisheries with which it interacts that this work proceeds.

V. Status of Management Measures

Management of northern shrimp is somewhat unique in that the participating states of Maine, New Hampshire and Massachusetts have designated the Commission as the joint regulatory agency under

Amendment One to the Commission's Compact. Under the FMP, the regulatory measures available to the Section are season length and gear type.

For the 1997/98 season, the Technical Committee recommended a two month season (February and March) in order to reduce exploitation on a declining northern shrimp resource. Following public hearings, the Northern Shrimp Section approved a season beginning December 8, 1997 and ending May 22, 1998. The season contained two block closures, from December 25-31 and March 16-31, and weekends off except for March 14-15. In addition, boats fishing for shrimp in the exclusive economic zone (EEZ) were required to get and Exempted Fisheries Program Certificate from NMFS (Table 16).

Table 16. Current State-by-State Implementation of FMP Compliance Requirements as of September 1, 1998.

Requirement	Implementation Date	ME	NH	MA
1 ¾" Mesh Size	Immediate	Y	Y	Y
Season Limits	Immediate	Y	Y	Y
Info. Collection	Immediate	Y	Y	Y
Bycatch Reduction Provisions	Immediate	Y	Y	Y

VI. Status of Assessment Advice

A quantitative stock assessment is conducted yearly to determine status of the stock. The stock assessment was recently peer-reviewed at the 25th SARC in July 1997, NAFO, and in the North American Journal of Fisheries Management publication review process. The assessment uses several models in determining the status of the stock: the DeLury, ASPIC surplus production, yield per recruit and egg per recruit models.

VII. Recommendations of the Plan Review Team

The Plan Review Team recommends the following:

1. This review finds a need to update the 1986 FMP. The only regulatory measures available to the Section are season length and gear type, both limited devices for controlling a fishery during times of low abundance and possible higher than normal effort. The industry would be better served if the plan provided the Section with the ability to manage effort more directly in response to fluctuations in stock abundance. The options of regulating vessel participation, days at sea, areas fished, quotas, and other means of limiting catch and effort are more realistic and accurate controls and are made possible by the increased accuracy of the new, model-based assessment. These new assessment methods incorporate several aspects of the fishery and survey data available and provide an integrated approach to understanding the dynamics of the stock and fishery. An amendment would also provide the opportunity to set an overfishing definition and compliance measures that are not included in the annual regulatory measure. In light of new assessment capabilities, the need for additional regulatory options, an overfishing definition, and an opportunity to adopt compliance measures, this review of the FMP recommends that the FMP be opened for updating.

2. All current research and monitoring activities are essential to the long-term management of the fishery and should be maintained, giving priority consideration to the summer trawl survey as the Technical Committee's principal assessment tool.

3. Since the northern shrimp fishery in the western Gulf of Maine can have significant impact on other fisheries, efforts to quantify the magnitude of bycatch by species, area, and season need to be continued, and the steps necessary to limit negative impacts must be taken.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR RED DRUM (*Sciaenops ocellatus*)

Prepared by:

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And

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR RED DRUM (*Sciaenops ocellatus*)

I. Status of the Fishery Management Plan

The Atlantic States Marine Fisheries Commission (Commission) adopted *a Fishery Management Plan (FMP) for Red Drum* in 1984. The original management unit included the states from Florida to Maryland. In 1988, the Interstate Fisheries Management Program (ISFMP) Policy Board requested that all states from Florida to Maine implement plan requirements to prevent development of northern markets for southern fish. This action was the first of two revisions to the 1984 plan.

The second revision came with Amendment 1 in 1991. Amendment 1 replaced the 1984 plan with one developed jointly between the Commission and the South Atlantic Fishery Management Council (Council). The plan adopted by the Council prohibits harvest of red drum in the exclusive economic zone (EEZ), thereby placing regulatory responsibility at the state level. However, cooperative state/federal efforts are augmented under provisions in the Council plan to direct federal data collection and analyses for long-term objectives to rebuild overfished stocks.

The goal of Amendment 1 is to attain optimum yield from the fishery over time. Optimum yield is defined as the amount of harvest that can be taken while maintaining the spawning stock biomass per recruit (SSBR) level at or above 30 percent of the level that would result at a fishing mortality rate of F=0. However, the Council recently adopted a new optimum yield level of 40 percent static spawning potential ratio (SPR) and threshold overfishing definition of 10 percent static SPR. The management objectives are: (1) assure escapement by controlling fishing mortality; (2) address incompatibility and inconsistency among state and federal regulations; (3) promote cooperative collection, analysis, and utilization of biological and socioeconomic data.

II. Status of the Stocks

Because only estimates are available on the present status of the adult stock, model results imply potential longer term, equilibrium effects. It is important to remember that population models used in the assessment (specifically yield per recruit and static SPR) are based on equilibrium assumptions. Estimates of 1992 through 1994 escapement (relative survival of red drum from age at entry to fishery to age 4) range from 10.4 percent for the northern region (North Carolina and north) and 17.2 percent for the southern region (South Carolina and south). Unpublished data from Florida show much higher escapement rates of between 55 to 62 percent; this may mean that escapement rates in Georgia and South Carolina are lower than the regional estimate. Estimates of static SPR (the ratio of spawning stock biomass per recruit with and without fishing mortality) range from 9.0 percent for the northern region and 14.0 percent for the southern region. This may be an overestimate because most states north of North Carolina allow a fishery for adults and the analysis assumes no adult fishing mortality.

Since no direct estimates are available on the current status of the adult stock, model results imply potential longer term, equilibrium effects. In this regard, the joint Commission/Council plan development team maintains that the National Marine Fisheries Service (NMFS) Marine Recreational Fisheries Statistics Survey (MRFSS), as the basis of management data, provides insufficient information to assess the status of adult red drum stocks.

III. Status of the Fishery

Back to 1950, few landings of red drum have been recorded in states north of New Jersey (Table 17). Of the Mid-Atlantic States, Virginia and Maryland have reported small landings since the 1980s. South Atlantic commercial landings show no particular temporal trends, averaging about 300,000 pounds annually. Coastwide commercial landings for 1996 were 118,393 pounds; preliminary 1997 data show commercial landings of 57,917 pounds. Based on available information from tagging studies, a large portion of harvests in state waters appear to be supported primarily by catches of sub-adult red drum (0-5 yr.).

Table 17. Commercial landings (in pounds) of red drum along the Atlantic coast, 1987-1997

Year	RI	NY	MD	VA	NC	SC	GA	FLEC	Total
1987				2600	249537	14042	4185	42993	313357
1988			8100	4000	219677		3149	284	235210
1989			1000	8200	274356	165	3863		287584
1990			29	1481	183216		2763		187489
1991			7533	24771	96045		1637		129986
1992			742	2352	128497		1759		133350
1993			121	8629	238099		2533		249382
1994	5094		1152	4080	142159		2141		149532
1995		668	6	2992	248193		2578		253769
1996		8	657	2073	113392		2271		118393
1997	43		24	3893	52605		1395		57917

* Confidential data

Historically, the major commercial producers have been North Carolina and Florida. Since January 1, 1989, commercial harvest has been prohibited in Florida under state regulations. An annual quota of 250,000 pounds controls commercial harvest of red drum in North Carolina. The North Carolina Marine Fisheries Commission recently approved temporary rules for the red drum fishery: prohibition on the possession or sale of red drum larger than 27 inches, reduce the recreational bag limit to 1 fish per day between 18-27 inch fish, commercial daily trip limit of 100 pounds with a 250,000 pound annual quota, and a requirement to attend gill nets less than five-inch stretched mesh from May 1-October 31 in order to reduce regulatory discards.

The Mid-Atlantic recreational fishery extends from Maryland southward along Virginia's barrier islands, into the Chesapeake Bay. The recreational catch for 1997 recorded by MRFSS was 799,676 pounds (Table 18). In 1997, total catch was 857,593 pounds with recreational anglers accounting for 93 percent of the harvest. For purposes of comparison, 1996 total catch was 1,453,352 with recreational anglers comprising 92 percent of the harvest.

Table 18. Recreational landings (in pounds) of red drum along the Atlantic coast, 1978-1997

Year	DE	NJ	MD	VA	NC	SC	GA	FLEC	Total
1987				44332	200729	913639	250795	227222	1636717
1988				9030	451974	1050049	385860	12507	1909420
1989			2348	27236	214849	396771	127245	146064	914513
1990			2679	0	302994	631819	161712	258569	1357773
1991			5635	30582	108268	284290	337207	516999	1282981
1992		0		55324	109134	411484	198751	396555	1171248
1993				45505	266459	282614	328245	290930	1213753
1994				3684	192060	314632	353616	578412	1442404
1995				66017	382428	463903	302500	511714	1726562
1996				1682	195740	398127	161928	577502	1334979
1997	0			1796	38286	293403	128232	337959	799676

IV. Status of Research and Monitoring

In cooperation with the states, the NMFS laboratory in Beaufort, North Carolina has compiled information and performed analyses on status of the stocks periodically since 1989. Fishery independent data collected by the states (North Carolina, South Carolina, Georgia, Florida) periodically have been utilized in coastwide stock assessment. Virtual population analyses utilize MRFSS as the primary data source.

In November 1994, the states of North Carolina, South Carolina and Georgia initiated a multi-year study to collect fishery independent data utilizing trammel nets and tagging techniques. The Florida Marine Research Institute continues to monitor juvenile red drum abundance in the northern Indian River Lagoon. A monitoring program, which uses trammel nets to catch sub-adult red drum for tagging and age composition sampling, also continues in Florida. A coastwide red drum stock assessment is scheduled for late 1999, and will incorporate the results of these studies and other data.

V. Status of Management Measures

With approval of Amendment 1, the Commission adopted a “phase-in” approach to attain the management goal of 30 percent SSBR in the fishery. The initial phase required all states to adopt measures which would achieve a 10 percent SSBR; all states have complied with this requirement. However, the further steps necessary to attain a 30 percent SSBR remain unclear.

The Council has recently set optimum yield for red drum at 40 percent static SPR with a threshold overfishing definition level at 10 percent static SPR. Once static SPR is established at or below 10 percent, F must be equal to 0. Because management measures restrict the harvest of large, adult red drum, our understanding of their population dynamics is limited. Consequently, escapement (juvenile fish that escape from the fishery to reach the large protected size) limits our ability to estimate static SPR.

For the Commission and the Council to continue to move toward attainment of the optimum yield goals, a plan amendment would have to be initiated for the state and federal plans. The federal plan requires a rebuilding schedule as mandated by the federal 602 regulations. Such a schedule could help clarify the next step in the Commission’s “phase-in” approach to plan implementation. Development of a Council

amendment also would require NMFS to provide fisheries data to support these activities in order to update the Council's Red Drum Source Document.

Currently, the consensus of the Commission/Council joint Plan Development Team is to await the results of the multi-state, fishery-independent study underway in Georgia, South Carolina, and North Carolina which would help fill in current data gaps. Initiation of a joint plan amendment process should not begin until the multi-state independent sampling project and coastwide stock assessment is completed, currently anticipated in 1999.

VI. Current State-by-State Implementation per Compliance Requirements as of September 1, 1998

Amendment 1 designated a series of steps to achieve the target SSBR level of 30 percent. Currently, the South Atlantic Board has determined that the states must adopt the management measures that will attain an SSBR level above 10 percent (first step of phase-in approach). The 10 percent scenario requires states to adopt either of two options:

1. 18-inch total length (TL) minimum, 27-inch TL maximum, and a 5 fish bag limit with one fish exceeding 27-inch TL; or
2. 14-inch TL minimum, 27-inch maximum, and 5 fish bag limit, with no fish exceeding 27-inches TL

Based on the most recent assessment (Vaughan 1995) the first criterion of SSBR>10 percent appears to have been met for the southern area. The northern area is currently at 9 percent SSBR. Table 19 presents current state regulation for red drum.

Table 19. Atlantic coastal states' red drum regulations as of October, 1998

State	Size limit (TL inches)	Possession limit	Other	Meets plan requirement
ME	None	None	None	N/A
NH	18-27	None	0 fish > 27" TL	N/A
MA	Minimum 14	None	None	N/A
CT	None	None	0 fish <32" TL	N/A
RI	None	None	None	N/A
NY	14 min.	None	2 fish > 32" TL	N/A
NJ	18 min.; 27 max.	None	1 fish > 27" TL	Yes
PA	None	None	None	No
DE	18 min.; 27 max.	5 fish	1 fish > 27" TL	Yes
MD	18 min.; 27 max.	5 fish	1 fish > 27" TL	Yes
PRFC	18 min.; 27 max.	5 fish	1 fish > 27" TL	Yes
VA	18 min.	5 fish	1 fish > 27" TL	Yes
NC	18 min.; 27" max.	1 fish	0 fish > 27" TL; Commercial quota = 250,000 lbs.; daily trip limit of 100 lbs.; attend gill nets < 5" stretch mesh from May 1 – Oct. 31	Yes
SC	14 min.; 27 max.	5 fish	Gamefish - no sale	Yes
GA	14 min.	5 fish	0 fish > 27" TL	Yes
FL	18 min.; 27 max.	1 fish	Gamefish - no sale	Yes

VII. Status of Assessment Advice

The last red drum assessment was conducted in 1995 and reviewed by the Scientific and Statistical Committee of the SAFMC. Separable VPA analysis is used to determine status of the stock. A quantitative assessment is scheduled for 1999.

VIII. Recommendations

The following are recommendations from the Plan Review Team:

1. The Commission South Atlantic Board should address the new target and threshold mandates adopted by the SAFMC.

2. The Commission and the Regional Fishery Management Councils should continue to collaborate on cooperative review of stock assessments and formulation of management measures.

3. States north of New Jersey should adopt the plan management measures to avoid open ports for commercial landings.

4. The management unit should be divided at the North Carolina/South Carolina border, and thus be managed as two separable sub-units of an Atlantic stock.

5. States should maintain annual age-length keys.

6. Mark-recapture and genetic discrimination should be a research priority for definition of unit stock on adults.

7. Conduct annual fishery–independent sampling of sub-adult and adult red drum on an interstate basis.

8. Research on stock enhancement should focus on genetic implications and cost benefits. The introduction of unmarked fish should be discouraged until efficacy of such an approach is validated.

9. A technical review of North Carolina's commercial quota should be made to determine its conservation equivalency in relation to the two management options in the plan

10. States with significant fisheries (over 5,000 pounds recorded by MRFSS) should collect socioeconomic data on red drum fisheries through add-ons to the MRFSS or by other means.

11. NMFS MRFSS should increase effort to intercept nighttime fisheries for red drum.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SCUP
(Stenotomus chrysops)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SCUP
(Stenotomus chrysops)

I. Status of the Fishery Management Plan

Commission management of scup was initiated as one component of a multi-species fishery management plan (FMP) addressing summer flounder, scup and black sea bass. In 1990, summer flounder was singled out for immediate action under a joint Commission and Mid-Atlantic Fishery Management Council (MAFMC) Plan. Further action on the scup-black sea bass plan was delayed to expedite the summer flounder FMP and a series of amendments that followed. In 1993 the Commission and Council resumed work on a joint scup FMP. The Commission approved the Fishery Management Plan for Scup in March 1996. Amendment 12 to the multi-species FMP, which establishes revised overfishing definitions, identification and description of essential fish habitat, and defines the framework adjustment process, is currently out for public comment.

The FMP includes a seven year plan for reducing fishing effort and restoring the stock. The primary concerns are excessive discarding of scup and near collapse of the stock. Management measures implemented in the first year of the plan (1996) included: dealer and vessel permitting and reporting, 9" commercial minimum size, 4" mesh restriction for vessels retaining over 4,000 pounds of scup, and a 7" recreational minimum size. The biological reference point to define overfishing is Fmax, defined as F=0.25. To provide management flexibility for addressing unforeseen conditions in the fishery, the plan contains framework provisions that allow implementation of time and area closures. Changes in the recreational minimum size may also be made through framework procedures. Amendment 12 to the multi-species management plan proposes to change the overfishing definition, with Fmax serving as a proxy for Fmsy. Under current stock conditions Fmax is 0.26.

A coastwide Total Allowable Catch (TAC) was implemented in the second year of the plan (1997). The Commission and Council developed a procedure for management and distribution of the coastwide commercial quota during 1996. The quota management protocol is detailed in Addendum 1 to the Scup FMP, approved in September 1996.

Addendum 1 to the Scup FMP details the state-by-state quota system for the summer period (May through October) that was implemented in 1997. Each state receives a share of the summer quota based on historical commercial landings from 1983-1992. In June 1997, the Commonwealth of Massachusetts filed a lawsuit against the Secretary of Commerce stating that the historical data used to determine the quota shares underestimate the commercial landings of scup. Massachusetts also stated that the resulting quota share discriminated against residents of the Commonwealth. On April 27, 1998, the U.S. District Court voided the state-by-state quota allocations for the summer quota period in the federal fishery management plan, and ordered the Secretary of Commerce to promulgate a regulation which sets forth state-by state quotas in compliance with the National Standards. This court order does not affect the state-by-state quota allocations that are included in the Commission Addendum 1 to the Scup FMP.

States with a declared interest in the Scup FMP are Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina. The Commissions Summer Flounder, Scup, and Black Sea Bass Management Board serves as the species management board, and the Demersal Species Committee guides plan development for the MAFMC. Technical issues are addressed by the Summer Flounder, Scup, and Black Sea Bass Technical Committee, Industry advice is solicited through

the Scup and Black Sea Bass Advisory Panel, and annual review and monitoring is the responsibility of the Scup Plan Review Team.

II. Status of the Stock

Scup were assessed at the 27th Northeast Regional Stock Assessment Workshop (27th SAW) in June 1998. The consensus summary of the Stock Assessment Review Committee (SARC) indicates that scup are currently over-exploited and at a low biomass level. The SARC concluded that reliable quantitative estimates of fishing mortality for scup are currently not available. The truncated age structure of fishery catches and historical low biomass indices from surveys indicates that the stock has been subject to prolonged high fishing mortality. The 1996 index of age 0 abundance from the Northeast Fisheries Science Center (NEFSC) autumn survey is the lowest of the 1984-1997 time series, and the six most recent years include the four lowest indices of age 0 abundance. In 1997 the index of age 0 abundance increased to the highest level since 1994, which may indicate a relatively strong year class for 1997. Spawning stock biomass is likely at a record low and the age structure is highly truncated (only 6 percent of the stock in 1995-1996 was age 3 and older). The SARC recommends that fishing mortality be substantially reduced immediately. Reduction in fishing mortality from discards will have the most impact on the stock, particularly considering the importance of the 1997 year class.

The current scup assessment (27th SAW) is based on commercial and recreational catch at age data for 1984-1997 and research survey indices of abundance. An exploratory VPA was tuned using several trawl survey abundance indices. The SARC believed the VPA was indicative of actual trends in the stock, but, due to gross inadequacies in the data , rejected the exploratory VPA as a basis for formal projections. These data deficiencies included inadequate characterization of the catch at age due to insufficient sampling of both the commercial and recreational catches and poor discard estimates due to inadequate sea sampling.

III. Status of the Fishery

The low abundance of scup is reflected in the reduced catch in recent years. The 1997 total catch of just over 6 million pounds is the lowest in the 1981-1997 time series (Table 20). The 1997 commercial landings of 4.8 million pounds are only about 10 percent of the over 48.5 million pound peak observed in 1960 and are the lowest observed in the 1930-1997 series. In past years more scup were harvested in Rhode Island than the other states; more recently, New Jersey has led in commercial landings. In 1997, Massachusetts had the highest commercial landings of scup.

The recreational fishery for scup is significant; recreational fishermen accounted for 20 to 50 percent of total annual catches from 1985–1997 (Table 21). Recreational fishermen caught 1.2 million pounds of scup in 1997, about half of the landings of 1996. Most recreational landings come from state waters. By state, anglers in Massachusetts catch the greatest proportion of scup and anglers from Massachusetts and New York accounted for about 80 percent of the recreational landings in 1997.

IV. Status of Assessment Advice

A quantitative assessment for the scup stock has not been conducted. The most recent quantitative assessment was attempted by the SAW-27 SARC. The 27th SAW rejected an exploratory VPA and the exploratory ASPIC run due to input data inadequacies. Management advice from the SAW was based on the truncated age structure and low abundance indices.

Table 20. Scup commercial landings by state 1980-1997 in thousands of pounds.

State	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
CT	38	98	55	109	71	90	147	664	791	196	364	633	426	326	313	197	219	110
DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0.05
ME	2	0	0	0	0	0	0	10	20	70	9	34	0	0	0	0	0	0
MD	70	19	4	28	12	37	30	0	3	2	9	34	37	23	22	2	45	2
MA	1,557	1,153	1,201	1,481	1,192	854	1,364	1,165	707	686	976	749	878	653	246	282	388	1,492
NH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NJ	5,093	6,592	3,848	5,592	4,887	3,291	4,177	4,005	2,940	2,688	2,215	4,320	3,252	4,016	3,209	2,391	2,515	1,315
NY	2,853	3,517	3,249	2,431	1,993	1,898	1,970	2,008	1,514	1,329	1,664	2,696	2,298	1,607	1,517	1,127	819	827
NC	1,739	2,178	2,297	1,473	1,556	852	460	322	218	55	241	206	342	177	307	24	64	2
RI	6,468	6,524	7,061	5,694	6,436	7,900	6,586	4,767	6,245	3,091	3,938	6,397	5,900	2,937	3,338	2,310	1,711	1,082
VA	1,171	2,324	2,297	1,183	1,485	164	601	513	281	99	165	123	161	167	203	45	158	4
Total	18,990	22,404	20,013	17,991	17,630	15,084	15,335	13,453	12,718	8,215	9,582	15,193	13,294	9,905	9,155	6,381	5,919	4,834.05

Table 21. Scup recreational landings, 1985-1997, by state in thousands of pounds. Data from MRFSS online query

STATE	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
MA	107.24	5,529.51	4,035.89	1,946.05	1,865.54	822.30	2,515.38	585.99	1,468.47	892.53	481.40	675.50	579.49
RI	54.78	154.33	241.75	367.02	750.94	517.59	1,072.22	529.25	467.58	439.04	430.72	563.52	183.58
CT	3,081.38	1,840.96	575.82	1,070.30	947.84	405.75	1,415.68	1,184.92	338.46	210.87	101.32	378.75	46.37
NH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NY	2,825.25	3,959.14	1,237.72	588.69	1,782.10	2,202.57	2,616.58	1,854.81	875.12	557.81	43.41	515.78	369.03
NJ	18.41	115.61	94.76	290.15	186.72	82.01	282.56	231.54	33.51	499.93	248.49	102.91	13.43
DE	0.00	0.00	0.00	0.26	1.83	16.95	139.84	6.06	1.58	11.66	0.34	0.29	1.45
MD	0.00	0.00	0.00	0.00	1.43	15.82	7.74	0.93	0.00	0.08	0.00	0.00	0.00
VA	5.94	5.21	10.48	3.99	17.60	76.57	35.44	8.87	9.85	6.48	6.71	1.76	0.00
NC	3.17	0.52	1.94	9.68	2.64	9.37	0.91	0.22	0.00	0.00	0.00	0.00	4.39
Total	6,096.16	11,605.29	6,198.36	4,276.15	5,556.63	4,148.92	8,086.36	4,402.60	3,194.56	2,618.40	1,312.38	2,238.51	1,197.74

Table 22. Summary of Scup management measures and landings in millions of pounds, 1997-1999.

	1997	1998	1999*
TAC	9.1	7.275	5.922
Commercial TAC	6.0	5.675	4.619
Commercial Catch, actual	4.834	?	?
Recreational Harvest Limit	1.997	1.601	1.303
Recreational Harvest, actual	1.198	?	?

*The 1999 commercial TAC and recreational harvest limit have been recommended by the MAFMC and Commission, NMFS must approve these limits prior to becoming the final regulations.

V. Status of Research and Monitoring

Commercial landings data are collected by the National Marine Fisheries Service (NMFS) Vessel Trip Report system and by state reporting systems. Commercial discard information is collected by the NEFSC sea sampling program. Biological samples (age, length) of the commercial fishery are collected through NEFSC weighout system and by the state of North Carolina. Recreational landings and discard information is obtained through the Marine Recreational Fisheries Statistics Survey. The only length frequency information for the recreational fishery is that collected by the New York party/charterboat survey. Fishery independent abundance indices are available from surveys conducted by the NEFSC, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and the Virginia Institute of Marine Science.

VI. Management Measures and Developing Issues

The FMP establishes a 7 year program to reduce exploitation on scup and restore the stock (Table 23). It also specifies minimum size requirements and commercial gear restrictions including minimum mesh size, maximum roller diameter, and pot and trap degradable fastener and escape vent provisions. Commercial operator, vessel and dealer reporting and permitting requirements are included in the FMP. Seasonal and area closures could be implemented in the future under framework provisions.

Table 23. Scup FMP Rebuilding Schedule

Year	FMP Year	Exploitation Target
1996	1	none
1997	2	47 percent
1998	3	47 percent
1999	4	47 percent
2000	5	33 percent
2001	6	33 percent
2002	7	19 percent

Addendum 1 to the Scup FMP specifies the commercial quota management scheme. The annual coastwide quota is divided among three periods. The Winter I period is January through April, the summer period is May through October, and November and December make up Winter II. During the

winter periods the quota is available coastwide and is limited through trip limits. The summer allocation is divided into state shares. When a winter period allocation is landed the states and the NMFS must prohibit landings. When a state lands it summer allocation it is expected to close its fishery and the NMFS will close that state for landings by federally permitted vessels. The quota, as well as accompanying trip limits, will be set annually.

Scup FMP Compliance Criteria

Commercial Fishery

The following management measures may change annually. 1998 requirements are indicated

- Minimum size of possession: 9”
- Minimum mesh and threshold: 4.5” after 4,000 pounds
- Maximum roller rig trawl roller diameter: 18:
- Pot and trap escape vents: 3.1” round, 2.25” square
- Pot and trap degradable fastener provisions: a) untreated hemp, jute, or cotton string 3/16” (4.8 mm) or smaller; b) magnesium alloy timed float releases or fasteners; c) ungalvanized, uncoated iron wire of 0.094” (2.4mm) or smaller
- Commercial quota: 4.572 million pounds
- Winter I and II landing limits: I = 20,000 pounds, 1,000 @ 85 percent and II = 8,000 pounds

The Summer Flounder, Scup, and Black Sea Bass Management Board and the Mid-Atlantic Fishery Management Council are recommending a commercial total allowable catch (TAC) of 4.619 million pounds and a recreational TAC of 1.303 million pounds. Mesh thresholds of 200 pounds from November to April and 100 pounds from May to October. Commercial discards of 2.085 million pounds, which would result in a commercial quota of 2.534 million pounds (Table 24). Landing limits of 12,000 pounds for winter 1, dropping to 1,000 pounds at 85 percent of the quota, and 4,000 pounds for winter 2. No change in minimum fish size (9” TL) or minimum mesh size (4.5”).

Table 24. Scup FMP Total Allowable Catch Distribution for 1998. Proposed measures for 1999 are in Bold and Parentheses.

	SHARE	TAC (million pounds)	DISCARD (million pounds)	QUOTA & HARVEST LIMIT
Total	100%	7.275 **(5.922)**	1.149	6.126
Commercial	78%	5.675 **(4.619)**	1.103 **(2.085)**	4.572 **(2.534)**
Winter I	45.11%	—	—	2.062 **(1.143)**
Summer	38.95%	—	—	1.781 **(0.987)**
Winter II	15.94%	—	—	0.729 **(0.404)**
Recreational	22%	1.601 **(1.303)**	0.046	1.555

The following required measures are not subject to annual adjustment:

Vessel and dealer permitting requirements
States are required to implement a permit for fishermen fishing exclusively in state waters, and for dealers purchasing exclusively from such fishermen. In addition, states are expected to recognize federal permits in state waters, and are encouraged to establish a moratorium on entry into the fishery.

Vessel and dealer reporting requirements
States are required to implement reporting requirements for state permitted vessels and dealers and to report landings from state waters to the NMFS.

Scup pot or trap definition
A scup pot or trap will be defined by the state regulations that apply to the vessels principal port of landing.

Quota management requirements
Winter I and II: States are required to (1) implement landing limits as specified annually; (2) notify state and federal permit holders of initial period landing limits, in-period adjustments, and closures; (3) prohibit fishing for, and landing of, scup when a period quota has been landed, based on projections by NMFS; and report landings from state waters to the NMFS for counting toward the quota.

Summer: States are required to (1) implement a plan of trip limits or other measures to manage their summer share of the scup quota; and (2) prohibit fishing for, and landing of, scup when their quota share is landed. States may transfer or combine quota shares. States must report all landings from state waters to the NMFS for counting toward the state shares.

Recreational Fishery
The following measures may change annually:

- Minimum size of possession: 7" (May be reconsidered in December, 1998)
- Possession limit: none (May be reconsidered in December, 1998)
- Seasonal closure: none (May be reconsidered in December, 1998)
- Recreational Harvest Limit: 1.555 million pounds

Other Measures
Reporting: States are required to submit an annual compliance report to the Chair of the Commission Scup Plan Review Team by June 1 of each year. This report should detail the state's management program for the current year and establish proof of compliance with all mandatory management measures. It should include landings information from the previous year, and the results of any monitoring or research programs.

De minimis: States having commercial landings during the summer period that are less than 0.1 percent of the summer period quota are eligible for *de minimis* consideration. States desiring *de minimis* classification must make a formal request in writing through the Plan Review Team for review and consideration by the Scup Management Board.

This summary of compliance criteria is intended to serve as a quick reference guide. It in no way alters or supersedes compliance criteria as contained in the Scup FMP and any Amendments thereto. Also please note that the management measures that change annually may be altered if Amendment 12 is approved.

Developing Issues

The most important developing issue during the upcoming year will be the changes in the FMP that may be developed in response to the Massachusetts lawsuit. The Summer Flounder, Scup, and Black Sea Bass Management Board and the Mid-Atlantic Council will spend considerable amounts of time determining the most fair and equitable solution to the problem. NMFS may also appeal the decision of the U.S. District Court, which may result in a different set of instructions to the Management Board and Council.

Over exploitation and excessive discarding continue to be the important and difficult issues surrounding the scup FMP. Scup is a component of the Mid-Atlantic mixed species trawl fishery which relies principally on summer flounder, scup, and black sea bass, but also harvests *Loligo* squid and winter, witch, and yellowtail flounder. Management measures designed for a directed scup fishery will not be successful if they lead to increased discards by non-directed fisheries. Framework measures enacted through this FMP could be used to manage the mixed trawl fishery as a strategy for addressing its' problems is developed.

The SARC clearly indicates that a lack of adequate data threatens future assessment and quota setting capabilities. An analytical assessment that can produce reliable fishing mortality and stock abundance estimates is essential to successful management through annual quotas and harvest limits.

VII. State Compliance with Required Measures

Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina are required to comply with the provisions of the Scup FMP.

1996 - 1998 Scup FMP Compliance Schedule

1996 and 1997 initial FMP compliance dates:

Commercial Fishery	
Quota management measures	
ability to implement and enforce period landing limits	1/1/97
ability to notify permit holders of landing limits and closures	1/1/97
ability to close the summer fishery once the state share is harvested	5/1/97
ability to close the winter fisheries once the period quota is harvested appropriate time	
Size limit	6/30/96
Minimum mesh	1/1/97
Pot and trap escape vents, degradable fasteners	6/30/96
Roller diameter restriction,	6/30/96
Vessel permit and reporting requirements, state	1/1/97
Dealer permit and reporting requirements, state	1/1/97

Recreational

Size limit,	6/30/96

General

States submit annual monitoring and compliance report	6/1 annually

1998 Annual Specifications

Commercial

Winter I Landing Limits	1/1/98
Winter II Landing Limits	11/1/97

Recreational

To be determined in December 1998.

The Summer Flounder, Scup, and Black Sea Bass Management Board reviewed state compliance with the FMP in August 1998 and determined that Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina are in compliance with the plan. The Management Board recommended to the ISFMP Policy Board that the Commonwealth of Massachusetts is not in compliance with the Scup FMP in that it has not implemented and enforced the commercial fishery quota provisions of the FMP for the summer period. The Policy Board will discuss this issue at the Commission Annual Meeting in October 1998.

VIII. Recommendations

- The Plan Review Team (PRT) recommends that states take reasonable steps to enforce the mandatory FMP requirements. Also, states are reminded to provide evidence of enforcement efforts in their annual compliance reports.

- The PRT recommends that states submit annual compliance reports by the July 1 deadline, and that these reports include landings, regulatory, and enforcement information, as well as the results of any ongoing research and monitoring programs.

- The PRT is concerned about continued, excessive discarding of scup, particularly in the small mesh loligo fishery. A thorough bycatch monitoring program is needed to collect adequate discard information in the loligo fishery. Management measures imposed on the directed fishery will have little impact if discarding continues at current levels.

- The PRT recommends that the Management Board consider amending the Scup FMP to require that states prohibit landings once their summer quota share is landed.

A. SARC Data Needs

Increased and more representative sea and port sampling data of the various fisheries in which scup are landed and discarded is critical to characterize adequately the length composition of both landings and discards. The current level of sampling, particularly of commercial discards, seriously impedes the development of analytic assessments and forecasts of catch and stock biomass for this stock. A pilot study to develop a sampling program to estimate discards should be implemented. This would quantify the

advantages to obtaining sea samples from freezer trawlers and other small mesh fleets from which few samples have been collected, and would provide an opportunity for joint industry research programs.

Expanded age sampling of scup from commercial and recreational catches is required, with special emphasis on the acquisition of large specimens.

Additional information on compliance with regulations (e.g. length limits) and hooking mortality is needed to interpret recreational discard data.

Commercial discard mortality was assumed to be 100 percent. It is recommended that studies to better characterize the mortality of scup in different gear types be conducted to more accurately assess discard mortality.

Further biological studies are needed to look at factors affecting annual availability of scup to research surveys and maturity schedules.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SHAD AND RIVER HERRING
(Alosa sp.)

Prepared by

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SHAD AND RIVER HERRING
(Alosa sp.)

I. Status of the Fishery Management Plan

Date of FMP approval:	October, 1985; Amendment 1 scheduled for 10/98
Management unit:	Migratory stocks of American shad, Hickory shad, Alewife, and Blueback from Maine through Florida
States with declared interest:	Maine through Florida
Active Boards/Committees:	Shad & River Herring Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, Plan Review Team, Plan Development Team

The goal of the Fishery Management Plan (FMP) is to promote, in a coordinated coast– wide manner, the protection and enhancement (including restoration) of shad and river herring stocks of the Atlantic seaboard. The Plan further specifies four (4) management objectives as follows:

1. Control exploitation to ensure survival and enhancement of depressed stocks and continued well–being of stocks exhibiting no perceived decline;

2. Improve habitat accessibility and quality consistent with management actions for non-anadromous fisheries;

3. Initiate programs to reintroduce Alosid stocks to historical spawning areas, expand existing restoration programs, and initiate enhancement programs for depressed stocks; and

4. Recommend and support research programs that will produce data to enhance management capabilities.

The Plan Review Team and the Management Board have determined that the original 1985 FMP is no longer adequate for protecting or restoring shad and river herring stocks. Although improvement has been seen in certain stocks, *Alosa* populations apparently remain severely depleted, based on large differences between historical and contemporary landings. This situation is unlikely to change under the current management plan because the FMP does not require any specific management approach or monitoring program within the management unit, asking only that states provide annual summaries of restoration efforts and ocean fishery activity. Moreover, the plan does not provide for adaptive management in light of stock growth or declines. Accordingly, the Management Board has directed a Plan Development Team to develop a major revision of the 1985 FMP through a Plan amendment.

Amendment 1 is scheduled for adoption in October, 1998, and will contain specific measures to control exploitation of American shad populations while maintaining the status quo in the other Alosine fisheries.

The amendment will also mandate annual fishery-dependent and -independent monitoring programs to improve data collection and stock assessment capabilities.

II. Status of the Stocks

The Plan addresses four species: Hickory Shad (*Alosa mediocris)*, American Shad (*Alosa sapidissima*), Alewife (*Alosa pseudoharengus*), and Blueback Herring (*Alosa aestivalis*).

A stock assessment for American shad was completed in 1997 (ASMFC, 1998)[i], and submitted for peer review in early 1998 (ASMFC, 1998a)[ii]

American Shad

The status of American shad stocks by region and key river systems are as follows:

New England (Maine through Connecticut): In 1998, over 25,000 shad passed Essex Dam at Lawrence, MA on the Merrimack River. This was the highest number recorded to date, almost double the count from 1995. Shad runs on the Connecticut river have improved recently with population estimates of 661,000 - 710,000 in 1997-1998. This is double the 1994-1995 values but still well below the 1.6 million estimate for 1992. Juvenile indices on the Connecticut in 1996-1997 (38.7 and 60.9) were above the long-term average but well below the record high from 1994 (107.9).

Mid–Atlantic (New York through Virginia): Hudson River shad stocks remain deplete throughout the 1990's and commercial harvest continues to decline. Unlike earlier assessments, age structure is now truncated toward younger ages, rate of repeat spawning has declined and average size of fish in the harvest has declined.

The Delaware River adult shad population was estimated in 1995, 1996, and 1998 using hydroacoustic gear at the Route 202 bridge at Lambertville, New Jersey. The estimate of 303,000 fish in 1998 compares to 524,000 in 1996 and 290,000 in 1995. These numbers are revised downward from earlier estimates because of a recalculation of cross-sectional area covered by the acoustic gear. The river population is actually larger than these numbers suggest since some spawning occurs in the river and tributaries below Lambertville. The juvenile abundance index in 1997 was 278.

Shad populations throughout the Chesapeake Bay are growing in response to fishery closures and active hatchery-based restoration programs in the Susquehanna, Potomac, Pamunkey, and several Maryland tributaries. Juvenile shad indices on the Pamunkey and Mattaponi rivers (Virginia) in 1996 were, respectively, four and five times greater than the long-term averages (since 1979) and showed dramatic rebounds from 1995 low values. A study conducted by the Virginia Institute of Marine Science (VIMS) in the spring of 1998 showed mixed results in experimental gill net catch-per-unit-effort (CPUE) on Virginia river systems. CPUE on the Rappahannock River was near the historical values, CPUE on the James River was well below historic values, and 1998 CPUE in the York River experimental gear was

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[i] ASMFC, 1998. American Shad stock assessment peer review report. March, 1998. Washington, D.C. 217 pp.

[ii] ASMFC, 1998a. American shad & Atlantic sturgeon stock assessment peer review; Terms of reference and advisory report. July, 1998. Washington, D.C. 25 pp.

above past values. These results are difficult to interpret because of the short time series and the lack of other gill nets deployed near the experimental gear (due to the fishing moratorium for shad in Virginia). the Upper Bay and Susquehanna River recovery efforts. Compared to all earlier years, most fish (60-70 percent) returning to Conowingo Dam in 1997-1998 were of natural rather than hatchery origin, a reflection of successful reproduction of transplanted adults above all dams in 1991-1994.

South Atlantic (North Carolina through Florida): Personnel in South Carolina reported the 1995 run of shad on the Santee-Cooper system was excellent. In general, shad stocks seem to be still depressed with some improvement occurring in rivers such as the Altamaha in Georgia and the Savannah River between South Carolina and Georgia.

Hickory Shad – This species historically occurred in significant abundance from Virginia to Florida. Although commercial landings data suggest a declining trend in abundance, the lack of comprehensive and accurate commercial and recreational fishery data make it difficult to ascertain the status of the stocks. North Carolina has historically led the southeast in harvest, with recent landings the highest in 30 years. . Hickory shad are abundant in upper Chesapeake Bay compared to recent years.

River Herring

The status of river herring stocks by region is as follows:

New England: River herring runs in most Maine rivers, which historically produced large harvests, continue at historic low levels. However, the 1995 Androscoggin River run of 32,002 adults increased 166 percent compared to 1994. Runs in New Hampshire streams have been relatively stable in recent years, while the runs in the Merrimack River in 1995 (33,400+ adults) substantially increased over 1994 levels and were the highest since 1992. The 1995 run in Rhode Island's Gilbert Stuart Brook (95,331) was a 220 percent increase over the 1994 run, and well above the 12–year average annual run of 55,000 adults.

Mid–Atlantic: In 1996, the blueback herring juvenile index in the Hudson River was relatively high and alewife numbers were scarce. Similar to the situation with shad, blueback and alewife juvenile indices in the Pamunkey and Mattaponi rivers were very high in 1996 compared to 1995 and long-term averages. Adult alewives remained scarce in the upper Chesapeake Bay but the adult blueback herring counted at Conowingo Dam (Susquehanna River) in 1997 was the highest number seen since trapping operations began there in 1972.

South Atlantic: As with the Mid-Atlantic region, reliable data on river herring fisheries in the Southeast are scarce. From 1986–1994, Albemarle Sound juvenile indices for alewives have been almost nonexistent and blueback herring indices have been very low in comparison to pre–1986 data. A slight imrovement for both species was observed in Albemarle Sound during 1996-1997. Generally, river herring stocks remain depressed in the Southeast, with some improvement in South Carolina populations.

III. Status of the Fisheries

American shad, hickory shad, and river herring formerly supported important commercial and recreational fisheries throughout their range. Fisheries are executed in rivers, estuaries, and oceans. Although recreational harvest data are scarce, most harvest is believed to come from the commercial industry. Commercial landings for all these species have declined dramatically from historic highs. Following is a summary of fisheries by species:

Hickory Shad

Atlantic coast (Maryland to Florida) hickory shad landings are poorly monitored. The National Marine Fisheries Service (NMFS) does not record data for this species, and state data are questionable. This is primarily because of mixing with American shad upon landing, poorly understood geographic ranges, and poorly monitored recreational fishing areas. This species supports significant recreational fisheries in some areas, but good recreational harvest data do not exist. The most recent and complete data are for North Carolina, which has historically dominated the commercial fishery. Hickory shad landings at 187,886 pounds in 1996 and 138,086 pounds in 1997 were the highest in 30 years.

Recreational fisheries in several Chesapeake tributaries appear to be improving with most angled fish being released. Maryland Department of Natural Resources complete a hook and release mortality study in spring 1996 in Deer Creek, a lower Susquehanna tributary. Using volunteer fly fishermen, traditional handling techniques and streamside holding tanks, no hooking related mortality was observed over a 48 hour test period.

American Shad

Commercial landings have declined in all American shad stocks on the Atlantic coast with the exception of the Santee River (South Carolina) and the Altamaha River (Georgia) for the period 1992-1996. Total inriver commercial landings have declined steadily from over 3.2 million pounds in 1980 to less than 600,000 pounds in 1996. Coastal intercept landings rose steadily from 1980 to a peak of 2.0 million pounds in 1989, then declined thereafter to about a million pounds in 1996. Conclusions based solely on declining historic trends in shad landings, however, can be misleading without considering changes in the ratio of landings to fishing effort.

River Herring

Atlantic coast river herring landings have ranged from a high of 74,852,000 pounds in 1958 to a low of less than 5,000,000 pounds in recent years. During 1996, Maine, North Carolina, and Virginia have accounted for approximately 96 percent of coastwide landings.

Bycatch of river herring in Atlantic herring (*Clupea harengus*) fisheries is a potential concern, especially for the recovery of depressed stocks of the Chesapeake and waters further south. The Commission and its federal partners should monitor this bycatch regularly, and work to reduce it should it threaten the recovery of any river herring stock.

New England: Since 1976, Maine has been the major contributor to New England river herring landings. Landings throughout the region have shown a major downward trend since the early 1970s and in the past five years, Maine landings have declined dramatically in those rivers which traditionally contributed the majority of the catch. During 1992, the Damariscotta River harvest of 21,350 pounds was the lowest on record and this fishery has been closed since 1993.

Mid–Atlantic: Landings have declined dramatically since the mid 1960s and have remained very low in recent years, particularly in Maryland and Virginia, which were traditionally the major producers in the mid–Atlantic area.

South Atlantic: Landings reached a low in the early 1980s and have been variable since that time. North Carolina landings were at an all time low (911,410 lb.) in 1994. A closed harvest season was implemented in 1995, and continues. The closed season extends from 15 April to 1 January.

IV. Status of Research and Monitoring

As noted above, the Plan does not require states to conduct fishery-dependent or fishery -independent monitoring of *Alosa* fisheries. Nonetheless, some jurisdictions continue important research initiatives for these species.

Maine is actively involved in shad restoration using hatchery fry, fall fingerlings and wild adults. From 1992-1997, over 958,000 fry and 80,000 fall fingerlings were released into the Medomak River; in the Kennebec River 3.6 million fry and 110,000 fall fingerlings were released; and in the Saco River 484,000 fry were released. During this time frame 13,026 prespawner adults from the Saco and Connecticut River were released into the Kennebec (7830) and Androscoggin Rivers (5196). Pre-spawn fish from the Connecticut River were used in all years, with the exception of 1997 when shad from the Saco River were also available for release.

As part of the work conducted by the Kennebec River Coalition (State of Maine, NMFS and USFWS), eighteen miles of historic fish habitat in the Kennebec River will be accessible to migratory fish with the removal of the Edwards Dam. The Lower Kennebec Hydropower Settlement Accord (May 26, 1998), developed by the coalition identifies plans to remove the dam in July 1999 and to provide fish passage at dams upstream of the site in the future.

Thousands of adult shad were tagged and released in the Hudson River and Delaware Bay in recent years in efforts to document population sizes and distribution. About 1 million cultured shad larvae were stocked each year in 1996-1998 above dams in the Lehigh River, a Delaware tributary. Shad counts at fishways in the lower Lehigh have increased each year with most fish being of hatchery origin from earlier plants.

Major fish passage facilities were recently completed at Holtwood and Safe Harbor dams on the Susquehanna River. These and the permanent East lift at Conowingo Dam (1991) are now operated to pass all shad and herring upstream. Under ideal flow conditions In 1997, almost 104,000 shad and 374,000 herring were counted at the two Conowingo lifts. Shad counts at Holtwood and Safe Harbor that year were 28,000 and 21,000. In 1998, persistent high flows and rapid warming reduced fish lift effectiveness and shad counts at the three projects were 46,481, 8,235, and 6,054, respectively. Trap and transport of adults from Conowingo's west lift to upstream spawning waters in 1997–1998 totaled over 15,000 shad and 32,000 herring.

As part of the state-federal Chesapeake Bay Program, over 100 miles of blocked tributary waters were reopened to migratory fish each year in 1996 and 1997. The last blockage on the James River at Richmond (Boshers Dam) will have fish passage by 1998. The fourth and final blockage on the Susquehanna, York Haven Dam, will have operational fish passage by spring 2000. Together these two projects will reopen and additional 600 + miles of historic Alosid spawning habitat in the Chesapeake watershed.

All Chesapeake Bay jurisdictions and U.S. Fish and Wildlife Service (USFWS) are actively involved in shad stock rebuilding using hatchery reared and marked larvae. In each of the last 3 years (1995-1997),

over 22 million shad were released in the Susquehanna, Potomac, James, Pamunkey, Choptank, Pamunkey, Patuxent, Chester, and Nanticoke Rivers.

In 1998, over 32 million cultured American shad larvae were stocked by Chesapeake Bay jurisdictions and 13 million hickory shad were stocked by Maryland. (Note: total American shad stocked in Chesapeake Bay since 1986 is now 215 million).

The New York Department of Environmental Conservation and the University of Maryland collaborated on a shad tag and release study on the Hudson River during 1995-1997. Over 5,800 shad were tagged and the USFWS is maintaining tag return information from this effort, as well as a limited tagging effort on the lower Delaware.

In each of the last several years, USFWS has collected 8,000–10,000 adult river herring from the lower Merrimack River and New Hampshire coastal rivers for stocking into natural lakes above mainstem dams on the Merrimack River. This has resulted in extensive juvenile production.

V. Status of Management Measures

As noted in Section VI, there are only two compliance requirements, involving short reports from each jurisdiction. The status of each state's compliance with these measures is provided in Table 25.

Table 25. State Implementation of FMP Compliance Requirements as of September 23, 1998

Compliance requirement: Submission of annual report to: (1) monitor/document existing and new territorial sea fisheries for anadromous Alosids; and (2) evaluate potential for anadromous Alosid restoration within internal waters.

ME	NH	MA	RI	CT	NY	NJ	PA	DE	MD	PRFC	DC	VA	NC	SC	GA	FL
N	IP	N	N	N	Y	IP	IP	IP	Y	IP	N	Y	Y	N	Y	IP

Y = state has adopted compliance requirement
N = state has not adopted compliance requirement
IP = report is in press

As noted in Section I, the Management Board has determined that the original Plan and its few mandatory measures are insufficient for protecting and restoring Alosid stocks along the east coast. Accordingly, the 1985 fishery management plan will be amended in 1998. A Plan Development Team has developed a draft Amendment 1 to expedite recovery of American shad populations and maintain current regulations in the hickory shad and river herring fisheries. Public hearings on the draft amendment were held during July-August 1998, and the Management Board reviewed public input before making a final decision on regulatory and monitoring programs to be implemented for American shad fisheries.

After careful consideration of stock assessment results, peer reviewers' comments, and public opinion, the Management Board voted to address "inriver" or estuarine American shad fisheries differently than oceanic intercept fisheries. Specifically, the states decided to require states to submit in-river shad restoration plans for stocks under their jurisdiction. For those 7 river systems evaluated in the 1997 stock assessment (Connecticut River, Hudson River, Delaware River, Upper Bay Maryland, Edisto River, Santee River, and Altamaha River), states could continue current regulations since overfishing was not

detected for those respective stocks. Also, mandatory reporting of catch and effort data for all Alosine fisheries could be implemented under Amendment 1.

In addition, the Management Board voted to phase out all ocean intercept fisheries for American shad within 5 years of Amendment 1 implementation. States must demonstrate that they will achieve at least a 40 percent reduction in ocean intercept effort within the first 3 years of Amendment 1 passage.

For recreational fisheries, the states voted to implement a 10 fish combined daily creel limit for American and hickory shad. Existing or more conservative recreational/personal use regulations for River herring will maintained under Amendment 1.

In addition, the states will be required to submit annual reports on harvest and certain required fishery-independent monitoring programs. Implementation of these programs and reporting schedules is intended to improve future assessments of Alosine populations and permit adaptive management of fisheries as stock recovery is documented.

VI. Current State–by–State Implementation of Compliance Requirements as of September 21, 1998.

In the spring of 1994, the ISFMP Policy Board ascertained and approved two compliance requirements in the 1985 shad and river herring FMP:

1. Each state, in cooperation with NMFS, will monitor and document existing and new EEZ and territorial sea fisheries for anadromous Alosids, and report this information to the Commission.

2. Each state shall evaluate the potential for anadromous Alosid restoration within their internal waters, and provide it to the Commission along with a summary description of ongoing restoration efforts, and a statement of anticipated restoration activities for the next five years.

Reports on these two issues are due each year by September 20. The section on restoration efforts should focus on three areas. First, the report should summarize all current Alosid restoration efforts (including stocking programs, fish passage construction, and water quality improvement). Second, the report should identify state rivers that currently do not support Alosid populations but could if specific improvements were made in passage, stocking, or water quality. Last, as noted above, the report should summarize any of these types of restoration efforts planned for the next five years.

VII. Recommendations of Plan Review Team

Approve Amendment 1 to Shad and River Herring FMP in October, 1998 with implementation by spring 1999.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SPANISH MACKEREL
(Scomberomorus maculatus)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SPANISH MACKEREL (*Scomberomorus maculatus*)

I. Status of the Fishery Management Plan

The federal *Fishery Management Plan for the Coastal Migratory Pelagic Resources* (1983) and the Atlantic States Marine Fisheries Commission's *Fishery Management Plan (FMP) for Spanish Mackerel* (1990) manage Atlantic group Spanish mackerel in the state and federal Atlantic waters south of the New York/Connecticut border through the east coast of Florida. The States of Florida through New York, excluding Pennsylvania, have a declared interest in the Commission Spanish Mackerel FMP. The goal of the Commission Spanish Mackerel FMP is to complement federal management in state waters, to conserve the Atlantic Group Spanish mackerel resource throughout its range, and to achieve compatible management among the states that harvest Spanish mackerel. The Commission FMP objectives are to: (1) allow recovery of overfished populations and stabilize the stock at a level to produce maximum sustainable yield (MSY); (2) achieve compatible management throughout the range; (3) provide a flexible management system responsive to changes in the fishery and/or information; (4) promote cooperative interstate research and comprehensive monitoring activities and establish mandatory, timely reporting for quota monitoring; (5) minimize disruption of traditional fisheries and markets; and (6) minimize waste in the fishery.

Atlantic Group Spanish mackerel are managed on the basis of the annual recommendations of the joint Gulf of Mexico and South Atlantic Fishery Management Councils-appointed Mackerel Stock Assessment Panel, a technical group which reviews the stock assessments and makes annual determinations of Acceptable Biological Catch (ABC). The South Atlantic Fishery Management Council (SAFMC) determines needed annual adjustments to regulatory measures such as total allowable catch (TAC), bag limits, size limits, and trip limits. The SAFMC's Mackerel Committee includes representatives from the Mid-Atlantic Council and a fishermen Advisory Panel incorporating South Atlantic and Mid-Atlantic representation in their deliberations. A Plan Review Team comprised of Council, Commission, and State representatives annually reviews the status of implementation of the interstate FMP and reports to the South Atlantic Board. The South Atlantic State/Federal Fisheries Management Board serves as the Commission's Spanish mackerel management board and reports to the ISFMP Policy Board. The interstate FMP is intended to be a flexible plan that tracks the federal FMP; thus, the SAFMC has the lead on Spanish mackerel management.

The consensus of the Spanish Mackerel Plan Review Team is that the goal of the plan and its management objectives continue to be valid. The South Atlantic and most Mid-Atlantic States have made significant progress toward implementation of the interstate Spanish mackerel plan.

II. Status of the Stocks

The Mackerel Stock Assessment Panel (MSAP) conducted a full stock assessment for Atlantic Group Spanish mackerel in 1998. The following comments were taken from their 1998 report. The assessment included virtual population analyses of estimated numbers caught at age. The expected yield from Atlantic Group Spanish mackerel for the 1997/98 fishing year (FY 97/98) is 5.35 million pounds. Results of the 1998 full assessment of the Atlantic Group Spanish mackerel indicated a median pooled fishing

mortality rate on fully recruited year classes (2+) of 0.21 per year within the 10^{th} percentile and 90^{th} percentile range of 0.16-0.27. The ABC for FY98/99 is 6.6 (5.4-8.2) million pounds at $F_{40\%}$ static SPR. The static SPR was estimated at 42 percent for 1996-97 and consequently the Atlantic Group Spanish mackerel is considered by the MSAP not overfished for the current fishing year.

The MSAP believes harvest reductions are due to elimination of gillnets in Florida's waters. The low level of harvest in relation to the stock size is encouraging for stock rebuilding, which is reflected in the increase in transitional SPR. Cooperative State/Federal management has achieved a successful stock recovery.

III. Status of the Fishery

Spanish mackerel sustain important recreational and commercial fisheries in South Atlantic waters and are gaining importance in the mid-Atlantic states. Trip limits implemented in state and federal waters off Florida continued to prevent premature closure of the commercial fishery before the end of the fishing year.

The July 1, 1995 net ban affected commercial landings in Florida, and changed the characteristics of the fishery. The MSAP reported FY95/96 total landings of 3.1 million pounds, significantly under the 4.1 million pound record for FY94/95. Numbers for FY97/98 although incomplete are projected as 4.68 million pounds. The National Marine Fisheries Service (NMFS) report for state landings can be found in Table 26. The commercial fishery continued to expand in the northern range of the stock. Approximately 43,361 pounds of Spanish mackerel were landed commercially from New Jersey northward in 1997. The commercial fishery coastwide is predominantly in state waters.

The Marine Recreational Fisheries Statistics Survey (MRFSS) estimates that total recreational catch during 1997 was 1,437,488 pounds (Table 27). The fishery's resurgence into the stock's historical northern range continues.

IV. Status of Research and Monitoring

In addition to conducting the bi-annual stock assessments, the NMFS-Southeast Fisheries Science Center (SEFSC) is studying length and weight at age and size frequency; fishing mortality and migration; collecting age data and catch per unit effort by area, season, fishery, and gear; monitoring bycatch from shrimp trawls; investigating methods to predict year class strength and calculating estimates of recruitment; and developing conservation gear to reduce bycatch. The NMFS is also collecting economic information through a North Carolina State University demand study on finfish. The Gulf and South Atlantic Fisheries Development Foundation and several states (North Carolina, South Carolina, Georgia, and Florida) are evaluating finfish bycatch in the southeastern shrimp trawl fishery, inclusive of Spanish mackerel.

Abundance trends continue to be monitored primarily through fishery dependent sources. The States and the NMFS-SEFSC through the cooperative commercial statistics collection program and the MRFSS monitor catch. The commercial catch is monitored most intensively in the winter and early spring by the State of Florida and the NMFS as the commercial quota is approached.

Table 26. Commercial landings (in pounds) of Spanish Mackerel along the Atlantic coast, 1978-1997. Based on NMFS commercial landings data.

Year	MA	RI	NY	NJ	MD	VA	NC	SC	GA	FLEC	Total
1978				100	100	1600	39851	608	211	5510538	5553008
1979						700	12573	150	2201	4885628	4901252
1980				600		8300	75306	6769	1491	9811053	9903519
1981			500	500		3500	50838	*	518	4174432	4230288
1982			1000	200		12700	188827	1081	745	3758603	3963156
1983			600	100		3500	40897	706	0	5947102	5992905
1984			300	100		10000	127467	1321	114	2397373	2536675
1985	969		100	n/a		15300	171461	847	1	3244980	3433658
1986	600		3200	1500		168400	230697	5700	964	4003738	4414799
1987	1600	4900	16600	24000	4800	251200	503798	886	201	3497135	4305120
1988	11979	3400	19200	16900	4300	291600	438222	863	682	3071687	3858833
1989	10008	8900	17700	24100	10400	354400	589152	799	50	2853177	3868686
1990	6586		24329	28336	43411	478167	838914	384	491	1979081	3399699
1991	19698	9530	149321	77151	62688	447127	858808	444	197	2986871	4611835
1992	608	2277	31873	51751	37930	271313	738362	1952	71	2022961	3159098
1993	5	2843	42063	23036	9445	335363	582868	480	95	3891979	4888177
1994	3273	893	124733	19915	3363	376818	531355	362	0	3099780	4160492
1995	0	12419	9136	2153	3089	168732	402197	0	0	3064926	3662652
1996	0	2523	17980	40821	78	283750	401524	0	0	2244667	2991343
1997	15	86	31138	12122	3033	164639	766681	*	*	2269284	3246998

* Confidential data

Table 27. Recreational landings (in pounds) of Spanish Mackerel along the Atlantic coast, 1978-1997
Based on MRFSS data

Year	NY	NJ	MD	VA	NC	SC	GA	FLEC	Total
1987	2890		14345	2011	1296732	117053	40681	230725	1704437
1988				160407	2136806	140896	5141	656047	3099297
1989	3560	35415		81107	877911	197982	6162	303485	1505622
1990	2332	3320	1790	86932	1084167	153932	45748	346585	1724806
1991	19612	36096	57249	72708	1056524	291717	3717	887777	2425400
1992	3880	16526	9634	76411	947065	145451	79818	669160	1947945
1993	7590	5280	68757	93272	664815	135287	22209	439555	1436765
1994	0	8613	44969	160610	588035	152836	66949	350679	1372691
1995	0	0	32117	112790	329125	31726	12619	298651	817028
1996		0		80660	374403	182878	31255	397653	1066849
1997				22234	845349	141338	37441	391125	1437487

V. Management Measures

In response to the 1998 MSAP Report, the SAFMC has recommended a TAC for FY 1998-99 of 6.6 million pounds, which is 1.4 million pounds below the 1997-98 season TAC. The TAC allocation changed this year to 55 percent (3.63 million pounds) to the commercial fishery and 45 percent (2.97 million pounds) to the recreational fishery. The bag limits in federal waters for FY98-99 will remain 10 fish per person per day throughout the stock's management range (Florida through New York). Trip limits for the commercial fishery in federal waters remain unchanged, with incremental limits off Florida and a year-round 3,500-pound daily possession/landing limit for vessels from Georgia through New York. The timing of the fishing year is such that it is unlikely the commercial quota will affect any of the Mid-Atlantic States.

The commercial fishery coastwide has been predominately in state waters; however, the Florida state net ban, which became effective on July 1, 1995 has shifted the bulk of the commercial harvest off Florida into federal waters. States are beginning to implement effort control; North Carolina implemented a two-year moratorium on issuance of new commercial licenses. Maryland capped its commercial licenses at the existing number for a five-year period. Virginia delayed entry for two-years into its gill net fishery. New York has a restrictive period for commercial licensing of non-residents and income-related eligibility requirements associated with certain fisheries.

VI. Implementation of FMP Compliance Requirements as of August 1, 1998.

Since adoption of the interstate Spanish mackerel FMP in 1990, South and Mid-Atlantic states have responded to the plan's recommendations through implementation of bag limits, size limits, commercial trip limits, and/or provisions for seasonal closures (Table 28) to complement the Council's measures for federal waters. In February, 1994 the South Atlantic State/Federal Fishery Management Board determined the following measures of the Commission Spanish Mackerel FMP to be mandatory for compliance with the interstate plan: quota closures, 10 fish bag limit, 12-inch fork length minimum size, 3.5-inch minimum stretch mesh size for the directed gill net fishery, and commercial trip limits or landing restrictions (3,500 lb./trip from Georgia through New York; incremental trip limits in Florida). The suspense date for compliance was March 20, 1995. All nine states with a declared interest have achieved full regulatory compliance with the Commission plan. The recovery of the Spanish mackerel fishery throughout its historical range continues to benefit from management measures in State waters (Florida in particular) and federal waters.

VII. Status of Assessment Advice

The Mackerel Stock Assessment Panel conducted a quantitative stock assessment in March 1998. The status of the stock was evaluated using an age-based sequential virtual population analysis (VPA). The South Atlantic Fisheries Management Council, inclusive of members of the South Atlantic Board, internally reviewed and endorsed the assessment. The SAFMC review process is accomplished by the Scientific and Statistical Committee and the Mackerel Advisory Panel.

Table 28. Current State Regulations (New York through Florida) for Spanish Mackerel on the Atlantic Coast as of September 1998.

State	Bag Limit	Size Limit	Other
NY	10 fish	14" TL min.	3,500 lb. commercial trip limit
NJ	10 fish	14" TL min.	
DE	10 fish	14" TL min.	
MD	10 fish	14" TL min.	Declaration allowing regulation through framework. Gill net mesh sizes for Chesapeake Bay.
VA	10 fish	14" TL min.	Size limit exemption for pound net fishery; closure when quota reached 3500 lb. trip limit.
NC	10 fish	12" FL min.	3,500 lb. commercial trip limit (Spanish and king mackerel combined); finfish excluder devices required in shrimp trawls. Purse gill net prohibition.
SC	10 fish	12" FL min.	3,500-lb. commercial trip limit tracking by reference the federal FMP.
GA	10 fish	12" FL min.	Season closed December 1 - March 15.
FL	10 fish	12" FL min.	3 1/2-inch minimum mesh size, 600-yd. maximum length net. Commercial daily trip limits: 1,500 lb. April 1 - November 30; December 1 until 75 percent of adjusted quota reached-unlimited harvest on Monday, Wednesday, and Friday; 1,500 lb. per vessel per day on Tuesday and Thursday; 500 lb. per vessel per day on Saturday and Sunday; >75 percent adjusted quota until quota fulfilled-1, 000 lb. per vessel per day; >100 percent of adjusted quota-500 lb. per vessel per day.

VIII. Recommendations

A. Regulatory Recommendations

1. The passage of a constitutional amendment banning nets in Florida waters is expected to displace the southeast Florida gill net fishery into adjacent federal waters and/or into state and federal waters north of Florida. In order to prevent disruption of traditional fisheries and avoid user conflicts, it is recommended that states with commercial Spanish mackerel fisheries north of Florida adopt the recommended trip limits.

2. States should be considered *de minimis* with regard to trip and landing limits (FMP measure 8.6.8) if their landings are less than five percent of the target commercial quota. If a state's landings are 5 percent or greater of the target commercial quota, the state should implement the required trip or landing limits in the next fishing year. Any state with *de minimis* status should provide monitoring reports for their commercial fishery on a timely enough basis to prevent quota overages.

B. Amendments

1. In light of the mandatory nature of state regulatory requirements implied as a result of federal action, it is preferable that the Commission have a mechanism to independently affirm those measures. This can be accomplished through:

    a. an amendment to the Commission plan to incorporate a framework mechanism for tracking the federal FMPs adjustments to TACs, bag limits, size limits, trip limits, and other regulatory measures.

    b. a joint federal/interstate FMP for Spanish mackerel.

Given limited resources, the latter is probably the most efficient mechanism to accomplish complementary state/federal management of Spanish mackerel, with the South Atlantic Council remaining as lead. However, a joint plan is not feasible until the SAFMC has a separate FMP for coastal migratory pelagics, which is being discussed for Amendment 12 to the federal plan. Until an amendment or joint plan is feasible, South and Mid-Atlantic States should remain actively involved in the joint councils' regulatory process for Atlantic Group Spanish mackerel.

2. The federal and interstate FMPs should clarify what constitutes a directed fishery.

C. Research and Monitoring Recommendations

The following information and research needs have been identified in the 1998 Report of the Mackerel Stock Assessment Panel, with the first two considered priorities:

1. Determine the bycatch of Spanish mackerel in the directed shrimp fishery in Atlantic Coastal waters

2. Evaluate potential bias of the lack of appropriate stratification of the data used to generate age-length keys for Atlantic and Gulf Spanish mackerel

3. Develop fishery independent methods of monitoring stock size of Atlantic Spanish mackerel (consider aerial surveys used in south Florida waters)

4. Evaluation of catch-per-unit effort (CPUE) indices relative to standardization methods and management history, with emphasis on greater temporal and spatial resolution in estimates of CPUE.

5. Completion of research on applicability of assessment and management models for dynamic species such as Spanish mackerel.

6. Yield per recruit analyses are needed relative to alternative selective fishing patterns.

7. States should be encouraged to consider MRFSS add-ons or other mechanisms for collection of socioeconomic data under the guidance of the Commission Management and Science Committee's Recreational Statistics Committee.

8. More timely reporting of mid-Atlantic catches is needed for quota monitoring.

DRAFT
1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SPOT*
(Leiostomus xanthurus)

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* At time of publication this review was updated by staff and forwarded to the Plan Review Team for review. It has not been approved by the South Atlantic Board.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SPOT
(Leiostomus xanthurus)

I. Status of the Fishery Management Plan

The management plan 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 planning process, the *Spot Fishery Management Plan* (FMP) was seen by the Commission as in need of review and possible revision. A Wallop-Breaux grant from U. S. Fish and Wildlife Service was provided to conduct a comprehensive data collection workshop for spot. The workshop would lay the groundwork for a major amendment to the 1987 FMP. The October 1993 workshop at the Virginia Institute of Marine Science (FMP) 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 a workshop report (ASMFC Special Report #25).

Subsequent to the workshop and independent of it, the South Atlantic State/Federal Fisheries Management Board of the Commission 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. In their final schedule for compliance under the ACFCMA, the Interstate Fisheries Management Program (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. The 1993 workshop proceedings should provide a starting place for plan revision.

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 the sample in generalized trawl and seine surveys in several states. An analysis of spot catches in Maryland's juvenile seine survey shows a trend of increasing abundance from 1957 to l976, and then, through 1992, more moderate numbers punctuated by occasional years of high abundance. Spot young-of-year abundance in the Virginia Chesapeake Bay trawl survey has fluctuated widely without showing a trend. The indices in 1992 and 1993 were, however, relatively low. The North Carolina Pamlico Sound Survey juvenile spot index has fluctuated without trend since 1979.

III. Status of the Fishery

The recreational harvest (A + B1 fish) of spot from along the Atlantic coast has varied from 5.2 to 20.1 million fish from 1981 to 1997 (Table 29). The recreational harvest in 1997 was 6.3 million fish. The number of spot harvested recreationally has declined from the early 1980s to the present. The number of spot released by recreational anglers from 1981-97 has remained relatively constant, ranging from 2 to 6 million fish with the exception of 1981 (11.2 million fish), 1990 (7.2 million fish) and 1991 (10.6 million fish).

Table 29. Recreational harvest (A + B1 fish) of spot in numbers and weight, and number released by year for the Atlantic Coast (data from MRFSS website).

Year	Number Harvested (A + B1)	Weight (A + B1) in pounds	Number released
1981	18,211,373	6,915,819	11,151,731
1982	14,035,394	3,986,816	5,698,367
1983	20,125,239	4,998,289	4,940,633
1984	6,662,176	1,799,941	5,218,761
1985	18,616,969	5,944,431	3,945,261
1986	12,932,596	3,393,314	6,229,556
1987	9,927,128	3,846,868	2,970,240
1988	7,888,631	2,522,409	2,827,220
1989	9,022,104	3,293,813	3,982,096
1990	9,699,092	3,584,904	7,247,827
1991	14,083,432	4,514,384	10,546,642
1992	10,945,571	4,024,449	3,800,211
1993	9,399,408	3,371,424	3,875,820
1994	12,819,339	4,327,879	5,444,180
1995	8,267,116	3,107,747	3,115,145
1996	5,252,914	2,046,047	2,045,145
1997	6,308,683	2,699,588	3,492,660

Commercial landings of spot have fluctuated without trend from 5.6 to 10.4 million pounds over the same time period (Table 30). Spot landings were at their highest over two decades ago, averaging over 10 million pounds from 1972-75. Commercial landings in 1997 were 6.6 million pounds. Small spot are a major component of the bycatch in seine, fish 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.

Table 30. Commercial landings of spot, 1960-1997 (data from NMFS website).

Year	Pounds	Metric Tons		Year	Pounds	Metric Tons
1960	10,787,600	4,893.2		**1979**	3,443,175	1,561.8
1961	7,646,400	3,468.4		**1980**	9,826,108	4,457.1
1962	7,438,200	3,373.9		**1981**	7,501,055	3,402.5
1963	6,256,300	2,837.8		**1982**	10,415,759	4,724.6
1964	8,603,400	3,902.5		**1983**	7,156,536	3,246.2
1965	4,786,800	2,171.3		**1984**	5,898,047	2,675.3
1966	5,583,600	2,532.7		**1985**	7,133,159	3,235.6
1967	10,677,700	4,843.4		**1986**	6,964,802	3,159.2
1968	5,895,800	2,674.3		**1987**	8,039,683	3,646.8
1969	3,893,900	1,766.3		**1988**	6,885,425	3,123.2
1970	9,749,100	4,422.2		**1989**	7,046,596	3,196.3
1971	5,899,500	2,676.0		**1990**	6,481,345	2,939.9
1972	11,169,500	5,066.5		**1991**	7,176,632	3,255.3
1973	10,419,900	4,726.4		**1992**	6,765,078	3,068.6
1974	10,028,000	4,548.7		**1993**	7,312,402	3,316.9
1975	12,737,400	5,777.6		**1994**	8,795,939	3,989.8
1976	5,461,700	2,477.4		**1995**	7,489,134	3,397.0
1977	7,056,300	3,200.7		**1996**	5,638,796	2,557.7
1978	9,542,600	4,328.5		**1997**	6,570,733	2,980.5

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 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 Southeast Area Management Area 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. Research on the life history and population dynamics of spot in the Chesapeake is presently being conducted jointly by Old Dominion University and VIMS. Virginia Marine Resources Commission and North Carolina Marine Fisheries investigated the use of culling panels in pound nets to release small croaker, spot, and weakfish. 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 North Carolina in order to reduce the catch of small fish.

VI. Status of Management Measures and Issues

The FMP 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 recent experimental work on bycatch reduction and examined the population implications of bycatch reduction. It is becoming clear that there are economically viable shrimp gears that reduce finfish bycatch. At the state level, North Carolina has been testing bycatch reduction devices in the shrimp trawl fishery and has achieved finfish reductions of 50-70 percent with little loss of shrimp. North Carolina requires fish excluder devices in every trawl (except try nets) in the shrimp fishery (commercial and recreational). In the North Carolina flynet fishery, where a large portion of the spot catch occurs, there is a new 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. This requirement should reduce the catch of small spot. The states of Florida through North Carolina have promoted and require the use of TEDS in state waters. None of the states have minimum trawl mesh sizes or culling panels in directed gears. 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, needs further work. A target reduction in bycatch of spot may be a suitable objective criteria in an amended plan. None of the states plan to implement a size limit in the foreseeable future.

VII. Current State-by-State Implementation of FMP Compliance Requirements

There are currently no requirements.

VIII. Recommendations of FMP Review Team

<u>High Priority</u>

- 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 BRDs on spot catch should be evaluated in those states with significant commercial harvests.

- Fishery dependent and 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 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.

Medium Priority

- 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.

Low Priority

Criteria should be cooperatively developed for aging spot otoliths and scales.

DRAFT
1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SPOTTED SEATROUT*
(Cynoscion nebulosus)

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* At time of publication this review was updated by staff and forwarded to the Plan Review Team for review. It has not been approved by the South Atlantic Board.

DRAFT
1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SPOTTED SEATROUT
(Cynoscion nebulosus)

I. Status of the Fishery Management Plan

Date of FMP approval:	1984
Lead agency and group with purview:	Atlantic States Marine Fisheries Commission
Management unit:	Spotted seatrout in the territorial sea of the Atlantic Ocean from Maryland through the Florida Keys.
States with declared interest:	Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida
Other states affected by FMP requirements:	None
States added/deleted since last review:	None
List of active Boards/Committees:	South Atlantic State/Federal Fisheries Management Board and Spotted Seatrout Plan Review Team
Amendments:	Amendment 1, approved by Policy Board November, 1991, added an objective of maintaining a spawning potential ratio (SPR) of at least 20 percent to minimize the possibility of recruitment failure.

The goal of the plan is "to perpetuate the spotted seatrout resource in fishable abundance throughout its range and generate the greatest possible economic and social benefits from its harvest and utilization over time." The plan's objectives are to: (1) attain over time optimum yield; (2) maintain a spawning potential ratio of at least 20 percent to minimize the possibility of recruitment failure; (3) promote conservation of the stocks in order to reduce the inter-annual variation in availability and increase yield per recruit; (4) promote the collection of economic, social, and biological data required to effectively monitor and assess management efforts relative to the overall goal; (5) promote research that improves understanding of the biology and fisheries of spotted seatrout; (6) promote harmonious use of the resource among various components of the fishery through coordination of management efforts among the various political entities having jurisdiction over the spotted seatrout resource; and (7) promote determination and adoption of standards of environmental quality and provide habitat protection necessary for the maximum natural protection of spotted seatrout.

It is the opinion of the Advisory Committee and Plan Review Team that the goal and objectives of the plan are still valid but full implementation of the fishery management plan (FMP) has still not been achieved.

II. Status of the Stock

Fluctuations in spotted seatrout landings (both commercial and recreational) have varied considerably during the last 15 years, but since most of these reported landings have no meaningful effort data associated with them, they are not useful as indicators of the status of the stocks. Some states are beginning to accumulate catch/effort data, especially in regards to recreational fisheries, which should provide insight into the status of the stocks over time.

Both Florida and South Carolina have run virtual population analyses on local stocks of spotted seatrout. Florida's spotted seatrout management plan has a goal of a 35 percent spawning stock ratio (SSR) while South Carolina has adopted the Commission plan objective of maintaining a spawning potential ratio (SPR) of at least 20 percent to minimize the possibility of recruitment failure. Florida's data indicate that the management measures currently contained in their plan will not achieve the plan goal of a 35 percent SSR while South Carolina's preliminary analysis indicates that fishing effort needs to be reduced approximately 20 percent to meet the plan objective of a 20 percent SPR. Population analyses on other stocks within the region have not been conducted at this time.

III. Status of the Fishery

Spotted seatrout are taken by both commercial and recreational fishermen in the South Atlantic region (North Carolina through the East coast of Florida); although in South Carolina the species has been declared a gamefish and can only be taken by recreational means.

The recreational harvest of spotted seatrout in the South Atlantic region has ranged from 680,493 to 2.4 million fish from 1981-97, averaging close to 1.4 million fish (Table 31). Coastwide recreational harvest in 1997 was 866,011 spotted seatrout weighing approximately 1.4 million pounds. The estimated number of spotted seatrout released has generally increased since the early 1980s, with a dramatic rise from 1990 to 1991 (Table 31). The number of fish released has remained well over 1 million fish per year since that time.

State by state recreational harvest (in numbers of fish) of spotted seatrout for 1997 was as follows: New Jersey - 3,196; Delaware - 245; Maryland - 19,923; Virginia - 92,402; North Carolina - 251,728; South Carolina - 110,538; Georgia - 165,000; and Florida - 222,979.

Atlantic coast commercial landings of spotted seatrout (1960-95) have fluctuated without trend, ranging from 479,000 pounds to 1.4 million pounds (Table 32). However, during the early 1960s and early 1970s, commercial landings of spotted seatrout were sustained at or above the 1 million pound level. Whether this was related to resource abundance or effort though, is unknown. During the 1980s, the majority of commercial landings (in pounds of fish landed) came from the east coast of Florida, while in the 1990's, the majority of commercial landings have come from North Carolina.

In 1995 (the last year of complete data), commercial landings were: 28,722 pounds in Virginia; 574,393 pounds in North Carolina; 8,482 pounds in Georgia, and 184,269 pounds in Florida. Commercial landings of spotted seatrout in Maryland have been reported with weakfish, some sporadic landings in Delaware and New Jersey have occurred over the years, and South Carolina has no commercial fishery.

Table 31. Recreational harvest (A + B1 fish) of spotted seatrout in numbers and weight, and number released (B2 fish) by year for the Atlantic Coast (data from MRFSS website).

Year	Number Harvested (A + B1)	Weight (A + B1) in pounds	Number released (B2 fish)
1981	816,897	1,184,485	251,434
1982	1,614,793	1,547,186	196,745
1983	1,184,671	1,343,221	429,357
1984	1,000,822	1,163,363	167,129
1985	1,729,655	2,064,687	112,863
1986	1,790,261	2,121,306	402,796
1987	1,944,128	2,395,086	514,233
1988	1,806,120	2,326,338	943,612
1989	1,220,563	1,770,223	556,455
1990	1,071,215	1,516,771	465,829
1991	2,433,451	3,241,968	1,443,449
1992	1,268,760	1,774,897	1,048,820
1993	1,276,657	1,768,819	1,234,688
1994	1,339,083	1,835,367	1,404,182
1995	1,650,998	2,208,191	2,353,210
1996	680,493	880,680	1,599,958
1997	866,011	1,377,736	1,833,682

Table 32. Commercial landings of spotted seatrout, 1960-1997 (data from NMFS website; data for 1996 and possibly 1997 appear to be incomplete).

Year	Pounds	Metric Tons		Year	Pounds	Metric Tons
1960	1,169,900	530.7		**1979**	479,309	217.4
1961	1,090,200	494.5		**1980**	743,143	337.1
1962	1,017,000	461.3		**1981**	850,526	385.8
1963	1,112,300	504.5		**1982**	825,448	374.4
1964	1,054,200	478.2		**1983**	659,579	299.2
1965	941,500	427.1		**1984**	529,915	240.4
1966	879,400	398.9		**1985**	495,518	224.8
1967	733,900	332.9		**1986**	539,417	244.7
1968	754,800	342.4		**1987**	668,797	303.4
1969	899,100	407.8		**1988**	649,569	294.6
1970	1,200,800	544.7		**1989**	858,008	389.2
1971	916,700	415.8		**1990**	521,949	236.8
1972	1,194,000	541.6		**1991**	917,417	416.1
1973	1,319,000	598.3		**1992**	795,946	361.0
1974	1,379,900	625.9		**1993**	720,386	326.8
1975	1,288,100	584.3		**1994**	710,035	322.1
1976	1,244,100	564.3		**1995**	796,162	361.1
1977	837,800	380.0		**1996**	19,437	8.8
1978	509,100	230.9		**1997**	325,488	147.6

IV. Status of Assessment Advice

A formal stock assessment of spotted seatrout has not been conducted. Florida and South Carolina have run virtual population analyses on local stocks of spotted seatrout. The 1984 FMP recognized the lack of biological and fisheries data necessary for stock assessment and effective management of the resource. Spotted seatrout 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 incidental bycatch and discard mortality of small spotted seatrout in non-directed fisheries.

V. Status of Research and Monitoring

No directed research in spotted seatrout is currently being conducted in Virginia or Maryland. Georgia is conducting a fishery independent monitoring program with trammel nets. Personnel are conducting research to determine exploitation rates, annual survival, movements and age-growth rates. South Carolina has an extensive directed research program on this species, supported with Wallop-Breaux funds. Current project objectives include determining the rates of utilization and movements of spotted seatrout; locating and mapping sites of spawning aggregations with the use of hydrophones; deriving indices of juvenile abundance and attempting to correlate these data with future abundance estimate of adults. North Carolina has completed the fourth year of a five year Wallop-Breaux funded study of spotted seatrout life history. Fish are collected monthly for age and growth, to determine spawning season, and to determine size and age at maturity. Florida Department of Natural Resources implemented a juvenile finfish monitoring program in the northern Indian River Lagoon in the spring of 1990. The goal of this sampling program is to develop a recruitment index for spotted seatrout. Under a State/Federal Cooperative Agreement with the National Marine Fisheries Service (NMFS), length composition data are being collected from commercial catches made along the Florida east coast.

VI. Status of Management Measures and Issues

All states which declared an interest in spotted seatrout have established a minimum size limit of at least 12 inches total length (TL) as called for in the FMP. Collection of improved catch and effort data from the commercial and recreational fisheries has been initiated in all states as recommended in the FMP.

South Carolina has declared spotted seatrout a gamefish, imposed a creel limit of 15 fish per angler per day and a minimum size limit of 12" TL. Florida has a commercial minimum size limit of 15" TL and a 75 fish daily possession limit; commercial harvest is limited to hook and line and castnets. Florida has a recreational slot limit of 15 - 20" TL , one fish over 20" may be kept per day; a recreational bag limit of 5 fish/day; and seasonal closures of January - April north of Volusia County, and November - December for Volusia and counties south.. Georgia has a daily bag limit of 25 fish, a minimum size of 12" TL and fish must be landed with head and fins intact. North Carolina has a 12" TL minimum size limit. Virginia has a 14” TL commercial and recreational minimum size; recreational possession limit of 10 fish; and a commercial quota. Maryland has a 14” TL minimum recreational size and 10 fish possession limit; a 12” TL minimum commercial size limit and seasonal closures and mesh restrictions.

VII. Current State-by-State Implementation of FMP Compliance Requirements as of June 1, 1998

Compliance with current regulations by state:

Requirement	Fishery	No. Carolina	So. Carolina	Georgia	Florida
12" TL Min. Size	Recreational	12" TL	12" TL	12" TL	15-20" TL, with 1 fish >20" TL
	Commercial	12" TL	Gamefish	12" TL	15" TL

VIII. Recommendations of FMP Review Team

- Efforts should be continued towards achieving full implementation of the FMP.
- Collection of commercial and recreational landings data should be continued, and increased emphasis should be placed on obtaining complimentary effort data.
- Development and implementation of methodologies to monitor stock status such as pre-recruit indices and virtual population analyses should receive more attention as should effort data associated with catches and size composition data on catches.
- The spotted seatrout FMP should be reviewed periodically and updated to incorporate new data and research findings and to assess the status of stocks and the fisheries.

A. Prioritized Research Recommendations

High Priority

- Identify essential habitat requirements.
- Stock assessments should be conducted to determine the status of stocks relative to the plan objective of maintaining a spawning potential of at least 20 percent.
- Development and implementation of methodologies to monitor stock status such as prerecruit indices and virtual population analyses should receive more attention as should effort data associated with catches and size composition data on catches.
- The Marine Recreational Fisheries Statistics Survey should be expanded to assure adequate data collection for increased intercepts and state add-ons of social and economic data needs.

Medium Priority

- Evaluate effects of environmental factors on stock density.
- Collection of commercial and recreational landings data should be continued and expanded, and increased emphasis should be placed on obtaining complimentary effort data.
- Emphasis should be placed on collecting the necessary biological data to be able to conduct stock assessments.

- Work should be continued to examine the stock structure of spotted seatrout on a regional basis, with particular emphasis on molecular techniques.

- Collection of social and economic data needs to receive high priority.

- Age structure analyses by sex should be utilized in stock assessments to facilitate comparisons among regions.

Low Priority

- Conduct yield modeling.

- Define appropriate levels of precision and timeliness of spotted seatrout.

- Pre-recruit indices should use sizes that are as close to recruitment as possible; however, the economic considerations of collecting and processing these data make this recommendation a lower priority.

IX. List of References

Muller, R. G., and M. D. Murphy. 1995. A stock assessment of spotted seatrout, *Cynoscion nebulosus*. Florida Dept. of Env. Prot., Florida Mar. Res. Inst., St. Petersburg, FL.

Notes:

Florida Department of Environmental Protection developed a spotted seatrout stock assessment in January 1995 that addressed by sex yield modeling, spawning potential ratios, use of fishery independent monitoring to tune virtual population models.

Commercial effort is collected through Florida's Marine Fisheries Information System (Trip Tickets).

South Carolina Department of Natural Resources has recently (1996) completed a stock assessment; plans are underway to conduct a stock assessment utilizing Georgia fishery-dependent and -independent data in spring 1997.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SUMMER FLOUNDER
(Paralichthys dentatus)

Prepared by

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And

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR SUMMER FLOUNDER
(Paralichthys dentatus)

I. Status of the Fishery Management Plan

The summer flounder (*Paralichthys dentatus*) fishery of the Atlantic coast is managed jointly by the Atlantic States Marine Fisheries Commission (Commission) and the Mid-Atlantic Fishery Management Council (Council). The original Commission Fishery Management Plan (FMP) recommended a 14 inch minimum size and was approved in 1982. The Council Plan, prepared in 1988 and based on the Commission plan, established a 13" minimum size. Since then, nine amendments have been developed and all were approved except Amendment 1 which would have required a 5–1/2" minimum mesh size in the codend of trawls and Amendment 11 which would have reallocated commercial quota shares. Amendment 10 to the Summer Flounder FMP was adopted in May 1997. Amendment 12, which establishes revised overfishing definitions, identification and description of essential fish habitat, and defines the framework adjustment process, is currently out for public comment.

Amendment 2 (approved in August 1992) provided a strategy for reducing fishing mortality to Fmax, balanced against reasonable impacts on the fishermen. Management measures included a federal (EEZ) moratorium on entry into the commercial fishery, vessel and dealer permitting and reporting requirements, an annual commercial quota, and minimum mesh requirements with an exemption program. Recreational fishery measures include size limits, possession limits, and seasonal closures.

The management system established under Amendment 2 has been modified by the following amendments. Amendment 3 (approved in July 1993) revised the mesh requirement exemption program. Amendment 4 (approved in September 1993) revised the state-specific shares of the coastwide quota allocation in response to a reporting issue in Connecticut. Amendment 5 (approved in December 1993) allows states to transfer or combine their commercial quota shares. Amendment 6 (approved in May 1994) allows properly stowed nets with a cod end mesh size less than that stipulated in the plan to be aboard vessels in the summer flounder fishery. Amendment 7 (approved May 1995) adjusted the stock rebuilding schedule and capped the 1996-1997 commercial quotas at 18.51 million pounds. There is no Amendment 8 or 9 to the Commission FMP. The Council adopted Scup management measures as Amendment 8 and Black Sea Bass measures as amendment 9, while the Commission adopted separate Scup and Black Sea Bass Management Plans.

Amendment 10, approved by the Commission in May 1997, initially sought to examine the commercial quota management system. Its scope was expanded to address a number of federal and state issues in the fishery, including: (1) allow framework adjustments to the minimum mesh for any portion of the net; (2) require 5.5” diamond mesh between the wings and the codend of trawls; (3) continue the federal moratorium on entry; (4) remove the requirement that federally permitted vessels must land summer flounder every year; (5) modify the federal vessel replacement criteria; (6) implement state *de minimis* criteria; (7) prohibit transfer at sea; (8) require states to report summer flounder landings from state waters to the National Marine Fisheries Service (NMFS); and (9) allow states to implement a summer flounder filet at sea permit system. The amendment also proposed alternative commercial quota schemes, including (1) a trimester quota with state-by-state shares during summer, (2) a trimester coastwide quota of equal periods, and (3) a revision to the allocation formula. Ultimately, the Board and Council decided to maintain the current state-by-state quota allocation system.

The objectives of the FMP have not changed and are to: (1) reduce fishing mortality of summer flounder to assure overfishing does not occur; (2) reduce fishing mortality on immature summer flounder to increase spawning stock biomass; (3) improve yield from the fishery; (4) promote compatible management regulations between state and federal jurisdictions; (5) promote uniform and effective enforcement of regulations; and (6) minimize regulations to achieve the stated objectives.

The management unit includes summer flounder in U.S. waters in the western Atlantic Ocean from the southern border of North Carolina northward to the U.S. - Canadian border. States and jurisdictions with a declared interest in the summer flounder FMP include all those from North Carolina through Massachusetts except Pennsylvania and the District of Columbia. The Potomac River Fisheries Commission also declared interest in the summer flounder FMP. A Commission plan review team, Technical Committee, and species board, and the Council's Demersal Species Committee is actively working on this plan. Annual framework adjustment advice is provided by a joint Commission-Council Technical Monitoring Committee.

II. Status of the Stock

According to the Advisory Report of the 25th Northeast Regional Stock Assessment Workshop (25th SAW), the summer flounder stock is at a medium level of historical abundance and is overexploited. The 1996 estimate of fishing mortality is above the FMP target of F=0.41 in 1996 and the overfishing target of Fmax=0.24. After declining 72 percent from 1983 to 1989, spawning stock biomass has increased from a record low in 1989 of 11.7 million pounds to over 38 million pounds in 1996, the highest level since 1983. The 1995 year class is about average, but the 1996 year class is estimated to be the smallest since the poor year class of 1988. The age structure has begun to expand, with 34 percent of the stock at ages 2 and older in 1996. Under equilibrium conditions at Fmax, at least 85 percent of the stock would be expected to be age 2 and older.

A summer flounder stock assessment was not conducted this year due to the National Research Council review mandated by Congress. However, projections for 1999 were developed using SAW 25 results, 1997 survey indices and 1997 catch data. The projections indicate that total allowable landings for 1999 should be 14.96 million pounds, which would have a 50 percent probability of reaching the overfishing target of F=0.24.

III. Status of the Fishery

During the late 1980s landings declined dramatically, reaching a low of 9.3 million pounds in the commercial fishery in 1990 and 3.2 million pounds in the recreational fishery in 1989. Following these record lows, the commercial landings showed an increasing trend through 1996, while the recreational landings have increased consistently through 1997. Reported commercial landings for 1997 are 8.887 million pounds, and the recreational landings of 11.857 million pounds exceed the 1997 recreational harvest limit by over 4.4 million pounds. (Table 33 and Table 34).

Table 33. Summer flounder commercial landings in pounds by state, 1986-1997

State	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
ME	0	7,700	4,800	9,200	3,035	167	164	6,023	4,857	5,318	8,226	2,835
NH	100	300	0	0	20	87	14	0	0	0	0	0
MA	2,953,600	3,327,400	2,420,600	1,877,900	628,988	1,121,811	1,383,283	902,786	1,048,901	1,127,995	800,704	745,171
RI	7,042,100	4,774,000	4,718,800	3,082,900	1,408,347	1,672,565	2,531,506	1,942,451	2,570,819	2,365,465	1,766,482	1,557,867
CT	160,200	609,100	740,900	513,100	343,223	420,800	494,600	224,620	370,413	306,404	278,776	247,258
NY	2,737,500	2,641,400	3,438,700	1,463,700	405,031	731,484	1,239,488	849,376	1,270,012	1,248,078	940,313	815,741
NJ	4,016,900	4,450,500	6,006,400	2,864,900	1,458,281	2,340,745	2,870,945	2,466,452	2,413,761	2,298,303	2,369,134	1,319,446
DE	3,800	4,100	6,600	2,900	2,000	4,100	11,900	6,403	3,635	3,072	7,917	5,187
MD	315,500	318,900	513,900	204,100	138,594	233,678	318,944	254,081	160,380	136,167	264,886	214,948
VA	3,712,400	5,790,900	7,756,300	3,688,900	2,144,894	3,712,559	5,171,856	3,052,136	3,100,801	3,355,838	2,274,457	2,305,985
NC	5,924,000	5,128,000	6,770,000	4,206,000	2,728,000	3,516,000	2,576,000	2,894,835	3,571,188	4,566,766	4,227,052	1,673,345
TOTAL	26,866,100	27,052,300	32,377,000	17,913,600	9,260,413	13,753,996	16,598,700	12,599,163	14,514,767	15,413,406	12,937,947	8,887,783

Table 34. Summer flounder recreational landings in pounds by state ('000 lbs), 1986-1997

State	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
ME	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH	0	1	0	0	0	2	2	8	16	48	3	0	0	0	0	0	0
MA	124	1,486	663	350	88	2,500	583	281	36	64	79	118	203	243	227	213	277
RI	179	601	160	131	317	2,604	320	253	167	91	132	121	220	263	236	578	419
CT	84	222	499	419	339	775	434	170	97	31	141	192	129	475	395	432	362
NY	3,064	2,960	6,387	4,027	1,880	2,300	2,436	3,003	689	1,458	1,502	989	1,735	2,645	1,068	1,316	2,207
NJ	3,611	4,324	10,387	8,531	7,936	7,632	5,880	6,723	796	1,805	3,759	3,891	4,269	3,843	1,895	5,058	6,057
DE	253	884	936	1,307	230	162	188	752	208	167	205	401	524	338	193	721	332
MD	267	128	873	656	95	202	730	958	309	222	358	374	336	117	216	191	87
VA	2,026	6,018	7,517	2,038	742	522	1,400	1,866	557	724	1,547	804	949	943	1,022	1,448	1,758
NC	471	1,609	548	1,305	863	1,164	196	610	283	533	234	258	466	461	251	362	357
TOTAL	10,081	18,233	27,969	18,765	12,490	17,861	12,167	14,624	3,158	5,143	7,961	7,148	8,831	9,327	5,503	10,319	11,856

IV. Status of Assessment Advice

A quantitative assessment (virtual population analysis) of commercial and recreational total catch at age (landings plus discards) was conducted in 1997. This assessment was externally reviewed by the 25th SAW. The uncertainty associated with the estimates of fishing mortality and spawning stock biomass in 1996 were evaluated with respect to research survey variability. The National Research Council will be conducting a review of the summer flounder assessment in Fall 1998 and Winter and Spring 1999. The final report should be available in late 1999.

V. Status of Research and Monitoring

Several states and NMFS conduct seasonal sampling cruises using an otter trawl to assess the condition of summer flounder populations inshore and in the exclusive economic zone (EEZ). New York conducts a survey of anglers on open boats on Great South Bay to collect data on age and size composition from which mortality rates are calculated. New Jersey collects data from the commercial trawl fishery and conducts an ocean trawl survey from which data on summer flounder are collected and catch-per-unit-of-effort and distribution information are generated for juveniles and adults. Maryland constructs a juvenile index from trawl data collected in the ocean side bays and is also compiling data on population age, sex, and size from summer flounder taken in pound nets, and Delaware conducts a trawl survey which collects information on the summer flounder resources. North Carolina conducts two otter trawl surveys for juvenile fluke, conducts tagging programs to determine migrations and to assess mortality, and collects information on age and growth and catch-per-unit-of-effort for the winter trawl fishery. Virginia prepares a young-of-the-year index from data collected from beach seine and trawl surveys.

VI. Status of Management Measures and Issues

Management measures imposed upon harvesters of summer flounder include an annual commercial quota and recreational harvest limit, minimum sizes, minimum mesh requirements for trawls, permits and administrative fees for dealers and vessels, a moratorium on entry into the fishery, mandated use of sea samplers, monitoring of sea turtles in the southern part of the management unit, and collection of data and record keeping by dealers and processors. Fishing mortality has been controlled by a total allowable landings (TAL) since 1983, allocated into a commercial quota (60 percent of the TAL) and a recreational harvest limit (40 percent of the TAL). The commercial quota is allocated to each state based on landings during a baseline period (Table 35), and any overages are subtracted from a state's quota for the following year.

Table 35. Summer flounder commercial quota shares, initial quota allocations 1994-1998, and adjusted 1998 quota as of September 1998.

State	percent	1994 initial	1995 initial	1996 initial	1997 initial	1998 initial	1998 as of 9/98
ME	0.04756	7,612	6,987	5,284	5,284	5,284	4,791
NH	0.00046	74	67	51	51	51	51
MA	6.82046	1,091,653	1,001,953	757,841	757,841	757,841	721,889
RI	15.68298	2,510,149	2,303,894	1,742,583	1,742,583	1,742,583	1,742,583
CT	2.25708	361,258	331,574	250,791	250,791	250,791	250,457
NY	7.64699	1,223,943	1,123,374	849,680	849,680	849,680	788,282
NJ	16.72499	2,676,928	2,456,969	1,858,363	1,858,363	1,858,363	1,858,363
DE	0.01779	2,847	2,614	1,977	1,977	1,977	-14,534
MD	2.0391	326,369	299,551	226,570	226,570	226,570	199,876
VA	21.31676	3,411,867	3,131,519	2,368,569	2,368,569	2,368,569	2,357,377
NC	27.44584	4,392,860	4,031,905	3,049,589	3,049,589	3,049,589	2,649,849
Total	100.0	16,005,560	14,690,407	11,111,298	11,111,298	11,111,298	10,558,994

Summer Flounder Compliance Criteria

Commercial Fishery

The following measures may change annually. 1998 and 1999 measures are indicated. PLEASE NOTE: the 1999 management measures have been recommended by the Commission Summer Flounder, Scup, and Black Sea Bass Management Board and the Council. The recommendations must be approved by NMFS prior to becoming the final regulations for 1999.

Minimum size: 14"
Minimum mesh and threshold: 5.5 diamond, 6" square @ 100 lb. (Apr. - Oct.) and 200 lb. (Nov. - Mar.)
Regulation of mesh beyond the codend: 5.5" throughout the mesh
1998 Commercial quota: 11.11 million pounds*
1999 Commercial quota: 12.06 million pounds**

* IMPORTANT 1998 QUOTA REQUIREMENTS
15 percent of each state allocation must be set aside to mitigate discards after closure of the directed summer flounder commercial fishery. To be eligible to land this 15 percent, the state must adopt appropriate trip limits sufficiently restrictive to allow bycatch landings for the entire year without exceeding the state quota. Additionally, either the state or the fishermen must participate in collection of additional discard data. States must submit plans to meet these requirements ASAP, and said plans must be approved by the Summer Flounder Management Board or have preliminary approval of the Plan Review Team before the state can open its 1998 commercial fishery.

** IMPORTANT 1999 QUOTA REQUIREMENTS
All of the 1998 quota requirements will remain in place for 1999. The increase in total allowable landings is to be used by states to provide for additional bycatch reserves, and that the bycatch can only retained such that the summer flounder on board will not exceed 10 percent of other species on board for any trip set under the bycatch allocation.

The Commission and the Council are not recommending any changes to the commercial minimum size limit or the minimum mesh size for 1999.

The following measures are not subject to annual adjustment.

Quota management provisions: States are required to adopt appropriate measures to manage their quota shares. States may transfer or combine their quota shares as specified in Amendment 5. States must document through a vessel and dealer reporting system all landings that are not otherwise included in the federal monitoring of permit holders. States are required to forward all landings information to the NMFS for inclusion in quota reporting.

Transfer at Sea: States must prohibit permitted summer flounder vessels from transferring summer flounder from one vessel to another at sea. (As specified in Amendment 10)

De minimis status: States having commercial landings less than 0.1 percent of the coastwide total will be eligible for *de minims* status. (As specified in Amendment 10)

Recreational Fishery
The following measures may change annually:

Minimum size of possession: 15", Subject to reconsideration, December 1998.
Possession limit: 8, Subject to reconsideration, December 1998.
Seasonal closure: none, Subject to reconsideration, December 1998.

The Commission Management Board approved an alternative standard allowing states to maintain the 14.5" size limit, reduce the possession limit to 6 fish, and implement a seasonal closure sufficient to reduce landings by 8 percent The Commission Management Board and the Council will meet in December 1998 to set the regulations for the 1999 recreational summer flounder fishery.

Other Measures
Filet at sea permit: Party or charter vessels in state waters will be allowed to filet at sea if they obtain a state issued permit allowing such activity. (As specified in Amendment 10)

Reporting:
1. States must submit a commercial fishery management proposal by October 1 of each year. The proposal must detail the specific management measures that the state intends to use to manage their commercial quota allocation. The proposal must be reviewed and approved by the Management Board.

2. States must submit an annual compliance report to the Chair of the Summer Flounder Plan Review Team by April 1 of each year. The report must detail the state's management program for the current year and establish proof of compliance with all mandatory management measures and all framework changes specified for the current year. It should include landings information from the previous year, and the results of any monitoring or research program.

This summary of compliance criteria is intended to serve as a quick reference guide. It in no way alters or supersedes compliance criteria as contained in the Summer Flounder FMP and Amendments thereto. Also please note that the management measures that change annually may be altered if Amendment 12 is approved.

1998 Management Measures Summary
The TAL was set at 18.52 million pounds for 1998, resulting in an initial commercial quota of 11.11 million pounds and a recreational harvest limit of 7.41 million pounds (Table 36). After adjusting for overages from 1997, the commercial quota dropped to 10.56 million pounds. To meet the harvest limit in 1998, a minimum size limit of 15 inches and a eight fish possession limit were established for the recreational fisheries in 1998.

Table 36. Summary of summer flounder management measures and landings in millions of pounds, 1993-1997.

	1993	1994	1995	1996	1997	1998
TAL	20.73	26.68	19.40	18.52	18.52	18.52
Commercial Quota	12.35	15.60*	14.61*	10.80 *	8.38*	10.56*
Commercial Landings	12.54	14.51	15.41	12.94	8.98	?
Recreational Harvest Limit	8.38	10.67	7.76	7.04	7.41	7.41
Recreational Landings	8.83	9.32	5.50	10.32	11.86	?

* Corrected for prior year overages. 1995 also includes 3.05 m lb. added by court order.

Developing Issues

Amendment 11

State shares of the commercial quota are based on the relative proportion of landings in each state from 1980 to 1989. However, during this baseline period, some states had higher size limits than did other states. Generally, states North of New Jersey had a 14" size limit, and states to the South had lower size limits. The states having higher size limits during the baseline period contend that those size limits provided a significant conservation benefit that resulted in lower landings during the baseline period. These states contend that a significant poundage of fish was not landed because of the 14" size limit. If these fish were landed, as they were in states with lower size limits, then the state's quota share would be higher.

This supposed inequity in the baseline landings has been discussed many times since the quota system went into effect. However, Board members remain dissatisfied with the analysis to date. In May 1997 the Interstate Fisheries Management Program (ISFMP) Policy Board instructed the Summer Flounder Management Board to consider reallocation of the summer flounder state quota shares through an amendment to the Summer Flounder FMP. Amendment 11 developed to reallocate the state shares, however the Management Board did not approve the Amendment in October 1997.

Alternative Management Schemes

Despite failed efforts to change the quota management system in Amendment 10 and the reallocation proposed for Amendment 11, few are satisfied with the current state of summer flounder management. The Summer Flounder Advisory Panel continues to demand that a more equitable system be enacted to manage this resource. In response to a motion passed by the Management Board, the Summer Flounder, Scup, and Black Sea Bass Technical Committee developed a list of alternatives to the state-by-state quota management system in July 1998. Pursuing alternatives to the state-by-state quota management scheme will likely occupy much of the Management Board's attention during 1999.

Amendment 12

The Council is currently receiving public comment on Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass FMP. The Amendment establishes revised overfishing definitions, identification and description of essential fish habitat, and defines the framework adjustment process. The Council and Commission will review public comment and vote on final approval of the Amendment in October 1998.

VII. Current State by State Implementation of FMP Requirements

1997 - 1998 Summer Flounder FMP Compliance Schedule

COMMERCIAL:

14" minimum size	3/1/97
5.5" codend mesh	1/1/98
Ability to regulate mesh in any portion of the net	1/1/98
5.5" mesh, body	6/3/98
Prohibition of transfer at sea	1/1/98
Mandatory reporting to NMFS of landings from state waters	1/1/98

RECREATIONAL

15" minimum size	1/1/98
8 fish possession limit	1/1/98
1999 management measures (possession and seasons TBD)	4/1/99

GENERAL

Submission of annual commercial management plan	10/1/97, annually thereafter
Submission of annual landings and compliance report	4/1/98, annually thereafter

The Management Board reviewed state compliance with the FMP in August 1998 and found the states of Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Potomac River Fisheries Commission, and North Carolina were all in compliance with the FMP. The annual compliance reports from New York and Virginia have been reviewed by the Plan Review Team (PRT) and are waiting final approval by the Management Board.

Table 37. State compliance with required management measures as of August 1998.

	COMMERCIAL		**RECREATIONAL**	
State	**14" size**	**5 1/2" Mesh**	**15" size**	**8 limit**
ME	Y	Y	Y	Y
NH	Y	NA	Y	Y
MA	Y	Y	Y	Y
RI	Y	Y	Y	Y
CT	Y	Y	Y	Y
NY	Y	Y	Y	Y
NJ	Y	Y	Y	Y
DE	Y	NA	Y	Y
MD	Y	Y	Y	Y
VA	Y	NA	Y	Y
PRFC	Y	NA	Y	Y
NC	Y	Y	Y	Y

VIII. Recommendations of FMP Review Team

- The PRT recommends that the Management Board consider a reduction in the recreational bag limit and /or a seasonal closure, in view of the fact that the recreational harvest limit has been exceeded for the past 2 years and will likely be exceeded in 1998.

- The PRT encourages states to work with their fishermen to develop voluntary discard data collection systems. Although not reflected in the available data, some fishermen report that discarding of summer flounder is increasing. Such claims should be investigated.

- The PRT recommends that research and monitoring be initiated to address concerns that regulatory actions such as trip limits and seasonal closures are increasing discarding and high-grading.

- The PRT recommends additional analyses and data collection directed at adequately characterizing discards in the small mesh exemption area and determining if undersize fish are less available in the exemption area.

- The PRT recommends that states consider implementing measures to reduce discarding through their own regulatory process as one component of their quota management system

- The PRT reminds all states that annual landings and compliance reports must be submitted by April 1. These reports are required to address overall landings, current regulations, and enforcement. The report should establish proof of compliance with, and enforcement of, all mandatory management measures.

- The PRT reminds all States that state quota management plans must be submitted by October 1 for approval of the Management Board. Quota management plans must outline the state's quota management measures.

- The PRT reminds all states that they are responsible for enforcing mandatory management requirements. A state can be found out of compliance for failing to enforce a mandatory measure. States are required to provide proof of enforcement in their annual compliance reports.

A. Stock Assessment Review Committee (SARC) Data Recommendations

The Northeast Fisheries Science Center sea sampling program should continue collection of data for summer flounder, with special emphasis on (a) comprehensive areal and temporal coverage, (b) adequate length and age sampling, (c) continued sampling after commercial fishery areal and seasonal quotas are reached and fisheries are limited or closed, and (d) estimation of summer flounder discard in the scallop dredge fishery. Maintaining adequate sea sampling will be especially important in order to monitor (a) the effects of implementation of gear and area restrictions, both in terms of the response of the stock and the fishermen, (b) potential continuing changes in "directivity" in the summer flounder fishery, as a result of changes in stock levels and regulations, and (c) discards of summer flounder in the commercial fishery once quota levels have been attained and the summer flounder fishery is closed or restricted by trip limits.

Although NMFS Northeast Region commercial fishery biological sampling intensity meets the traditional standards for adequate sampling when considered on an overall, annual basis, the sample distribution is sparse for some strata of the fishery. Sampling intensity and coverage improved in 1996, and the SARC recommends this level of coverage be continued in the future.

1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR TAUTOG
(Tautoga onitis)

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1998 REVIEW OF THE FISHERY MANAGEMENT PLAN FOR TAUTOG (*Tautoga onitis*)

I. Status of Fishery Management Plan

In May 1993 the Commission voted develop a *Fishery Management Plan (FMP) for Tautog*. The primary rationale is the vulnerability of tautog to overfishing. Additional concerns centered around localized overfishing and rising commercial fishing effort and landings. States declaring interest in tautog are: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, and Virginia. Plan development began in 1994 and the Tautog FMP was approved in March 1996. In May 1997 the Commission approved Addendum 1 to the Tautog FMP. Addendum 1 included *de minimus* specifications and adjustments to the compliance schedule. Required management measures began April 1, 1998.

II. Status of Stocks

Tautog is a long lived species, with individuals over age 30 reported from Rhode Island and Connecticut. Most females mature (80 percent) at age 3. Natural mortality (M) has been estimated at M=0.15 for males and M=0.2 for females. Based on an assessment prepared in 1995 using data through 1994, tautog in the region from Massachusetts to New York are considered overfished with fishing mortality exceeding the interim target fishing mortality rate of F=0.24. Estimates of fishing mortality from New York to Massachusetts range from F=.15 to F=0.86; for 1994 the fully recruited fishing mortality in that area was estimated at F=0.71. A point estimate of fishing mortality was derived from the mean of five available estimates. These include fishing mortality estimated from three trawl surveys (Massachusetts, Connecticut, and Rhode Island surveys), Rhode Island tagging data, and the VPA (virtual population analysis, incorporating data from Massachusetts - New York). For New Jersey, fishing mortality is estimated at 0.77 from 1991 - 1994 based on trawl survey data.

Fishery independent information also indicates that tautog are overfished. Abundance indices through 1994 show about a 64 percent decline in the last 10 years. Surveys in Connecticut and Rhode Island reached record lows in 1995, although the New York survey improved in 1995 after a record low in 1994.

For states south of N ew Jersey, a lack of data hampers efforts to estimate current fishing mortality rates and tautog abundance. Several states are beginning to collect additional data as part of the management plan with the goal of reliably estimating F in 1998. The Technical Committee met in Spring 1998 to review the 1998 compliance reports and compile the additional data that has been collected since the approval of the FMP. The Technical Committee will be updating the stock assessment in Fall 1998 or Winter 1999.

III. Status of Fishery

The tautog fishery is primarily recreational, extending from Maine to Virginia. Most landings occur in state waters between Cape Cod and the Chesapeake Bay. Tautog ranked between fourth and seventh in recreational species sought in both the North Atlantic and Mid-Atlantic sub-regions in 1989 and 1990, accounting for between 5.4 percent and 9.7 percent of all recreational trips. Tautog are most frequently sought in spring and fall, although some fishermen pursue them year-round and there is an active fishery off the Virginia coast in winter.

Recreational landings declined in 1997, extending the declining trend since 1987 (Figure 1). Historically, most tautog were landed in New York and New Jersey, but over the last few years New Jersey and Virginia have dominated. In fact, fishermen in New Jersey and Virginia took almost 40 percent of the coastwide recreational harvest in 1997. The recreational harvest in number of fish is included in Table 38.

Figure 1. Tautog recreational harvest (A + B1) in number of fish, 1981-1997.

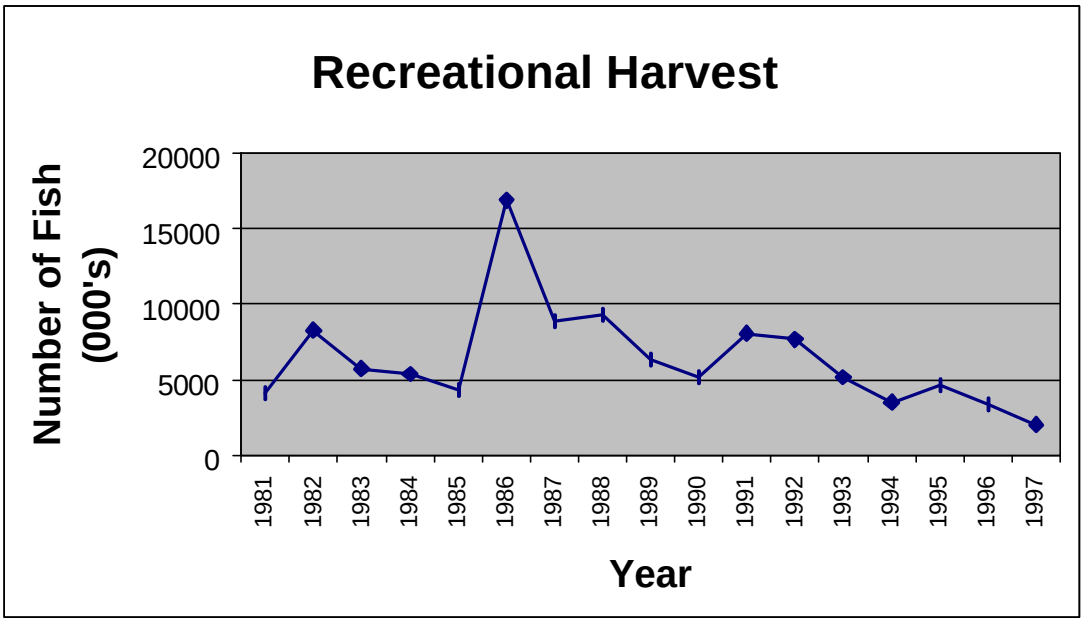

Table 38. Tautog recreational harvest (A + B1) in thousands of fish, 1981-1997 by state. Data from MRFSS.

Year	CT	DE	MD	MA	NJ	NY	RI	VA	Total
1981	242,339	6,584	10,296	790,618	161,425	1,496,055	664,574	742,660	4,114,551
1982	610,614	428,041	90,646	3,226,901	1,241,168	1,674,966	726,191	271,921	8,270,448
1983	458,587	4,437	6,551	1,837,281	414,962	1,124,856	615,602	1,267,179	5,729,455
1984	733,716	95,740	79,111	733,884	717,269	541,810	1,809,842	669,876	5,381,248
1985	471,191	144,860	1,107	328,045	741,665	2,034,924	277,386	298,800	4,297,978
1986	838,356	264,747	10,049	7,862,664	2,132,593	2,833,237	2,042,604	918,148	16,902,398
1987	1,106,617	387,079	266,096	1,751,390	2,130,976	2,288,099	507,429	442,756	8,880,442
1988	610,178	249,805	446,951	2,255,954	1,331,847	2,380,309	612,129	1,410,018	9,297,191
1989	1,038,227	743,347	78,392	1,076,377	1,289,200	1,018,026	296,892	806,345	6,346,806
1990	200,002	142,628	59,721	895,336	1,256,500	1,980,309	389,583	229,444	5,153,523
1991	648,641	354,502	106,224	798,897	2,189,166	2,352,670	1,007,559	619,221	8,076,880
1992	1,048,649	183,856	159,731	1,668,502	2,485,718	1,199,570	656,719	255,998	7,658,743
1993	441,161	191,016	111,126	633,751	1,205,917	1,578,110	378,426	641,300	5,180,807
1994	417,439	152,034	209,753	373,188	330,551	585,037	328,668	1,106,745	3,503,415
1995	395,964	736,462	111,667	317,130	1,803,429	366,925	246,353	622,491	4,600,421
1996	250,581	184,127	23,484	469,370	1,134,876	245,564	252,366	799,419	3,359,787
1997	84,379	189,029	179,750	160,625	426,030	321,426	303,873	360,529	2,025,641
Mean	564,508	262,253	114,744	1,481,171	1,234,900	1,413,053	653,894	674,285	6,398,808

Although commercial landings averaged 8.7 percent of total landings from 1982-1991, they have increased in recent years, reaching 15 percent of total landings from 1989 to 1991. Commercial interest in tautog has increased in response to higher market prices, exceeding $1.00/LB at times. As a result of the increase in both landings and market price, the ex-vessel value increased steadily from $76,000 in 1982 to $588,000 in 1991. Others factors contributing to the increase in commercial landings are the development of a live market for small fish, and increased regulation of other species such as striped bass, summer flounder, and winter flounder. Most commercial landings are taken by otter trawls, with gillnets, handlines, pots, and lobster traps all accounting for a share.

Commercial landings fluctuated without trend around the 200,000 pound mark from 1950 until 1980. Landings began to increase in the early 1980s and reached a high of 1,157,200 pounds in 1987 (Figure 2). From 1986 through 1992 landings were sustained at around a million pounds. Continuing the steep decline initiated after 1991, commercial landings were only 457,567 pounds in 1994. While this may only be half of the 1986-1992 landings, it is more than double the landings sustained from 1950 - 1980.

Table 39 shows commercial landings from 1981 - 1997.

Figure 2. Tautog commercial landings in thousands of pounds, 1981-1997.

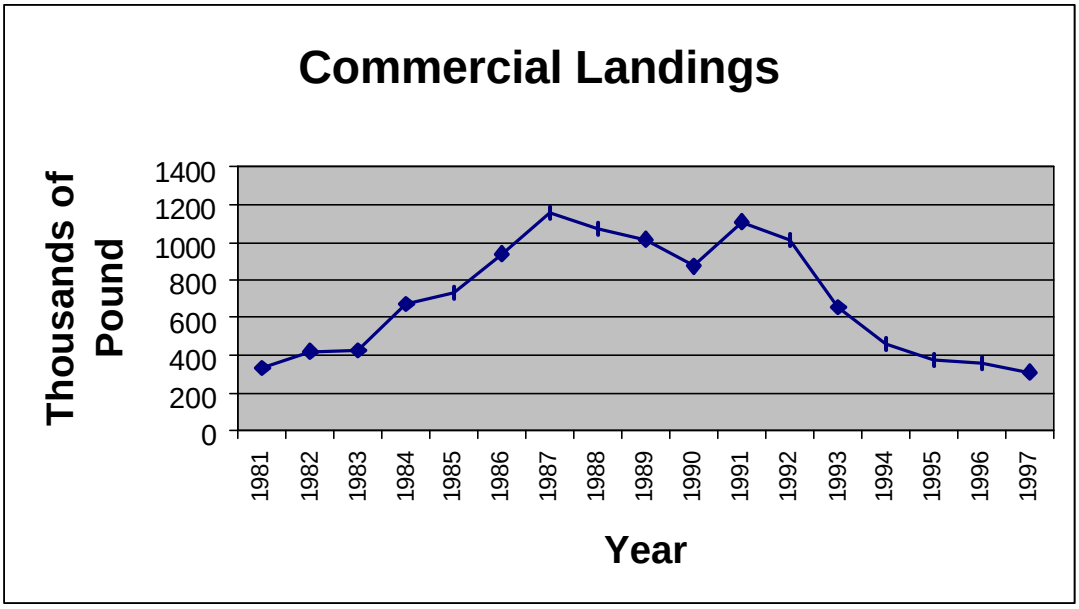

Table 39. Tautog commercial landings in thousands of pounds, 1981-1997 by state. Data from NMFS commercial statistics homepage.

Year	CT	DE	MD	MA	NJ	NY	RI	VA	Total
1981	20,500	1,000	1,200	103,000	54,400	81,400	69,800	700	332,000
1982	21,200	800	100	69,300	148,200	90,400	86,300	2,600	418,900
1983	33,500	800	-	57,600	100,600	88,400	142,600	1,700	425,200
1984	32,700	1,400	2,600	68,100	129,700	102,500	334,700	1,200	672,900
1985	49,900	3,200	2,400	63,200	125,500	84,500	403,200	1,639	733,539
1986	103,900	300	2,600	165,800	100,700	201,300	363,100	1,800	939,500
1987	159,200	500	3,800	250,000	95,200	225,200	420,500	2,700	1,157,100
1988	112,100	600	6,100	277,100	88,000	255,000	328,900	2,800	1,070,600
1989	99,706	-	3,978	352,507	51,842	285,422	214,928	7,387	1,015,770
1990	82,008	500	4,599	289,074	99,112	181,543	211,084	5,151	873,071
1991	54,000	1,300	3,164	354,346	93,022	226,413	371,597	5,058	1,108,900
1992	65,700	200	4,058	292,291	116,332	169,011	359,767	4,389	1,011,748
1993	44,000	300	1,432	160,336	153,474	89,467	201,593	2,660	653,262
1994	43,000	400	1,718	37,399	162,641	71,375	130,719	10,315	457,567
1995	20,466	600	4,416	35,298	116,123	72,879	95,019	27,701	372,502
1996	33,327	1,599	3,622	32,579	89,435	105,466	64,876	26,137	357,041
1997	14,519	841	7,663	64,275	49,726	101,001	45,880	25,078	308,983
Mean	58,219	844	3,144	157,189	104,353	143,016	226,151	7,589	700,505

IV. Status of Assessment Advice.

The Tautog assessment was reviewed through the NMFS 20th Northeast Regional Stock Assessment Workshop (SAW) in Spring 1995. The Stock Assessment Review Committee (SARC) rejected that VPA due to lack of data and inadequate age-length keys. The SARC also reviewed a catch curve analysis as well as data and analysis from individual states. The SARC recommended an immediate reduction of fishing mortality (F) to avoid a collapse of the fishery resource. The Technical Committee and Stock Assessment Sub-Committee will update the stock assessment in Spring 1999.

V. Status of Research and Monitoring

Length and abundance data are collected in trawl surveys in Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Delaware. New York and New Jersey are collecting length and age data from party boats. Age/length information is also being collected in Massachusetts, Connecticut, Virginia, and Maryland. Rhode Island is tagging tautog to determine movements and to estimate mortality.

Connecticut conducted a hook and release mortality study in 1993 and 1995; Virginia conducted a study in 1995. Results indicate about a 4 percent discard mortality rate.

VI. Status of Management Measures and Issues

The approved FMP includes commercial and recreational minimum sizes, and catch restrictions to reach the target fishing mortality (Table 40 and Table 41). The interim fishing mortality target is F=0.24, which represents a partial reduction to the overfishing definition F=M=0.15. Recreational fisheries will be

restrained by possession limits and seasonal closures, and commercial plans will be developed by each state. The size limit will be phased-in over two years.

Table 40. 1998 Commercial Tautog Regulations

STATE	SIZE LIMIT	POSSESSION LIMITS	SEASONS	QUOTA	GEAR RESTRICTIONS
Massachusetts	16”	40	some gears		Yes
Rhode Island	16”	20	some gears	Yes	Yes
Connecticut	14”	a	July 1 – March 31; April 1 - June 30		
New York	14”	b	some gears		Yes
New Jersey	14”			Yes	Yes
Delaware	14”/15”	See recreational	See Recreational		
Maryland	14”	5			
Virginia	14”		January 1- April 30; September 1- December 31		Yes

Table 41. 1998 Recreational Tautog Regulations

STATE	SIZE LIMIT	POSSESSION LIMITS	SEASONS
Massachusetts	16”	6	-
Rhode Island	16”	4[2]	See note 2
Connecticut	14”	4	January 1-April 30, June 15-December 31
New York	14”	c	-
New Jersey	14”	d	d
Delaware	14”	10[1]	July 1 - March 31
	15”	3	April 1 - June 30
Maryland	14”	5	-
Virginia	14”	10	January 1- April 30 July 1 – December 31

a The trawl fishery has a possession limit of 75 fish, the commercial hook, fish pot, trap net, fyke net, and gill net fisheries the possession limit is 25 fish, and in the lobster pot fishery the possession limit is 10 fish. Holders of Connecticut Marine Pound Net Registration may possess up to twelve fish year round except that during the May 1 through June 14 closed season all female tautog must be released without avoidable injury.

b New York has a 25 fish vessel trip limit for commercially caught tautog, except only 10 per vessel are allowed when lobster pot gear and more than six lobsters are in possession.

c New York has a one fish bag limit in effect for recreational catches from June 1 through October 6 and a 10 fish bag limit in effect from October 7 through May 31

d New Jersey has a possession limit of 10 tautog from January 1 through May 31 and October 10 through December 31. The possession limit from June 1 through October 9 is 1 tautog

1 Delaware has an 11 day closure from September 8 through September 18.

2 Each person fishing from a vessel for hire may possess no more than 1 legal size tautog per day from January 1 through October 14 and no more than 12 legal size tautog per day from October 15 through December 31.

The Tautog Plan Review Team reviewed the states' annual compliance reports during spring 1998. The Plan Review Team recommended that all of the states be found in compliance, however the Team expressed concern about the Rhode Island's recreational fishing management program. Rhode Island implemented a differential bag limit for party/charter boats and all other modes of recreational fishing.

The Technical Committee has reviewed the Rhode Island's management program at the request of the Management Board and determined that the current regulations may not meet the interim fishing mortality rate of F=0.24. The Board will review these findings at the Annual Meeting in October 1998.

VII. Current State-by-State Implementation of FMP Compliance Requirements as of September 1, 1998.

States are expected to comply with the following provisions:

1.	Restrictions to reach interim F target	4/1/1998
2.	Minimum size of 14"	4/1/1998
3.	Submission of plans to meet F=0.15 target	10/1/1999
4.	Implement regulations to meet F=0.15 target	4/1/2000

VIII. Prioritized Research Needs

1. Establish standardized state-by-state long-term surveys to monitor tautog abundance and length-frequency distributions, and to develop young-of-the-year indices. This is especially needed in the southern portion of the species range. Both fishery-dependent and fishery-independent information is needed.

2. Sample hard parts for annual ageing from the catches of recreational fishery and fishery-independent surveys throughout the range of the stock.

3. Initiate biological sampling of the commercial catch over the entire range of the stock.

4. Explore possible regional and local genetic differences (stock differentiation) and relate these to recruitment, growth, exploitation rates, and habitat differences. These differences can help support appropriate region-specific management strategies.

5. Determine mortality rate for fish hooked and released.

6. Define the status (condition and extent) of optimum or suitable juvenile habitats and trends in specific areas important to the species. It is critical to protect these habitats or to stimulate restoration or enhancement, if required.

7. Define the susceptibility of juveniles to coastal/anthropogenic contamination and resulting effects. This information can explain differences in local abundance, movements, growth, fecundity, and serve to support continued or increased regulation of the inputs of these contaminants and to assess potential damage.

8. Collect effort data for determining commercial and recreational catch per unit effort.

9. Define the specific spawning and pre-spawning aggregating areas and wintering areas of juveniles and adults used by all major local populations, as well as the migration routes used by tautog to get to and from spawning and wintering areas and the criteria or times of use. This information is required to protect these areas from damage and overuse or excessive exploitation.

10. Define local and regional movement patterns and site fidelity in the southern part of the species range. This information may provide insights into questions of aggregation vs. recruitment to artificial reef locations.

11. Define the source of offshore eggs and larvae (in situ or washed out coastal spawning).

12. Confirm that tautog, like cunner, hibernate in the winter, and in what areas and temperature thresholds, for how long, and are there special habitat requirements during these times that should be protected or conserved from damage or disturbance. This information will aid in understanding behavior variability and harvest availability.

13. Define the role of prey type and availability in local juvenile/adult population dynamics over the species range. This information can explain differences in local abundance, movements, growth, fecundity, etc.

14. Determine pot and trap escape vent dimensions needed to release tautog over a range of sizes.

15. Define larval diets and prey availability requirements. This information can be used as determinants of recruitment success and habitat function status. Information can also be used to support aquaculture ventures with this species.

1998 REVIEW OF AMENDMENT 3 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR WEAKFISH
(Cynoscion regalis)

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1998 REVIEW OF AMENDMENT 3 TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR WEAKFISH
(Cynoscion regalis)

I. Status of the Fisheries Management Plan

The Atlantic States Marine Fisheries Commission (Commission) adopted its first *Fishery Management Plan (FMP) for Weakfish* in 1985. Amendment 1 to the FMP, which superseded the original plan, was adopted in 1992, and Amendment 2 was adopted in October 1994. Weakfish are currently managed under the guidelines contained in Amendment 3, which was approved by the Commission in May 1996 and completely replaces all previous amendments.

The goals of Amendment 3 are to utilize interstate management so that Atlantic coastal weakfish recover to healthy levels which will maintain commercial and recreational harvest consistent with self-sustaining spawning stock and to provide for restoration and maintenance of essential habitat. The management objectives are: (1) to restore the weakfish population over a 5-year period; (2) to reach and maintain a target fishing mortality rate of 0.5; (3) to restore the expanded age and size structure; (4) to achieve compatible and equitable management measures among jurisdictions; (5) to promote cooperative interstate research, monitoring and law enforcement; (6) to promote identification and conservation of habitat; and (7) to establish standards and procedures for both the implementation of Amendment 3 and for determination of states' compliance with provisions of the management plan.

Weakfish are managed under this plan as a single stock throughout their coastal range. All states from Massachusetts to Florida and the Potomac River Fisheries Commission have a declared interest in the Weakfish FMP. Responsibility for the FMP is assigned to the Weakfish Management Board, a Plan Review Team, a Technical Committee, a Stock Assessment Sub-Committee and an Advisory Panel.

II. Status of the Stocks

Northeast Regional Stock Assessment Workshop 26

The stock assessment for weakfish was recently reviewed at 26th Stock Assessment Workshop (SAW) during December of 1997. The SAW document represents an analysis of the weakfish stock through 1996, and this subsection is summarized from that report. Overall, the 26th SAW states that the weakfish stock is increasing in abundance and is fully exploited.

The abundance of weakfish has been increasing in recent years, with above average recruitment occurring 1994-1996 years. The relative exploitation index and catch-curve estimates of total mortality have declined, suggesting fishing mortality is declining. Aging analysis shows indications of age structure expansion. Exploratory virtual population analysis (VPA) shows increases in spawning stock biomass at a mean rate of 22.5 percent per year since 1991 and a decrease in the fishing mortality rate by 21.4 percent per year from 1992-96.

The primary fishery independent abundance index is the National Marine Fisheries Service/ Northeast Fisheries Science Center (NMFS/NEFSC) fall inshore trawl survey. The surveys indicates that weakfish abundance and age structure were strongest in the 1980s, declined in the 1990s, and have recently begun

to rebuild. The 1996 values for age 5 fish were the highest since 1984, and age 2 and 3 fish have exceeded the values from the 1980s, increasing by an order of magnitude.

A number of other surveys conducted by state agencies, universities, and power companies are also available. Direct comparisons are difficult due to difference in information collected and length of time series. Collectively, they indicate the abundance of ages 2-7+ has increased since 1994 and 1996 provided a strong year class.

The weakfish stock is recovering from lows in the early 1990s. This increase in stock abundance should allow the continued expansion of the age structure to that of the reference period (1979-94).

III. Status of the Fishery

In 1997, the commercial landings were 3,300 mt, which is a slight increase over 1995 and 1996 landings of 3,200 mt. Landings from North Carolina, Virginia and New Jersey combined accounted for 85 percent of commercial landings in 1997, with 50 percent coming from North Carolina.

According to the Marine Recreational Fishery Statistics Survey, 1997 recreational landings were 3,424,720 fish, which is a slight increase over the 1996 landings of 3,356,360and a 46 percent increase over 1995 landings. Most of the increase was due to landings from the states of New Jersey and Delaware. Landings from New Jersey and Delaware combined accounted for 75 percent of recreational landings in 1996 and 1997.

IV. Status of Research and Monitoring

North Carolina, New Jersey and Delaware conduct small trawl surveys to determine a juvenile index for weakfish. Delaware, Maryland, Virginia and North Carolina collect age, size and weight and catch per unit effort data from large trawl surveys. North Carolina, Delaware, and Maryland monitor size and age composition of their commercial fisheries. Virginia also monitors sex, size, and age from commercial fisheries and sex and size from recreational fisheries. North Carolina samples juvenile abundance and continues to evaluate by catch in shrimp trawls equipped with bycatch reduction devices (BRDs).

The Gulf and South Atlantic Fisheries Development Foundation is evaluating the overall finfish by-catch in shrimp trawls. North Carolina and South Carolina, with the assistance from several other states and federal partners, are reviewing different aging methods for weakfish. Georgia is conducting fishery independent and fishery dependent sampling of shrimp trawl bycatch.

V. Status of Management Measures

Each state is required to implement harvest reduction strategies designed to recover weakfish over a 5-year period. Restoration of historic age and size structure, as represented by the average percentage of fish numbers at each age from 1979 to 1994, is also a plan goal. Table 42 describes the necessary reductions under Amendment 3 for fishing years 1996-2000. According to the 26th SAW, the projected fishing mortality for 1996 was achieved. Table 43 shows the average percentage of fish numbers at each age (age 0 to 7 and older) from 1979 to 1994. The fishing year is currently defined as April 1 through March 31. A summary of state weakfish regulations for the 1997 recreational and commercial fishery is also included (Table 44 and Table 45).

Table 42. Required reduction schedules for fishing mortality rates (F) for Atlantic coast weakfish, 1996 - 2000. All reductions in F are based on a 12-inch minimum size limit.

	Fishing Year				
	1996	1997	1998	1999	2000
Projected F	1.27	1.27	1.01	0.76	0.50

Table 43. Average percentage of fish numbers at each age (age 0 to 7 and older) from 1979 to 1994. Data comes from the 1994 Virtual Population Assessment model.

Percentage of Weakfish at each Age								
	0	1	2	3	4	5	6	7 and Older
Average %	68.45	20.98	7.28	2.09	0.69	0.29	0.10	0.12

Table 44. Summary of state weakfish regulations for the 1997 recreational fishery

State	Size Limits	Possession Limits	Closed Seasons
Connecticut	16” min. size	No limit	
Delaware	13” min. size	6 fish	
Florida	12” min. size	5 fish	
Georgia	13” min. size (effective 4-2-98)	6 fish (effective 4-2-98)	
Maryland	14” min. size	10 fish	
Massachusetts	16” min. size	No limit	Open all year
New Jersey	14” min. size	14 fish	
New York	16” (10 filleted, 12 dressed)	6	Open all year
North Carolina	12” min. size	4 fish	
Potomac River Fisheries Commission	14” min. size	10 fish	
Rhode Island	16” min. size		
South Carolina			
Virginia	14” (8/16-4/30) 12” (5/1-8/15)	14 fish (8/16-4/30) 4 fish (5/1-8/15)	

Table 45. Summary of state weakfish regulations for the 1997 commercial fishery

State	General	Trawl	Gillnet	Haul Seine	Pound Net	Hook & Line
Connecticut	No regulations					
Delaware			12” min. size; 4/1-9/30 min. mesh size of 3.125”; season closure for 34 days during May and June			13” min. size; 4 days per week (days chosen by fishermen)
Florida	12” min. size; all otter trawls in state waters must use BRDs					
Georgia	13” min. size (effective 4-2-98); 6 fish (effective 4-2-98)					
Maryland	12” min. size; Chesapeake Bay open commercial season for all gear types 8/9-9/30	3 3/8” min. square mesh size, 3 3/4 min. diamond mesh size; open season (Atlantic) 10/18-11/30	3” stretch mesh min. size; open season (Atlantic) 4/1-4/30 and 10/1-10/25			
Massachusetts	16” min. size					
New Jersey		13” min. size 1/1-8/31; otter trawl min. size 12” 9/1-12/31 with min. mesh size of 3.75” stretched diamond or 3.375 stretched square mesh; otter trawl fishery was closed 8/1-10/7	gill net mesh exemption program- min mesh size 2.75” and < 3.25” (21 permits issued, of which 11 were active); closed 5/21-9/2 and 10/20-10/26		season closed 6/7-6/30	no commercial license, but can sell legal fish.
New York	16” TL min. size; closed season 6/25-8/27 and 11/16-3/31; no sale of fish from party/charter vessel while carrying passengers for hire	cod end mesh size 4.5” diamond or 4” square inside measure	3.5” min. Stretch mesh size			
North Carolina	min. size of 12” TL (except for inshore long haul seines and pound nets)	Flynets closed south of Cape Hatteras	appropriate L_{25} mesh size for 12” fish	10” min. size; BRDs required	10” min. size; BRDs required	
Potomac River Fisheries Commission	12” min. size; season open 7/28-12/31				1 bushel per day bycatch allowed	
Rhode Island	16” min size					
South Carolina	No regulations					
Virginia		12” min size, min cod end mesh size of 3”; season closure from 9/26-3/31	12” min. size; 2-7/8” min. stretch mesh net size; closed season 5/14-10/7 and 12/18-3/31	no min. size; closed season 4/1-4/15, 6/11-8/20,9/25-3/31	no min. size limit; closed season 5/1-5/22 and 9/13-3/31; limited entry with 161 licenses	

* Amendment #3 allows a 150-pound bycatch for non-directed fisheries.

VI. Current State-by-State Implementation per Compliance Requirements as of September 1, 1998

As of September 1, 1998, all states were in compliance with Amendment 3 to the FMP. The States of Florida, South Carolina, and Georgia remain *de minimis* states as defined in Amendment 3. Their landings for 1996 and 1997 are well below the standard for *de minimis* of 1 percent of coastwide commercial and recreational directed landings for 1996 and 1997.

One sign of concern occurred off the coast of Maryland during December of 1997 with respect to compliance with the weakfish plan. Maryland extended their season due to bad weather days without prior approval of the Board. Maryland did change their plan back to a 43-day season, but the question of paying back the overage arose. After review by the Plan Review Team and Technical Committee, the Board decided to require Maryland to payback 11 days in their 1998 trawl fishery.

VII. Status of Assessment Advise

A quantitative assessment for weakfish was done in January 1998 through the 26th SAW. The types of models used to determine the status of the stock included virtual population analysis, extended survivor virtual population analysis, ADAPT, and CAGEAN. Bootstrap analysis was performed to identify sources of uncertainty with the stock assessment. The stock assessment was externally reviewed through the SAW process. An internal stock assessment review through the Weakfish Technical Committee is scheduled for the fall of 1998.

VIII. Recommendations

The Plan Review Team recommends that:

- States continue their reduction in harvest strategies and, if the upcoming assessment shows the need, revise them to meet the mortality reduction goals.
- Maryland payback the weather day overage that occurred in 1997.
- The stock assessment should be updated in 1999
- Review the Evaluation Manual and if necessary make changes that will clarify mortality adjustments.
- The Technical Committee provide tables on current VPA to give minimum size and creel limits that give F=0.76 in 1999 for both the recreational and commercial fisheries, if needed.

1998 REVIEW OF INTERSTATE FISHERY MANAGEMENT PLAN FOR INSHORE STOCKS OF WINTER FLOUNDER

(Pseudopleuronectes americanus)

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1998 REVIEW OF INTERSTATE FISHERY MANAGEMENT PLAN FOR INSHORE STOCKS OF WINTER FLOUNDER

(Pseudopleuronectes americanus)

I. Status of Fishery Management Plan

The *Interstate Fishery Management Plan for Inshore Stocks of Winter Flounder* was adopted by the Commission in May 1992. An implementation strategy was also adopted at that time and printed separately as Addendum I to the plan. The Winter Flounder Management Board is responsible for monitoring plan implementation.

The plan contains specific fishery management and habitat protection/enhancement measures to meet the following goals: (1) to maintain winter flounder stocks in sufficient abundance to support stable, productive commercial and recreational fisheries; (2) to preserve, maintain, and enhance habitat and environmental quality necessary for optimal growth and reproduction; (3) to the extent possible, minimize incompatibility in management practices between this and other northwest Atlantic management plans, recognizing that winter flounder stocks vary biologically and may justify differing strategies; and (4) to the extent possible, minimize conflicts between competing uses of the winter flounder resource.

The designated management unit for the plan includes the state waters of Maine through Delaware. States declaring an interest in the plan include: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Delaware. States required to comply with the plan include all the states identified above and the state of Pennsylvania.

II. Status of Stocks

Two inshore Management Units are identified: Gulf of Maine (GOM) - waters north of Cape Cod; Southern New England/Mid-Atlantic (SNE/MA) - waters south of Cape Cod to the Delaware-Maryland border. Previously, the SNE and MA areas were considered as separate units but were combined during the 1995 assessment because growth data and tagging studies showed more similarity between the SNE and MA regions. This change was reviewed and accepted by the Stock Assessment Review Committee (SARC 21) in 1995. Another change accepted by the SARC was lowering the natural mortality estimate from M = 0.35 to M = 0.2. This change was based on updated catch and age data which showed the presence of older fish (up to 16 years old) in the exploited population, leading the technical committee to adopt the conventionally accepted M = 0.2.

The Technical Committee met in January 1998 to assess the status of both the SNE/MA and GOM stock units. The committee attempted to construct the catch at age matrix for updating the 1995 virtual population analysis (VPA) for the SNE/MA unit but was unable due to a lack of samples from two commercial market categories in 1995 and 1996. In addition, several other market categories were poorly sampled during 1995-96. The committee concluded that the commercial length frequency sampling was insufficient for characterizing the commercial landings at age for the SNE/MA. Given the level of uncertainty in the commercial landings at age, and uncertainty in the less precisely estimated commercial and recreational discard at age matrices, the committee concluded that an age-based assessment would be inappropriate at that time.

The committee decided to assess the SNE/MA unit using the ASPIC model (A Surplus Production model Incorporating Covariates) which is a biomass dynamic model that assumes logistic growth and does not require either age data or estimates of natural mortality. It is based on the Schaefer model, is non-equilibrium and requires the use of survey biomass indices and catch. The model estimates the following parameters: (1) the ratio of starting biomass to the biomass that yields maximum sustainable yield (B1R); (2) survey index catchability coefficients (q_i); (3) the maximum stock yield (MSY); and (4) the intrinsic rate of growth (r). The model calculates fishing mortality (F_{bio} = catch in biomass/average stock biomass), fishing mortality that achieves maximum sustainable yield (F_{msy} = r/2), biomass that yields maximum sustainable yield (B_{msy} = K/2), and the carrying capacity (K = 4MSY/r). The fishing mortality rate derived from this model is a biomass removal rate and is not directly comparable to the age-based reference points in the current FMP. The model assumes that all biomass is fully exploitable. In the case of winter flounder, partially recruited age-groups contribute to the total stock biomass, thus the estimate of F_{bio} is sensitive to the contribution of yearclasses before they fully recruit to the fishery.

Total stock biomass of the SNE/MA unit declined from 43,500 metric tons (mt) in 1981 to a low of 8,400 mt in 1992. Biomass has since increased to 20,500 mt in 1997. This is below the B_{msy} estimate of 25,830 mt (80 percent CL: 19,530 to 39,060 mt). The trend and magnitude of biomass estimates in this model are similar to estimates from the SARC 21 VPA. Fishing mortality (F_{bio}) increased from 0.37 in 1981 to 0.63 in 1984 and fluctuated around this level until 1991. F_{bio} declined from 0.76 in 1991 to 0.18 in 1996. The trend in F_{bio} is similar to the trend in fully recruited F (F_{full}) from the SARC 21 VPA (1985-93) and the Committee's 1996 projection analyses. F_{bio} in 1996 is 0.18 and is below the F_{msy} estimate of 0.32 (80 percent CL: 0.17 to 0.45). The increase in biomass in the stock coincides with recent good recruitment and suggests that the unexploitable portion of biomass has increased in recent years, i.e. the drop in F_{bio} may be greater than the decline in F on the fully recruited portion of the stock (F_{full}).

F_{bio} incorporates the fishing mortality rate on both fully recruited and partially recruited cohorts, weighted by the biomass of each cohort. Thus trends in F_{bio} may not directly reflect trends in fully recruited F because of the percent biomass contributed by partially recruited age classes varies with yearclass size, particularly when the age structure of the population is truncated. A method was used to equilibrate F_{bio} to F_{full} by the committee in order to evaluate the reduction in F relevant to the FMP's interim goals and target. For the SNE/MA unit, F_{full} was estimated to be 0.36 in 1996, above both the interim target (F_{30} = 0.30) and the rebuilding target (F_{40} = 0.21). The committee then applied the NEFMC's Multispecies Monitoring Committee expected reduction of 22 percent in nominal effort from fishing year 1996 to 1998 due to Framework 20 ot the Multispecies FMP and the Vessel Capacity Reduction Program. Assuming no shift in effort onto winter flounder, fishing mortality was projected to decline to 0.27 in 1998, resulting in a 22 percent shortfall from the January 1, 1999 F_{40} target of 0.21.

State and federal trawl surveys indicate similar trends in stock biomass. The NEFSC fall biomass index declined from 1969 through 1975, rapidly increased to a record high in 1981, before steadily declining to a record low in 1993. This index has increased slightly in recent years but remains at a low level. The Massachusetts Division of Marine Fisheries (MADMF) spring biomass index was at a high level from 1978-84 before declining to a record low in 1991. The index has since increased and remains stable near levels seen in the mid-80s. Rhode Island Division of Fish and Wildlife (RIDFW) indices showed a similar trend: high biomass in the early 1980's followed by a steady decline to record lows in the early 1990s. Biomass temporarily increased in 1994-95, but has declined again. The Connecticut Department of Environmental Protection (CTDEP) biomass index (1985-96) was at a low level from 1985-87 before increasing to a record high in 1990. This index decreased to a record low in 1995 but rebounded to a high level the following year. The CTDEP index follows the same trend as the other surveys but appears to lag them in time.

Trends in recruitment vary according to survey and may reflect geographic differences in stock strength. Based upon examination of survey indices, recruitment appears good to moderate for the 1992-94 yearclasses, and poor for the 1995 yearclass in most surveys. The RIDFW survey indicates poor recruitment after the 1992 yearclass. Estimates of the 1996 yearclass size vary among young-of-the-year surveys as well. The 1996 yearclass appears strong in CTDEP and New York Department of Environmental Conservation (NYDEC) surveys, average in the MADMF seine survey, and poor in the RIDFW and Delaware Division of Fish and Wildlife surveys.

Data for the GOM unit are insufficient to conduct an age-based assessment. In January 1998, the committee examined trends in research survey indices and used the ASPIC model to assess this stock. Total stock biomass declined from 19,600 mt in 1979, to a low of 6,000 mt in 1991. Biomass has since increased to 8,900 mt in 1997. This is well below the B_{msy} estimate of 32,870 mt (80 percent CL: 13,070 to 203,700 mt), and is below the lower confidence level of B_{msy}. Fishing mortality (F_{bio}) fluctuated around 0.30 from 1981 through 1991, before declining to 0.09 in 1994. Fishing mortality has remained near that level in recent years. F_{bio} in 1996 was 0.09 and is below the F_{msy} estimate of 0.11 (80 percent CL: 0.07 to 0.17). The decline in F_{bio} may be due to an increase in unexploitable stock biomass by recent recruitment of age-2 fish rather than a decline in fully recruited F (F_{full}). Since the F_{bio} estimates can not be directly compared to the biological reference points and because this stock has never been assessed with an age-based assessment, the F_{full} equivalent to F_{bio} can not be estimated. The fishing mortality targets for this stock (F_{25} = 1.00; F_{30} = 0.78; F_{40} = 0.49) were estimated using the BIOREF model with M = 0.35. Natural mortality for this stock is currently estimated to be 0.2, but the biological reference points have not been recalculated. The biological reference points should be significantly less than the current ones: the new F_{40} will likely be in the range of 0.15 to 0.25.

State and federal survey indices have shown similar trends in stock biomass, declining from time series highs in 1979 to record lows in the late 1980s. Biomass has since fluctuated without trend. The MADMF spring survey has shown record high recruitment of age-2 fish since 1992. The increase in age-2 indices may reflect true high recruitment of age-2 fish (age-1 indices are at or above the time series average for 1992, 1993, 1995 and 1996), or it may reflect higher survival of ages 1 and 2 due to improved selectivity resulting from implementation of state and federal regulations such as mesh size increases, Nordmore grate implementation, certification of small mesh fisheries, etc. However, these large yearclasses do not follow through to older age groups since indices of age-3 and older fish are among the lowest in the time series. This strongly suggests that the fully recruited fishing mortality has not declined on this stock. Another explanation would be that the catchability coefficient (q) in the MADMF survey has increased for age-2 fish and declined for older ages. This however, is unlikely since there has been no change in survey methodology throughout the time period.

III. Status of Fishery

Commercial landings from the SNE/MA averaged 8,500 mt from 1964-72 before declining to around 4,800 mt throughout the mid to late 1970s. Commercial landings increased in the early 1980s to a record high of 11,176 mt in 1981 and remained at high levels through 1985. Landings rapidly declined after 1985 and have averaged near 2,500 mt in recent years. Commercial landings in 1997 were projected to be 3,058 mt. Landings by distance from shore (<3 mi; 3-12 mi; >3 mi) were unavailable for 1994-96 because of the switch from the NEFSC's weigh-out system to the Vessel Trip Reports (logbooks). Commercial landings from the exclusive economic zone (EEZ) (>3mi) averaged 86 percent of total commercial landings from 1989-93. State and federal management measures implemented since 1993 are unlikely to have significantly changed the percentage of total commercial landings from the EEZ.

Recreational landings from the SNE/MA peaked at 5,772 mt in 1984 before declining to a record low of 383 mt in 1992. Landings have fluctuated between 543 and 661 mt in recent years. Recreational landings as a percentage of total landings increased from 20 percent in 1982 to 44 percent in 1988, then declined to 20 percent in 1990 remaining near that level in recent years. On average, recreational landings have comprised 27 percent of the total landings (1981-96).

Commercial landings from the GOM stock fluctuated around 1,000 mt from 1964-75. Landings rapidly increased to a peak of 2,703 mt in 1982 and then declined to a time series low of 534 mt in 1994. Landings have increased slightly in recent years, 695 mt in 1995 and 698 mt in 1996. Landings in 1997 are projected to decrease to 493 mt, a record low.

Recreational landings from the GOM fluctuated around 2,000 mt during the early 1980s before declining to under 100 mt in 1991. Recreational landings have remained below 100 mt in recent years. On average, recreational landings have comprised 40 percent (range 25-60 percent) of the total catch from 1979-90. The percent total contribution of recreational landings to total landings dropped to 9 percent in 1991 and has remained near that level through 1996 (range 5-13 percent).

IV. Status of Assessment Advice

Assessments for both the SNE/MA and Gulf of Maine winter flounder stocks were last reviewed by the SARC in 1995 (SAW 21). The most recent assessment of the stocks occurred in January 1998 and the results are included in Section III. A surplus production model was used to assess both stocks and provide preliminary biomass-based reference points. Although a VPA could not be performed for the SNE/MA stock in January 1998, efforts continue to update the VPA for SAW 28 (December 1998). Possible sources of uncertainty in the assessment include area of capture data in recent years (1994-96), geographic differences in age and growth, aging methodology, effects of recent management measures, incomplete biological sampling in 1995-96, unvalidated commercial discard data, low recreational sampling levels, lack of age samples from recreational fishery and out of date maturity data.

V. Status of Research and Monitoring

Several states (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware) and NMFS conduct trawl surveys in which winter flounder are taken. Indices of abundance and estimates of fishing rate are produced from most surveys. Separate young-of-the-year surveys in several states provide early indices of recruitment within each management area. Fishery dependent indices of stock condition are also available from the Marine Recreational Fishery Statistics Survey (MRFSS) and commercial sampling/statistics programs.

VI. Status of Management Measures and Issues

The FMP calls for harvest control strategies which will achieve the target management reference point (F40) in three steps. All states were initially required to have implemented measures to achieve F25 and achieve this goal one year after adoption of the Plan.

By January 1, 1995 measures to achieve F_{30} were in place, and by January 1, 1999, the plan required that F_{40} be achieved. All states currently have plans that were approved by the Winter Flounder Management Board in 1995, however, changes in the most recent stock assessment (1995) concluded that none of the states were achieving a fishing mortality rate corresponding to F_{30} at that time. Subsequent analyses in early January 1997, including a preliminary projection analysis, indicated that fishing mortality on a

coastwide basis was slightly higher than the F_{30} target for the SNE/MA complex. Fishing mortality in the GOM was presumed to be higher and the spawning stock biomass was at a low level, indicating that the GOM unit may be in greater need of rebuilding than the SNE/MA unit.

The New England Fishery Management Council's Amendment 5 of the Groundfish Plan included winter flounder and required a 12" minimum size and 5.5" (S. of Cape Cod) or 6" (GOM) mesh for directed groundfish trips. Vessels fishing with smaller mesh in the regulated mesh areas while in an exempted small mesh area were limited to 10 percent groundfish species, by weight, up to a maximum of 500 lbs. The Plan also called for a 50 percent reduction in fishing effort in 10 percent increments over five years. Effort reduction under the Groundfish Plan was initiated in May 1994. At the end of 1994, the Council passed emergency regulations that closed prime fishing areas on Georges Bank (Areas I & II), Nantucket Shoals (Nantucket Lightship) and addressed redirection of effort into the GOM and SNE. At the same time, development of Amendment 7 started. Amendment 7 extended days at sea controls and required that any fishing by an EEZ-permitted vessel be conducted with not less than 6" mesh (diamond or square) in SNE waters east of 72o 30'.

Table 46. Current state commercial regulations for winter flounder as of February 1998.

	COMMERCIAL		
State	**Minimum Size Limit**	**Cod-end Mesh**	**Closed Season(s)**
ME	12"	6.0"	
NH	12"	6.0" (to take, transport or posses winter flounder or other groundfish)	No mobile gear allowed in state waters
MA[1]	12"	6.0" square or diamond; 100 lb limit for all flounder species for mesh < 6.0";	Year round night closure to mobile gear; Gulf of Maine spawning closure and inshore net areas closed to all gear from: 2/1 - 5/31; Year round prohibition of commercial netting in inshore net area and Buzzards Bay; Year round prohibition of commercial harvest of winter flounder in Mount Hope Bay; at least 12 other seasonal/area/gear closures
RI	12"	6.0" (except fyke nets)	Open 3/1 in CMLMA[2] until 1/2 quota (89,000 lbs. in 1997) is reached; reopens 10/1 to 11/15, or until quota is met; 100 - 300 lb. trip limit in CMLMA
CT	12"	4.5" from 7/1-11/14; 5.5" from 11/15-6/30 (diamond mesh)	Closed: 3/1 - 4/14; 100 lb limit for small-mesh (≤5.5") regulated fisheries
NY	12"	5.5" (diamond) 6.0" (square) 100 lb. mesh trigger	Fyke nets closed: 3/23-9/30; Pound/trap nets: 6/15-7/25; All other comm. gear closed: 6/14-11/30
NJ	12"	5.0"	Trawling prohibited < 2 miles; Fyke nets closed: 2/20-9/30; All other comm. gear closed: 6/1-11/30
DE	10"	None	Trawling prohibited

[1] Massachusetts also has a maximum vessel size limit of 72 feet length overall.
[2] Coastal Marine Life Management Area - Narragansett Bay, coastal salt ponds, and Little Narragansett Bay; quota varies yearly and was proposed to be 53,900 for 1998.

Table 47. State recreational regulations for winter flounder as of February 1998

	RECREATIONAL			
State	**Minimum Size Limit**	**Bag Limit**	**Closed Season(s)**	**Last Update**
ME	12"	None	None	3/2/98
NH	12"	None	None	2/12/98
MA	12"	10; 4 in Mt. Hope Bay during open season	Closed: 3/1 - 4/30; Mt. Hope Bay only: closed 5/20 - 9/27 and 10/29 - 4/12	3/3/98
RI	12"	4 [3]	Open: 4/12/98 to 5/18/98; and 9/27/98 to 10/27/98	3/6/98
CT	12"	8	None	3/6/98
NY [4]	11"	15	All state waters closed from 7/1 to 9/14 and from 12/1 to 3rd Saturday in March	2/12/98
NJ	10"	None	Closed: Jan 1 - Feb 28 and June 1 - Sep 14	2/26/98
DE	10"	None	None	2/27/98

[3] Unlawful to sell recreational catch.
[4] Winter flounder may not at any time be taken for commercial purposes aboard party and charter vessels.

VII. Current State-by-State Implementation of FMP Compliance Requirements as of August 1, 1997

By January 1, 1995, the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Delaware were required to: (1) report to the Commission concerning habitat protection efforts with other in-state agencies; and (2) implement an approved plan to achieve a minimum 30 percent MSP. Since Pennsylvania does not have a winter flounder fishery, they were not included in the following table of fishery restrictions. Habitat protection measures however, were required of all states including Pennsylvania.

By July 1, 1997, the above mentioned states excluding Pennsylvania, were required to submit a plan to achieve a minimum 40 percent MSP. Addendum 2 to the FMP (approved in February 1998) revised this date to August 1, 1998 and changed the implementation date to May 1, 1999.

VIII. Recommendations of FMP Review Team

A. Regulatory Recommendations

The New England Fishery Management Council should continue to monitor the effectiveness of management strategies to reduce winter flounder exploitation in federal waters. States should revise plans to meet new reference points as described in the next stock assessment.

B. Amendments

No amendments to the current plan are in development. Addendum 2 was approved on February 3, 1998 and revised the implementation schedule laid out in Addendum 1.

C. Research and Monitoring Recommendations

1. Coastwide

- Focus research on quantifying mortality associated with habitat loss and alteration, contamination by toxics and power plant entrainment and impingement.

- Research studies should be designed to provide reliable estimates of anthropogenic mortality from sources other than fishing. Both mortality sources should then be incorporated into fisheries yield/recruit models to simultaneously evaluate these dual mortality factors.

- Conduct studies of flounder populations in impacted areas to fully quantify physiological adaptation to habitat alteration, and interactive effects, on an individual and population level.

- Update or conduct regional maturity studies. This may require a workshop to ensure the use of standardized criteria among regional studies.

- Process archived age samples from surveys and commercial landings. Processing pre-1985 samples will allow the extension of the SARC 21 VPA back in time and will eliminate the need for MADMF and the RIDFW to use pooled-age keys for the 1978-89 period. Processing NEFSC survey samples for the GOM stock will provide another source of information on recruitment and mortality for comparison with the MADMF survey.

- Improve sampling of commercial landings of winter flounder.

- Expand sea sampling in order to validate commercial discard estimates from Vessel Trip Reports.

- Maintain or increase sampling levels and collect age information from MRFSS samples.

- Landings data should be collected in a manner that allows disaggregation of total landings into state landings by fishing zone.

- Biological sampling of catches via sea and port sampling should be improved within state waters and the EEZ.

- Conduct mesh selectivity studies using a range of mesh sizes equal to and greater than 5.5 inches (square and diamond).

- Conduct evaluation studies on selectivity devices such as a raised footrope trawl to reduce bycatch of winter flounder.

2. Southern New England - Mid-Atlantic Stock Complex

- Maintain or increase sampling levels and collect age information from MRFSS samples.
- Expand sea sampling for estimation of commercial discards.
- Develop a geographically more comprehensive data set to calculate maturity at age, reflecting any differential availability of mature fish to inshore and offshore surveys.
- Include years prior to 1985 and after 1993 in the catch at age analysis.
- Evaluate size-selectivity performance of survey gear compared to typical commercial gear, and implications for estimation of commercial discards from research survey length frequency information.
- Consider effects of catch-and-release components of recreational fishery on discard at age.
- Examine other biological reference points and rebuilding strategies in projection models.
- Evaluate effects of smoothed length-frequency distributions on the relationship between survey and commercial catches at length.
- Evaluate the feasibility of virtual population analysis based only on ages fully recruited to landings (i.e. no discards).
- Examine the implications of stock mixing from data from the Great South Channel region.

3. Gulf of Maine Stock

- Process archived age samples from NEFSC surveys and commercial landings, and develop an analytical age based assessment.
- Examine growth variations within the GOM, using results from the GOM Biological Sampling Survey (1993-94).
- Further examine the stock boundaries to determine if Bay of Fundy winter flounder should be included in the GOM stock complex.
- Update age-based biological reference points or define new biomass-based reference points.