Chesapeake Bay Weakfish and Spotted Seatrout Fishery Management Plan

An Agreement Commitment Report from
the Chesapeake Executive Council

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ADOPTION STATEMENT

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EXECUTIVE SUMMARY

Introduction

One of the strategies for implementing the Living Resources Commitments of the 1987 Chesapeake Bay Agreement is to develop and adopt a series of baywide fishery management plans (FMPs) for commercially, recreationally, and selected ecologically valuable species. The FMPs are to be implemented by the Commonwealth of Pennsylvania, Commonwealth of Virginia, District of Columbia, Potomac River Fisheries Commission, and State of Maryland as appropriate. Under a timetable adopted for completing management plans for several important species, the weakfish and spotted seatrout FMP was scheduled for completion in December 1990.

A comprehensive approach to managing Chesapeake Bay fisheries is needed because biological, physical, economic, and social aspects of the fisheries are shared among the Bay's jurisdictions. The Chesapeake Bay Program's Living Resources Subcommittee formed a Fisheries Management Workgroup to address the commitment in the Bay Agreement for comprehensive, bay-wide fishery management plans. The workgroup is composed of members from government agencies, the academic community, the fishing industry, and public interest groups representing Pennsylvania, Maryland, Virginia, the District of Columbia, and the federal government.

Development of Fishery Management Plans

An FMP prepared under the 1987 Chesapeake Bay Agreement serves as a framework for conserving and wisely using a fishery resource of the Bay. Each management plan contains a summary of the fishery under consideration, a discussion of problems and issues that have arisen, and recommended management actions. An implementation plan is included at the end of the FMP to provide additional details on the actions that participating jurisdictions will take and the mechanisms for taking these actions.

Development of a fishery management plan is a dynamic, ongoing process. The process starts with initial input by the Fishery Management Workgroup, is followed by public and scientific review of the management proposals, and then by endorsement by the appropriate Chesapeake Bay Program committees. A management plan is adopted when it is signed by the Chesapeake Bay Program's Executive Committee. In some cases, regulatory and legislative action will have to be initiated, while in others, additional funding and staffing may be required to fully implement a management action. A periodic review of each FMP will be conducted under the auspices of the Bay Program's Living Resources Subcommittee, to incorporate new information and to update management strategies as needed.

Goal Statement

The goal of the Chesapeake Bay Weakfish and Spotted Seatrout Management Plan is to enhance and perpetuate weakfish and spotted seatrout stocks in the Chesapeake Bay and its tributaries, and throughout their Atlantic coast range, so as to generate optimum long-term ecological, social and economic benefits from their commercial and recreational harvest and utilization over time.

In order to meet this goal, a number of objectives must be met. They include following the guidelines established by the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fishery Management Commission (MAFMC) for coastwide management of the weakfish and spotted seatrout fisheries, providing for fair allocation of the resources, promoting efficient harvesting practices, promoting biological and economic research and pursuing standards of environmental quality and habitat protection. These objectives are incorporated into the problems and management strategies discussed below.

Problem Areas and Management Strategies

Problem 1: Overfishing. The weakfish is an important fishery resource along the Atlantic coast, particularly between New York and North Carolina. Total coastwide landings by weight have shown a decreasing trend since 1980. Recent stock assessments indicate that weakfish from Maryland to North Carolina are experiencing growth and recruitment overfishing. Spotted seatrout coastal landings are generally down from mid-1970's levels, however, this species does not appear to be overfished.

Strategy 1: Bay jurisdictions will evaluate a number of alternatives to control directed fishing mortality and improve protection of weakfish beyond age I. Management options include higher minimum size limits, reductions in by-catch and hook-and-line creel limits. Management agencies will continue to participate in coastal deliberations to protect small weakfish in other coastal states. Current regulations for spotted seatrout will be maintained.

Problem 2: Stock Assessment and Research Needs. Bay jurisdictions lack some of the biological and fisheries data to effectively manage the weakfish and spotted seatrout resources.

Strategy 2: Bay jurisdictions will continue existing programs which collect weakfish and spotted seatrout data and promote cooperative interstate research. Additional research efforts necessary to improve weakfish and spotted seatrout management will be identified.

Problem 3: Habitat Loss and Degradation. Estuarine areas are important to weakfish and spotted seatrout for spawning, nursery and feeding grounds. Estuarine habitat loss and degradation in

the Chesapeake Bay negatively impacts weakfish and spotted seatrout abundance.

Strategy 3: The Bay jurisdictions will continue their efforts to improve water quality and define habitat requirements for the living resources in the Chesapeake Bay pursuant to the 1987 Chesapeake Bay Agreement. Efforts include identifying and controlling nutrients, toxic materials, conventional pollutants, atmospheric inputs and protecting wetlands and submerged aquatic vegetation.

Problem 4: Recreational-Commercial Conflicts. As natural resources decline, many recreational and commercial fishermen increase their fishing effort. Competing recreational and commercial interests in the Chesapeake Bay's weakfish, spotted seatrout and other finfish fisheries has led to numerous conflicts between these groups. Conflicts also exist between full-time and part-time watermen.

Strategy 4: Bay jurisdictions will examine recreational-commercial conflicts arising in Chesapeake Bay finfish fisheries and adopt management measures as necessary to resolve the issues.

INTRODUCTION

MANAGEMENT PLAN BACKGROUND

As part of the 1987 Chesapeake Bay Agreement's commitment to protect and manage the natural resources of the Chesapeake Bay, the Bay jurisdictions are developing a series of fishery management plans covering commercially, recreationally, and selected ecologically valuable species. Under the agreement's Schedule for Developing Baywide Resource Management Strategies, a list of the priority species was formulated, with a timetable for completing fishery management plans as follows:

- oysters, blue crabs and American shad by July 1989;
- striped bass, bluefish, weakfish and spotted seatrout by 1990;
- croaker, spot, summer flounder and American eel by 1991; and
- red and black drum by 1992

A comprehensive and coordinated approach by the various local, state and federal groups in the Chesapeake Bay watershed is central to successful fishery management. Bay fisheries are traditionally managed separately by Pennsylvania, Maryland, Virginia, the District of Columbia, and the Potomac River Fisheries Commission (PRFC). There is also a federal Mid-Atlantic Fishery Management Council, which has management jurisdiction for offshore fisheries (3-200 miles), and a coast-wide organization, the Atlantic States Marine Fisheries Commission (ASMFC), which coordinates the management of migratory species in state waters (internal waters to 3 miles offshore) from Maine to Florida. The state/federal Chesapeake Bay Stock Assessment Committee (CBSAC) is responsible for developing a Baywide Stock Assessment Plan, which includes collection and analysis of fisheries information, but does not include the development of fishery management plans.

Consequently, a Fisheries Management Workgroup, under the auspices of the Chesapeake Bay Program's Living Resources Subcommittee, was formed to address the commitment in the Bay Agreement for Baywide fishery management plans. The Fisheries Management Workgroup is responsible for developing fishery management plans with a broad-based view. The workgroup's members represent fishery management agencies from Maryland, Pennsylvania, Virginia, the District of Columbia, and the federal government; the Potomac River Fisheries Commission; the Bay area academic community; the fishing industry; conservation groups; and interested citizens. Establishing Chesapeake Bay FMP's, in addition to coastal FMP's, creates a format to specifically address problems that are unique to the Chesapeake Bay. They also serve as the basis for implementing regulations in the Bay jurisdictions.

WHAT IS A FISHERY MANAGEMENT PLAN?

A Chesapeake Bay fishery management plan provides a framework for the Bay jurisdictions to undertake compatible, coordinated management measures to conserve and utilize a fishery resource. A management plan includes pertinent background information, lists management actions that need to be taken, the jurisdictions responsible for implementation, and an implementation timetable.

A fishery management plan is not an endpoint in the management of a fishery; rather, it is part of a dynamic, ongoing process consisting of several steps. The first step consists of analyzing the complex biological, economic and social aspects of a particular finfish or shellfish fishery. The second step includes defining a fishery's problems, identifying potential solutions, and choosing appropriate management strategies. Next, the chosen management strategies are put into action or implemented. Finally, a plan must be regularly reviewed and updated in order to respond to the most current information on the fishery; this requires that a management plan be adaptive and flexible.

GOALS AND OBJECTIVES FOR FISHERY MANAGEMENT PLANS

The goal of fisheries management is to protect the reproductive capability of the resource while providing for its optimal use by man. Fisheries management must include biological, economic and sociological considerations in order to be effective. Three simply stated objectives to protect the reproductive capabilities of the resource while allowing its optimal use include:

- quantify biologically appropriate levels of harvest;
- monitor current and future resource status to ensure harvest levels are conserving the species while maintaining an economically viable fishery; and
- adjust resource status if necessary, through management efforts.

MANAGEMENT PLAN FORMAT

The background section of this management plan summarizes:

- natural history and biological profile of weakfish and spotted seatrout
- FMP status and management unit;
- fishery parameters;

- habitat issues;
- historical fishery trends;
- economic perspective;
- current resource status;
- current laws and regulations in the Chesapeake Bay; and
- data and analytical needs.

The background information is derived primarily from the document entitled, Chesapeake Bay Fisheries: Status, Trends, Priorities and Data Needs and is supplemented with additional data. Inclusion of this section as part of the management plan provides historical background and basic biological information for each of the species.

The management section of the plan, which follows the background, defines:

- the goal and objectives for each species;
- problem areas for each species;
- management strategies to address each problem area; and
- action items with a schedule for implementation.

Once the plan has been adopted by the Bay Program's Executive Committee, appropriate administrative, regulatory and legislative action will be initiated. A periodic review of the management plan will be required to continually update management strategies and actions. The Living Resources Subcommittee will be responsible for this review.

SECTION 1. BACKGROUND

Life History - Weakfish

The weakfish (Cynoscion regalis), also commonly known as the squeteague, gray seatrout, drummer or shad trout, is a member of the drum family, Sciaenidae. This family is known for producing a drumming or croaking sound and that is how it acquired its name. Only the males can produce the "drumming" sound made by contracting special muscles around the swim bladder (Bigelow and Schroeder 1953). Weakfish range along the Atlantic coast from Massachusetts to Florida occasionally straying as far north as Nova Scotia and south into the Gulf of Mexico. Weakfish are most abundant from Rhode Island to North Carolina (Figure 1 , from Wilk 1976). They are found in salinities from 6.6 to 32.3 ppt and in temperatures ranging from 9.5 to 30.8°C (49.1 to 87.4°F). The presence of more than one weakfish stock along the Atlantic coast has been suggested by several investigators based on morphometric and meristic characteristics, and growth rates (Nesbit 1954; Perlmutter et al. 1956; Shepherd and Grimes 1983). In general, northern weakfish live longer (up to 11 years) and grow larger than southern weakfish (Stagg 1986). However, genetic investigations have indicated the northern and southern populations are genetically homogeneous (Crawford et al. 1988). Comparisons of morphometric and mitochondrial DNA analyses (Scoles, 1990a and McDowell et al. 1990) on the same fish have shown that a single genetic stock exists with recognizable north (New York) and south (Carolinas) morphometric differences. A July 1990 ASMFC weakfish workshop recognized the Atlantic coast weakfish population as a single unit stock.

Adults migrate inshore to estuaries, bays, and sounds during the spring to spawn. Comparisons of length frequencies by month from adults entering the Chesapeake Bay in early spring show that 2 year-old and 3 year-old fish arrive at least one month ahead of 1 year-old fish (Massmann 1963). After spawning, the adults may remain inshore or return to the ocean. It appears that a greater proportion of adults return to ocean waters and remain there all summer (Mercer 1983). When water temperatures begin to decrease in the fall, adults begin to migrate south and offshore. The wintering grounds of adult weakfish are unknown but evidence suggests they overwinter along the continental shelf from the Chesapeake Bay to Cape Fear, North Carolina (Merriner 1973). Weakfish migration does not appear to be a discrete movement from one area to another but rather one with a shifting population center (Richards 1965).

Spawning occurs in near-shore and estuarine waters along the coast from March through October with peak occurrence during late April through June (Mercer 1983). Fertilized eggs have been collected from a range of water temperatures, 17 to 26.5°C (62.6 to 79.7°F), and salinities between 12.1 and 31.3 ppt. Laboratory

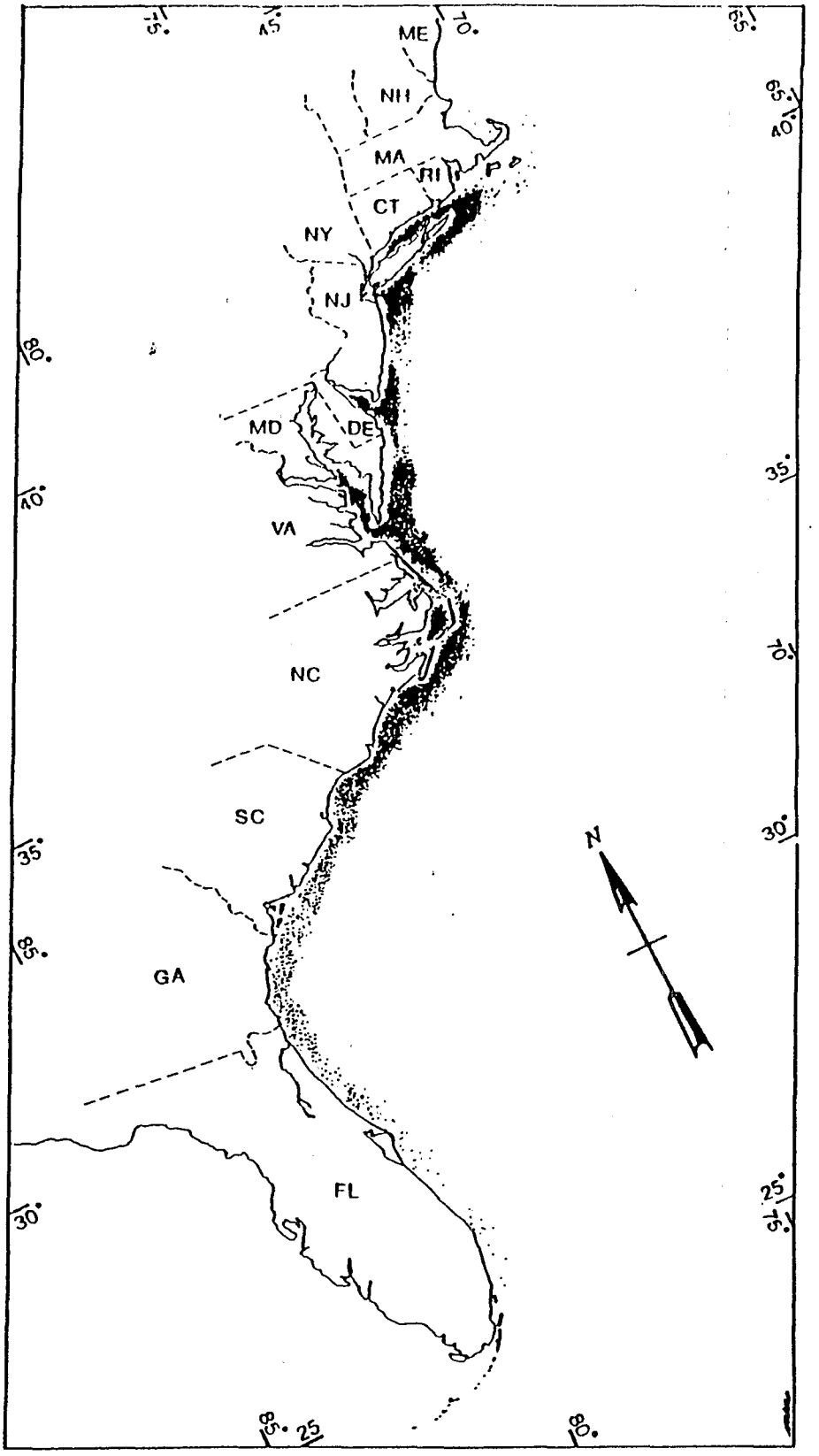

Figure 1. General distribution of the weakfish, Cynoscion regalis, along the Atlantic coast of the United States. Density of stippling indicates areas where weakfish tend to congregate (from: Wilk 1976).

studies on the viability of weakfish eggs have found hatching success reduced by sudden changes in temperature or salinity, turbulence, and dissolved oxygen below 4.3 mg/l (Harmic 1958). Peak larval abundance in the Chesapeake Bay usually occurs during late summer. Weakfish larvae are generally distributed throughout the lower Bay with the highest densities near the Bay mouth and along the eastern Bay margin (Olney 1983). The lower Chesapeake Bay appears to be an important nursery site for larval and juvenile weakfish including Virginia's seaside estuaries (Cowan and Birdsong 1985). Larvae prefer low salinity waters and probably use the net up-estuary movement of deep water in the main channel to reach freshwater (Thomas 1971). Larvae become demersal at 8 mm TL (0.3 inches) and growth is rapid during the first year reaching an average length of approximately 170 mm TL (6.7 inches).

Juvenile weakfish are euryhaline, capable of withstanding a broad range of salinities. They are found in low salinity waters throughout the summer and move to high salinity waters in the fall (Raney and Massmann 1953; Gunter and Hall 1963; Thomas 1971). Peak abundance of juvenile weakfish in the Maryland portion of the Chesapeake Bay occurs during August and September and in the Virginia portion of the Bay during September and October (Hornick et al. 1988). The northern distribution of juvenile weakfish in the Bay is affected by salinity. Abnormally dry summers, accompanied by higher salinities, allow a more northerly distribution. The largest concentrations of juvenile weakfish in the Bay usually occur south of the Choptank River. Juvenile weakfish usually leave the estuary and Bay areas by December (Hildebrand and Schroeder 1928; Massmann et al. 1958; Thomas 1971; and Chao and Musick 1977).

Young-of-the-year and yearling weakfish feed primarily on planktonic crustaceans and small fish (Chao and Musick 1977). Adult weakfish are top carnivores in the Chesapeake Bay and have similar food habits to bluefish and striped bass (Lascara 1981). Behavioral observations suggest that weakfish forage along eelgrass beds eating blue crabs and spot. Food habits appear to differ among estuarine areas. Age composition and growth rates have been estimated from scales, otoliths (ear bones) and vertebrae. Length frequencies vary from one investigator to another, season to season, year to year, and area to area (Mercer 1983). Growth differences between areas have been used as evidence for subpopulations (Shepherd and Grimes 1984).

Female weakfish are slightly larger than males, especially after reaching 2 years of age, and usually live longer (Seagraves 1981). In southern populations, male weakfish reach sexual maturity at a smaller size than female weakfish. The length at which 50 percent of the fish are classified as having mature ovaries or testes is considered the size at which sexual maturity is attained. For southern males (North Carolina), sexual maturity is reached between 130 and 150 mm SL (5 to 6 inches) and for females between 145 mm and 190 mm SL (5.7 to 7.5 inches). In northern populations (Delaware Bay and north), size at maturity

is similar for both sexes. Both males and females reach maturity around 254 mm (10 inches). Weakfish males and females probably reach sexual maturity by age 1 throughout their geographic range with a 100 percent maturity by age 2 (Merriner 1976). Fecundity, number of eggs produced, increases with age. An age 0 female (a fish with no scale annulus or age ring) produces an average of 45,000 eggs, with production increasing to 1,726,000 eggs at age IV (Merriner 1976).

Life History - Spotted Seatrout

Spotted seatrout range from Cape Cod, Massachusetts to Carmen Island in the Gulf of Campeche, Mexico. They are uncommon north of the Chesapeake Bay and are most abundant from Florida to Texas. Spotted seatrout are primarily estuarine, preferring relatively shallow water located over sandy bottom, submerged aquatic vegetation, shell reefs or bottom structure. Spotted seatrout are year-round residents of estuaries in the southern portion of their range and are seasonal migrants to the Chesapeake Bay. The spring migration into the Bay begins in May and the fall migration to southern waters takes place in October and November. As in the southern portion of their range, spotted seatrout are most common in shallow creeks and rivers of the Chesapeake Bay adjacent to beds of eelgrass and widgeon grass, although they will move into deep channels and holes during midsummer. Spotted seatrout mature between one and three years of age and males tend to mature at a smaller size than females. Size at maturity varies from estuary to estuary.

Biological Profile - Weakfish

Natural mortality rate:	No data exist to directly estimate natural mortality rates (M).
Fecundity:	Estimates range from 384,000 (New York Bight) to 2,300,000 eggs (North Carolina) per fish at a size of 20 inches TL.
Age/size at maturity:	In southern populations, males reach maturity when approximately 1 year old or 5-6 inches (130-150 mm) standard length (SL), while females are slightly larger (5.7-7.5 inches, 145-190 mm SL) before attaining sexual maturity. In northern populations, size at maturity is similar for both sexes at about 254 mm (10 inches).
Longevity:	In general, northern weakfish live longer, up to 11 years at about 620 mm (24.4 inches), as compared

to 4-5 years (485 mm, 19.1 inches) for the southern stock, and 5-6 years (540 mm, 21.3 inches) for the central stock.

Spawning and Larval Development

Spawning season:	March through October, with peaks in May and June.
Spawning area:	The principal spawning area is from the Chesapeake Bay to Montauk, Long Island, New York.
Location:	Occurs within large estuaries in deeper waters or in inlets, sheltered coves, and river mouths, but some spawning may also occur outside estuaries near their mouths.
Salinity:	Larvae have been collected in salinities from 12-31 ppt.
Temperature:	From 53 to 75°F (11.7 to 23.9°C).
Dissolved oxygen:	Minimum probably 5.0 ppm.

Young-of-year

Location:	Move from high salinity to low salinity areas; abundant in deeper water from August-December.
Salinity:	Euryhaline, juveniles enter fresh water and have been taken in salinities as high as 31 ppt.
Temperature:	Unknown.

Subadults and Adults

Location:	Estuarine and ocean waters.
Salinity:	From 6.6 to 32.3 ppt.
Temperature:	From 49 to 90°F (9.4 to 32.2°C).

Biological Profile - Spotted Seatrout

Natural mortality rate:	Unknown for the Chesapeake Bay.
Fecundity:	14,000 to 16,000,000 eggs/female.

Age/size at maturity:	Reported size and age at maturity for Chesapeake Bay males is 250 mm TL (9.8 inches) at year 2; reported size and age at maturity for Chesapeake Bay females is 290-350 mm TL (11.4-13.8 inches) at year 3.
Longevity:	15 years.

Spawning and Larval Development

Spawning season:	Protracted spring and summer spawning season; two peaks in the spawning activity in the Chesapeake Bay, one from mid-May to mid-June and a second in July.
Spawning area:	Estuarine and near-shore coastal waters.
Spawning location:	The preferred spawning habitat of spotted seatrout is unknown but is believed to be deeper channels immediately adjacent to vegetated shallows.
Salinity:	Reported range for spawning 17-35 ppt; optimal for larvae 19-38 ppt.
Spawning temperature:	70 to 82°F (21.1 to 27.8^{o}C).

Young-of-Year

Location:	Usually in submerged aquatic vegetation near shore during summer and fall.
Salinity:	Most abundant between 17-35 ppt.
Temperature:	Optimal range probably 61 to 81°F (16.1 to 27.2^{o}C).

Subadults and Adults

Location:	Estuarine and coastal waters with extensive vegetation in areas 10 to 20 feet deep.
Salinity:	Reported from 0-77 ppt; and most abundant from 5-35 ppt.
Temperature:	Reported from 41 to 95°F (5.0 to 35.0^{o}C).

FMP Status and Management Units

Spotted seatrout and weakfish management plans were prepared under the Atlantic States Marine Fisheries Commission's (ASMFC) Interstate Fisheries Management Program and were completed in October 1984 and October 1985, respectively. Management measures called for in the spotted seatrout plan include a minimum size limit of 12 inches total length with comparable mesh size regulations in directed fisheries, data collection for stock assessment and monitoring of the status of the fisheries. High research priorities include stock identification, mortality estimates and yield modeling, habitat requirements, effects of environmental factors on stock size, development of a pre-recruit index, mesh size selectivity and social and economic analyses.

Major provisions identified in the weakfish plan call for coastal states from Rhode Island to Virginia to delay harvest of weakfish until age 1, and that the use of Trawl Efficiency Devices (TEDs) be promoted in the southern shrimp fisheries. The major problem for weakfish is the lack of biological and fisheries data necessary for effective management. The coastal plan, therefore, promotes cooperative interstate research to understand the coastal fisheries and biology of weakfish.

Both plans were reviewed by the ASMFC and updated in April 1988. Goal statements and management objectives for each continue to be valid, however, full implementation of either plan is lacking. Recommendations to meet spotted seatrout management objectives include continued efforts towards achieving full implementation of the FMP, continued and increased collection of commercial and recreational landings data (to include effort data), development and implementation of methodology to obtain pre-recruit indices to monitor stock status, coordinated research and monitoring activities at the state and regional level and periodic review and updating of the FMP to incorporate new data and research findings.

Recommendations for the weakfish fishery include continued efforts toward the full implementation of the FMP, continued promotion of TEDs and their usefulness in reducing finfish bycatch, the development of an improved coastwide research program on weakfish (especially stock ID work) and holding annual workshops to coordinate nearshore state and federal finfish surveys. Recommendations from a July 1990 ASMFC weakfish workshop should be finalized this fall.

The management units are the weakfish (*Cynoscion regalis*) and spotted seatrout (*Cynoscion nebulosus*) throughout their range on the Atlantic coast.

Fishery Parameters - Weakfish

Status of exploitation: Since 1972, landings have been well above the long term average;

	however, Chesapeake Bay catches have comprised proportionately less of the total Atlantic coast harvest than mid- and southern Atlantic catches.
Long term potential catch:	Currently unknown.
Importance of recreational fishery:	Significant. In 1979, an estimated 2.2 million pounds of weakfish were caught recreationally in Maryland, as compared to 85,000 pounds caught commercially. In Virginia, an estimated 3.1 million pounds were caught recreationally in 1986, compared to 2.0 million pounds caught commercially.
Importance of commercial fishery:	Historically, harvests in Virginia have been significantly higher than in Maryland. Weakfish has ranked in the top five species in pounds landed and value 24 of 48 years in Virginia (1940-1987). In 1982, the Maryland proportion of total reported Atlantic coast weakfish catch was less than two percent, Virginia's about 12 percent--as compared to about 20-30 percent combined for both states, from 1955-1980.
Fishing mortality rates:	42 to 47 percent annually.

Fishery Parameters - Spotted Seatrout

Status of exploitation:	Limited commercial and recreational landings data are available from ASMFC States for 1977-1989. Atlantic coast landings have fluctuated, with North Carolina and the east coast of Florida generating the largest commercial catches. Commercial landings are considerably less in the other states, however, this species is important as a recreational catch. These landings data are considered as very gross indicators of stock conditions since effort data is lacking. Recreational fishing effort for 1979 - 1986 is reported

	to have increased.
Long term potential catch:	Currently unknown.
Importance of recreational fishery:	Significant in some years.
Importance of commercial fishery:	Insignificant.
Fishing mortality rates:	Unknown.

Habitat Issues - Weakfish

Weakfish utilize both coastal and estuarine waters at different life history stages. Protecting coastal and estuarine habitats is important to the overall health of the stock. Good water quality in estuarine areas is critical for successful spawning and growth of early larval stages. Most estuarine areas of the United States have been impacted by agricultural drainage, flood control and development. The National Estuary Study in 1970 indicated that 73 percent of all estuaries had been moderately or severely degraded by filling, dredging, and pollution.

Specific habitat issues have not been identified for weakfish in the Chesapeake Bay. The multifaceted issue of habitat protection and enhancement for living resources in the Chesapeake Bay is currently being addressed by the 1987 Chesapeake Bay Agreement. Within this agreement, strategies for wetlands protection, nutrient and non-point pollution reduction and reduction of toxic and conventional pollutants are being implemented. The improvement and maintenance of water quality are the most critical elements in the overall restoration and protection of living resources in the Chesapeake Bay.

Habitat Issues - Spotted Seatrout

Spotted seatrout are most abundant in estuarine habitats from Florida to Texas. Factors important in determining habitat suitability for spotted seatrout include: presence of large areas of submerged aquatic vegetation; presence of large areas of shallow, quiet brackish water (bays and lagoons); absence of predators; absence of competitors; an abundance of grazing crustaceans and fishes of suitable size; a stable temperature, ranging from 15.6 to 26.7^{o}C (60 to 80°F); and adequate areas adjacent to grass flats having a depth of 3-6 m (10-20 feet) that can be used as refuge from winter cold. The Chesapeake Bay, which marks the northern range of spotted seatrout abundance, provides suitable habitat for a migratory population.

Spotted seatrout are very susceptible to the effects of estuarine habitat degradation. The Chesapeake Bay has suffered a

major decline in submerged aquatic vegetation, the prime habitat for spotted seatrout juveniles and adults. Causes leading to the decline of submerged vegetation may be related to nutrient enrichment. The improvement and maintenance of water quality is essential to the re-establishment of submerged aquatic vegetation in the Chesapeake Bay.

The Fisheries - Weakfish

Since weakfish are a migratory species and range up and down the Atlantic coast, commercial harvest along the coast will affect harvest within the Bay. The following account of the Atlantic coast commercial fishery is taken from Mercer (1983). Commercial landings of weakfish along the coast have fluctuated widely since the late 1800's. Although records are incomplete for the early years, they indicate large catches of weakfish between 1897 and 1908. Total commercial landings during the last 40 years reveal two peaks, one during the 1940's and another during the late 1970's. Weakfish landings reached a record high of 18,800 mt in 1945 followed by a decline to 2,800 mt in 1952. During the next 15 years, weakfish landings fluctuated between 2,000 and 4,000 mt and then reached a record low of 1,400 mt in 1967. Landings increased to over 16,000 mt in 1980 and have since been on a downward trend. The Chesapeake Bay region dominated total landings between 1880 and 1957, followed by the Middle Atlantic region and the South Atlantic region (Figure 2, from Mercer 1983).

Commercial catch records for weakfish from the Chesapeake Bay are presented in Figure 3a. Except for the low landings recorded during World War II, the total harvest of weakfish reported from Chesapeake Bay in the 1930's and 1940's ranged from 6 to 11 million pounds. Following the war, there was a record harvest of approximately 18 million pounds. The weakfish harvest declined to an average of 1.6 million pounds over the next twenty years, then increased slightly to an average of 3.1 million pounds during 1970-1979. In 1980, the total weakfish harvest peaked at 5.1 million pounds. Since then, harvest has averaged around 1.7 million pounds. Virginia has harvested between 50 and 89 percent of the total weakfish harvest from the Chesapeake Bay (Figure 3b). Maryland's harvest from the Bay has not exceeded 4 million pounds and has been less than 500,000 pounds in the last ten years (Figure 3c).

Historically, weakfish in Maryland were primarily harvested by pound nets. In recent years, otter trawls in the Atlantic Ocean and gill nets have accounted for approximately 70 percent of the catch (Figure 4a-d). In Virginia, the primary gear type for harvesting weakfish in the Bay has been pound nets (Figure 5a-d). Since 1970, CPUE in both Maryland and Virginia, for all gear types has been rising (Stagg 1986). This trend is also evident for the whole Atlantic coast weakfish fishery (Mercer 1983). Since 1980, coastwide landings by number have increased while landings by weight have shown a decreasing trend.

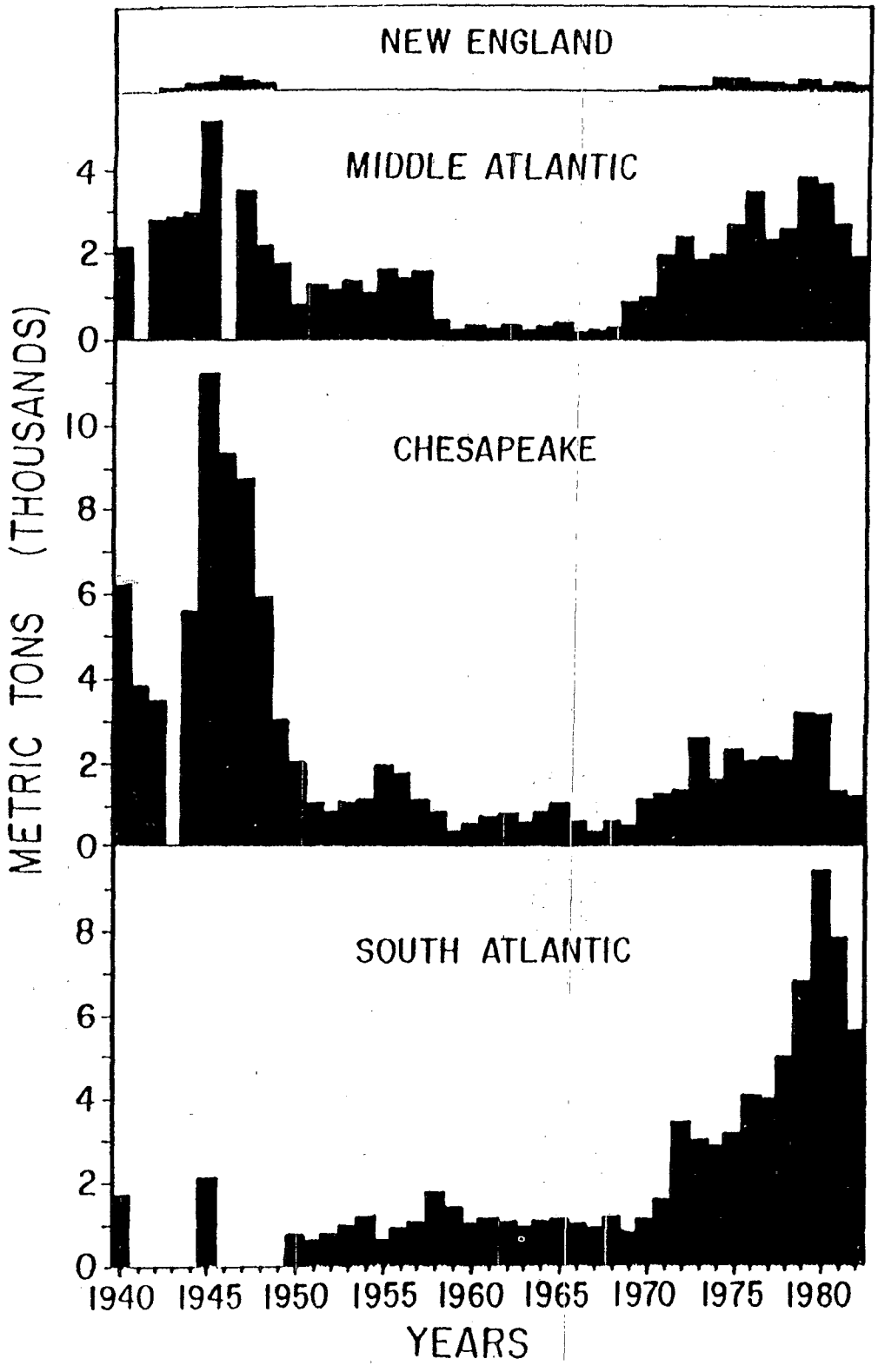

Figure 2. U.S. commercial landings of weakfish, Cynoscion regalis, by geographic region, 1940-1982.

Weakfish Commercial Landings from the Chesapeake Bay

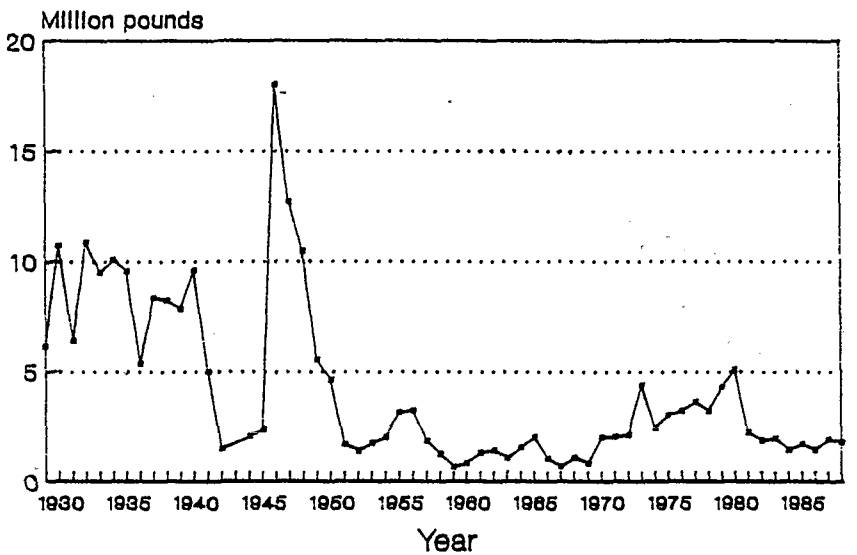

Figure 3a

Weakfish Commercial Landings from Virginia

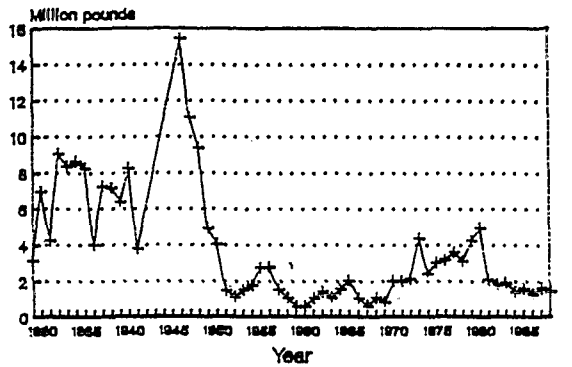

Figure 3b

Weakfish Commercial Landings from Maryland

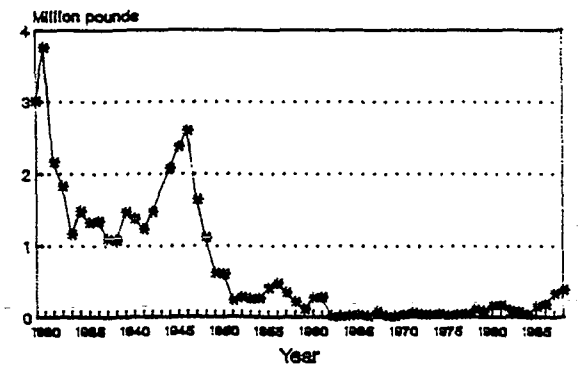

Figure 3c

Maryland commercial weakfish landings by gear

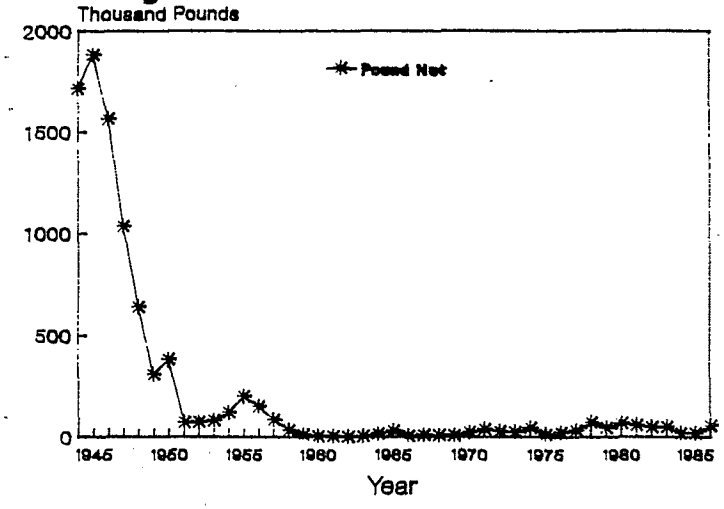

Figure 4a

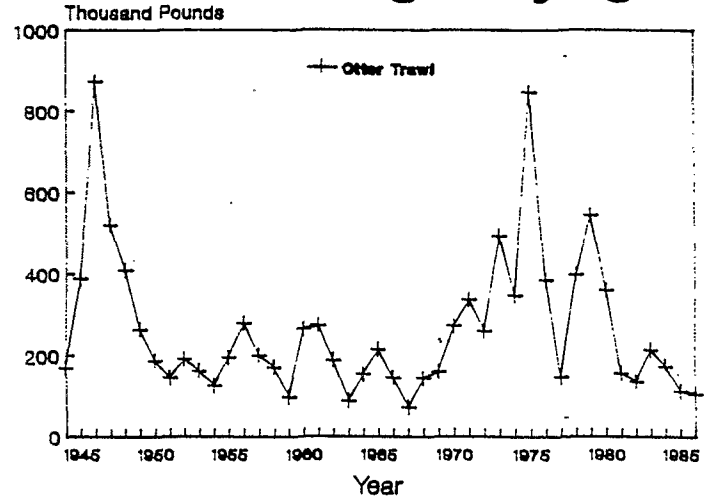

Figure 4b

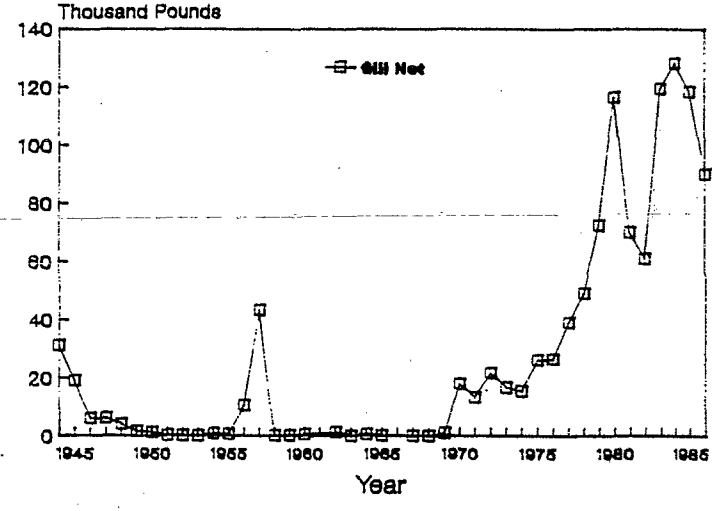

Figure 4c

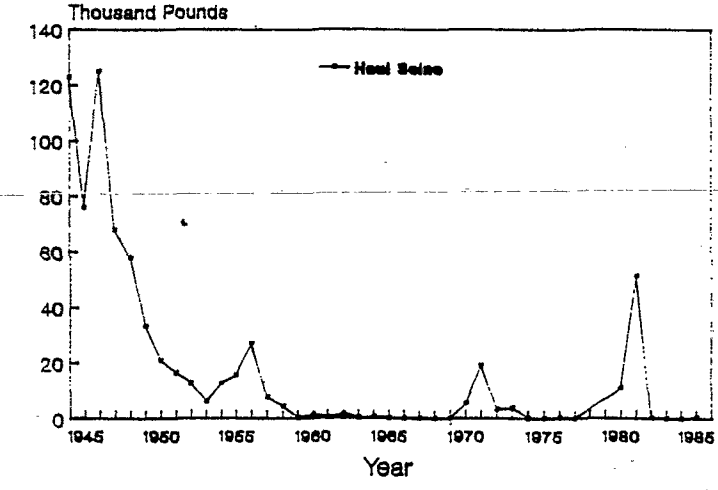

Figure 4d

Virginia commercial weakfish landings by gear

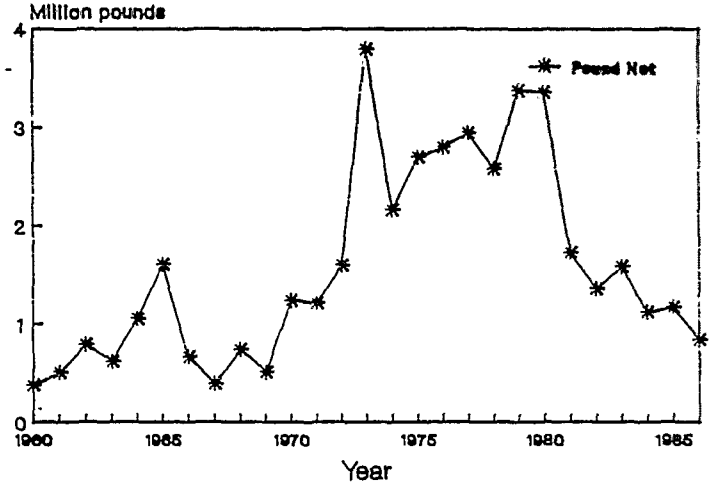

Figure 5a

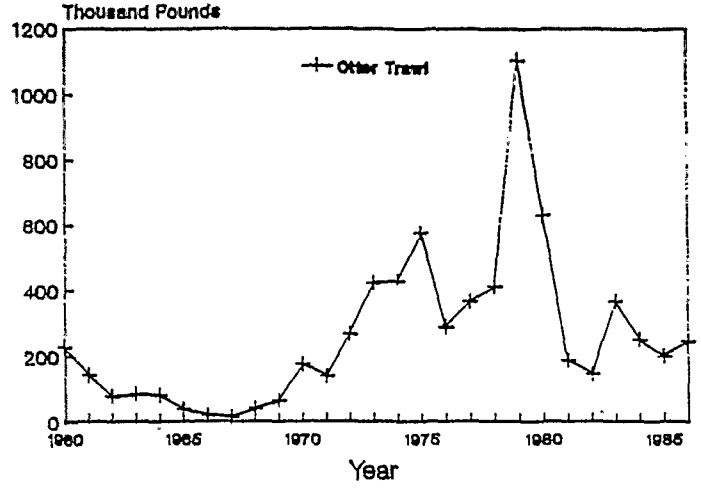

Figure 5b

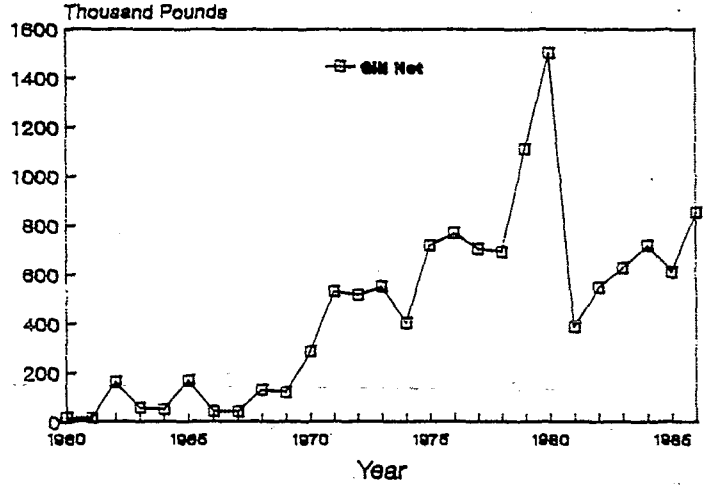

Figure 5c

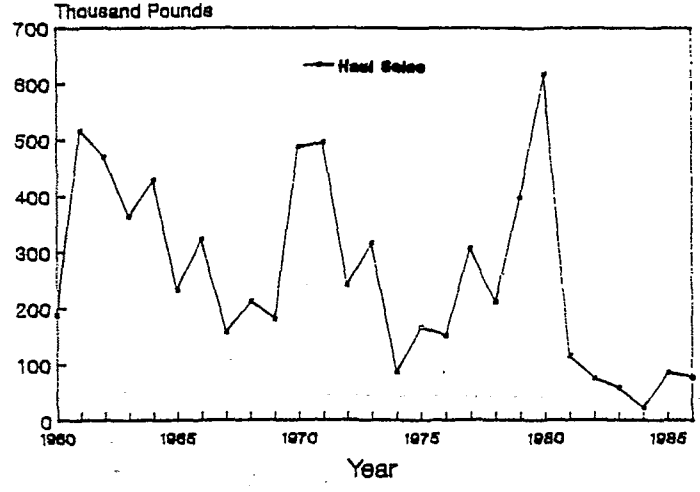

Figure 5d

Recreational fishery statistics for weakfish are incomplete. Based on a limited number of salt-water angling surveys, weakfish catches along the Atlantic coast were low in the 1960's and increased in 1970 (Mercer 1983). Along the coast, the number of anglers in the recreational fishery doubled between 1960 and 1970 with the recreational catch probably exceeding the commercial landings in 1970, 1975 and 1979. The recreational catch of weakfish in Maryland tidal waters (Chesapeake Bay and ocean side bays) declined from 1,780,761 pounds (545,470 fish) in 1979 to 331,492 pounds (126,780 fish) in 1980 (Williams et al. 1982). The average weight of weakfish also decreased. Catch rates from a recreational fishing survey of Virginia's Eastern Shore from 1955 to 1962 indicated peak abundance during 1955 (Richards 1965). Catch rates declined to a low in 1958 and increased through 1962. Catch rates of weakfish in the Chesapeake Bay have shifted from a single peak in the fall to bimodal peaks in the spring and fall.

Presently, Maryland and the Potomac River have a ten inch size limit on weakfish and Virginia has a nine inch size limit. There are no daily quotas or seasons for any Chesapeake Bay areas. Trawling is prohibited within the Bay and in Virginia's Territorial Sea. There are various limits on mesh sizes and gears.

The Fisheries - Spotted Seatrout

Spotted seatrout are not an important commercial fishery in the Maryland portion of the Chesapeake Bay. Landings have never exceeded 30,000 pounds and have been less than 1000 pounds a year since the 1940's (Figure 6a). In Virginia, commercial landings reached an historical high of 760,000 pounds in 1944 and have since generally declined (Figure 6b). In recent years, Virginia landings, which were in the range of 2000 to 6000 pounds from 1977-1984, increased to an average of approximately 14,000 pounds for 1985-88.

Recreational surveys suggest that the sport catch exceeds the commercial harvest. In the Chesapeake Bay, the largest spotted seatrout catches occur from May through November in the lower Bay, Rappahannock and York Rivers. Virginia landings were estimated at 86,000 pounds in 1986.

Economic Perspective - Weakfish

Food landings of weakfish from along the Atlantic coast were valued at $8.8 million in 1981. Price movements for weakfish appear to react inversely to landings (Cato 1981). The real price of weakfish, in present value terms - adjusted for inflation, has gradually increased since 1967. Real price increases have most likely resulted from increased demand (Cato 1981). There is very little information on the economic value of the recreational weakfish fishery.

Spotted Seatrout
Commercial Landings

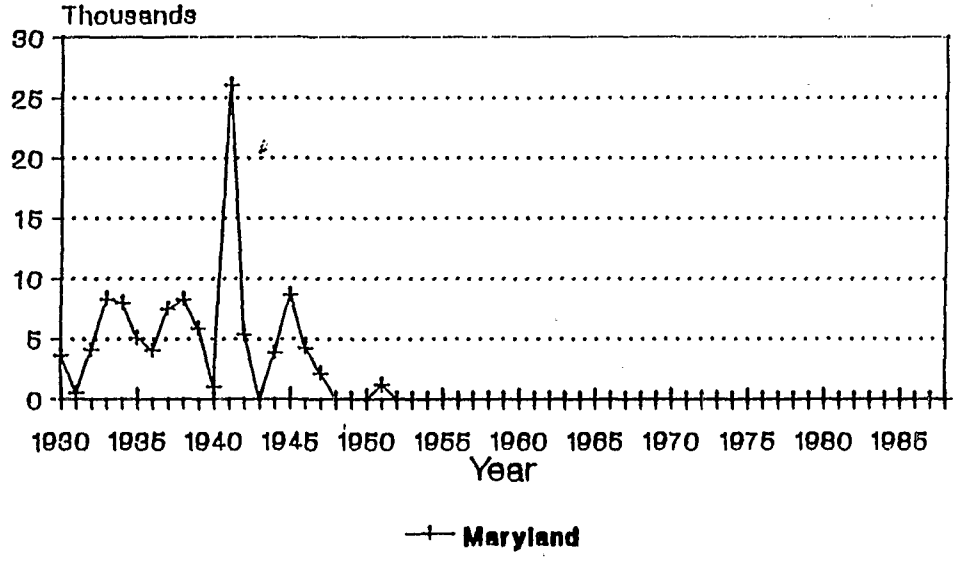

Figure 6a

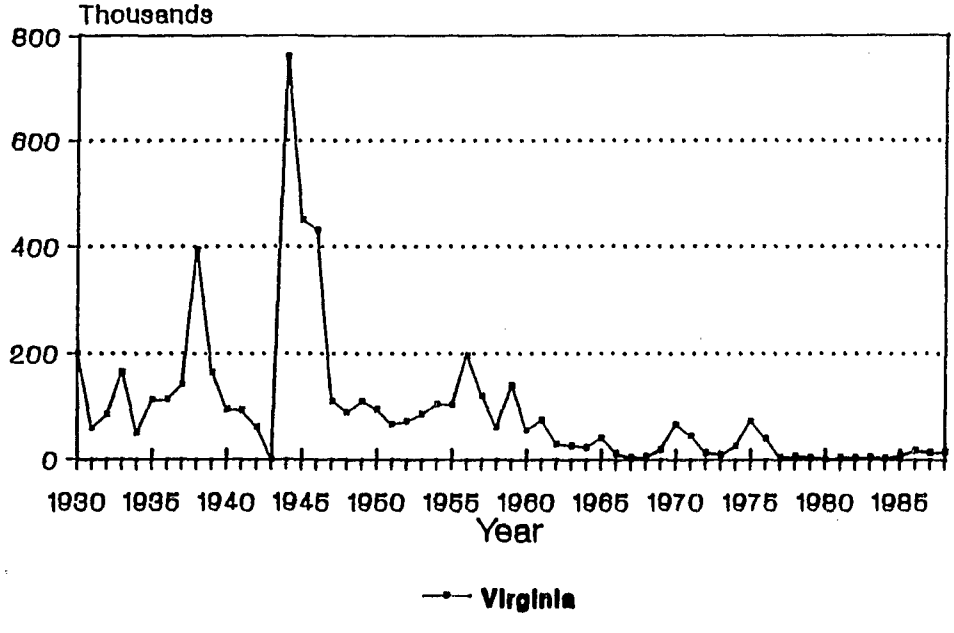

Figure 6b

Dockside values of the commercial weakfish fishery in the Chesapeake Bay are available, but do not provide the total value of the commercial fishery. In 1982, the ex-vessel value for a reported 1,860,000 pounds of weakfish from the Chesapeake Bay was $1,001,000. This breaks down to a cost of $0.54 per pound.

Virginia has historically been an important source of weakfish for the U. S. market. In 1941, Virginia supplied 85 percent of the total U. S. weakfish landings. Virginia supplied 50 percent or greater of the total U. S. weakfish landings all but one year between 1940 and 1951. Since then, however, the percentage supplied by Virginia has decreased steadily. Only 9 percent of the U. S. weakfish market was supplied by Virginia in 1987.

Economic Perspective - Spotted Seatrout

Spotted seatrout contributed more to the total value of U. S. sciaenid landings between 1960 and 1974 than any other species (Cato 1981). In 1982 the total value of spotted seatrout landings was $3 million. Values of Atlantic coast landings have fluctuated, but increased from 1979 to 1982. In comparison, the total value of Gulf of Mexico landings have generally increased from 1950 to 1982. The real (deflated) price of spotted seatrout declined from 1967 to 1977 along the Atlantic coast. Gulf of Mexico prices have increased since 1974.

Virginia spotted seatrout commercial landings from 1985 to 1988 total 55,465 pounds for a total dockside value of $56,295. This breaks down to $1.02 per pound. Recreational surveys indicate that the sport fishery catch of spotted seatrout probably exceeds the commercial harvest. There is very little information on the economic value of the recreational spotted seatrout fishery.

Resource Status - Weakfish

In 1980, reported commercial weakfish landings along the Atlantic coast were the third highest on record. Landings have since declined and available indices of recruitment suggest they will continue to drop. Based on the yield-per-recruit and eggs-per-recruit analyses, it appears that weakfish from Maryland to North Carolina have been experiencing growth overfishing and recruitment overfishing (Boreman and Seagraves 1984). Populations to the north of Maryland are near or at maximum fishing levels.

Very little is known about weakfish in the Maryland portion of the Bay. Catch-per-unit-of-effort (CPUE) for weakfish in pound nets has shown a general improvement since 1970 (Bonzek and Jones 1984). However, a trawl survey conducted from 1980-1982 indicated a decline in juvenile weakfish abundance (Dintaman 1981, 1982, 1983). Basic biological and fisheries information about size, age, growth, and sex composition is incomplete.

Resource Status - Spotted Seatrout

Present condition of the Atlantic Coast population is largely unknown, but it does not appear to be overfished. Catches have fluctuated since 1950 with Florida and North Carolina accounting for the majority of Atlantic Coast landings. Declines have been attributed to winter cold kills, environmental degradation and fishing pressure.

Laws and Regulations - Weakfish

Limited entry:	Maryland's Delay of Application Process, which went into effect September 1, 1988, requires previously unlicensed applicants to wait two years after registering with MDNR before a license to harvest finfish with commercial fishing gear will be issued. Virginia - Proposed legislation authorizing the VMRC to limit or delay entry to fisheries (House Bill 286) was introduced to the 1990 Virginia General Assembly. The Bill was tabled and assigned to a legislative subcommittee for further study. Potomac River - current moratorium on any new commercial hook and line or gill net licenses, only Maryland and Virginia residents allowed to fish commercially.
Minimum size limit:	Maryland and Potomac River - 10 inches TL; Virginia - 9 inches TL.
Creel limit:	Not in effect for Maryland, Virginia or Potomac River.
Harvest quotas:	Not in effect.
By-catch restrictions:	Not in effect for Maryland. Virginia, 10 percent; (aggregates > 100 lbs, by weight; aggregates < 100 lbs, by number). Potomac River - no allowance for any undersize weakfish in either recreational or commercial fisheries.

Season:	No closed season for Maryland, Virginia or Potomac River.
Gear - Area restrictions:	Maryland - purse seines, otter trawls, beam trawls, trammel nets, troll nets, drag nets and monofilament gill nets prohibited (otter and beam trawls are legal on the Atlantic Coast at distances of one mile or more offshore). Prohibition on gill netting in most areas of the Chesapeake Bay and its tributaries, <u>except</u>: (1) attended drift gill nets 2.5 to 3.5 inches stretch mesh may be fished outside the striped bass spawning reaches and; (2) anchor, stake and drift gill net 4.0 to 6.0 inches stretch mesh can be fished in the Chesapeake Bay, excluding the tributaries south of Kent Point from June 1 to September 30, inclusive. Minimum stretch mesh size restrictions for pound net - 1.5 inches, fyke and hoop net - 1.5 inches, haul seine - 2.5 inches. Virginia - Trawling prohibited. It is unlawful to set, place or fish a fixed fishing device of any type within three hundred yards in either direction from the Chesapeake Bay Bridge Tunnel. From April 1 through 31 May the spawning areas of the James, Pamunkey, Mattaponi, and Rappahannock Rivers are closed to stake and anchor gill nets. Striped bass taken in spawning areas by any gear must be released immediately. Minimum stretch mesh size restrictions: pound net - 2 inches; gill net - 2 7/8 inches (increased to 3 inches in 1992); haul seine - 3 inches (nets over 200 yards long). Additionally, no haul seine can be longer than 1000 yards in length or deeper than 40 meshes. Any gill net, whether floating or submerged, that is not assigned a fixed location shall be set in a straight line, have no greater depth than 330 inches, shall not exceed 1200 feet in

length and shall be fished no closer than 200 feet to any other such gill net. Gill nets are prohibited in the Lower Hampton Roads area from the Friday preceding Memorial Day to Labor Day, both days inclusive, from 7:00 A.M. to 5:00 P.M.; gill nets are prohibited in four Eastern Shore Bayside creek mouths (the Gulf, Hungars Creek, Nassawadox Creek and Occohannock Creek) from June 1 to October 1. Also, Sections 28.1-52 and 28.1-53 of the Code of Virginia outline placement, total length and distance requirements for fishing structures.

Potomac River - Current moratorium on any new gill net or hook and line licenses. The use of a spear, gig, purse net, beam trawl, otter trawl or trammel net are prohibited. Mesh size restrictions on pound net - 1.5 inches, haul seine - 1.5 inches, fyke net - 1.5 inches, fish pot - 2.0 inches, gill net - 3.75 inches with a maximum of 7.0 inches. Length limitations on pound net (1200 feet), stake gill net (600 feet), anchor gill net (600 feet x 12 feet), fyke net (400 feet), haul seine (1200 feet or 2400 feet), fish pot (10 feet). Seasonal restrictions: Pound net - February 15 through December 15; Anchor or stake gill net - June 1 through November 30; Drift gill net - closed; Haul seine - January 1 through December 31, except Saturdays and Sundays from June 1 through August 31; and not between sunset on any Friday and sunset on the ensuing Sunday at all other times.

Laws and Regulations - Spotted Seatrout

Limited entry:	Maryland, Virginia and Potomac River - Same as weakfish.
Minimum size limit:	Maryland, Virginia and Potomac River - 12 inches TL.

Creel limit:	Not in effect for Maryland, Virginia or Potomac River.
Harvest quotas:	Not in effect for Maryland, Virginia or Potomac River.
By-catch restrictions:	Maryland and Virginia - none in effect. Potomac River - same as weakfish.
Season:	No closed season.
Gear- Area restrictions:	Maryland, Virginia and Potomac River- Same as weakfish.

Data and Analytical Needs - Weakfish

1. Determination of the Atlantic coast stock structure and the extent of stock mixing.

2. Collect accurate catch and effort statistics from both commercial and recreational fisheries.

3. Collect basic biological data including size and age composition, growth rates, mortality rates, and estimates of abundance.

4. Develop a recruitment index and examine the relationships between parental stock size and environmental factors on yearclass strength.

5. Coordinate coastwide data on juvenile abundance.

6. Investigate the reproductive biology of weakfish which includes size at sexual maturity, fecundity and spawning periodicity.

7. Assess the socioeconomics of the weakfish fishery.

Data and Analytical Needs - Spotted Seatrout

1. Determination of the stock structure of the Atlantic Coast spotted seatrout population.

2. Develop annual age and sex specific estimates of relative abundance.

3. Improve estimates of the commercial, recreational and charter boat harvest.

4. Develop age specific estimates of growth, natural mortality and fishing mortality in the Chesapeake Bay.

5. Collect information relating to the stock-recruitment relationship of spotted seatrout.

6. Determination of contaminants which affect reproductive success and the extent to which they do so.

7. Develop a reliable index of recruitment.

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Section 2. WEAKFISH AND SPOTTED SEATROUT MANAGEMENT

The source documents for this plan, Atlantic States Marine Fisheries Commission (1984, 1985, 1988), Mercer (1983, 1984), Jones et al. (1988) and Wilk (1979) contain current knowledge and discuss the status and research needs for weakfish and spotted seatrout stocks in the Chesapeake Bay and coastal waters. Problems and management strategies have been defined and grouped into specific categories and serve as the basis for identifying the goal and objectives. The management strategies and actions will be implemented by the jurisdictions to protect and enhance the stocks of weakfish and spotted seatrout utilizing the Chesapeake Bay. Existing regulations regarding the harvest of these species will continue to be enforced except where otherwise indicated by the plan.

A. GOAL AND OBJECTIVES

The goal of this plan is to:

> Enhance and perpetuate weakfish and spotted seatrout stocks in the Chesapeake Bay and its tributaries, and throughout their Atlantic coast range, so as to generate optimum long-term ecological, social and economic benefits from their commercial and recreational harvest and utilization over time.

In order to meet this goal, the following objectives must be met:

1) Follow guidelines established by the Atlantic States Marine Fisheries Commission for coastwide management of weakfish and spotted seatrout stocks and make Bay regulatory actions compatible where possible.

2) Promote protection of the resource by maintaining a clear distinction between conservation goals and allocation issues.

3) Maintain weakfish and spotted seatrout spawning stocks at a size which minimizes the possibility of recruitment failure and determine the effects of environmental factors on year-class strength.

4) Promote the cooperative interstate collection of economic, social and biological data required to effectively monitor and assess management efforts relative to the overall goal.

5) Improve collection of catch and standardized effort statistics in the weakfish and spotted seatrout fisheries.

6) Promote fair allocation of allowable harvest among various components of the fishery.

7) Continue to provide guidance for the development of water quality goals and habitat protection necessary to protect weakfish and spotted seatrout populations within the Bay and state coastal waters.

B. PROBLEM AREAS AND MANAGEMENT STRATEGIES

Problem 1 - Overfishing: Total coastwide landings of weakfish by weight have shown a decreasing trend since 1980, while the number of fish caught has increased. These trends are especially pronounced for the recreational fishery. The NMFS reports a recent decline in juvenile abundance and notes that the last strong year class was in 1978. Recent assessments of weakfish stocks indicate that weakfish from Maryland to North Carolina are experiencing growth and recruitment overfishing, while populations to the north of Maryland are near or at maximum fishing levels. Total coastwide landings of spotted seatrout have varied considerably since 1977. Although landings are generally down from those prior to the mid-1970's, spotted seatrout do not appear to be overfished. Data to support a stock assessment are generally lacking and need to be collected.

Strategy 1 - Overfishing: Additional data needs to be collected, but in the interim, management agencies will take a conservative approach. Control of fishing effort on weakfish, utilizing combinations of options such as higher minimum size limits, reductions in bycatch, and hook-and-line creel limits, will help increase yield per recruit and the coastal spawning population. Current regulations for spotted seatrout will be maintained. Weakfish overfishing problems are regional; in fact, Bay fishing is a relatively small component of Mid-Atlantic commercial fisheries. For this reason, the Bay jurisdictions will pursue resolution of overfishing problems through regional management measures derived in the ASMFC and MAFMC processes.

PROBLEM 1.1
Recent stock assessments on weakfish indicate that current fishing mortality (F) is greater than F_{max} from Maryland south, signifying an overfishing problem (F_{max} is the point where yield will not increase with additional fishing effort, but may decrease as fish are caught at small and immature sizes). Current Chesapeake Bay size limits also allow for marketing of some sexually immature fish from Mid-Atlantic and northern areas.

STRATEGY 1.1
Information obtained from stock assessment work and catch/effort analyses are critical for the development of management measures to address suspected overfishing and to enhance Atlantic coast stocks. Bay jurisdictions will evaluate a number of alternatives to control directed fishing mortality and improve protection of weakfish beyond age I.

ACTION 1.1.1
Maryland, Virginia and the PRFC will continue the stock assessment work and analyses of catch/effort data described in Action 2.1 to improve management measures for controlling overharvest.

IMPLEMENTATION 1.1.1
Continue.

ACTION 1.1.2
1) Maryland and the PRFC will propose an increase in the minimum size limit for weakfish from 10 inches to 12 inches.
2) Virginia will continue to enforce its minimum size limit of 9 inches for weakfish.
3) Bay jurisdictions will pursue discussions on a consistent Baywide minimum size for weakfish.

IMPLEMENTATION 1.1.2
1) 1991; 2) Continue; 3) Continue.

ACTION 1.1.3
Maryland, the PRFC and Virginia will continue to enforce their 12 inch minimum size limit for spotted seatrout.

IMPLEMENTATION 1.1.3
Continue.

ACTION 1.1.4
Maryland will continue its Delay of Application program for commercial fishing licenses to control fishing effort. Virginia will continue to pursue a limited and delayed entry program.

IMPLEMENTATION 1.1.4
Continue.

ACTION 1.1.5
Maryland, the PRFC and Virginia will evaluate recreational and commercial creel limits for weakfish and spotted seatrout hook-and-line fisheries, and implement them as needed.

IMPLEMENTATION 1.1.5
1991-1992.

PROBLEM 1.2
The incidental bycatch of small weakfish in non-directed fisheries may impact recruitment to the weakfish spawning stock. Nondirected fisheries include the Chesapeake Bay's pound net fishery, Maryland's coastal gill net and trawl fisheries and North Carolina's trawl, pound net, long haul seine and beach seine fisheries for finfish and shrimp.

North Carolina's juvenile bycatch alone likely exceeds the Bay's entire commercial catch.

STRATEGY 1.2
Virginia and Maryland will investigate the incidental bycatch of small weakfish in non-directed fisheries and participate in coastal deliberations to protect small weakfish in other coastal states.

ACTION 1.2
1) Maryland will collect information from its pound net, ocean gill net and ocean trawl fisheries to develop management strategies for reducing the non-directed bycatch of small weakfish and other species. Options for consideration include minimum mesh sizes, season and area restrictions, culling practices and fishing efficiency devices.

2) Virginia will continue to monitor the species composition and biological characteristics of bait harvested in its pound net fishery. The VMRC will take action, as needed, to reduce the incidental bycatch of small weakfish in the bait fishery.

3) Maryland, the PRFC and Virginia will work through the Mid-Atlantic Fisheries Management Council and the Atlantic States Marine Fisheries Commission to encourage protection of immature weakfish caught in North Carolina fisheries.

IMPLEMENTATION 1.2
1) Begin in 1991; 2) Continue; 3) 1991.

Problem 2 - Stock Assessment and Research Needs: Currently, fisheries managers lack some of the biological and fisheries data necessary for effective management of the weakfish resource. Biological, social and economic data are lacking as well for spotted seatrout.

Strategy 2 - Stock Assessment and Research Needs: Atlantic coast databases are limited concerning harvest, fishing effort and biological characteristics of the harvest and fishery independent measures of weakfish and spotted seatrout stocks. Specific research to address these deficiencies will be identified.

PROBLEM 2.1
A) Atlantic coast weakfish and spotted seatrout stock structures and the extent of weakfish stock mixing are poorly understood.

B) Data for weakfish and spotted seatrout size and age composition, maturity schedules, growth rates, mortality

rates and estimates of abundance are inconsistent.

C) Catch and effort statistics for weakfish and spotted seatrout commercial and recreational fisheries need to be improved for fisheries stock assessment.

D) Information relating to the stock-recruitment relationship for weakfish and spotted seatrout is lacking.

STRATEGY 2.1
Maryland, Virginia and the Potomac River Fisheries Commission will continue existing programs which collect weakfish and spotted seatrout data and promote cooperative interstate research efforts to improve weakfish and spotted seatrout databases.

ACTION 2.1
A) The jurisdictions will continue to support stock identification research, particularly mitochondrial DNA analysis being conducted at Virginia's Institute of Marine Science (VIMS), and analysis of weakfish and spotted seatrout scales and otoliths. Coordinated studies on the relative contribution of various estuaries, including the Chesapeake Bay, to the coastal weakfish stock will be initiated.

B) VMRC's Stock Assessment Program will continue to collect biological data (age, size, sex) from commercial catches of weakfish and spotted seatrout. A cooperative Virginia Institute of Marine Science - Old Dominion University Wallop-Breaux project on weakfish population dynamics, mortality estimates and yield models is proposed. Other finfish species to be examined include the spotted seatrout.

C) Maryland, Virginia and the PRFC will continue to collect fisheries landings data on weakfish and spotted seatrout as part of ongoing commercial fisheries statistics programs. Maryland will continue its commercial pound net sampling project to collect data on length, weight and sex for weakfish and other species. Virginia will continue to pursue its limited and delayed entry program and a mandatory reporting system for its licensed commercial seafood buyers. Maryland and Virginia will continue to supplement the Marine Recreational Fisheries Statistics Survey to obtain more detailed catch statistics at the state level. Maryland will implement a reporting system for charter boats that require daily logs.

D) Maryland and Virginia will continue the Baywide trawl survey of estuarine finfish species and

crabs to measure size, age, sex, distribution, abundance and CPUE. Maryland will continue studies utilizing bottom trawls and beach seines and will conduct a pilot stock assessment study on weakfish and other estuarine species.

IMPLEMENTATION 2.1
Variable, depending on project.

Problem 3 - Habitat Loss and Degradation: Estuarine areas are utilized by weakfish and spotted seatrout stocks for spawning, nursery and feeding grounds. Increasing urbanization and industrial development of the Atlantic coastal plain has resulted in a decrease in the environmental quality of many estuarine communities. Estuarine habitat loss and degradation in Chesapeake Bay may contribute to declines in weakfish and spotted seatrout stocks.

Strategy 3 - Habitat Issues: The jurisdictions will continue their efforts to improve water quality and define habitat requirements for the living resources in the Chesapeake Bay.

PROBLEM 3.1
Water quality impacts the distribution and abundance of finfish species in the Chesapeake Bay.

STRATEGY 3.1
The District of Columbia, Environmental Protection Agency, Maryland, Pennsylvania, the Potomac River Fisheries Commission, and Virginia will continue to promote the commitments of the 1987 Chesapeake Bay Agreement. The achievement of the Bay commitments will lead to improved water quality and enhanced biological production.

ACTION 3.1
The District of Columbia, Environmental Protection Agency, Maryland, Pennsylvania, the Potomac River Fisheries Commission, and Virginia will continue to set specific objectives for water quality goals and review management programs established under the 1987 Chesapeake Bay Agreement. The Agreement and documents developed pursuant to the Agreement call for:

1) Developing habitat requirements and water quality goals for various finfish species.
2) Developing and adopting basinwide nutrient reduction strategies.
3) Developing and adopting basinwide plans for the reduction and control of toxic substances.
4) Developing and adopting basinwide management measures for conventional pollutants entering the Bay from point and nonpoint sources.

5) Quantifying the impacts and identifying the sources of atmospheric inputs on the Bay system.
6) Developing management strategies to protect and restore wetlands and submerged aquatic vegetation.
7) Managing population growth to minimize adverse impacts to the Bay environment.

IMPLEMENTATION 3.1
Continuing.

Problem 4 - Recreational-Commercial Conflicts: The number of recreational anglers along the Atlantic coast doubled from 1960 to 1970 and continues to increase at a rapid rate. Effort is reported to be increasing in the weakfish and spotted seatrout recreational fisheries. The number of recreational boaters has also been increasing rapidly in the Chesapeake Bay, resulting in many areas being congested at certain times of the year. As commercial watermen are increasingly constrained by limited fishery resources, many are increasing their effort. There is also competition between full-time and part-time fishermen. Competing recreational and commercial interests have led to more frequent and intensive conflicts.

Strategy 4 - Recreational-Commercial Conflicts: Maryland and Virginia will examine recreational-commercial conflicts arising in Chesapeake Bay finfish fisheries and adopt management measures as necessary to resolve the issues.

PROBLEM 4.1
The concentration of gill nets in certain Chesapeake Bay waters has led to conflicts over placement of nets, marking, number and length, mesh sizes allowed and other issues. In Virginia, recreational gill netters are viewed as a problem by commercial gill netters and recreational hook and liners. Commercial gill netters also have conflicts among themselves and with recreational hook and liners and boaters.

STRATEGY 4.1
Conflicts arising from the use of gill nets in Chesapeake Bay waters will be closely monitored by jurisdictional managers. Appropriate management measures will be developed as necessary.

ACTION 4.1
Virginia, the PRFC and Maryland will continue to address fishing conflicts and issues with existing advisory groups. These include VMRC's Finfish Subcommittee, comprised of commercial and recreational fishing representatives; MDNR's Tidal Fisheries Advisory Commission and Sports Fishing Advisory Commission; and PRFC's members from Virginia and Maryland.

IMPLEMENTATION 4.1
Continue.

ACTION 4.2
1) In April 1990, the VMRC adopted a uniform marking system and a minimum mesh size of 2 7/8 inches for all gill nets fished in Virginia's tidal waters. The minimum mesh size will increase to 3 inches in January 1992. Gill nets will be prohibited from the Hampton Roads area (7:00 A.M. - 5:00 P.M.) and four Eastern Shore Bayside creek mouths during summer months to avoid conflict with recreational user groups.
2) In September 1990, Maryland adopted a marking system, based on Virginia's scheme, for drift gill nets used in the striped bass fishery. This marking system will be proposed for gill nets used in other fisheries as well.

IMPLEMENTATION 4.2
Ongoing.

APPENDIX

CHESAPEAKE BAY WEAKFISH AND SPOTTED SEATROUT
MANAGEMENT PLAN IMPLEMENTATION

PROBLEM AREA	ACTION	DATE	RESPONSIBLE AGENCY & METHOD	ADD. STAFF or $$	COMMENTS/NOTES
1. Overfishing	1.1.1 VA, MD and the PRFC will continue the work described in Action 2.1	Continue	VMRC - A MDNR - A PRFC - A		Up-to-date analyses are needed to develop effective management measures.
	1.1.2 A) MD and the PRFC will propose a 12 inch minimum size limit for weakfish	1991	MDNR - R,L PRFC - R		Adoption of this plan will give MDNR regulatory authority for these fisheries.
	B) VA will maintain its 9 inch minimum size limit for weakfish	Continue	VMRC - A		
	C)Bay jurisdictions will discuss a Baywide minimum size for weakfish		MDNR - A VMRC - A PRFC - A		Discussions should extend coastwide.
	1.1.3 Bay jurisdictions will maintain their 12 inch minimum size limit for spotted seatrout	Continue	MDNR - A VMRC - A PRFC - A		
	1.1.4 MD will continue its Delay of Application Process; VA will pursue its delayed entry program.	Variable by item	MDNR - A VMRC - L		VA may have proposals in 1991.
	1.1.5 MD, VA and the PRFC will evaluate recreational and commercial creel limits for weakfish hook-and-line fisheries, and implement as needed.	1991-92	MDNR - A,R,L VMRC - A,R PRFC - A,R		Should include examination of of MRFSS data.

PROBLEM AREA	ACTION	DATE	RESPONSIBLE AGENCY & METHOD	ADD. STAFF or $$	COMMENTS/NOTES
	1.2 A) MD will monitor by-catch of small weakfish in non-directed fisheries;	1991	MDNR - A		
	B) VA will monitor by-catch of small weakfish in non-directed fisheries;	Continue	VMRC - A		
	C) MD, VA and PRFC will work with MAFMC and ASMFC to encourage protection of small weakfish in North Carolina fisheries.	1991	MDNR - A VMRC - A PRFC - A		NC has no minimum size limits and has a large discard from its shrimp fishery.
2. Stock Assessment & Research Needs	2.1 A) Conduct stock identification work	Continue	VMRC - A MDNR - A		Additional information on stock structure and mixing is needed.
	B) Continue collection of biological data from commercial weakfish and spotted seatrout catches;	Continue	VMRC - A		VIMS-ODU Wallop-Breaux project on weakfish pop dynamics, mortality estimates, yield models
	C) Continue on-going commercial fisheries statistics programs; VA will pursue its mandatory reporting system; VA and MD will continue to supplement the Marine Recreational Fisheries Statistics Survey	Variable by item	VMRC - A MDNR - A PRFC - A		
	D) Continue the Baywide Trawl Survey to measure size, age, sex, distribution abundance and CPUE.	Continue	VMRC - A MDNR - A		

PROBLEM AREA	ACTION	DATE	RESPONSIBLE AGENCY & METHOD	ADD. STAFF or $$	COMMENTS/NOTES
3. Habitat Loss and Degradation	3.1 Promote the objectives of the Chesapeake Bay Agreement to improve water quality	Variable	VMRC - A MDNR - A PRFC - A DCFM - A PFC - A		Additional coordination among agencies and jurisdictions needed.
4. Recreational-Commercial Conflicts	4.1 VA, PRFC and MD will continue addressing conflicts under advisement by VA's FMAC and MD's TFAC and SFAC	Continue	VMRC - A MDNR - A PRFC - A		
	4.2 A) VA will continue requirements for marking gill nets and maintain area and mesh size size restrictions;	Continue	VMRC - A		
	B) MD will continue requirements for marking gill nets	Continue	MDNR - A		

Legend:
VMRC = Virginia Marine Resources Commission
MDNR = Maryland Department of Natural Resources
PRFC = Potomac River Fisheries Commission
DCFM = District of Columbia, Fisheries Management
FMAC = Fisheries Management Advisory Committee
TFAC = Tidal Fisheries Advisory Commission
PFC = Pennsylvania Fish Commission
SFAC = Sports Fisheries Advisory Commission

A = Administrative action
R = Regulation
L = Legislation
K = $1,000