

2000 REVIEW OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
FISHERY MANAGEMENT PLAN FOR
AMERICAN EEL
(Anguilla rostrata)

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And

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AMERICAN EEL
(*Anguilla rostrata*)**

I. Status of the Fishery Management Plan

<u>Year of plan's adoption:</u>	1999
<u>Management unit:</u>	Migratory stocks of American Eel from Maine through Florida
<u>States with a declared interest:</u>	Maine through Florida, including District of Columbia, Potomac River Fisheries Commission
<u>Active committees:</u>	American Eel Management Board, Plan Review Team, Technical Committee, Stock Assessment Subcommittee, Advisory Panel.

II. Status of the Stock

Current stock status for American eel is poorly understood due to limited and non-uniform stock assessment efforts and protocols across the range of this species. Reliable indices of abundance of this species are scarce. Limited data from indirect measurements (harvest by various gear types and locations) and localized direct stock assessment information are currently collected.

Although eel have been continuously harvested, consistent data on harvest are often not available. Harvest data is often a poor indicator of abundance, because harvest is dependent on demand and may consist of annually changing mixes of year classes. Most of the data collections were of short duration and were not standardized between management agencies. Harvest data from the Atlantic coastal state (Maine to Florida), indicate that the harvest has declined after a peak in the mid-1970s. Annual eel catch ranged from 913,251 lbs. to 3,608,357 lbs. between 1970 and 1999. The lowest harvest (between 1970 and 1999) was 913,251 lbs., which occurred in 1997. Because fishing effort data is unavailable, however, finding a correlation between population numbers and landings data is problematic.

As stated in Section 2 of the FMP, the purpose of this management effort is to reverse any local or regional declines in abundance and institute consistent fishery-independent and dependent monitoring programs throughout the management unit.

III. Status of the Fishery

American eel currently support important commercial fisheries throughout their range. Fisheries are executed in rivers, estuaries, and ocean. Commercial fisheries for glass eel/elvers exist in Maine, Connecticut, South Carolina, and Florida, whereas yellow/silver eel fisheries exist in all states/jurisdictions with the exception of Pennsylvania and the District of Columbia.

As in previous years, the Maine Department of Marine Resources continued to monitor the elver fishery to determine if Atlantic salmon bycatch was occurring in this fishery. The length of the

2000-fishing season remained the same as in 1999 (March 22- May 31) which represented a three-week reduction in fishing opportunity over the 1998 and previous fishing years. Poor markets in 1999 continued to plague the fishery in 2000, resulting in reduced fishing effort statewide. Elver prices paid to harvesters opened at \$15.00 per pound and dropped to \$10.00 per pound as the season progressed. Maine DMR Marine Patrol Officers and biological staff checked the downeast salmon rivers for the presence of elver nets during the open season. Due to poor market conditions, which deteriorated as the season progressed, many fishermen pulled their nets or stopped fishing before the season ended on May 31.

Coastwide commercial landings for American eel have declined dramatically from historic highs. Commercial landings decreased from the high of 1.8 million pounds in 1985 to a low of 913 thousand pounds in 1997. A slight increase in commercial landings occurred in 1998 (1,034,288 pounds). In 1999, commercial landings equaled 1,036,946 pounds. Landings from Maryland, Virginia and Delaware combined accounted for 58% of commercial landings in 1999, with 46% coming from Maryland and Virginia .

Recreational:

Few recreational anglers directly target eel. Hook and line fishermen, for the most part, catch eel, incidentally when fishing for other species. The NMFS Marine Recreational Fisheries Statistics Survey (MRFSS), which has surveyed recreational catch in ocean and coastal county waters since 1981, shows a declining trend in the catch of eel during the latter part of the 1990's. According to MRFSS¹, 1999 recreational harvest was 5,686 fish, which represents a decline in number of fish from 1998 (6,257 fish). Recreational landings weakened by 9 % between the years 1998 and 1999. About one half of the eel caught were released alive by the anglers. Eel are often purchased by recreational fishermen for use as bait for larger gamefish such as striped bass, and some recreational fishermen may catch eels and then utilize them as bait.

IV. Status of Research and Monitoring

The FMP requires States/jurisdictions with a declared interest to conduct an annual young-of-the-year survey for the purpose of monitoring annual recruitment of each year's cohort. The FMP does not require any research initiatives in participating states/jurisdictions. Nonetheless, several research needs have been identified for American eel to further understand the species' life history, behavior and biology. Research needs for American eel include:

1. A coast wide sampling program for American eel should be formulated using standardized and statistically robust methodologies.
2. A stock assessment committee should identify the best stock assessment methods for American eel.
3. Workshop on aging and sexing techniques should be considered to increase the accuracy of

¹ MRFSS Data for American Eel is uncertain. The proportional standard errors (PSEs) for Delaware, Maryland, Rhode Island, South Carolina and Virginia during 1999 were 56.9, 99.8, 96, 59.7, and 100 respectively. No data was recorded for the other states along the eastern seaboard. The PSEs for Massachusetts, Rhode Island, and South Carolina during 1998 were 100, 93.6, and 99.9 respectively.

data collected in coastwide sampling program.

4. Documentation of the commercial eel fishery should be more accurate so that our understanding of participation in the fishery and the amount of directed effort could be known.
5. Determine mortality rates at different life history stages (leptocephalus, glass eel, yellow eel, silver eel), and mortality rates with size of the yellow eel stage. Determine sustainable fishing mortality rates (F) for eel.
6. Regular periodic stock assessments and determination of fishing mortality rates (F) are required to develop a sustainable harvest rate in addition to determining whether the population is stable, decreasing, or increasing.
7. Investigate: fecundity, length and weight relationships for females throughout their range; growth rates for males and females throughout their range; predator-prey relationships; behavior and movement of eel during their freshwater residency; oceanic-behavior, movement and spawning location of adult mature eel; and all information on the leptocephalus stage of eel.
8. Investigate larval and juvenile survival and mortality to assist in the assessment of annual recruitment. Such research could be aided by continuing and initiating new tagging programs within individual states.
9. Evaluate the impact, both upstream and down stream, of barriers on eel with respect to population and distribution affects.
10. Investigate low cost alternatives to traditional fishway designs for passage of eel upstream and downstream of barriers.
11. Economics studies are necessary to determine the value of the fishery and the impact of regulatory management.
12. Age at entry of glass eel into estuaries and fresh waters should be examined.
13. Examination of the mechanisms for exit from Sargasso Sea and transport across the continental shelf.
14. Contaminant effects on eel and the effects of bioaccumulation with respect to impacts by age on survival and growth and effect on maturation and reproductive success should be researched.
15. Migratory routes and guidance mechanisms for silver eel in the ocean should be examined.
16. Mechanisms of recognition of the spawning area by silver eel, mate location in the Sargasso Sea, spawning behavior, and gonadal development in maturation should be researched.
17. Examine the mode of nutrition for leptocephalus in the ocean.
18. Provide analysis of food habits of glass eel while at sea.
19. Location and triggering mechanism for metamorphosis from leptocephalus to eel should be examined.
20. Investigate spawning behavior

V. Status of Management Measures and Issues

The FMP requires that all states/jurisdictions conduct an annual young-of-the-year (YOY) abundance survey by 2001 in order to monitor annual recruitment of each year's cohort. In addition, the FMP requires all states/jurisdictions to establish a minimum recreational size limit of six inches and a recreational possession limit of no more than 50 eels per person, including crew members involved in party/charter (for-hire) employment, for bait purposes during fishing. Recreational fishermen are not allowed to sell eel without a State license permitting such activity. Commercial fisheries management measures stipulate that states/jurisdictions shall maintain existing or more conservative American eel commercial fishery regulations, including gear specification contained in Table 2, for all life stages.

In addition to these mandatory regulations, federal agencies are working to implement the recommendations to the Secretaries as listed in the FMP.

VI. Current State-by-State Implementation of FMP Compliance Requirements (as of September 1, 2000)

The States of New Hampshire, Pennsylvania, South Carolina, Georgia, and Florida have requested *de minimis* status and continue to meet such criteria. Their landings for 1998 and 1999 are well below the standard for *de minimis* of 1% of coastwide commercial and recreational directed landings for 1998 and 1999. In addition, the states of Massachusetts, Rhode Island, Connecticut, and New York also meet *de minimis* criteria as defined in the FMP, although these states have not formally requested such status.

The PRT reviews state compliance on an annual basis. See TABLE 1 for current status of state compliance. The annual YOY abundance survey as well as all commercial and recreational management measures for American eel are considered compliance elements in the FMP.

TABLE 1. State Compliance Matrix

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	IP	Y	Y	Y	Y	Y

NOTE: Y = State/jurisdiction is in compliance
 N = State/jurisdiction is not in compliance
 IP = Report in press

VII. Recommendations/findings of FMP Review Team

1. All States/jurisdictions should implement the requirements and recommendations of the FMP for American eel.
2. Board consider recommendations of the ICES Working Group on Eels
3. Deminimis criteria should be reevaluated in light of data availability
4. CPUE may be difficult to estimate given fishery practices such as stock piling of harvest and holding activities