

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

**2007**

Prepared by:

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**I. Status of the Fishery Management Plan**

<u>Date of FMP approval:</u>	November 1999
<u>Addenda:</u>	Addendum I (February 2006)
<u>Management unit:</u>	Migratory stocks of American Eel from Maine through Florida
<u>States with a declared interest:</u>	Maine through Florida, including the District of Columbia and the Potomac River Fisheries Commission
<u>Active committees:</u>	American Eel Management Board, Plan Review Team, Technical Committee, Stock Assessment Subcommittee, and 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 the 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 are often a poor indicator of abundance because harvest is dependent upon demand and may consist of annually changing combinations 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 states (Maine to Florida) indicate that the harvest has declined after a peak in the mid-1970s. Annual eel catch ranged from 641,225 pounds to 3,951,936 pounds between 1970 and 2005. The lowest harvest in this time period was 641,225 pounds, which occurred in 2002. Because fishing effort data is unavailable for the entire time series, finding a correlation between population numbers and landings data is difficult.

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.

In 2003, declarations from the International Eel Symposium (AFS 2003, Quebec City, Quebec, Canada) and the Great Lakes Fisheries Commission (GLFC) highlighted concerns regarding the health of American eel stock. Available data point to decreasing recruitment, combined with localized declines in abundance. This information is cause for concern and represents an opportunity for cooperation with other entities such as the GLFC to preserve the American eel stock.

A stock assessment was presented to the Management Board during the February 2006 Meeting Week. The stock assessment failed some of the terms of reference according to the peer review advisory report. In May 2006, the Board tasked the American Eel Stock Assessment Subcommittee with following up on specific recommendations in the peer review report to improve the 2005 stock assessment. The Stock Assessment Subcommittee follow up to the peer review report was presented to the Board at the October 2006 Annual Meeting.

**III. Status of the Fishery**

American eel currently support important commercial fisheries throughout their range. Fisheries are executed in riverine, estuarine, and ocean waters. Commercial fisheries for glass eel/elver exist in Maine and South Carolina, whereas yellow/silver eel fisheries exist in all states and jurisdictions with the exception of Pennsylvania and the District of Columbia (though in New Hampshire, South Carolina and Georgia, no commercial yellow or silver eel landings were reported in 2006).

### ***Commercial***

Commercial landings decreased from the high of 1.8 million pounds in 1985 to a low of 641 thousand pounds in 2002. Landings of yellow/silver eels in 2006 totaled 738, 657 pounds.<sup>1</sup> New Jersey, Delaware, and Maryland each reported landings over 100,000 pounds of eel, and together accounted for 69% of the coastwide commercial total landings in 2006.

### ***Recreational***

Available information indicates that few recreational anglers directly target eel. For the most part, hook-and-line fishermen catch eel incidentally when fishing for other species. The National Marine Fisheries Service (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 1990s. According to MRFSS<sup>2</sup>, 2006 recreational total catch was 85,969 fish, which continues the decline seen in number of fish caught in 2005 (94,119 fish). New York, New Jersey, and South Carolina combined, represent 64% of the recreational American eel catch. About 77% of the eel caught were released alive by the anglers (MRFSS 2006 total recreational harvest was 19,690 fish). Eel are often purchased by recreational fishermen for use as bait for larger gamefish such as striped bass, and some recreational fishermen may catch their own eels to utilize as bait.

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<sup>1</sup> Harvest data for 2006 comes from the 2007 State Compliance Reports. All landings are preliminary and some are incomplete.

<sup>2</sup> MRFSS Data for American Eel are unreliable. 2006 Proportional Standard Error (PSE) values for recreational harvest ranged from 0 to 99.7.

**Table 1. State commercial regulations for the 2006 fishing year.\***

<b>State</b>	<b>Size Limit</b>	<b>License/Permit</b>	<b>Other</b>
ME		Harvester license. Dealer license and reporting.	Seasonal closures. Gear restrictions.
NH	6"	Commercial saltwater license and wholesaler license. Monthly reporting.	50/day for bait. Gear restrictions in freshwater.
MA	6"	Commercial permit with annual catch report requirement. Registration for dealers with purchase record requirement.	Nets, pots, spears, and angling only. Mesh restrictions. Each of 52 coastal towns has its own regulations.
RI	6"	Commercial fishing license.	
CT	6"	Commercial license. Dealer reporting.	Gear restrictions
NY	6"	Commercial harvester license and reporting. Dealer license.	Gear restrictions.
NJ	6"	License required.	Gear restrictions.
PA	NO COMMERCIAL FISHERY		
DE	6"	License required.	Commercial fishing in tidal waters only. Gear restrictions.
MD	6"	Licensed required with monthly reporting.	Prohibited in non-tidal waters. Gear restrictions.
DC	NO COMMERCIAL FISHERY		
PRFC	6"	Harvester license and reporting.	Gear restrictions.
VA	6"	License with two-year delayed entry system. Monthly reporting.	Mesh size restrictions on eel pots. Bait limit of 50 eels/day. Seasonal closures.
NC	6"	Standard Commercial Fishing License for all commercial fishing	Mesh size restrictions on eel pots. Bait limit of 50 eels/day. Seasonal closures.
SC		License for commercial fishing and sale. Permits by gear and area fished. Monthly reporting.	Gear restrictions.
GA	6"	Personal commercial fishing license and commercial fishing boat license. Harvester/dealer reporting.	Gear restrictions on traps and pots. Area restrictions.
FL		Permits and licenses.	Gear restrictions.

\* For specifics on licenses, gear restrictions, and area restrictions, please contact the individual state.

**Table 2. State recreational regulations for the 2006 fishing year.\*\***

<b>State</b>	<b>Size Limit</b>	<b>Possession Limit</b>	<b>Other</b>
ME	6"	50 eels/person/day	Gear restrictions. License requirement and seasonal closures (inland waters only).
NH	6"	50 eels/person/day	Coastal harvest permit needed if taking eels other than by angling. Gear restrictions in freshwater.
MA	6"	50 eels/person/day	Nets, pots, spears, and angling only; mesh restrictions. Each of 52 coastal towns has its own regulations.
RI	6"	50 eels/person/day	
CT	6"	50 eels/person/day	
NY	6"	50/eels/person/day	Additional length restrictions in specific inland waters.
NJ	6"	50 eels/person/day	
PA	6"	50 eels/person/day	Gear restrictions.
DE	6"	50 eels/person/day	Two pot limit/person.
MD	6"	No possession limit in tidal areas; 25/person/day limit in non-tidal areas	Gear restrictions.
DC	6"	10 eels/person/day	Five trap limit.
PRFC	6"	50 eels/person/day	
VA	6"	50 eels/person/day	Recreational license. Two pot limit. Mandatory annual catch report. Mesh size restrictions on eel pots.
NC	6"	50 eels/person/day	Gear restrictions. Non-commercial special device license. Two eel pots allowed under Recreational Commercial Gear license.
SC	None	None	Gear restrictions and gear license fees.
GA	None	None	
FL	None	None	Gear restrictions.

\*\* For specifics on licenses, gear restrictions, and area restrictions, please contact the individual state.

#### IV. Status of Research and Monitoring

The FMP requires states and jurisdictions with a declared interest in the species 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 other research initiatives in participating states and jurisdictions. Nonetheless, the American Eel Technical Committee has identified several research topics that could further understanding of the species' life history, behavior, and biology. Research needs for American eel include:

##### *High Priority*

- Develop the SLYME model for describing the life history table for American eel in U.S. Atlantic coastal waters.
- Accurately document the commercial eel fishery so that our understanding of participation in the fishery and the amount of directed effort could be known.
- Investigate, develop, and improve technologies for American eel passage upstream and downstream at various barriers for each life stage. In particular, investigate low-cost alternatives to traditional fishway designs for passage of eel.
- A coastwide sampling program for yellow and silver American eels should be formulated using standardized and statistically robust methodologies.
- Regular periodic stock assessments and establishment of sustainable reference points for eel are required to develop a sustainable harvest rate in addition to determining whether the population is stable, decreasing, or increasing.
- Research the effects of swim bladder parasite *Anguillacolla crassus* on the American eel's growth and maturation, migration to the Sargasso Sea, and the spawning potential.
- Evaluate the impact, both upstream and downstream, of barriers to eel movement with respect to population and distribution effects. Determine relative contribution of historic loss of habitat to potential eel population and reproductive capacity.

##### *Medium Priority*

- Investigate survival and mortality rates of different life stages (leptocephalus, glass eel, yellow eel, and silver eel) to assist in the assessment of annual recruitment. Continuing and initiating new tagging programs with individual states could aid such research.
- Tagging Programs: A number of issues could be addressed with a properly designed tagging program. These include:
  - Local and regional movement and migration patterns
  - Natural, fishing, and/or discard mortality; survival
  - Growth
  - Validation of aging method(s)
  - Abundance
  - Reporting rates
  - Tag shedding or tag attrition rate

A tagging study to examine local and regional movement has been completed by a graduate student at Delaware State University and other studies on local movements and abundance are currently being conducted by other Delaware graduate students.

- Research contaminant effects on eel and the effects of bioaccumulation with respect to impacts on survival and growth (by age) and effect on maturation and reproductive success.
- 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.
- Assess characteristics and distribution of eel habitat and value of habitat with respect to growth and sex determination.
- Identify triggering mechanism for metamorphosis to mature adult, silver eel life stage, with specific emphasis on the size and age of the onset of maturity, by sex. A maturity schedule (proportion mature by size or age) would be extremely useful in combination with migration rates.

***Low Priority***

- Perform economics studies to determine the value of the fishery and the impact of regulatory management.
- Review the historic participation level of subsistence fishers in wildlife management planning and relevant issues brought forth with respect to those subsistence fishers involved with American eel.
- Examine the mechanisms for exit from the Sargasso Sea and transport across the continental shelf.
- Research mechanisms of recognition of the spawning area by silver eel, mate location in the Sargasso Sea, spawning behavior, and gonadal development in maturation.
- Examine age at entry of glass eel into estuaries and fresh waters.
- Examine migratory routes and guidance mechanisms for silver eel in the ocean.
- Investigate the degree of dependence on the American eel resource by subsistence harvesters (e.g., Native American Tribes, Asian and European ethnic groups).
- Examine the mode of nutrition for leptocephalus in the ocean.
- Provide analysis of food habits of glass eel while at sea.

**V. Status of Management Measures and Issues**

The FMP required that all states and jurisdictions implement 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 and 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 or 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 and jurisdictions shall maintain existing or more conservative American eel commercial fishery regulations, including gear specification contained in Table 2 of the FMP, 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.

In August 2005, the American Eel Management Board directed the American Eel Plan Development Team (PDT) to initiate an addendum to establish a mandatory catch and effort monitoring program for American eel. The Board approved Addendum I at the February 2006 Board meeting. At that same meeting, the Board tasked the American Eel Technical Committee (TC) with reviewing state proposals for implementation of Addendum I to the American Eel Fishery Management Plan. The TC provided their comments on the state's proposals to the Board in a memo on July 7, 2006.

In January 2007, the Management Board initiated the development of a draft Addendum with the goal of increasing the escapement of silver eels to the spawning grounds. The draft Addendum has been reviewed

by the Technical Committee and Advisory Panel, but additional work by the Stock Assessment Subcommittee needs to be completed before their final comments can be taken to the Board.

Delegates from the Atlantic States Marine Fishery Commission met with representatives from the Great Lakes Fishery Commission in April to begin discussions on working together to improve American eel management. The two groups agreed to jointly develop a Memorandum of Understanding that would outline a strategy to work together to more effectively manage this international resource. A draft of the MOU will be available in early 2008 for Management Board review.

## **VI. Current State-by-State Implementation of FMP Compliance Requirements (as of September 2006)**

The PRT reviewed the state compliance for 2006. The PRT finds that all states are currently implementing the required provisions of the American Eel Fishery Management Plan.

In 2007, the states of Massachusetts, Pennsylvania, South Carolina, Georgia, and Florida requested and met the qualification criteria for *de minimis* status. Qualification for *de minimis* in 2007 was determined from state reported landings found in compliance reports and the NMFS website for the years 2005 and 2006.

## **VII. Recommendations/findings of the Plan Review Team**

1. The PRT requests that state personnel highlight notable trends in annual reports.
2. Landings, effort, and biological data are needed to complete stock assessments. The PRT continues to express concern over the lack of data available for states to report landings by life stage. States are strongly encouraged to collect biological data from landings.
3. The PRT affirms the value of the young-of-the-year surveys and is adamant that they need to be performed on an annual basis. The PRT strongly recommends that all states and jurisdictions continue to implement the young-of-the-year survey.
4. State compliance reports were prepared in a variety of formats. The PRT requests that the states and jurisdictions prepare their reports following the outline that will be provided to them prior to the due date of the next annual compliance report.
5. In 2007, states are required to report harvest and effort data. States should attempt to validate the accuracy of this reported data. The PRT recommends that states provide information, either qualitative or quantitative, on the validity of this reporting.