



American Eel
Anguilla rostrata

Family: Anguillidae

Common Names:
American eel, silver eel, yellow eel, freshwater eel

Special Uses: Bait for both commercial and recreational fisheries; eaten fresh or smoked; young-of-the-year (elver) are often exported to Asian markets for aquaculture purposes

Age at maturity: 8 - 24 years

Species Profile: American Eel

Plan Seeks to Improve Our Understanding of the Species through Data Collection

Introduction

American eel (*Anguilla rostrata*) are an important resource from both a biodiversity and human use perspective. In all its life stages, eel serve as an important prey species for many fish, aquatic mammals, and fish eating birds. Eel continue to support valuable commercial, recreational, and subsistence fisheries coastwide, although fisheries are at a fraction of what they were historically.

American eel are a particularly challenging species to conserve and manage on a coastwide basis for a number of reasons. Throughout its lifespan from multiple juvenile life stages through adulthood, American eel will have inhabited and traversed a wide range of habitats from inland riverine systems through estuaries and far out into the Atlantic Ocean. During this journey, they will have moved through a myriad of jurisdictions and management authorities from inland and coastal states to the federal government.

From a biological perspective, there is a lot that is still not known about the species. Information on abundance and status at all life stages, as well as habitat requirements are very limited. The life history of the species, such as late age of maturity and a tendency of certain life stages to aggregate, can make this species particularly vulnerable to overharvest.

Life History

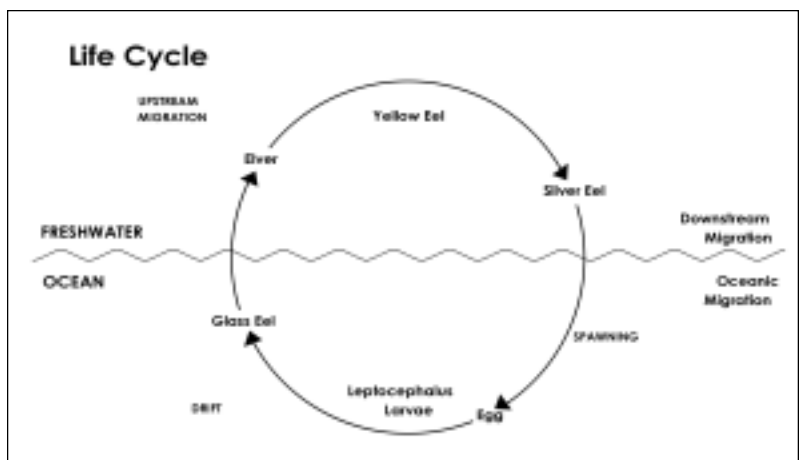
American eel are a catadromous fish species, spending most of their life in freshwater or estuarine environments, returning to the ocean to reproduce. Adult eel migrate to spawning grounds located in the Sargasso Sea, a large portion of the western Atlantic Ocean east of the Bahamas and south of Bermuda. The Gulf Stream then transports and disperses fertilized eggs and larval eel, called leptocephali, along the entire U.S. East Coast and into Canadian waters.

American eel are known to exhibit a multitude of life stages including leptocephali, glass eel, elver, yellow eel, and silver eel stages. Leptocephali metamorphose into glass eel as they migrate toward land and freshwater bodies. Glass eel develop into the pigmented elver stage as they move into brackish or freshwater. Usually by age two, elvers make the transition into the yellow eel stage. Yellow eel inhabit bays, estuaries, rivers, streams, lakes and ponds where they feed primarily on invertebrates and smaller fishes. Sexual maturity of yellow eel can occur any time between eight and 24 years of age according to data in the Mid-Atlantic region. When yellow eel reach sexual maturity they begin a downstream migration toward the Sargasso Sea spawning grounds. During this migration yellow eel metamorphose into the adult silver eel phase, undergoing several physiological changes that enable the animals to move from a freshwater to a saltwater environment. Adult silver eel are believed to spawn in the Sargasso Sea during winter and early spring.

Commercial &

Recreational Fisheries

Since the early 17th century, Native Americans have harvested eel for food and cultural sustenance. Today, commercial and recreational fisheries for American eel are seasonal, but remain economically important by providing both direct and indirect employment. Such employment includes gear manufacturing, food processing and shipping. Commercial landings of American eel fluctuate widely, as the fisheries are market-driven. Since the fishery's peak in the mid-1970s at 3.5 million pounds,



commercial landings have declined significantly to a near record low of 868,215 pounds in 2001. Recreational data concerning eel harvest appears to indicate a decline in abundance. According to the National Marine Fisheries Service's Marine Recreational Fisheries Statistics Survey, recreational harvest in 2001 was 10,805 eel, a significant decrease from the peak of 106,988 eel in 1982.

Atlantic Coast Management Considerations

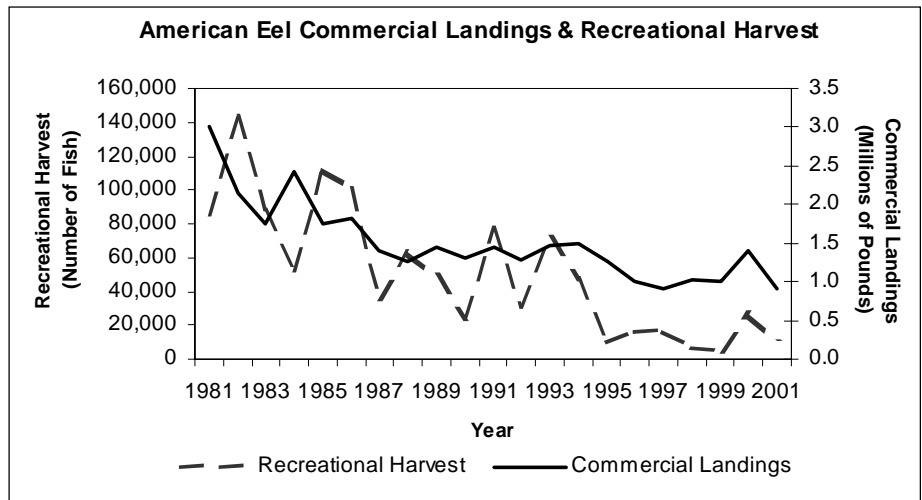
Increasing demand for eel by Asian markets and domestic bait fisheries, coupled with concern about declining eel abundance and limited assessment data, spurred plan development in the mid-90s, with final plan approval in 1999. The plan identified a number of factors contributing to possible declines in eel abundance along the Atlantic coast, including intense harvest pressure and habitat loss. It provided several reasons why heavy harvest pressure may adversely affect American eel populations. These include (1) a slow rate of maturation, requiring eight to 24+ years to attain sexual maturity; (2) a tendency for glass eel to aggregate seasonally during migration, making them vulnerable to directed harvest; (3) yellow eel harvest is a cumulative stress, over multiple years, on the same year class; and (4) all fishing mortality occurs prior to spawning.

Habitat losses have been a chronic problem for hundreds of years. Blockage of stream access, pollution and nearshore habitat destruction limit habitat availability for eel. Current data indicate that oceanic changes may also contribute to decline in eel abundance. Research in the late 90s has estimated that species that depend on access to Atlantic coastal watersheds may be deterred from reaching up to 84 percent of upstream habitats.

Management Hindered by Data Availability

The greatest hinderance to the development and implementation of an effective management program for American eel has been the lack of long-term data sets describing eel abundance at any life stage. Although eel have been continuously harvested, consistent data on harvest are often not available and, when available, are not good indicators of abundance because eel harvest is dependent on demand. Additionally, most of the data sets are of short duration and data collection protocols were not standardized between management agencies.

Few other long-term data sets are available from fish ladders, impingement sampling, research collections and monitoring programs. In addition, changes in year-class strength are not readily recognizable because most samples include individuals of similar sizes but from an unknown number of year classes. A compilation of all available information on eel fisheries and biology suggests that the data are fragmented and incomplete.



Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Plan Requirements & Recommendations

To address these issues, the plan requires states to implement conservative commercial and recreational regulations, as well as monitoring programs. The plan's primary focus is on data collection to further our understanding of American eel biology, behavior, habitat requirements and the fisheries themselves. All states are required to perform an annual young-of-the-year (YOY) abundance survey. This survey, conducted over a six-week time period each year, provides an annual estimate of juvenile abundance. It will be the primary source of fishery-independent data used in the upcoming stock assessment, scheduled for 2004. Data from the YOY survey can also provide managers with information on the effectiveness of coastwide management programs since juvenile abundance is influenced by factors that affect spawning, larval survival, transport, metamorphosis and recruitment.

In addition, the plan specifies that states will maintain their existing commercial fishery regulations, unless opting for more conservative regulations. Recreational fisheries management measures require states and/or jurisdictions to establish uniform possession limits, including a minimum six-inch size limit and possession of no more than 50 eels per person for bait purposes during fishing, including crew members involved in party/charter (for-hire) employment. Identification and protection of existing eel habitat, as well as restoration of historic habitat, are also addressed in the plan through recommendations concerning upstream and downstream passage and habitat monitoring.

On the international front, the Commission has begun to meet with American eel researchers through the International Council for the Exploration of the Sea Working Group on Eels and Canada's Department of Fisheries and Oceans to exchange information and discuss issues related to assessing stock size in data poor situations. These efforts are helping to ensure that the Commission will be able to perform the best possible stock assessment with the limited data available.