



**American Eel**  
*Anguilla rostrata*

**Common Names:** elver, silver eel, yellow eel, freshwater eel

**Interesting Fish Facts:**  
 •Aristotle did the first known research on eel.  
 • Leptocephali were originally thought to be a different species.  
 •American eel were once thought to be the same species as the European eel (*Anguilla anguilla*).

**Special Uses:**  
 •Bait for both commercial & recreational fisheries  
 •Eaten fresh or smoked  
 •Elvers are often exported to Asian markets for aquaculture purposes.

**Largest Recorded:** 25 inches, 8 lbs, 2 oz.

**Oldest Recorded:** 20 years

**Stock Status:** Unknown

## Species Profile: American Eel

### Management Program Seeks to Improve Our Understanding of Species Through Data Collection

#### Introduction

American eel 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. Although fisheries are a fraction of what they were historically, eel support valuable commercial, recreational, and subsistence fisheries.

American eel are a particularly challenging species to conserve and manage on a coast-wide basis for a number of reasons. Throughout its life-span, from multiple juvenile life stages through adulthood, American eel will have inhabited and traversed a wide range of habitats from the Sargasso Sea to estuaries and inland riverine systems. During this journey, they will have moved through myriad jurisdictions and management authorities from the high seas to federal government and on to state governments.

From a biological perspective, there is a lot that is still unknown about the species. Information about 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 at 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, traveling to the ocean as adults to reproduce and die. Sexually maturing 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 larval eel, called leptocephali, along the eastern coast of Central and North America. American eel are a panmictic stock, meaning that individuals from the entire range come together and reproduce at random. American eel found along the eastern coast of Mexico are from the same population as eel found in the St. Lawrence River in Canada.

American eel have a multitude of life stages: leptocephali, glass eel, yellow eel, and silver eel. Leptocephali metamorphose into glass eel as they migrate toward land and freshwater bodies. Glass eel develop into a pigmented stage as they move into brackish or freshwater. Usually by age two, small, pigmented eels make the transition into the yellow eel stage. Yellow eel inhabit fresh, brackish, and saltwater habitats where they feed primarily on invertebrates and smaller fishes. Sexual maturity can occur any time between eight and 24 years of age. When yellow eel start to sexually mature, 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. Adult silver eel are believed to spawn in the Sargasso Sea during winter and early spring.

#### Commercial and Recreational Fisheries

A valuable prey species for many fish, aquatic mammals, and fish-eating birds, American eel are an im-



Photo of glass eels courtesy of NYSDEC

portant resource from both a biodiversity and human use perspective. While eel harvest is just a fraction of what it was historically, eels continue to support valuable commercial, recreational, and subsistence fisheries.

Native Americans have traditionally harvested eel for food. Today, American eel commercial and recreational fisheries for food and bait are seasonal and provide both direct and indirect employment. Such employment includes gear manufacturing, food processing, and shipping. Commercial landings of American eel fluctuate depending on the market price for eel. Since the fishery's peak in 1979 at 3.95 million pounds, commercial landings have declined significantly to a near record low of 641,255 pounds in 2002.

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 has been on the decline since its peak in 1985. Since 1995, recreational harvest has fluctuated between 5,500 and 32,000 eel.

### Stock Status

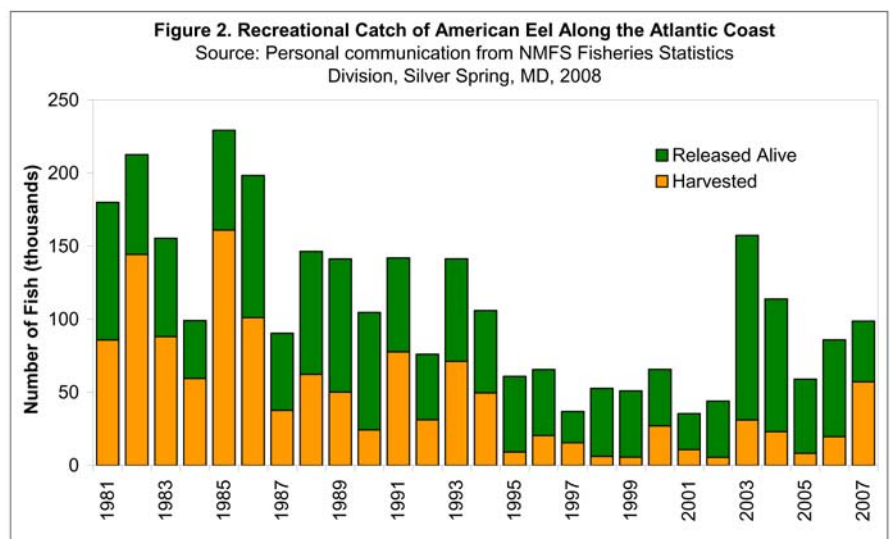
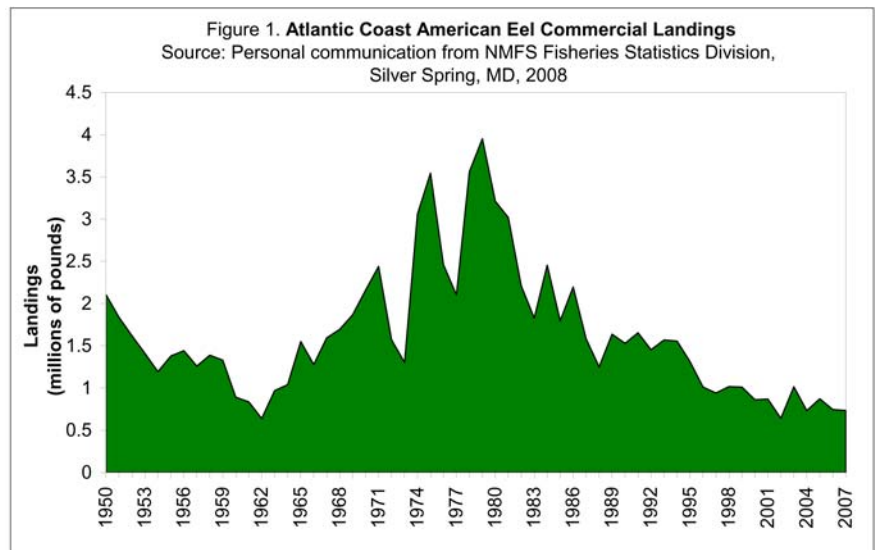
The Commission conducted a benchmark stock assessment for American eel in 2005. Insufficient data prevented the Commission from developing reference points or quantifying stock status in the assessment. However,

an independent panel of fisheries scientists (Peer Review Panel) reviewed the stock assessment and concurred with its overall finding that the abundance of yellow eel is at or near historic low levels coastwide. Further, abundance is likely to continue to decline unless mortality decreases and/or recruitment increases. While the cause of the decline is unknown, it is believed that factors such as harvest, habitat loss, predation, hydropower turbine mortality, disease, parasitism, reduced reproductive capacity resulting from pollution, and climate change have all played a role.

### Atlantic Coastal Management

Increasing demand for eel by Asian markets and domestic bait fisheries, coupled with concern about declining eel abundance and limited assessment data, spurred development of the first Interstate Fishery Management Plan for American Eel in the mid-1990s. The plan, approved in 1999, provided several reasons why heavy harvest pressure may adversely affect American eel populations: (1) American eel have a slow rate of maturation, requiring eight to 24+ years to attain sexual maturity; (2) glass eel tend to aggregate seasonally during migration, making them vulnerable to directed harvest; (3) harvest of yellow eel is a cumulative stress, over multiple years, on the same yearclass; and (4) all fishing mortality occurs prior to spawning.

Habitat loss and alteration has been a chronic problem for hundreds of years. Blockage of stream access, pollution, and destruction of nearshore habitat by humans limit habitat availability for eel. Research in the late 1990s has estimated that species that depend upon access to Atlantic coastal watersheds may be deterred from reaching up to 84% of upstream habitats. Current data indicate that oceanic changes might also contribute to decline in eel abundance.



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 collect harvest and effort data on commercial harvest. They are also required to perform an annual young-of-the-year (YOY) abundance survey. This survey provides an annual estimate of juvenile abundance. Data from the YOY surveys 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.

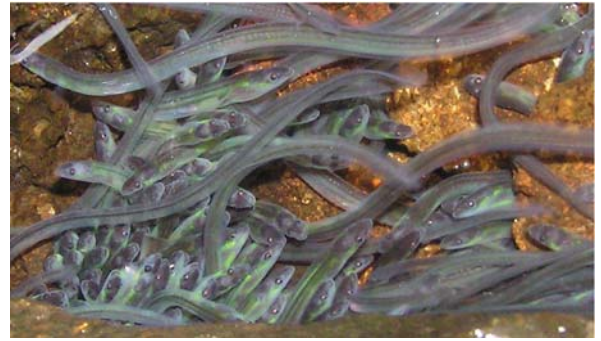


Photo credit: Rutgers University Marine Field Station

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 the states and/or jurisdictions to establish uniform possession limits, including minimum six-inch minimum size and possession of no more than 50 eels per person for bait. 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. The Commission is investigating potential changes to management that would increase the number of eels that are able to spawn each year.

Addendum II, approved in October 2008, maintains status quo on state management measures and places increased emphasis on improving the upstream and downstream passage of American eel. The states will revisit management measures upon completion of the American eel stock assessment in 2010. The Board chose to delay action on management measures in order to incorporate the results of a pending stock assessment in 2010 which will present new and updated information on American eel stock status, including the long-term young-of-the-year index being conducted by the states. In addition, the Board received overwhelming public comment and advice from its Advisory Panel that further restrictions on American eel harvest would significantly impact fishermen.

The greatest hindrance to the development and implementation of an effective management program for American eel is the panmictic nature of the stock. Local, regional, and ocean-wide actions have the ability to affect the entire stock because there is random mating within the breeding population—all of the American eel found from Canada to Central America. While different agencies have authority over eel in their jurisdictions, they do not have the ability to alter the population beyond their management boundaries. The Commission has begun a working relationship with the Great Lakes Fishery Commission, which is founded by a bi-national agreement between the U.S. and Canada, to facilitate participation and data sharing

