



U.S. Fish & Wildlife Service

American Eel

Anguilla rostrata

People have fished and farmed eels for hundreds of years, but we have known little about eels for most of that time. Even today the American eel's complex life history is not completely understood. During its lifetime, the eel undergoes several physical phases as well as changes in where it lives. Some scientists consider the highly adaptive American eel to have the broadest diversity of habitats of any fish species in the world.

Found from Greenland to Brazil, the American eel is firstly a creature of the ocean, using ocean currents to move from its natal waters, perhaps using cues from the currents or salinity to time its metamorphoses. Having survived at least one ice age, American eel seems to be a flexible species well-equipped to withstand the short- and long-term cycles and fluctuations inherent in ocean dynamics.

American eels begin their lives as eggs hatching in the Sargasso Sea, a 2-million-square-mile warm-water lens in the North Atlantic between the West Indies and the Azores. The buoyant eel eggs float to the ocean surface and hatch into small, transparent larvae shaped like willow leaves. These larvae drift with the Gulf Stream and other currents, taking about a year to reach the Atlantic coast. By this time, the larval eels have developed fins and the shape of adult eels. In this first phase, the juveniles – called glass eels – are without pigment and still transparent. In the second phase, juvenile eels develop gray to greenish-brown pigmentation and are called elvers. Juveniles slowly develop into yellow eels, the sexually immature adults that are actually yellow-greenish to olive-brown.

In their yellow phase, American eels are nocturnal, swimming and feeding at night. Carnivores that feed on insects, fish, fish eggs, crabs, worms, clams and frogs, eels

also will eat dead animal matter. Eels can move equally well and forcefully forward and backward, giving them the ability to pull, twist and spin to tear apart large prey.

American eels can absorb oxygen through their skin as well as their gills, making it possible for them to travel over land, particularly in wet grass or mud, which may help them move around barriers in streams. Eels also can cover their entire bodies with a mucous layer, making them nearly impossible to capture by hand – “slippery as an eel” is more than just a figure of speech.

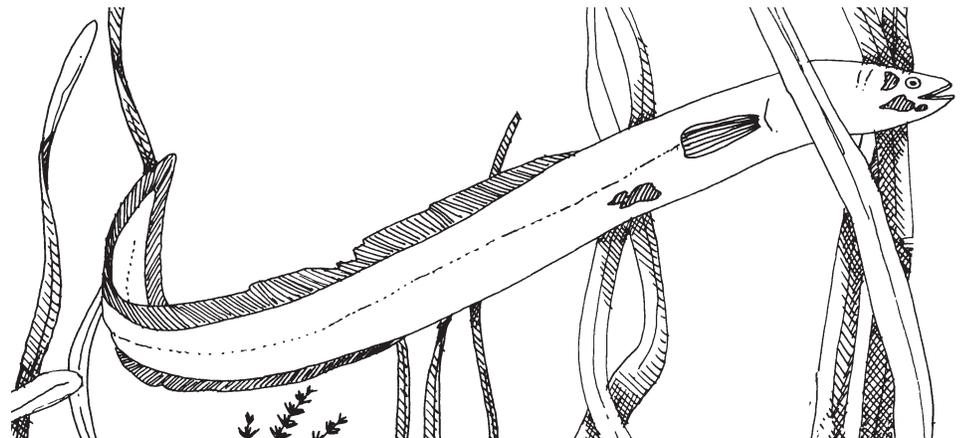
After as few as three, and for the females, possibly as many as 40 years living in freshwater streams, the yellow eels begin to sexually mature. Eels that remain in estuarine and marine waters undergo the same changes but mature earlier than those in fresh water. Size is the defining characteristic. Whether an eel is slow-growing (those in freshwater streams) or fast-growing (those in estuaries), their size at maturation is the same, and both sexes seem to mature at the earliest opportunity. With another change in pigmentation signaling sexual maturity, these “silver eels” are dark, with bronze-black backs and silver undersides.

Silver eels migrate to the ocean and return to the Sargasso Sea, where females release between 20 and 30 million eggs and the males fertilize them. Once they have spawned, it is assumed that adult eels die, although people have never witnessed eels spawning.

Eels have been a part of the human diet, especially in Europe and Asia, for hundreds and even thousands of years. In many European countries, eel populations

Catadromous? Anadromous? Something else?

The more familiar anadromous fish, like salmon or striped bass, are born in freshwater streams, travel to the ocean to mature, and return to their natal freshwaters to spawn. Catadromous fish are born in the ocean, mature in fresh water and return to the ocean to spawn. American eels, once thought to be the only North American example of catadromy, apparently have the option of living a catadromous life when conditions are favorable. Scientists call this facultative catadromy, meaning taking place under some conditions but not others, or optional.



have decreased dramatically, possibly as much as 99 percent, and there has been concern that the American eel populations, particularly those in fresh water, are following that same downward spiral. Fishing has had regionally recognizable impacts on American eel.

Like many other species, American eels no longer have access to much of their historical habitat because of dams and other obstructions in rivers. These eels, particularly silver females migrating downstream, also die in the turbines of hydropower plants. Contaminants, too, may impair eels, although which contaminants and how much harm they do are as yet unknown, may be difficult to discover, and may most likely affect the eels during their long ocean migration.

An Asian parasite likely introduced in aquaculture has spread rapidly in American eels in the past few years. This worm infests the eel's swim bladder. While it may not be a problem in shallow water, once the eels mature and begin their long return swim to the Sargasso, a non-functioning or even somewhat impaired swim bladder could doom eels to dying in the open ocean. Biologists simply do not know the extent of this parasite's damage to the American eel population.

Despite these challenges, American eels remain in much of their vast historic range. In some large coastal rivers, eels are the most commonly found fish, occupying more aquatic habitats than any other species.

The natural world is filled with wonders. In all our years of living with American eels, people still can barely conceive of the remarkable and complex arc of the lives of these fish. The U.S. Fish and Wildlife Service is working with partners to better understand and conserve this species that we have only begun to know.

The amazing eel

With their relatively weak jaws and many small teeth, eels have developed an unusual feeding process with food that cannot be consumed whole or readily broken into pieces by jerking or pulling. Holding on with their mouths, adult eels spin their bodies to break apart food, and have been recorded at six to 14 spins per second. In comparison, Olympic ice skaters can spin five times per second.

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