While Not Endangered, American Eels Face Numerous Threats

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American eels (*Anguilla rostrata*) may not be endangered, but biologists still believe the snakelike fish needs plenty of help.

The U.S. Fish and Wildlife Service (FWS) in January concluded that while the eel population has undergone significant declines in some places, including the Chesapeake Bay and the upper St. Lawrence River, it does not warrant listing as a threatened or endangered species.

Eels face a number of threats, but still inhabit about 75 percent of their historic range in the United States and Canada, the service said. Reproduction—measured by the number of small "glass eels" seen in coastal areas—appears stable, the service concluded.

"The eel population as a whole shows significant resiliency," said Heather Bell, the FWS biologist who led the review. "If we look at eels over time, we see fluctuations in the population numbers, so a decreasing number of eels right now does not necessarily forecast an irreversible trend."

The review was spurred by a petition filed in 2004 by two brothers, Tim Watts of Massachusetts and Doug Watts of Maine [see Summer 2005 *AC*, p. 29], who expressed concern about declines of eels in some of their favorite fishing areas, where they were unable to get past dams.

Nonetheless, concern about eels remains high among many fishery biologists and managers.

In the Chesapeake Bay—considered the heart of the eel population—long-running surveys by the Virginia Institute of Marine Science (VIMS) have documented a significant decline in the number of yellow eels since 1979. "I think what we are seeing is representative of what is going on along the coast, as well as in Canada," said Marcel Montane, who oversees the VIMS eel survey. "We've seen a large decrease."

Others report similar, if anecdotal, observations. Declines have been noted at the Conowingo Dam on the Susquehanna River, where large numbers of eels were once routinely seen trying to slither over the 100-foot-high structure.

"You talk to everybody; in the 1970s they were just crawling all over that dam," said Steve Minkkinen, who heads the FWS Maryland Fisheries Office. "People used to go there and get them for bait. There has only been one year in the last 10 where people saw a lot there."

Eels have a complex life cycle. They are born in the Sargasso Sea in the mid-Atlantic, and the larvae float with currents until they enter coastal areas as transparent, wormlike glass eels. As they gain pigmentation, and move into estuaries, they become elvers, and then larger yellow eels which range everywhere from coastal waters to the farthest headwater streams. As they mature, they can reach lengths of more than two feet, and finally become darker silver eels, which migrate back to the Sargasso Sea to spawn, then die.

Although eels can be found in almost every aquatic habitat, they are vulnerable to a variety of stressors. They are fished, largely for bait; exposed to chemical contaminants in some areas; and many have become infected with nonnative parasites that may affect their ability to swim. Dams impede their movements up and down rivers, and changing ocean currents may affect the distribution of their larvae along the coast.

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Last year, a stock assessment by the Atlantic States Marine Fisheries Commission (ASMFC), which regulates migratory fishes along the East Coast, concluded that the population of yellow eels was at or near historic lows.

"There is no reason to list them as endangered, [as] the management authority that is in place is adequate," said Dave Secor, a fisheries biologist with the University of Maryland Center for Environmental Science who chaired the ASMFC's eel stock assessment. "But I think there is a downward trend."

Secor said there was reason to be concerned about potential changes in ocean conditions, which might might be affecting larvae distribution along the coast. Such changes could account for significant population drops seen in Canada, which is at the northern edge of the species' distribution. Declines there are especially important because those eels are the largest females in the spawning population, each producing large numbers of eggs.

Elsewhere along the coast, Secor said that it's possible dams are taking a toll by reducing the number of eels reaching many habitats. Many small dams do not totally block upstream movements—some eels can slither around—but their numbers are reduced, and eels leaving the water may be subject to increased predation. In addition, large mature eels are thought to suffer high mortality when they migrate downstream to spawn if they pass through turbines at hydroelectric facilities. "You can only accumulate so much mortality," Secor said.

At its meeting in January, the ASMFC's Eel Management Board gave the go-ahead to develop management actions aimed at improving the survival of eels during their migration to the ocean. By increasing the number of spawning adults, the hope is that more young eels will make it back into coastal and freshwater areas.

Those management actions, which could be finalized this fall, will likely include a mix of seasonal closures, catch size and gear restrictions, and management triggers based on juvenile abundance indices. In addition, the recommendations would likely call for steps to improve eel passages at dams.

Actions are also planned in Canada, where a 99 percent drop in eels migrating through the Upper St. Lawrence River has been seen. Ontario has closed commercial and recreational fisheries, and the Canadian government has set a goal of reducing eel mortality by 50 percent from all sources.

"Eels face a gauntlet of challenges during their life cycle, with a substantial, we think, cumulative effect," Rob Macgregor, of the Ontario Ministry of Natural Resources, told the ASMFC.

In addition, the Canadian government is supporting efforts to stock eels upstream of dams to boost the spawning population—eels do not determine their sex until later in life and those that move far up freshwater rivers become almost exclusively females. Moving small glass eels into areas where they are likely to become females could boost the spawning stock—if they survive downstream migrations which often lead through turbines at hydroelectric dams.

In the Chesapeake Bay, which has historically had the largest eel population, fishery officials are moving forward with efforts to give eels a hand getting over the numerous dams that block their migrations to freshwater habitats.

In 2003, the first eelway in the watershed was completed by Allegheny Energy Supply at its Millville Dam, the first blockage on the Shenandoah River upstream of the Potomac. Since then, thousands of eels have passed the structure, and last year the company opened an eelway at the next dam, located 45 miles up the river at Warren.

This year, biologists are hoping to win approval for two passages on the Potomac River at Dams 4 and 5, located between Great Falls outside the District of Columbia and the mouth of the Shenandoah. The eelways have to be specially designed so they don't clash with the historic masonry structures, which are owned by the National Park Service as part of the Chesapeake and Ohio National Historic Park.

Last summer, federal and state biologists also built the first eel passage in Maryland, which allows eels to pass over a 10-foot-high dam at Unicorn Lake in Queen Anne's County.

On the Susquehanna, Minkkinen suggested that efforts might be considered to move eels upstream, where 43 percent of the potential habitat in the Bay watershed is closed by the Conowingo dam which, unlike some others, is too large for eels to crawl over. "I can't think of one thing you could do that could potentially have more impact than opening the Susquehanna up to eels," he said.

The river once supported a major eel fishery, and the Pennsylvania Fish and Boat Commission had a program to transport eels into the Susquehanna that moved 17 million eels from 1936 through 1980, when it was discontinued because of costs and declining interest in catching eels.

But interest is growing in returning eels to the river, in part because of recent research that shows eels are critical for the reproduction of certain important mussel species in the river. "We're going to be writing it into our management plan on the Susquehanna," said Mike Hendricks, a fisheries biologist with the commission.