Species of Concern
NOAA National Marine Fisheries Service

Rainbow smelt
Osemerus mordax

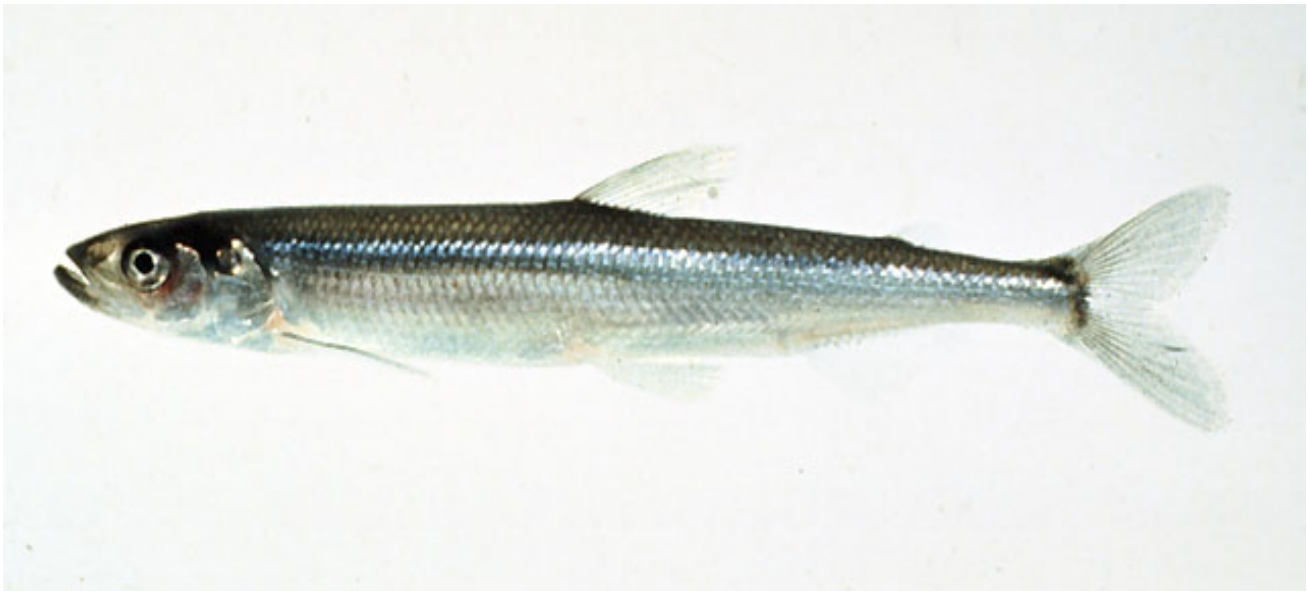

Photo credit: J.F. Scarola.

KEY INFORMATION

Areas of Concern
Rivers and coastal areas of eastern North America from Labrador to New Jersey and on the west coast from Vancouver Island around Alaska to the Arctic Ocean.

Year Identified as "Species of Concern"
2004

Factors for Decline
- Acid precipitation
- Fishing
- Dams and blocked culverts
- Spawning habitat degradation

Conservation Designations
IUCN: Not Evaluated

Current Status:

Demographic and Genetic Diversity Concerns:
During the last 15 to 20 years there has been a region-wide trend in declining smelt populations in Massachusetts Bay (Chase and Childs 2001). The current status of rainbow smelt populations for the majority of the Gulf of Maine is not well known, especially east of the Kennebec drainage. Many inland populations appear to be declining, apparently due in part to the impacts of **acid precipitation**.

Existing Protections and Conservation Actions:
In Massachusetts the fishery is closed by regulation from March 15th to June 15th to protect spawning fish (Chase and Childs, 2001). Massachusetts has a monitoring program, which looks at spawning habitat. There have been a number of projects in recent years involving restoration of habitat (Brad Chase, MA Division of Marine Fisheries, pers. comm. 2003.)

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Brief Species Description:

This is a small, slender, elongated fish averaging 6 to 8 inches (15 to 20 cm) in length. Sea-dwelling populations are **anadromous**, migrating to spawn in fresh water, while some populations are found entirely in fresh water. They have been introduced into freshwater systems in the northeastern and central U.S. (Buckley 1989). Rainbow smelt usually remain close to shore and in shallow water, and some spend the entire year in the **estuaries** (Collette and Klein-MacPhee 2002). There is evidence of migrations in the sea, however, little is known about this part of the smelt life history (Collette and Klein-MacPhee 2002).

Spawning takes place in late winter/early spring in the southern portion of this species range and in mid-spring farther north. Spawning is believed to be triggered by photoperiod rather than water temperature (Collette and Klein-MacPhee 2002). A female smelt can produce 7,000 to over 75,000 eggs, depending on size (Collette and Klein-MacPhee 2002).

Smelt are voracious feeders of amphipods, euphausiids, mysids, shrimps, and marine worms; and as they grow, any small fishes that are available (Collette and Klein-MacPhee 2002). Smelt are a major prey item for striped bass, bluefish and a variety of birds. Mortality due to predation is quite high for this species: up to 72% of adult fish die annually (Rainbow Smelt general information, 2002). In addition, smelt are preyed upon by their own species (Collette and Klein-MacPhee 2002).

Summer habitat varies with water temperature. Smelt leave the harbors and estuaries of Massachusetts Bay for slightly deeper and cooler water during the summer (Collette and Klein-MacPhee 2002). Farther north, east of Penobscot Bay, they remain in harbors, bays, and river mouths all summer (Collette and Klein-MacPhee 2002). Smelt overwinter in nearshore waters prior to making their spawning runs.

Status Reviews/Research Underway:

In 2006, the states of Maine, New Hampshire and Massachusetts received a grant under NMFS's Proactive Conservation Program to conserve and restore wild populations of rainbow smelt, Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and non-DPS Atlantic salmon (*Salmo salar*) within the U.S. Gulf of Maine watershed. The goals of the project are to complete a comprehensive Gulf of Maine inventory for each species (including information on status and trends of each species and threats); develop a set of conservation and restoration strategies; and implement the strategies by collaborating with local, state and Federal agencies, non-governmental organizations, and academia.

Contact Information

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References:

Buckley, J. 1989. Species profiles: Rainbow smelt. USFWS Biol. Rept., U.S. Army Corps of Engineers. TR EL-82-4.

Chase, B.C., and A.R. Childs. 2001. Massachusetts Division of Marine Fisheries Technical Report TR-5.

Collette, B.B., and G. Klein-MacPhee. 2002. Bigelow and Schroeder s fishes of the Gulf of Maine. Smithsonian Institution Press, Washington, DC.

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