Rainbow Smelt

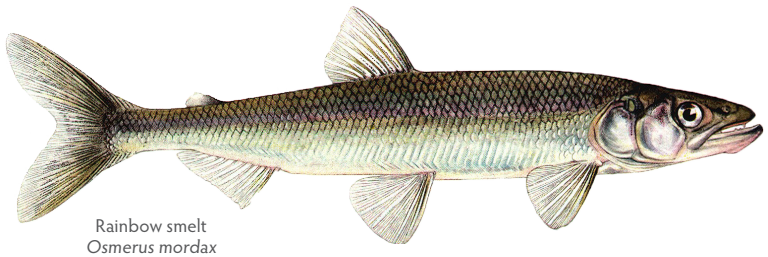
An Imperiled Fish in a Changing World

A century ago, streams in coastal New England teemed each spring with small silvery fish called rainbow smelt. By the millions, rainbow smelt swam from the ocean into rivers and brooks, spawned, and then returned to sea.

In a springtime ritual, adults and children went to their local streams and caught great quantities of the small fish. Prized as one of the best-tasting fried fish, smelt were brought home for dinner, sold locally, and shipped to distant markets. Many animals—seals, striped bass, codfish, great blue herons, and others—feasted on rainbow smelt during the springtime bonanza. Although small in size, this fish played a big role in the ecosystem and economy.

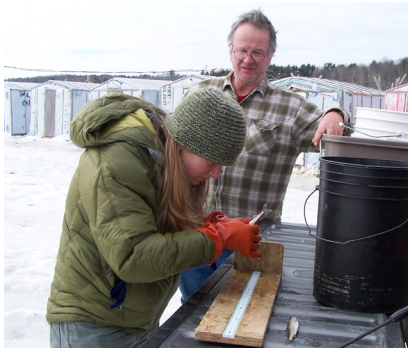
Now rainbow smelt are declining, even in streams that once hosted abundant runs each spring. The diminishing numbers have become evident in the Gulf of Maine. Recognizing the plight of the rainbow smelt, the U.S. government listed it in 2004 as a federal Species of Concern.

The state governments of Maine, Massachusetts, and New Hampshire are working together to understand the rainbow smelt's status and threats, and to plan a regional conservation effort for the species. Scientific research by the three-state collaborative focuses on the status of the smelt population and the condition of spawning areas in streams, which may be a key factor in the rainbow smelt's decline.



Rainbow smelt
Osmerus mordax

Ice-fishing shacks (above) are evidence of New England's long tradition of fishing for rainbow smelt. Scientists (below) from three states are studying causes of the smelt's recent decline, including loss of suitable stream habitats (bottom) for spawning.



Joyce Grondin; Mike Timberlake (top)

Tom Watson

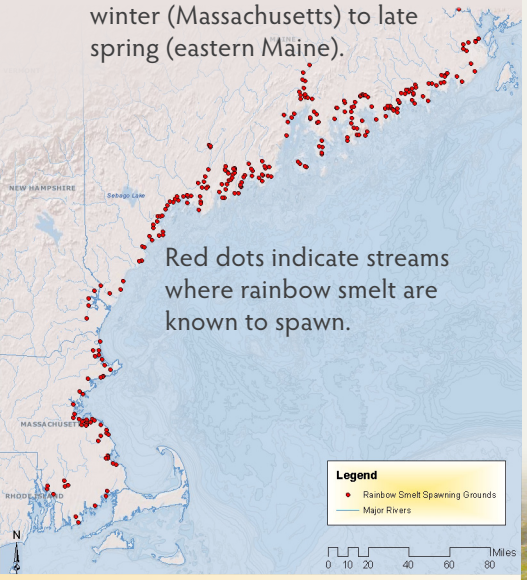
State and local governments, community groups, and individual citizens can take immediate action to resolve some of the threats and to restore the rainbow smelt as an icon of spring in New England.

"Second cousin to the grayling and trout, and one of the neatest, most graceful, and delicate of all our food fishes, is that universal favorite, the smelt." **Samuels (1904)**

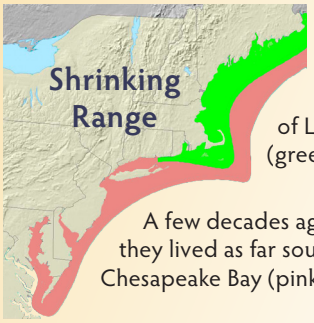
Matt Ayer

Rainbow Smelt at a Glance

- Native to coastal waters of northeastern United States and Canadian Maritimes.
- Eats shrimp, marine worms, amphipods, euphausiids, mysids, and smaller fish.
- Eaten by porpoises, seals, salmon, trout, bluefish, striped bass, Atlantic cod, and birds.
- Slender fish averaging 6 to 8 inches long.
- Can live up to 6 years, but more typically lives 3 or 4 years.
- Lives in estuaries, harbors, and offshore waters during summer, fall, and winter.
- Migrates into rivers and streams to spawn beginning in late winter (Massachusetts) to late spring (eastern Maine).



Red dots indicate streams where rainbow smelt are known to spawn.



At present, rainbow smelt live only north of Long Island Sound (green area).

A few decades ago, they lived as far south as Chesapeake Bay (pink area).

Katherine Mills

A New England Tradition

Historically, people in New England valued rainbow smelt as an easy-to-catch, abundant source of fresh protein after the long winter. The commercial fishery for rainbow smelt is one of the oldest in New England, and for many years it was among the most valuable. More recently, the catch along the Gulf of Maine coast has dwindled, although parts of eastern Maine still have strong commercial fisheries. Recreational fishing for rainbow smelt continues to be a popular pastime in Massachusetts, New Hampshire, and Maine.

Fish in Peril

Rainbow smelt were so plentiful a hundred years ago that farmers caught them by the barrelful and had enough to eat, use as bait, and even spread on their fields as fertilizer. In many places now, it would be difficult to fill a single barrel with rainbow smelt. The species has largely disappeared from the southern part of its geographic range, and its numbers along the coast of the Gulf of Maine have dropped dramatically. In general, rainbow smelt are least abundant in Massachusetts and increase slightly toward eastern Maine. Reliable data on population size are not available, but Maine fishery data show that rainbow smelt landings have dropped tremendously since the 1800s. While a decrease in fishing effort may contribute to the drop in landings, the overall trend is clear: rainbow smelt are in trouble.

Tom Watson

Many Potential Threats

A clear explanation for the rainbow smelt's decline is not yet known, but the species faces three broad types of potential threats:

1. Loss of suitable spawning habitat
2. Unfavorable changes in ocean conditions, such as water temperature or predation
3. Fishing pressure

Science for Solutions

Scientists from the state governments of Massachusetts, Maine, and New Hampshire are collaborating on a study of threats to rainbow smelt, particularly spawning habitat alteration. The states are using the scientific findings to develop a regional solution.

Brad Chase

A team of scientists uses a fyke net to catch rainbow smelt in a channelized river.

What Makes a Good Spawning Place?

Rainbow smelt tend to deposit their eggs in shallow riffles just upstream from the meeting of salt and fresh water.

Tom Watson

Some Human Activities Harm Spawning Areas

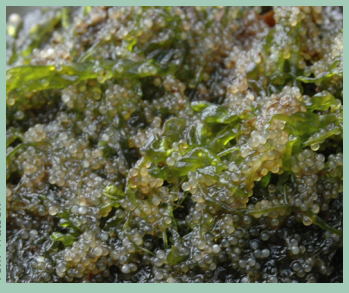
People have degraded many of the rainbow smelt's spawning sites in Massachusetts, New Hampshire, and Maine.

Claire Enterline

Dams and poorly designed culverts block rainbow smelt from spawning grounds.

Michael Rosenstein

Sediment from construction sites, road maintenance, and other sources smothers eggs.



Tom Watson

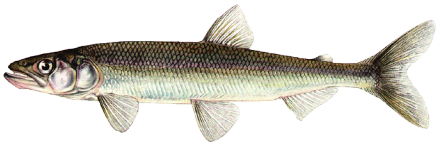
Fertilizers and faulty septic systems encourage growth of algae on smelt eggs.

Michael Krigsman

Pavement and other impervious surfaces promote runoff of pollutant-laden rainwater.

What Can You Do?

Individual citizens and towns can take important steps to help the rainbow smelt recover. Local efforts are essential and can make a big difference in the survival of the species.



Steve Mishos

1. Use less fertilizer on your property.

Water carries fertilizer into streams, where the nutrients promote growth of algae on smelt eggs.

USDA

2. Fix dams and culverts blocking smelt from spawning areas.

Many dams and culverts prevent rainbow smelt and other fish from swimming upstream and downstream. In collaboration with owners and government agencies, dams can be removed, culverts reconfigured, and culverts replaced with bridges.

USDA

3. Plant shrubs and trees along stream banks and refrain from clearing existing vegetation.

Vegetated buffers help to filter out pollutants, sediment, and excess nutrients before they enter the waterway. Shrubs and trees also shade streams, keeping the water cool for fish.

Brad Chase

4. Maintain natural stream channels and substrate; restore those altered with concrete walls or other structures.

Faster-flowing water in altered streams can lead to scouring or crowding of smelt eggs. Low water velocity and unnatural substrates can reduce egg attachment and incubation success.

Michael Rosenstein

5. Use less road salt and sand near streams.

When salt and sand are washed into streams, they can kill smelt eggs.

Max Wolfe

6. Clean storm drains annually.

Debris and infrequent maintenance can clog storm drains, forcing water to flow over ground. The water carries sediment into streams, which smothers smelt eggs.

Tom Watson

7. Get to know your smelt runs.

Find out where smelt spawn in your town and insist that local officials protect these valuable habitats.

For more information, please visit:
www.nmfs.noaa.gov/pr/species/fish/rainbowsmelt.htm

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