



DELTA STEWARDSHIP COUNCIL

DELTA SMELT BIOLOGY & MANAGEMENT 101



WHY DO WE CARE ABOUT DELTA SMELT?

Delta smelt is a species unique to the Sacramento-San Joaquin Delta and covered by federal and state Endangered Species Acts. Delta smelt live for about one year, and thus have low resilience to a bad year. Multiple bad years, caused by a variety of conditions, can have major population consequences. Low abundance in the fall means fewer spawners in the spring to support future populations. Since the early 2000s, when Delta smelt had a sharp decline caused by entrainment in the South Delta pumps, predators, habitat degradation, and poor food supply, they have remained at low levels. Now, **Delta smelt are approaching extinction.**

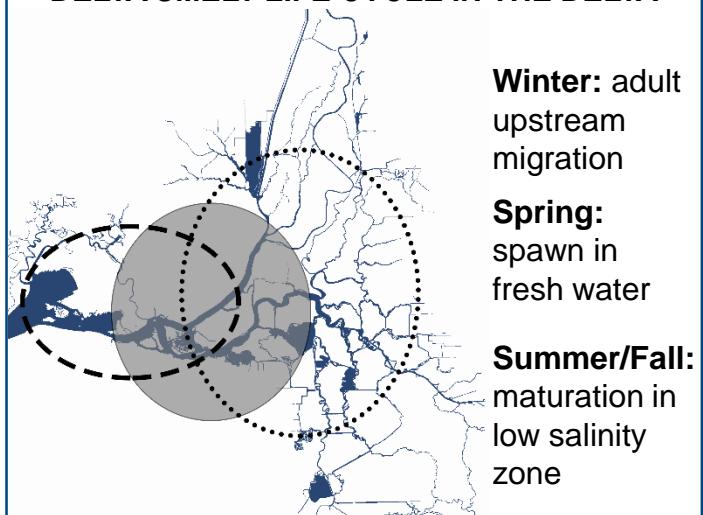
WHAT DO WE KNOW ABOUT DELTA SMELT?

Delta smelt are a well-studied and well-monitored fish species. **Delta smelt live in cool, low salinity, murky (turbid) water.** Turbidity provides refuge from predators. Delta smelt complete their entire life cycle in the Delta and employ a variety of life history strategies. Typically, they spawn in northern freshwater regions, and use the low salinity zone for rearing and maturation.

When the first winter rains occur, turbid waters are flushed through the system (known as “first flush”), and the distribution of turbid waters shifts, influencing where Delta smelt spawning occurs and where young fish emerge the following spring. Monitoring programs identify where Delta smelt are in a given month.

The federal government regulates operation of the federal and state water projects under the Endangered Species Act to minimize harm caused by entrainment. The Department of Water Resources (DWR) and the U. S. Bureau of Reclamation (Reclamation) **water management operations use survey data, turbidity, and temperature conditions** to guide winter and spring pumping levels to meet accordingly.

DELTA SMELT LIFE CYCLE IN THE DELTA

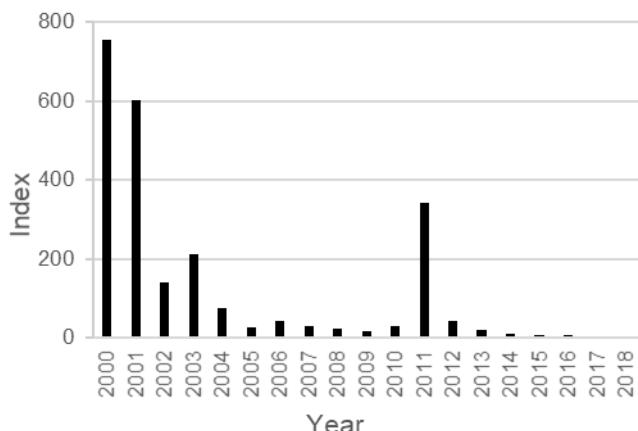


Winter: adult upstream migration

Spring: spawn in fresh water

Summer/Fall: maturation in low salinity zone

CDFW FALL MIDWATER TRAWL INDEX OF DELTA SMELT ABUNDANCE (2000-2018)



Comparative abundance of Delta smelt catch in fall has mostly decreased over the years.

WHAT ARE AGENCIES DOING TO HELP DELTA SMELT?

REGULATION

USFWS (with concurrence of the California Department of Fish & Wildlife) protects Delta smelt through a Biological Opinion (BiOp) that requires actions aimed at protecting the species under the federal and state Endangered Species Acts. It calls on Reclamation and DWR to:

- Limit entrainment in the South Delta pumps
- Increase flow actions that support habitat availability and the food web
- Restore Delta smelt habitat (8,000 acres)
- Establish a refugia population (in an aquaculture facility)

The **Smelt Working Group** (experts and project operators from federal and state agencies) advises on pumping operations throughout the Delta. A BiOp for these actions was released on Oct. 22, 2019.

ADDITIONAL COLLABORATIVE WORK

Several collaborative entities work on additional actions to support Delta smelt:

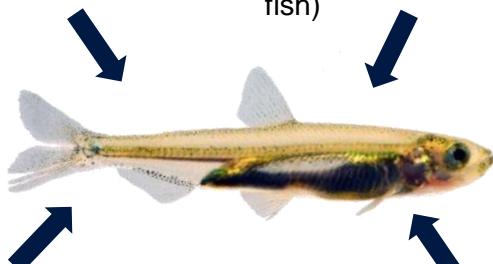
- The Interagency Ecological Program
- Collaborative Adaptive Management Team
- The Collaborative Science and Adaptive Management Program

The **Delta Smelt Resiliency Strategy**, from the California Natural Resources Agency, is a suite of actions designed to address causes of population decline. Actions include:

- Fall Flow action – supports the food web
- Rio Vista Research Station – centralized location for monitoring efforts
- Suisun Marsh Salinity Control Gates – provides access to low salinity, food rich habitat
- The Tracy Fish Culture Facility – collects and rears wild Delta smelt every year as a safeguard against extinction.

STRESSORS TO DELTA SMELT

1. Diversions
(agricultural, power plant) & **Entrainment**



2. Invasive species
(vegetation, invertebrates, predatory fish)

3. Contaminants
(metals, pesticides, pharmaceuticals)

4. Habitat Deterioration
(temperature, habitat loss, water quality)

GLOSSARY

Trawl Index: A measure of relative abundance, based on consistently monitored locations. An index of zero means that no Delta smelt were sampled at indexed locations, but they may be present elsewhere.

Biological Opinion (BiOp): USFWS finding as to whether a proposed action will jeopardize the continued existence of a species. Requires corrective actions.

Entrainment: When fish follow the flow of diverted water.

Refugia: A place that supports a population's survival through unfavorable conditions.