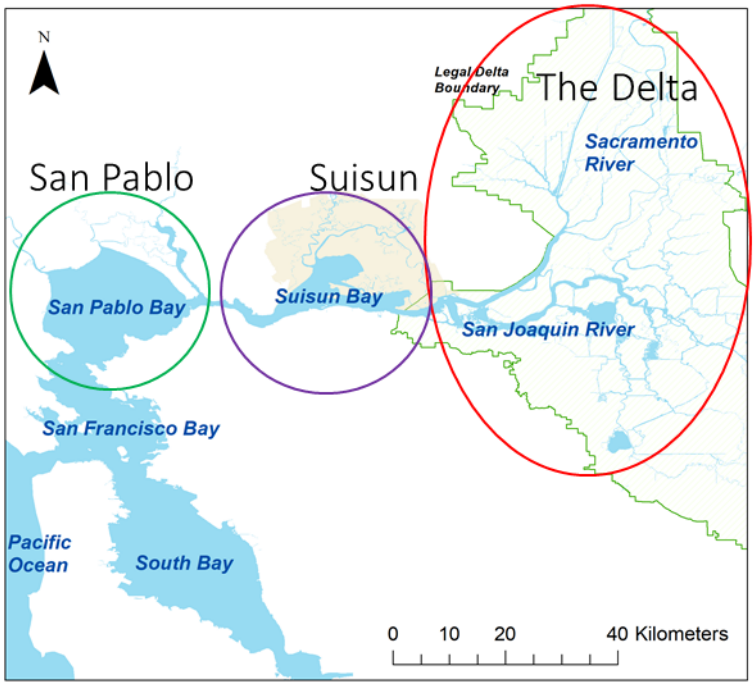
Summer 2018
IEP Seasonal Monitoring Report

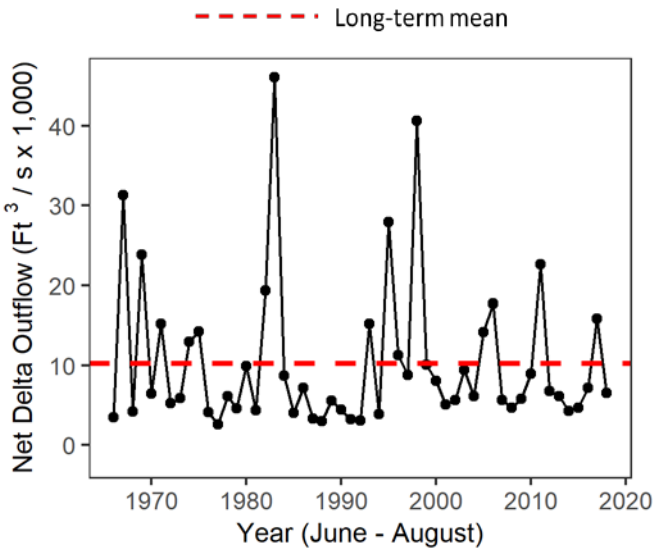
Interagency Ecological Program for the San Francisco Estuary
This report shows trends in water quality, plankton, and fish across multiple IEP surveys for June, July, and August of 2018.

Contents

Regions of the Estuary



Delta Outflow



- Freshwater flow influences water quality, plankton, and fish populations.
- Summer flow is driven primarily by rainfall, snowmelt, and upstream dam releases.
- The Summer of 2018 had slightly lower outflow than normal.

For questions, comments, or corrections, contact Rosemary Hartman – Rosemary.Hartman@water.ca.gov

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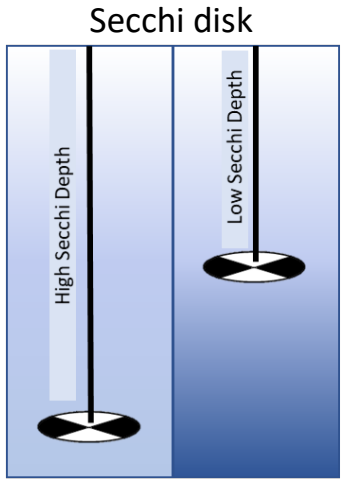
Secchi Depth

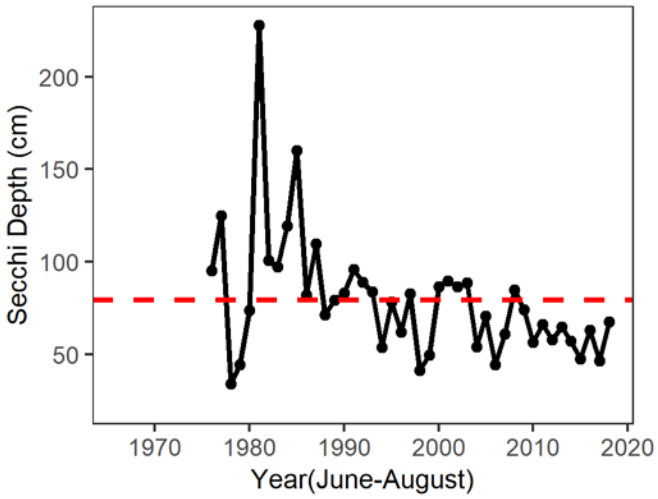
Background

- Organisms in this ecosystem are adapted to high turbidity conditions, and reductions in turbidity can have many negative ecological effects.
- Higher values for Secchi depth indicate lower turbidity.
- Secchi depth is measured monthly by DWR's Environmental Monitoring Program by dropping a black-and-white disk in the water until it disappears.

For more information, see: Schoellhamer, D. H. 2011. Sudden clearing of estuarine waters upon crossing the threshold from transport to supply regulation of sediment transport as an erodible sediment pool is depleted: San Francisco Bay, 1999. Estuaries and Coasts 34(5):885-899.

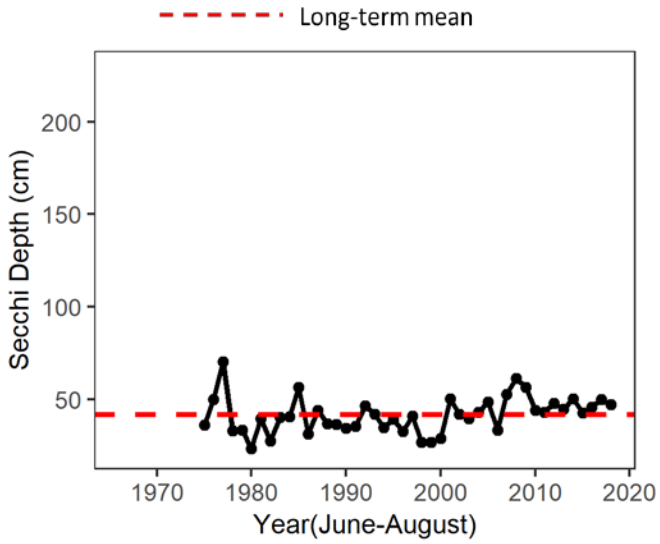


San Pablo Bay



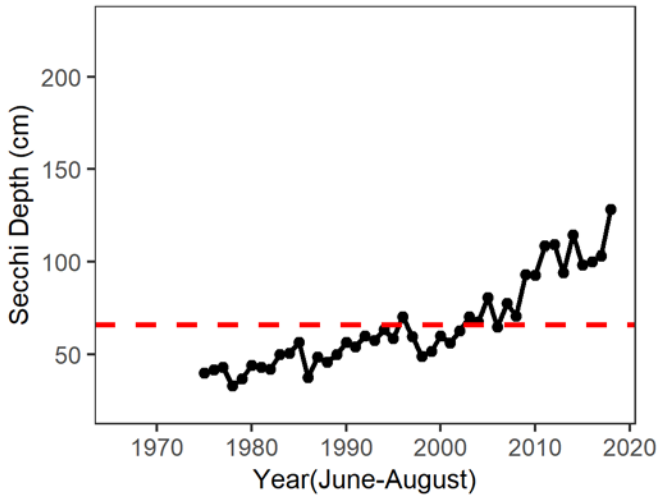
In 2018, San Pablo bay was close to the long-term average.

Suisun Bay



In 2018, Suisun Bay was also close to the long-term average.

The Delta



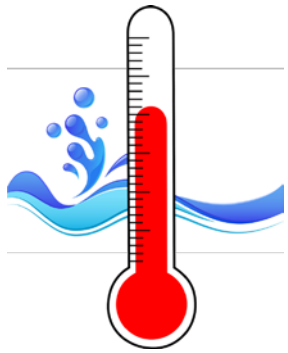
In 2018, the Delta was much clearer than average, the clearest Summer on record.

Water Temperature

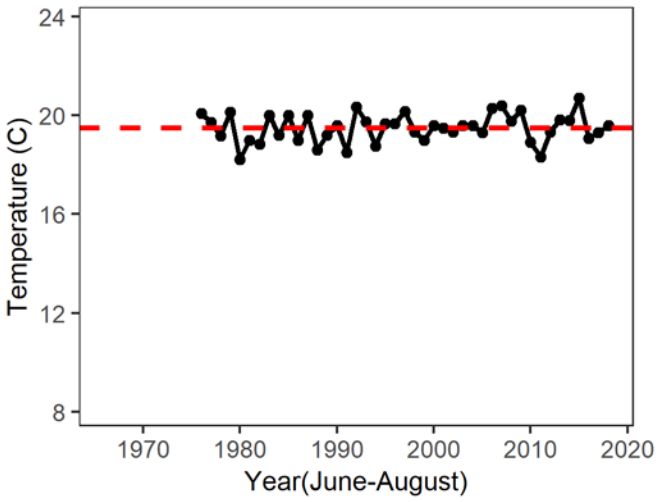
Background

- Water temperature is monitored monthly by DWR's Environmental Monitoring Program.
- High temperature can increase productivity and may trigger harmful algal blooms.
- Increasing Summer temperatures may limit juvenile smelt survival.
- Summer temperatures are lower closer to the ocean and slightly higher in the Delta.

For more information see: Lehman, P. W., T. Kurobe, S. Lesmeister, D. Baxa, A. Tung, and S. J. Teh. 2017. Impacts of the 2014 severe drought on the *Microcystis* bloom in San Francisco Estuary. Harmful Algae 63(Supplement C):94-108.

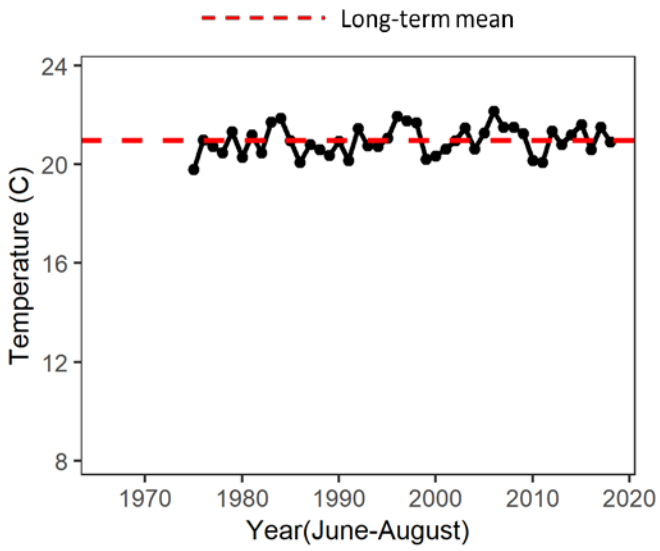


San Pablo Bay



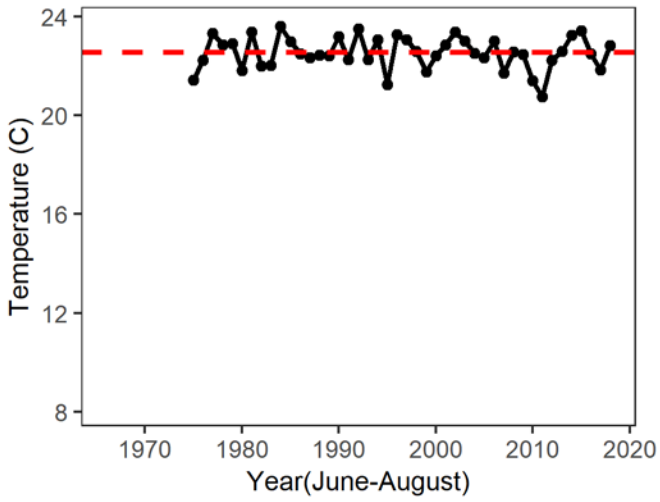
In 2018, San Pablo Bay temperatures were similar to the long-term average.

Suisun Bay



In 2018, Suisun Bay was similar to the long-term average.

The Delta



In 2018, the Delta was similar to the long-term average.

Chlorophyll

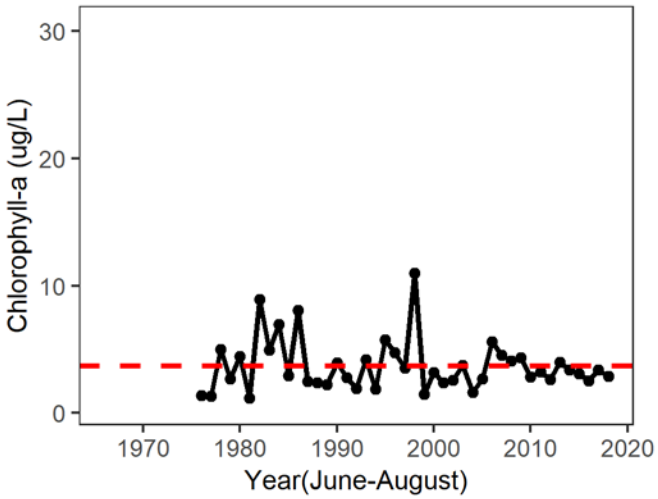
Background

- Chlorophyll is an indicator of phytoplankton production, which is highest during the Summer.
- Phytoplankton is the base of the pelagic food web. It is sampled monthly by DWR's Environmental Monitoring Program.
- The invasion of the clam *Potamocorbula amurensis* caused a decline in phytoplankton and zooplankton after 1986 – especially in Suisun Bay.

For more information see: Cahoon, T. and T. Brown 2018. Phytoplankton, Chlorophyll-a and Pheophytin-a Status and Trends 2017. IEP Newsletter 32(1):14-20.

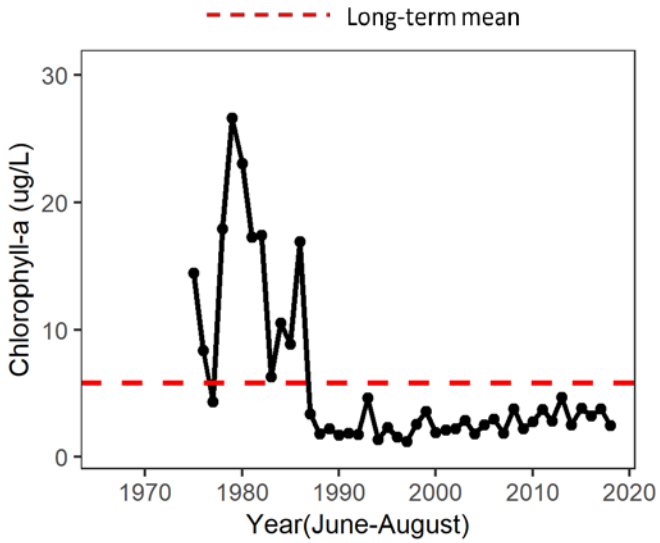
Phytoplankton

San Pablo Bay



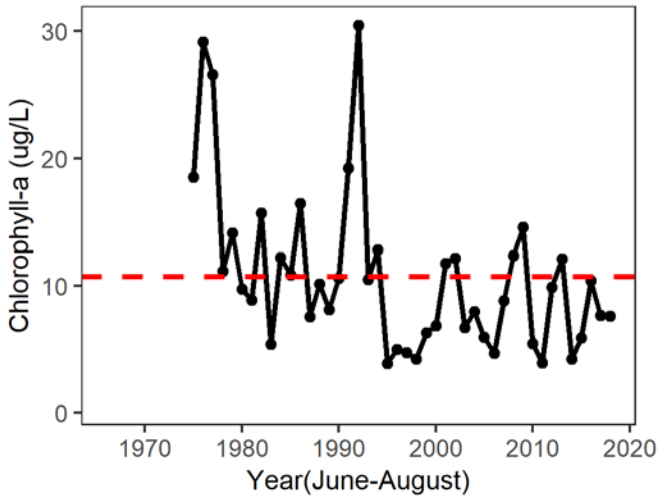
In 2018, San Pablo Bay chlorophyll was about average.

Suisun Bay



In 2018, Suisun Bay chlorophyll was slightly below average.

The Delta



In 2018, the Delta chlorophyll was also slightly below average.

Zooplankton

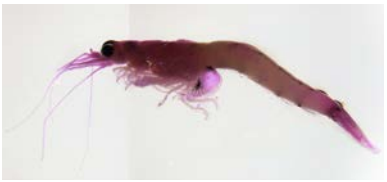
Background

- Zooplankton is sampled monthly by the CDFW/DWR Environmental Monitoring Program, but sampling in San Pablo Bay did not begin until 1998.
- Zooplankton are an important food source for pelagic fish.
- Calanoid copepods and mysids are particularly good fish food. Cyclopoid copepods are not as good for fish food.
- Biomass tends to be highest in summer.

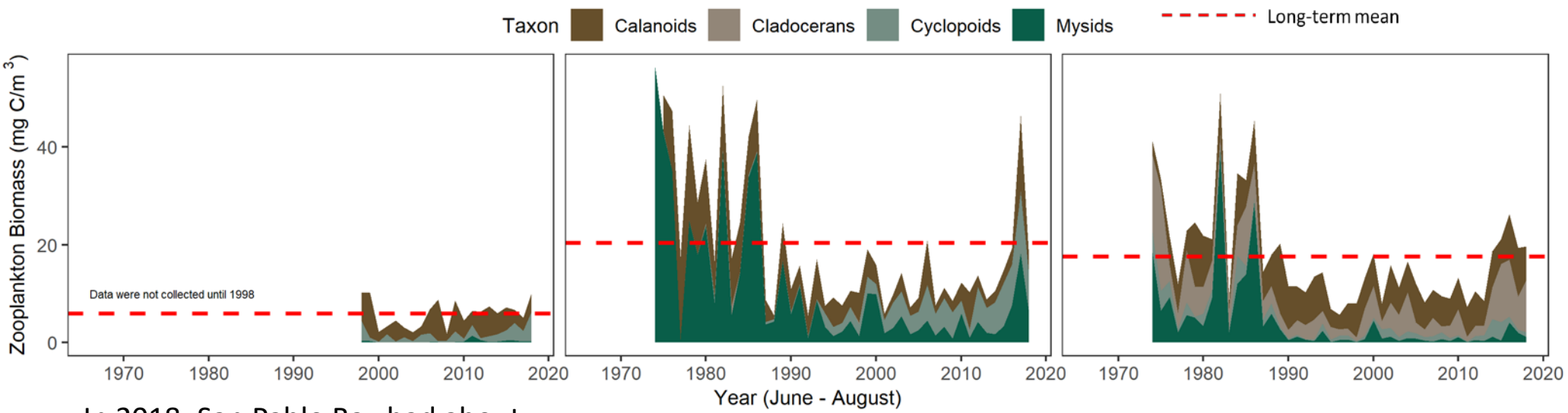
For more information see: Hennessy, A. 2018. Zooplankton Monitoring 2017. IEP Newsletter 32(1):21-32.

Copepod

Mysid



San Pablo Bay | **Suisun Bay** | **The Delta**



In 2018, San Pablo Bay had about average biomass, mostly cyclopoid copepods

In 2018, Suisun Bay also had slightly lower than average total biomass, mostly mysids.

In 2018, the Delta had about average total biomass, mostly cladocerans

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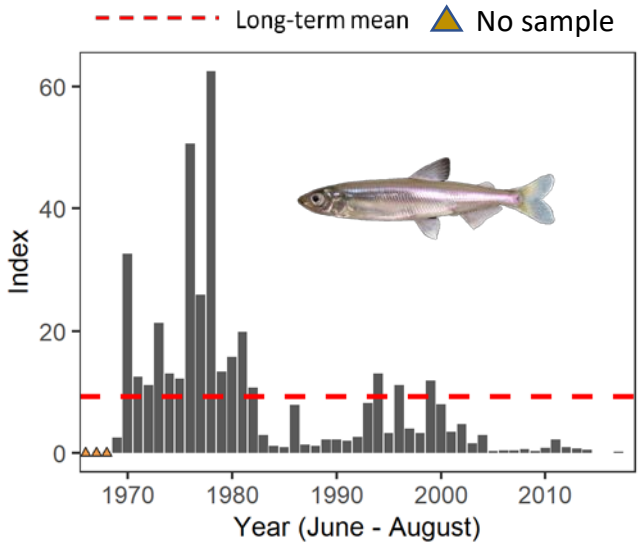
Fish

Background

- Delta Smelt, listed as threatened by the Endangered Spices Act, have been tracked by CDFW's Townet Survey since 1959 in Suisun Bay, San Pablo Bay, and the Delta.
- Northern Anchovy are an important forage fish in the brackish-saline regions of the estuary. They are sampled best by CDFW's San Francisco Bay Study.
- Sacramento Pikeminnow is a native cyprinid that is one of the few piscivorous native fish in the Delta. They are sampled by DJFMP's beach seine surveys throughout the estuary.

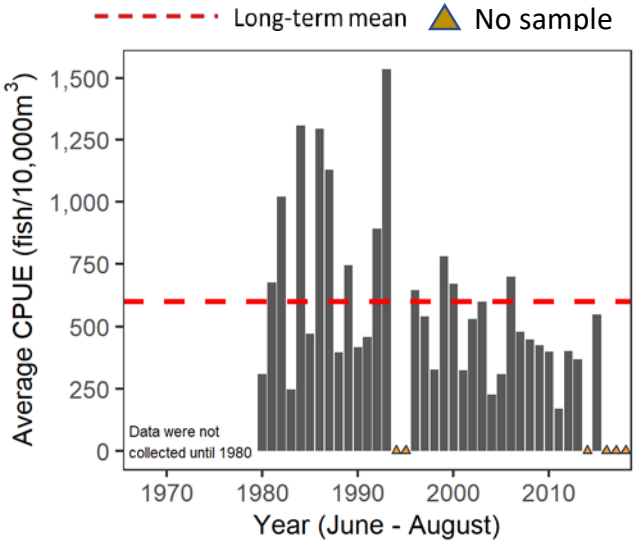
For more information, see: Hieb, K., J. Bautista, and J. Giannetta. 2018. Bay Study Fishes Status and Trends Report for the San Francisco Estuary, 2012–2016. IEP Newsletter 31(2):3-43.

Delta Smelt - Townet



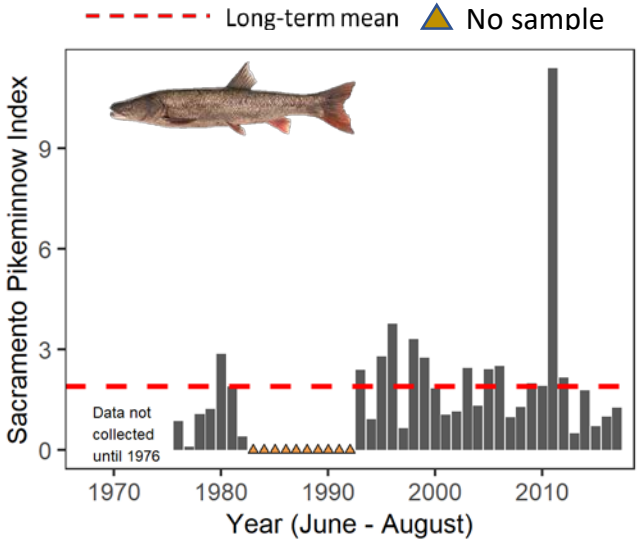
2018 was lower than the long-term average.

Northern Anchovy – Bay Study



The Bay Study has not been able to finish a survey in recent years, but previous catches were slightly lower than average.

DJFMP – Sac Pikeminnow



In 2018, Pikeminnow were less abundant than average

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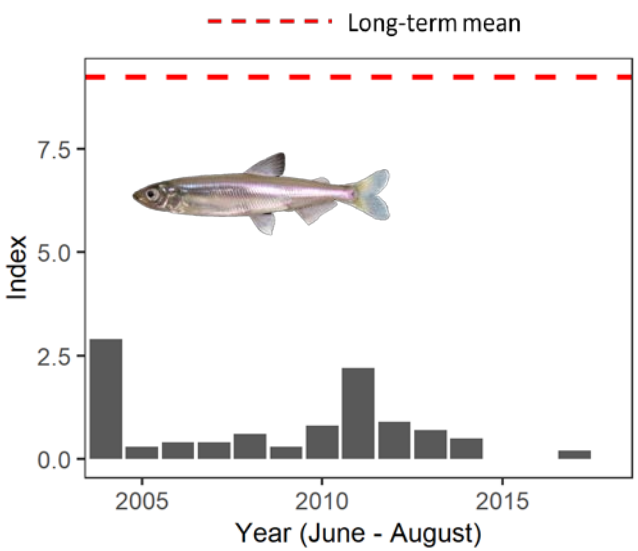
Recent Trends: 2004-2018

Background

- Delta Smelt have been in severe decline over the past two decades, with a Summer Townet index of zero in 2015, 2016 and 2018.
- *Microcystis* is a toxic cyanobacteria first found in the Delta in 1998. Microcystis presence has been documented by EMP and the Summer Townet Survey during their water quality sampling.
- Aquatic vegetation in the Delta has increased significantly in recent years. This vegetation is composed mostly of non-native invasive plant species and is categorized as either floating or submerged types. Coverage is estimated by UC-Davis using remote sensing of the North and Central Delta.

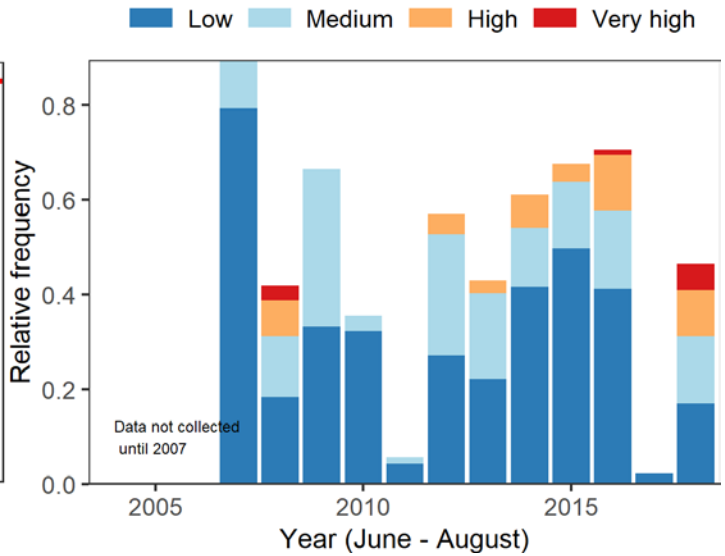
For more information, Ta et al. 2017. Invasive aquatic vegetation management in the Sacramento–San Joaquin River Delta: status and recommendations. San Francisco Estuary and Watershed Science 15(4)

Delta Smelt - Townet



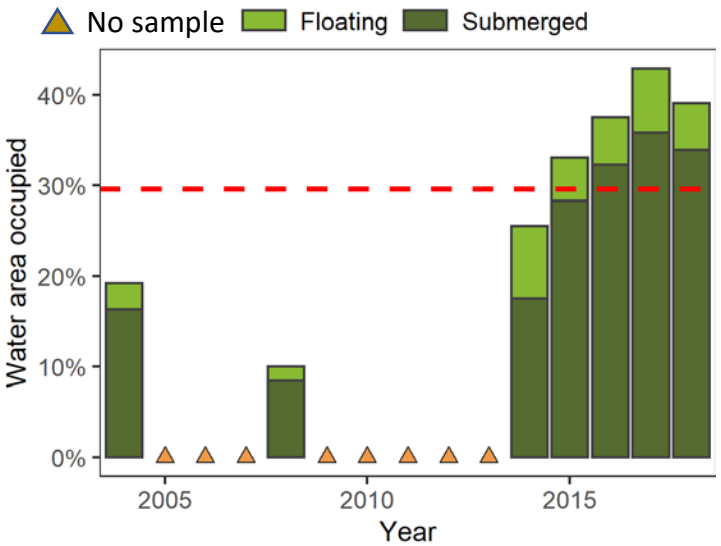
The 2018 Delta Smelt index was 0.

Microcystis



2018 had more observations of very high *Microcystis* than previous years.

Aquatic Vegetation



Aquatic vegetation was slightly lower than 2017, but higher than average.