Delta smelt conditions report

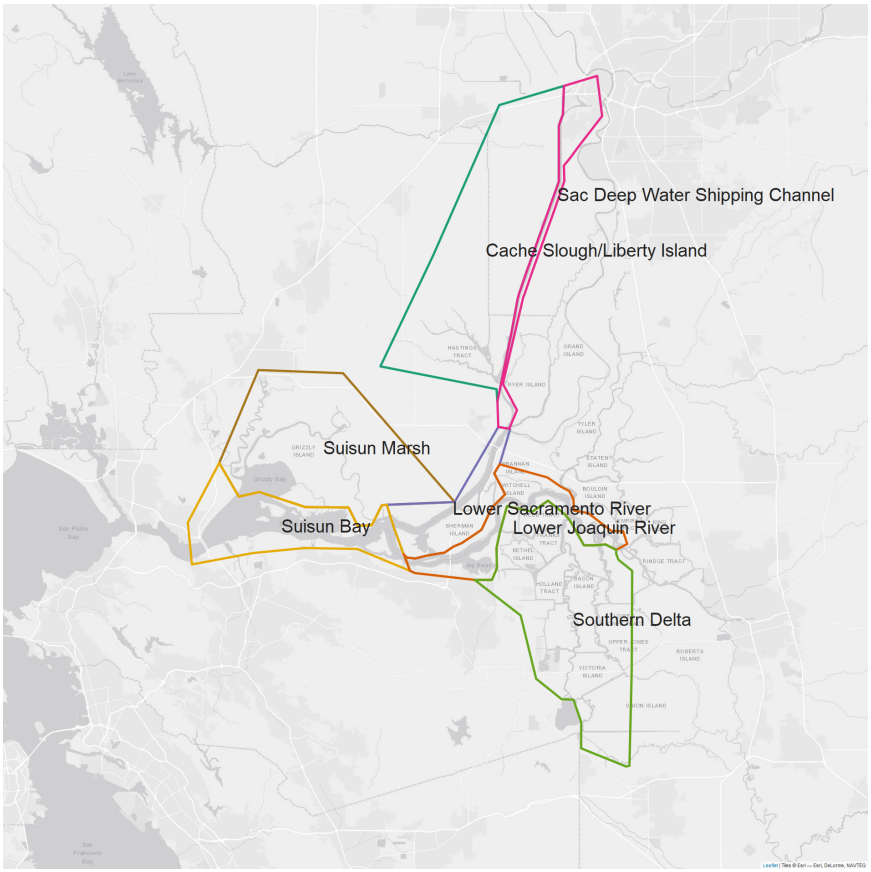
Delta Science Program

Oct 24, 2019

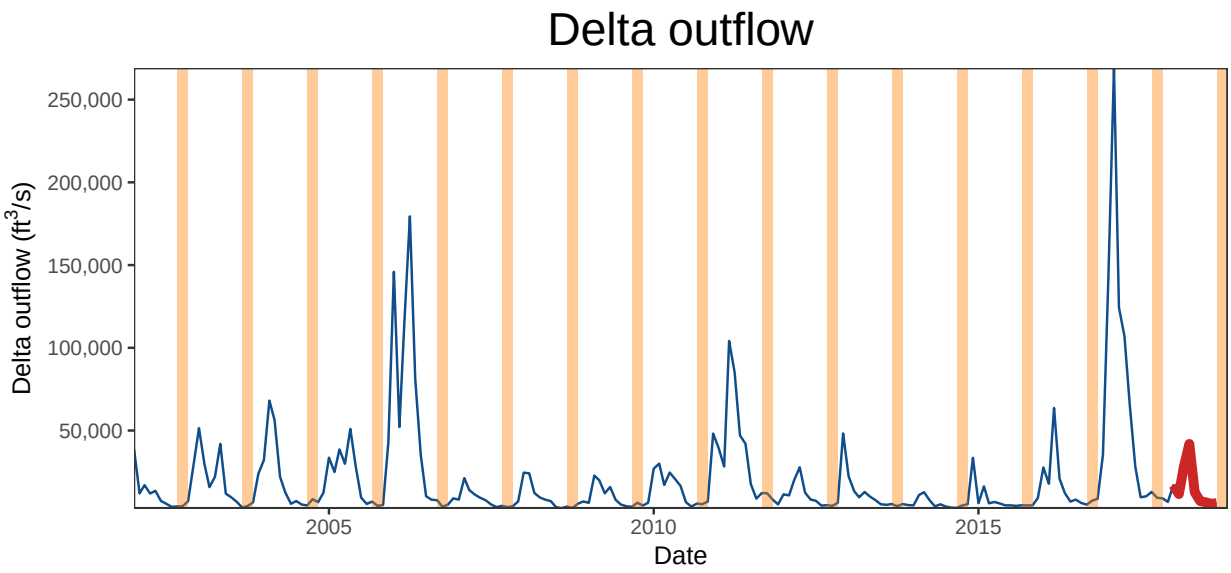
Introduction

Juvenile Delta Smelt Dale Kolke / DWR

Brief intro on what matters to delta smelt, their life cycle, and which regions they commonly occupy in different life stages.

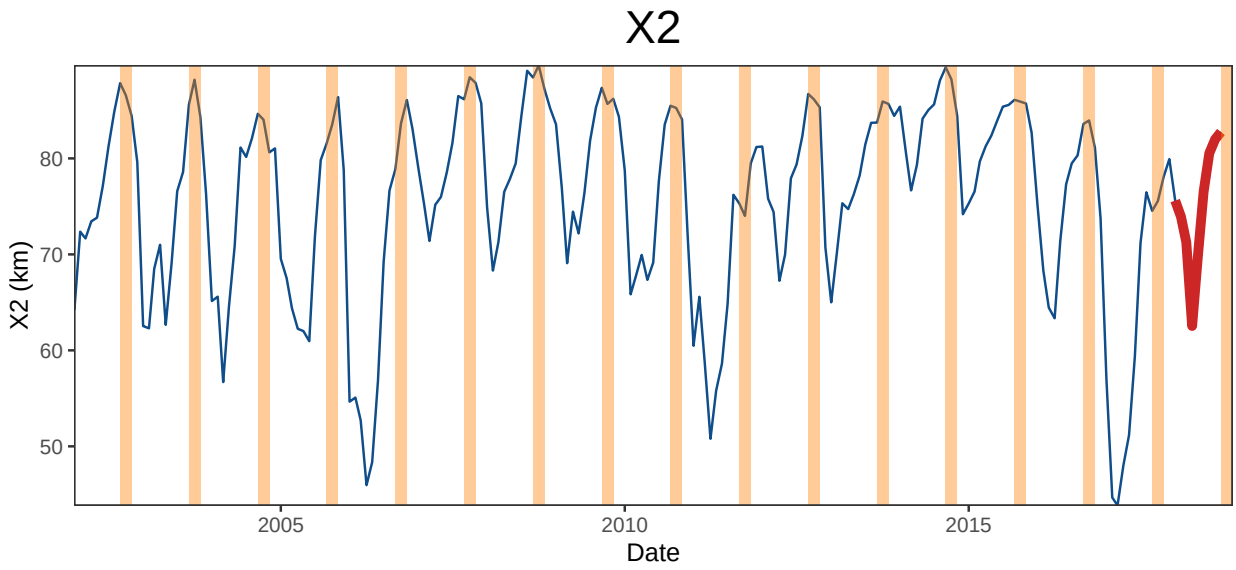


Abiotic drivers



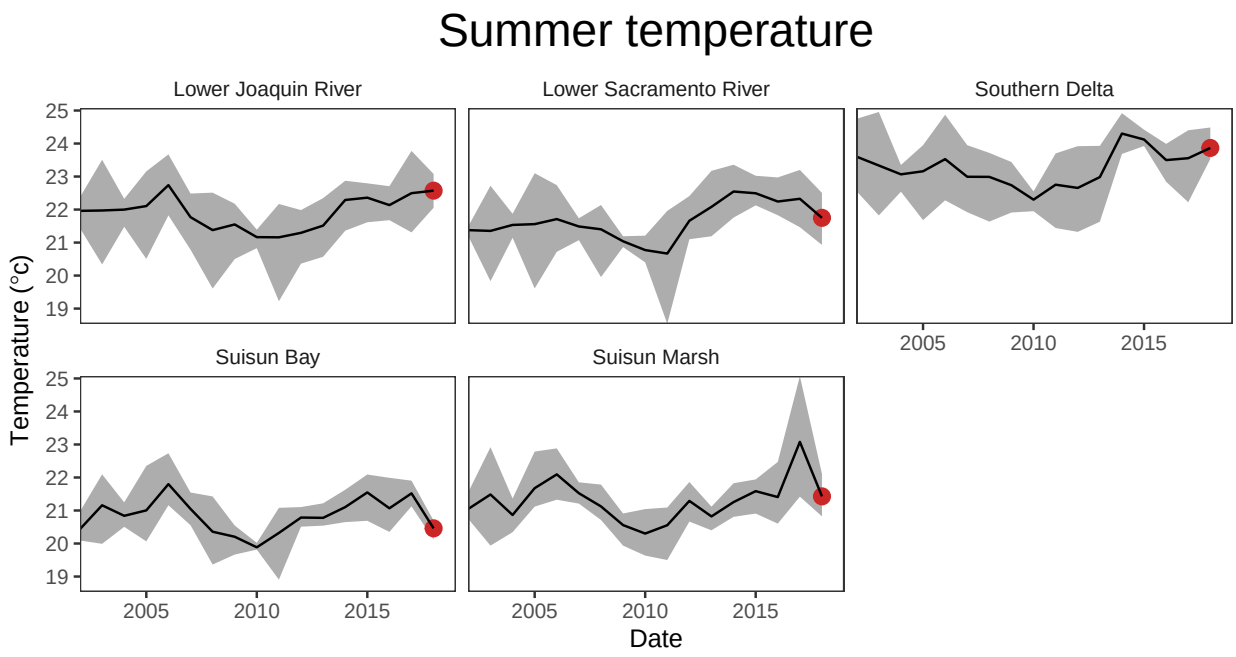
High Delta outflow into the San Francisco Bay is good for Delta Smelt because… Fall months are highlighted in orange.

Outflow was average in 2018 but much lower than the record flows in 2017.



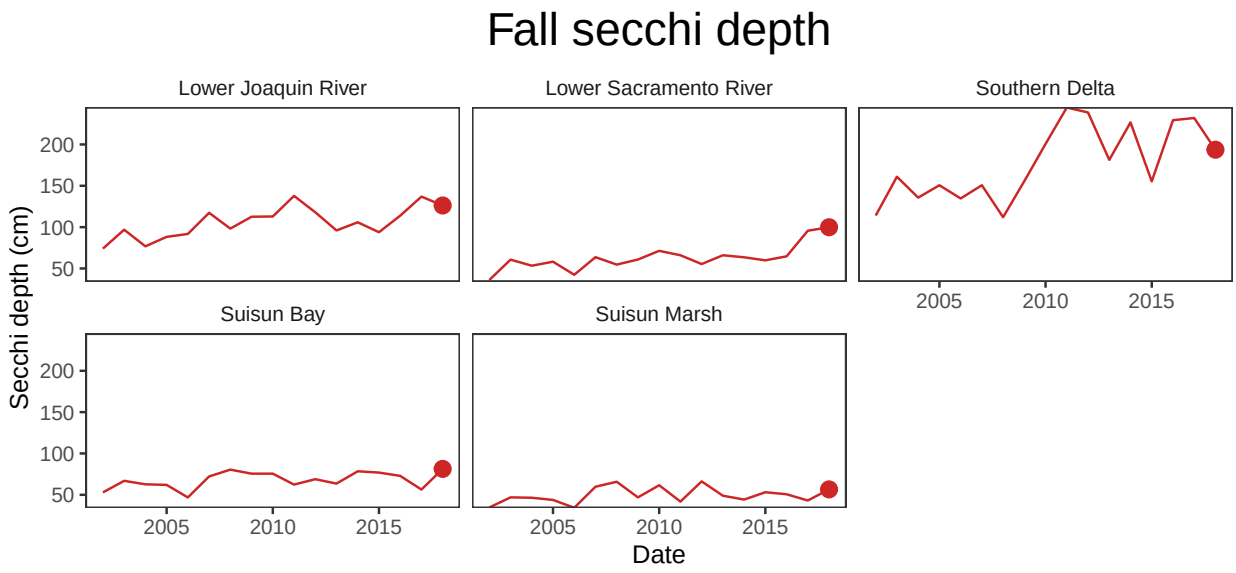
X2 is a measure of salinity intrusion defined as the distance from the golden gate to where the salinity of the bottom water reaches 2. Lower X2 is better for Delta smelt because it means there is more low salinity habitat for them to occupy…..Fall months are highlighted in orange.

X2 was about average in 2018 but higher than the record low the previous year.



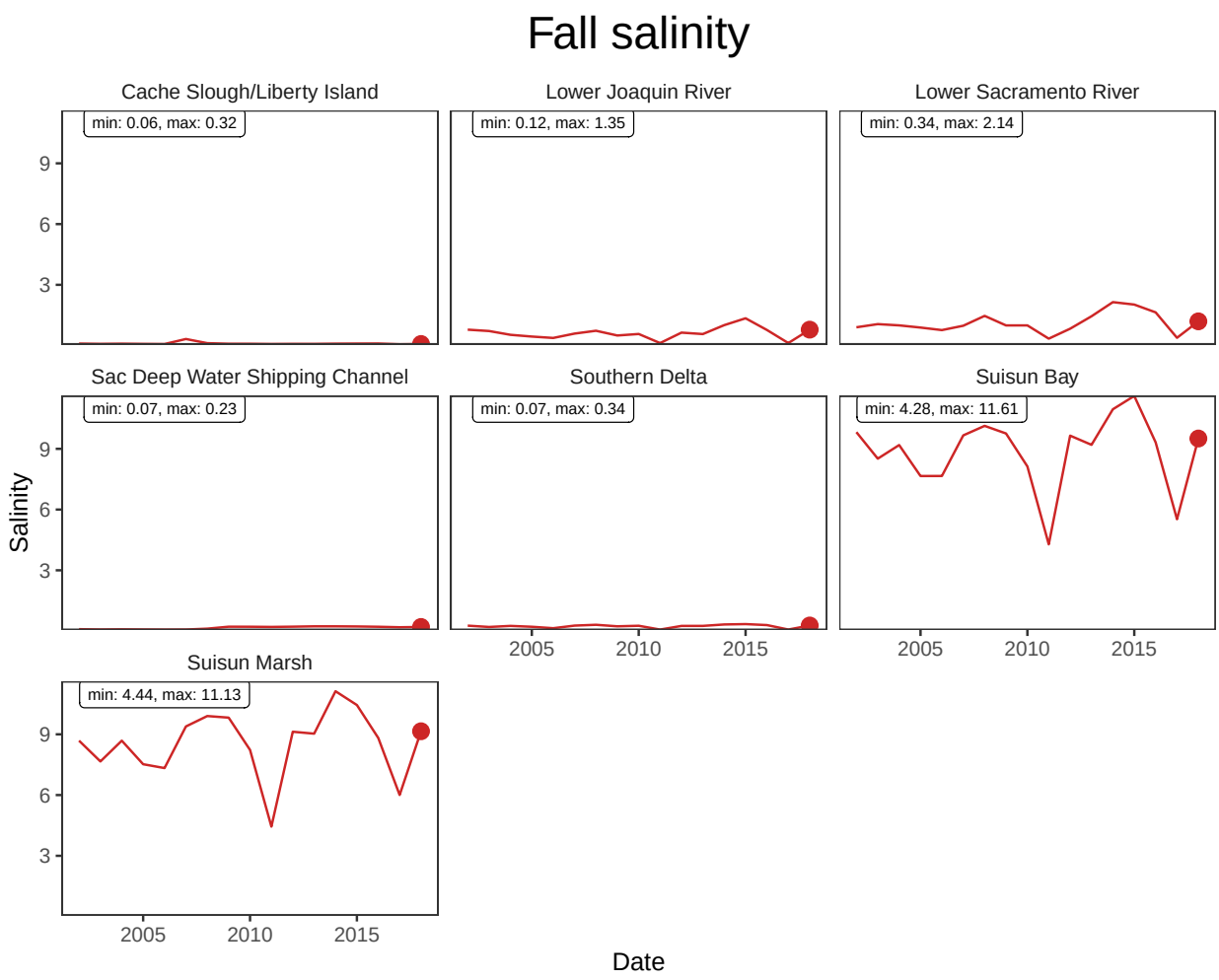
Delta smelt are sensitive to high water temperatures. Different life stages occur in different times of year that determine their temperature exposure. This graph displays the mean water temperature of the coldest, average, and hottest month each life stage would have experienced. Winter is defined as Dec-Mar, Spring as Apr-Jun, and Summer/fall as Jul-Nov. More detail….

Temperatures were low throughout the Delta in 2018, except in the Upper Sacramento.



Secchi depth is a measure of turbidity. Lower secchi depth indicates higher turbidity, which is preferred by Delta Smelt.

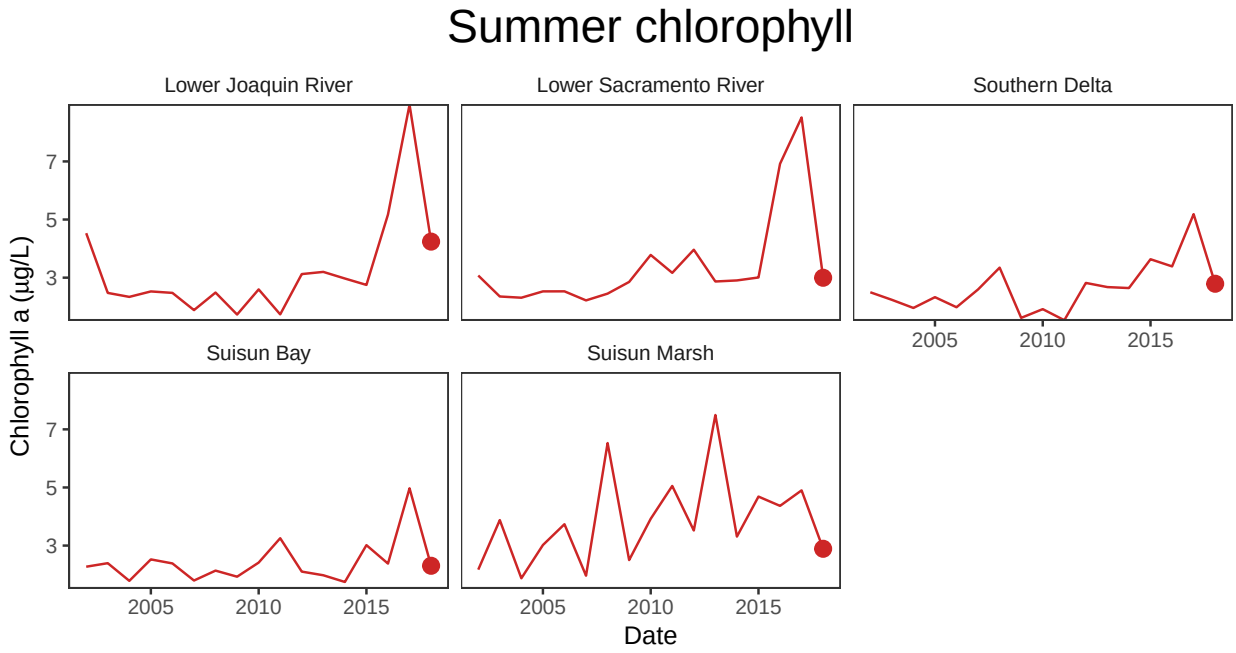
Secchi depth was above average in most regions in the Delta in 2018, reflecting a general trend of decreasing turbidity over the past few years.



Delta smelt prefer fresh water and are most abundant in salinities of 1-2 ppt, are rare in salinities higher than 6 ppt, and are not found in salinities above 14 ppt. A small percentage of Delta smelt are spawned in the brackish waters, but use freshwater during winter and spring months to spawn.

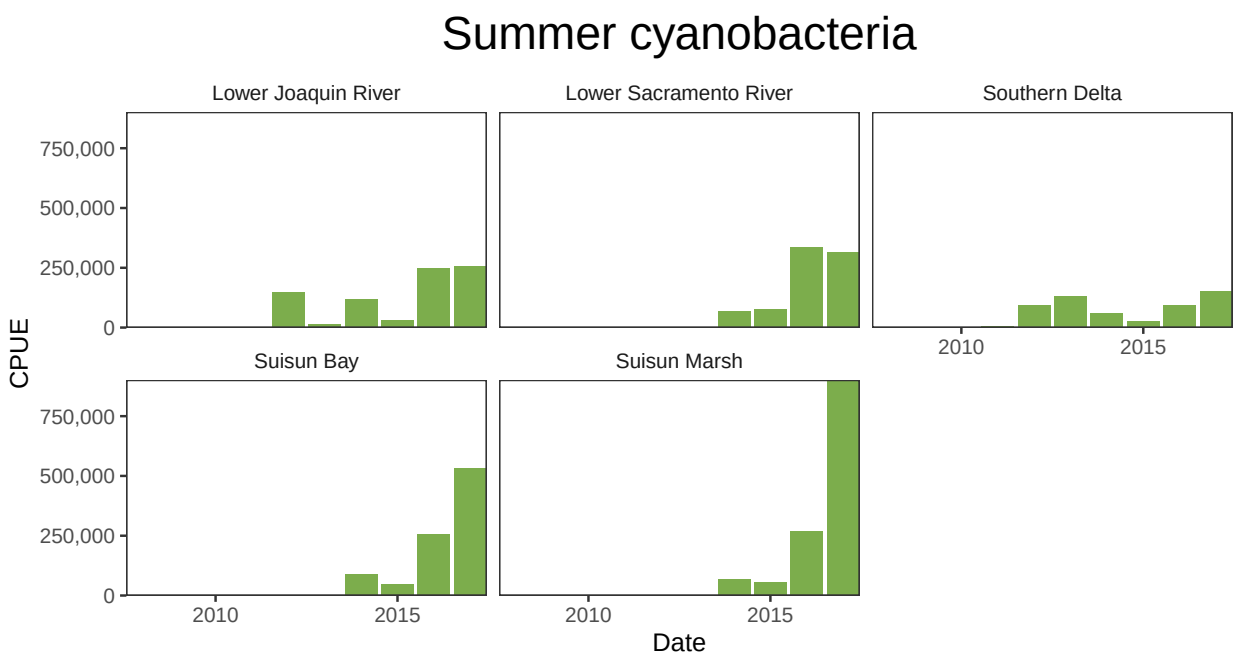
Salinity was average in 2018.

Biotic drivers



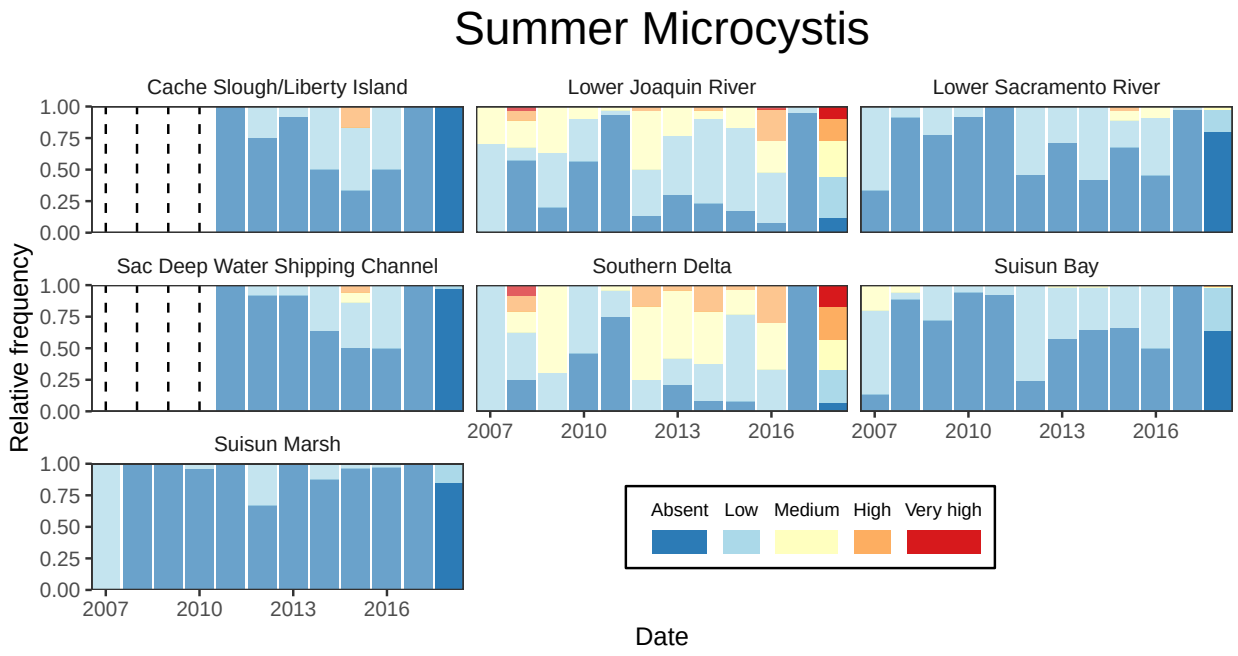
Chlorophyll is a measure of productivity at the base of the food web. Higher chlorophyll indicates more food is available for zooplankton which are important prey for many fish including Delta Smelt. Chlorophyll levels above 10 g/L (green) are required to sustain zooplankton growth.

Chlorophyll levels were low in 2018.



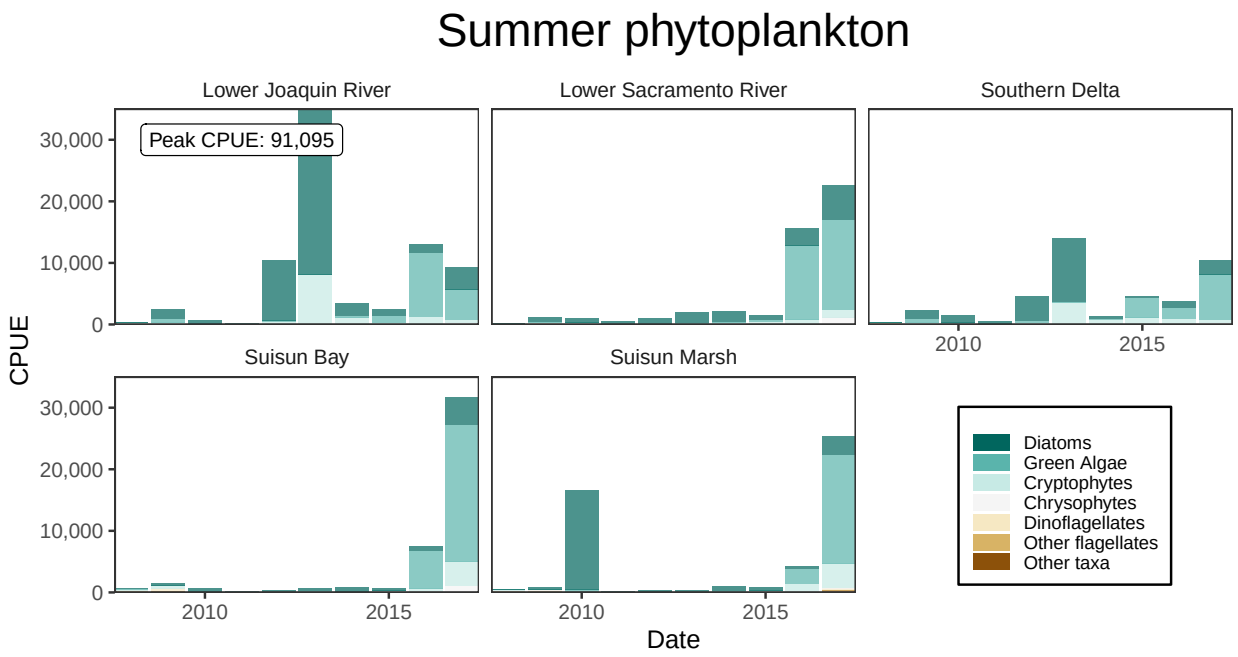
Cyanobacteria are phytoplankton that can produce toxins such as microcystis.

Cyanobacteria have increased in the past few years to record 2018 concentrations.



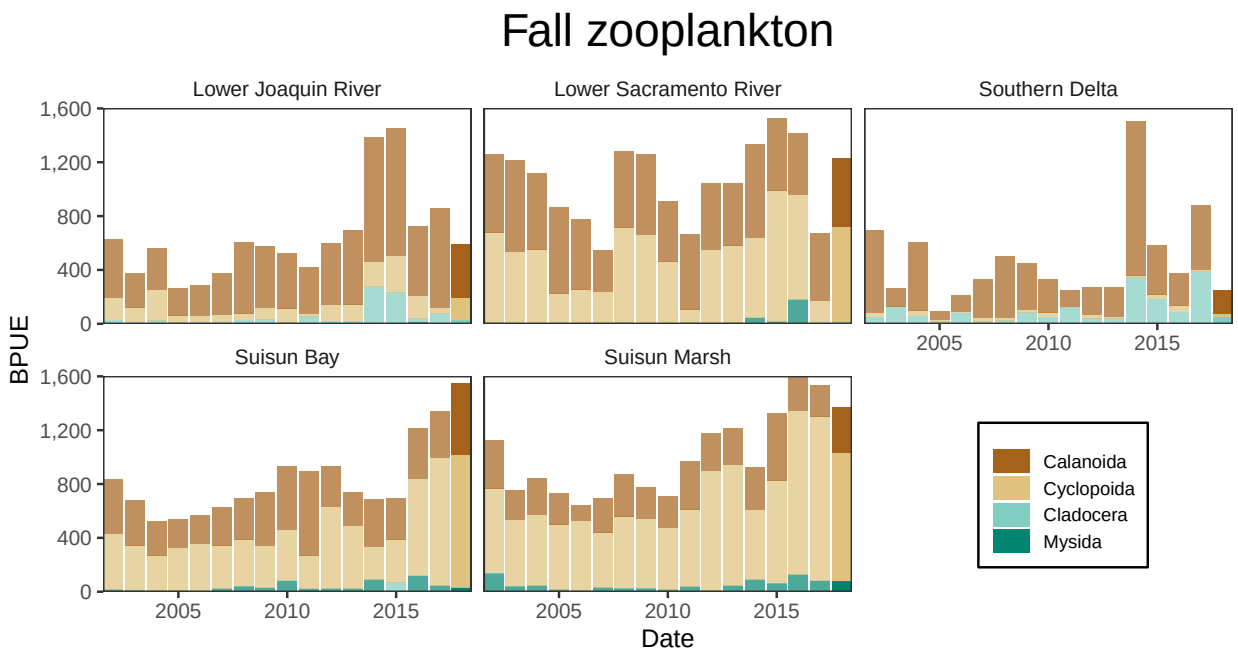
Microcystis is a toxin-producing cyanobacteria harmful to human and animal health.

High concentration microcystis blooms were detected in 2018 in the Lower San Joaquin and Southern Delta regions.



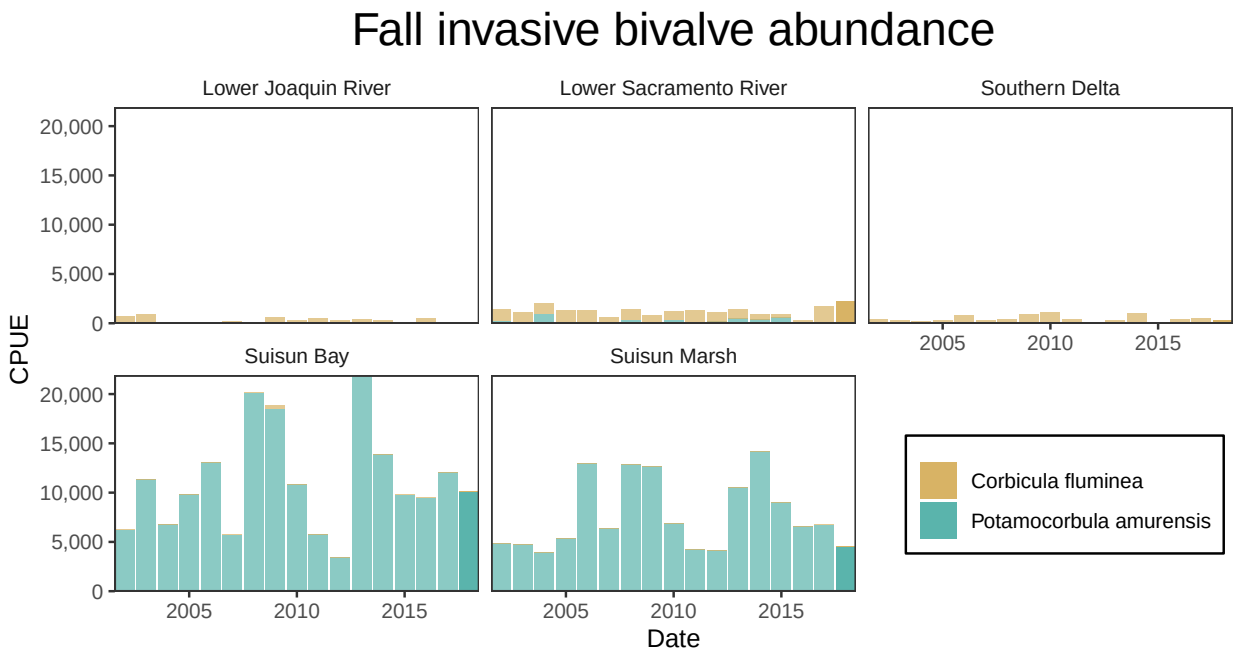
Phytoplankton are the base of the aquatic food web. They provide food for zooplankton, which are important prey for many fishes such as Delta Smelt.

Something about phytoplankton concentrations.



Zooplankton are important food for Delta Smelt, which feed primarily on these taxa

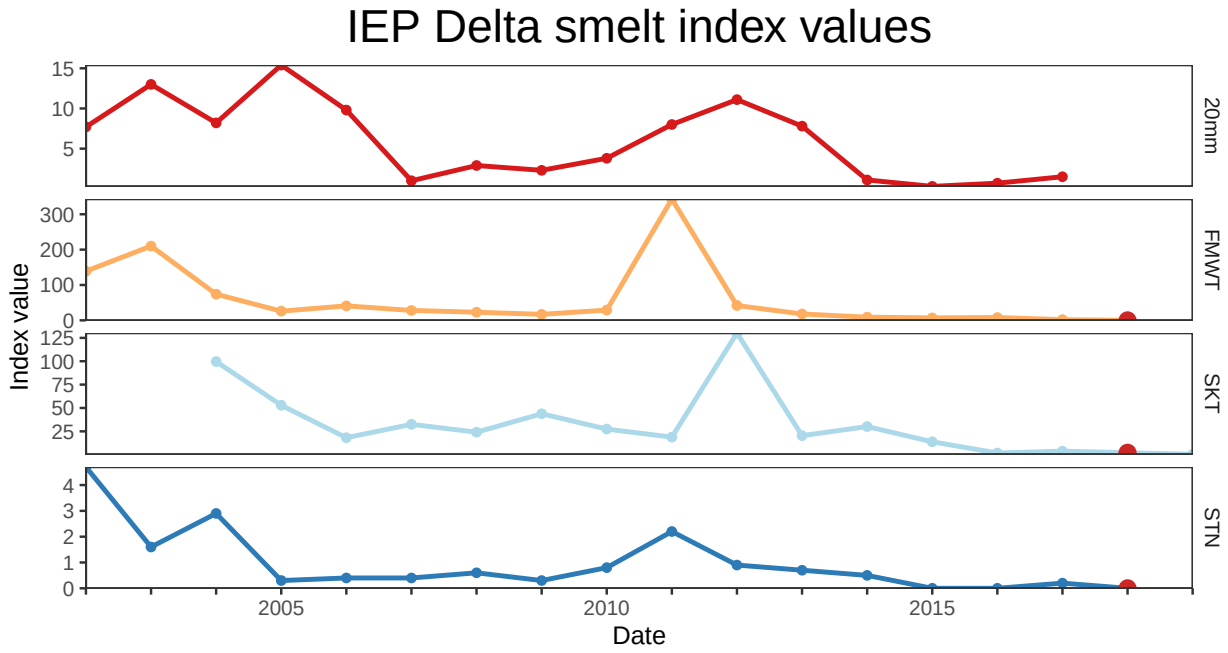
Zooplankton biomass was average in 2018 except in the Southern Delta and Suisin regions where it was above average.



Invasive bivalves (clams) have been responsible for drastic declines in phytoplankton and zooplankton biomass in the Delta, reducing the amount of food available for fishes.

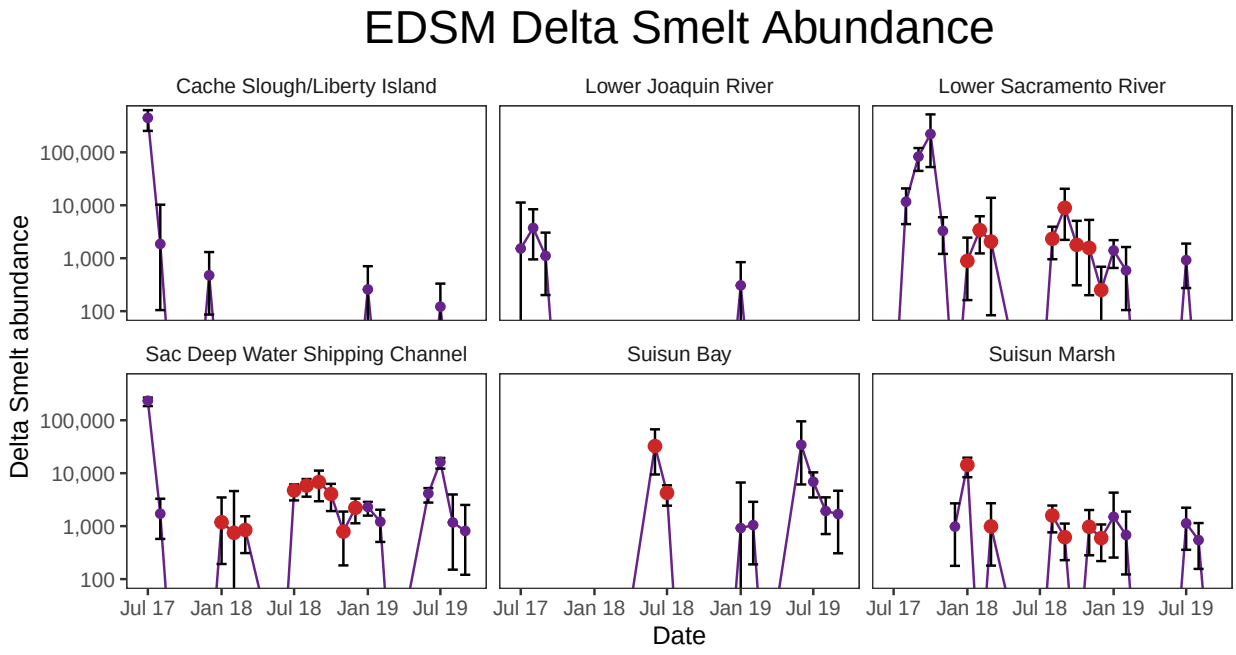
Bivalve abundances in 2018 were low or reduced relative to recent years in the Lower San Joaquin, Southern Delta, and Suisin Bay/Marsh but very high in the Lower Sacramento and Western Delta.

Delta Smelt



Delta smelt abundance is measured by 4 IEP surveys that target different life stages. Details here.

All abundance indices in 2018 were low or impossible to calculate due to very low catch.



EDSM calculates abundance estimates with confidence intervals every week. ***Note that the y-axis is log transformed (i.e. 1=10, 2=100, 3=1000, etc.) and the x axis starts in mid 2017. The y axis starts at the lowest estimated detection value; all missing values below the limit are 0s.***

EDSM also documents a general decline in Delta Smelt across all regions (since mid 2017).