

# Abundance and Distribution of Microplankton in the San Francisco Estuary

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## Introduction

Microplankton are a diverse group of planktonic organisms ranging from 0.02 to 0.2 millimeters (Figure 2). Defined solely by size, it spans numerous taxonomic groups, including both heterotrophs and autotrophs.

Microplankton are abundant in all aquatic ecosystems and are important prey for many organisms, including bivalves, crustaceans, and fish. Specifically, in the San Francisco Estuary (SFE) microplankton are the main food source for copepods that in turn serve as an important food for several species of protected fish.

Little is known about the microplankton community in the SFE, and information on their abundance and distribution will help scientists better understand their role in local foodwebs. Additionally, scientists will be able to understand how this community is affected by changes to the SFE.

Figure 1. Map of San Francisco Estuary with sampling stations (pink- low salinity zone, yellow- freshwater)

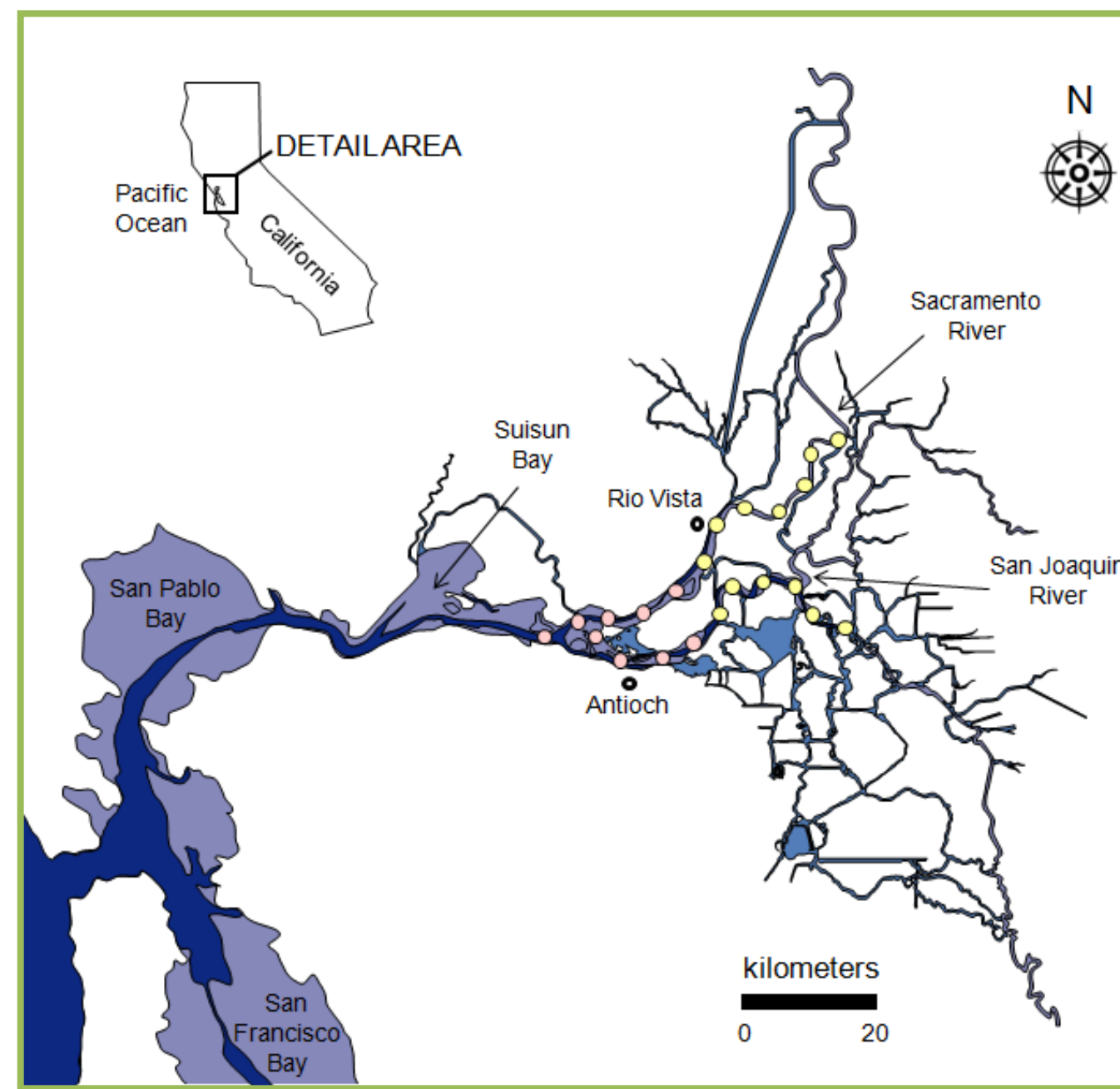
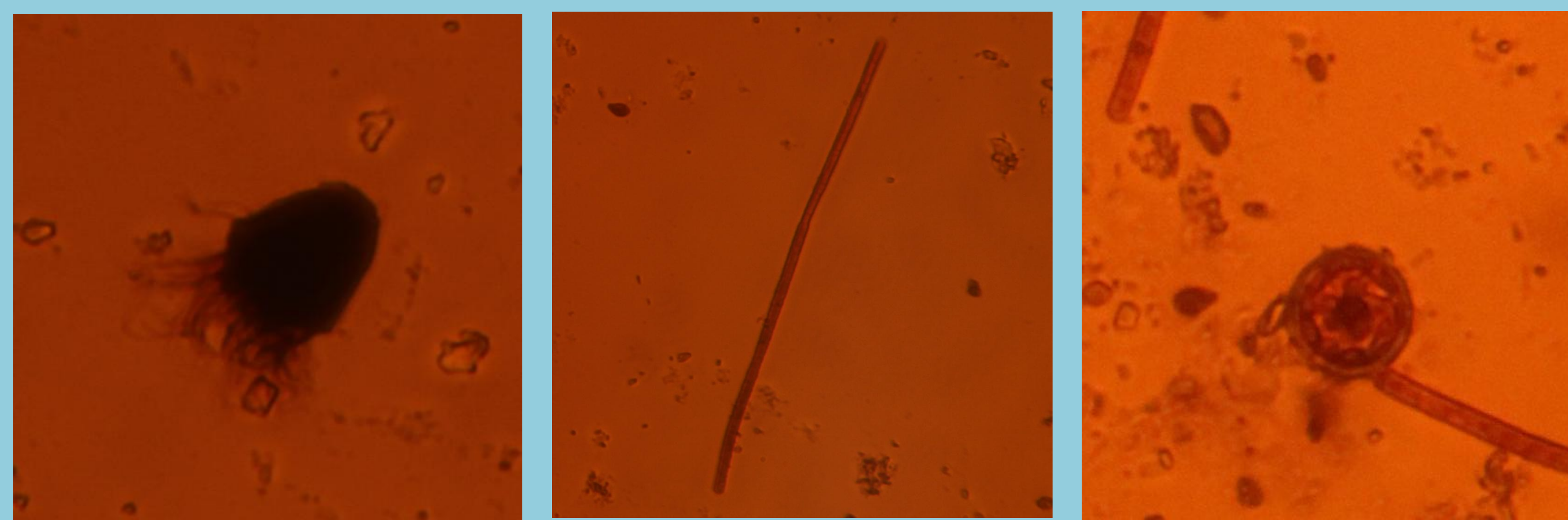


Figure 2. Examples of microplankton preserved in iodine.



Alloricate ciliate, heterotroph      Cyanobacterium, autotroph      Centric diatom, autotroph

## Research Questions

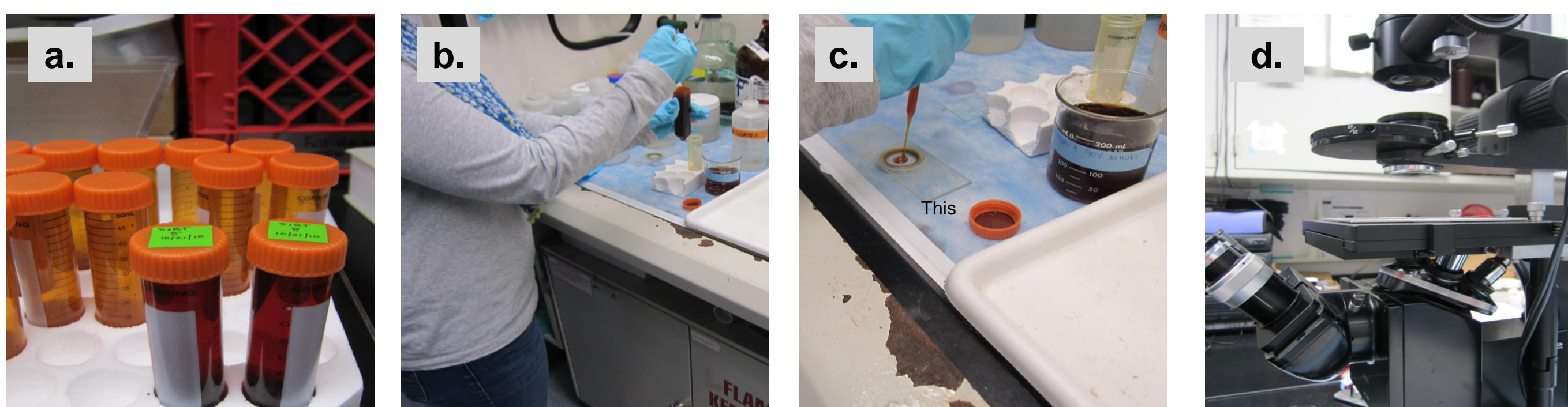
How does the abundance and composition of microplankton differ:

- between the Sacramento and San Joaquin Rivers?
- among 2010, 2011, and 2012?
- between fresh water and the low salinity zone?

## Methods

- Water samples were collected from the Sacramento and San Joaquin Rivers (Figure 2).
- Samples were preserved using iodine (acid Lugol's solution).
- Fifty milliliters of the sample was poured into a settling tube (Figure 3a).
- The settling tubes were stored to allow the cells to settle to the bottom.
- Excess water was removed from the tube with a pipette (Figure 3b).
- The remaining sample was transferred to a counting chamber (Figure 3c).
- Microplankton were counted, measured, and identified with an inverted microscope (Figure 3d).

Figure 3. Methods.



## Results

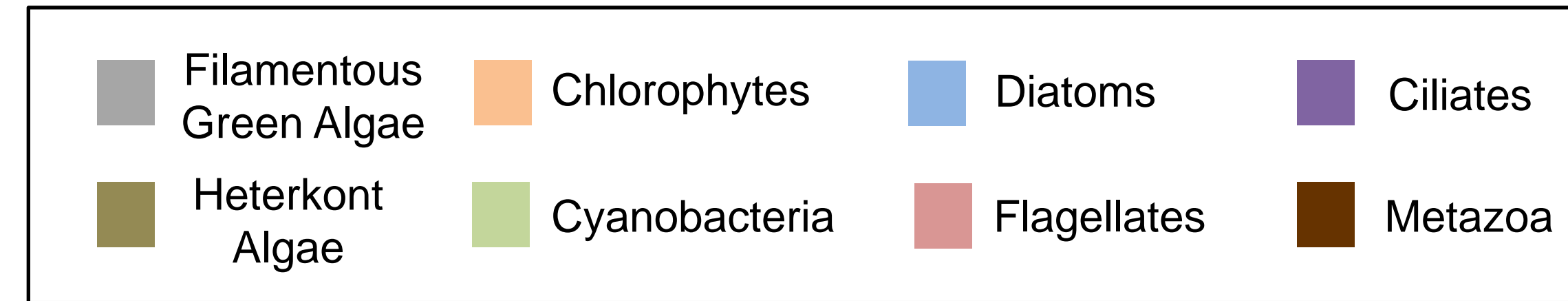
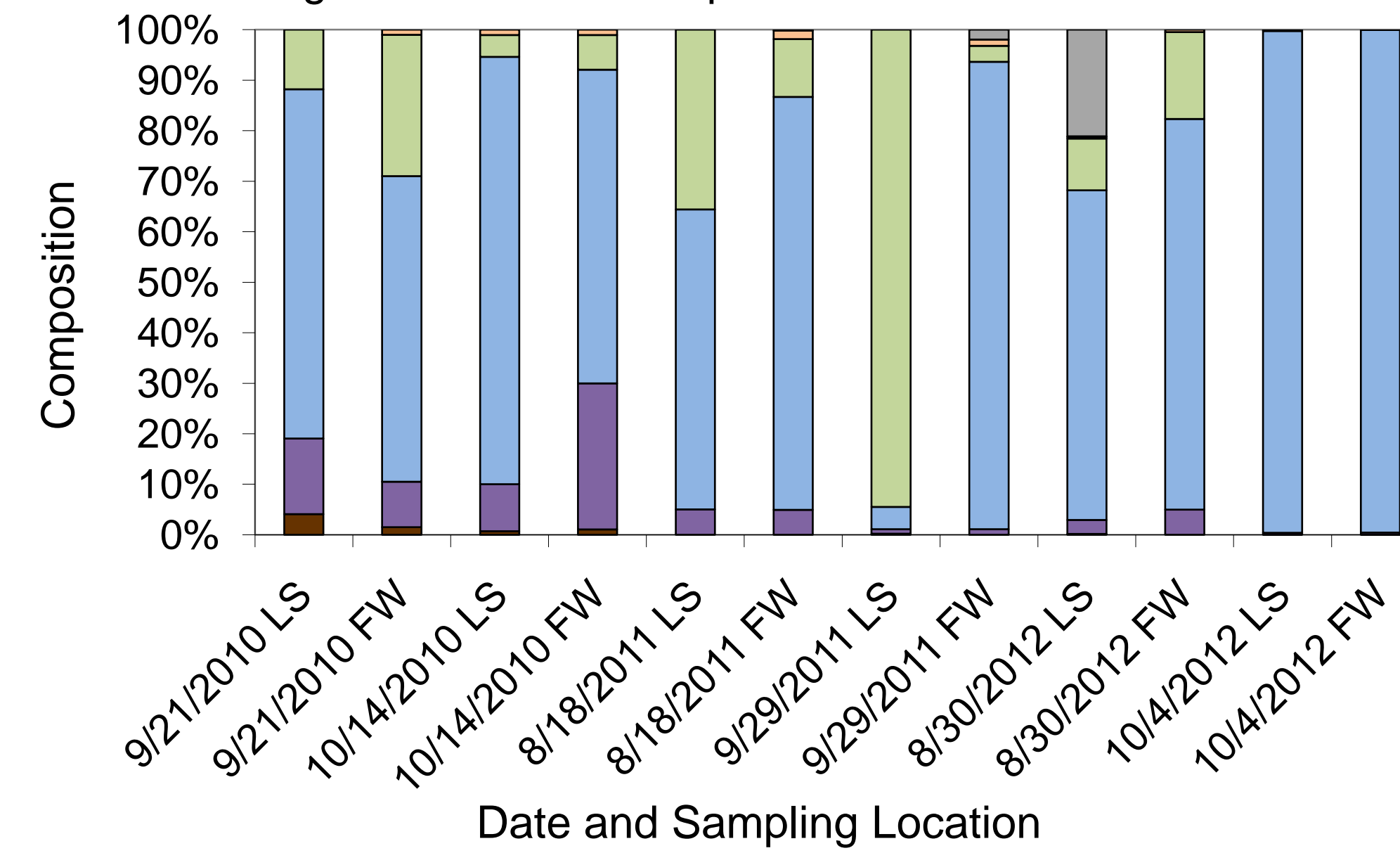
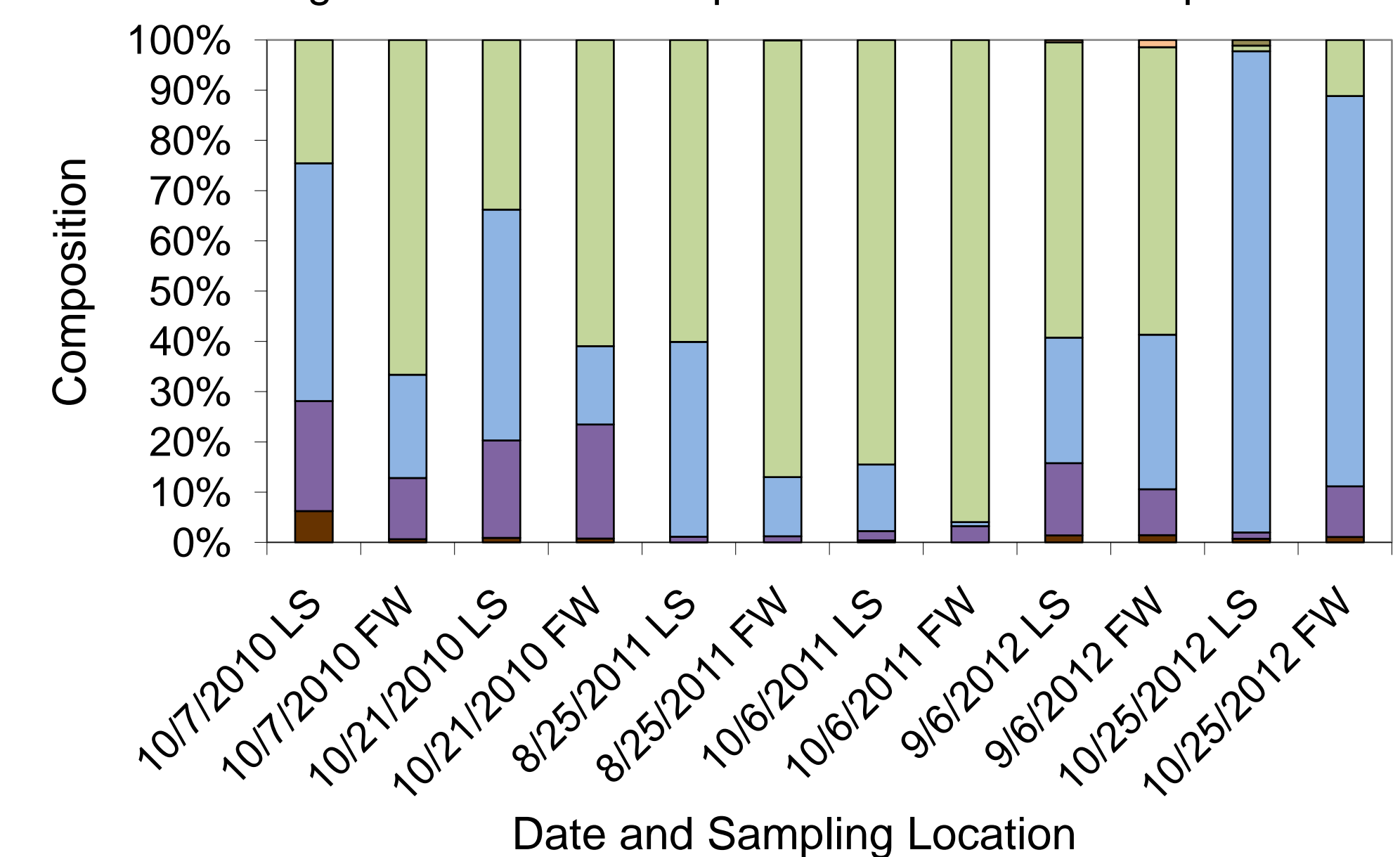


Figure 4. Percent composition in the Sacramento River.



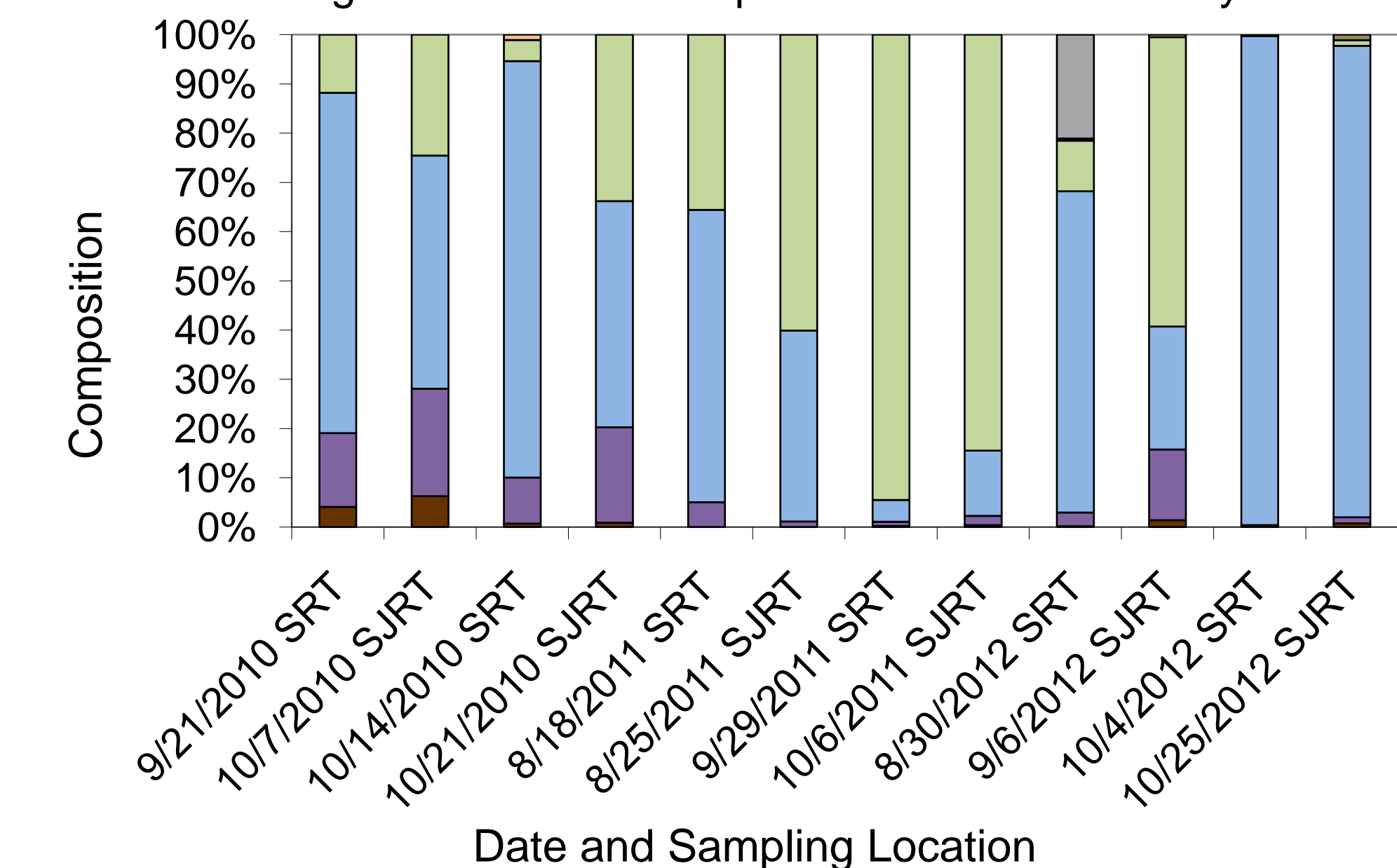
Dominated by diatoms

Figure 5. Percent composition in the San Joaquin River.



Dominated by cyanobacteria

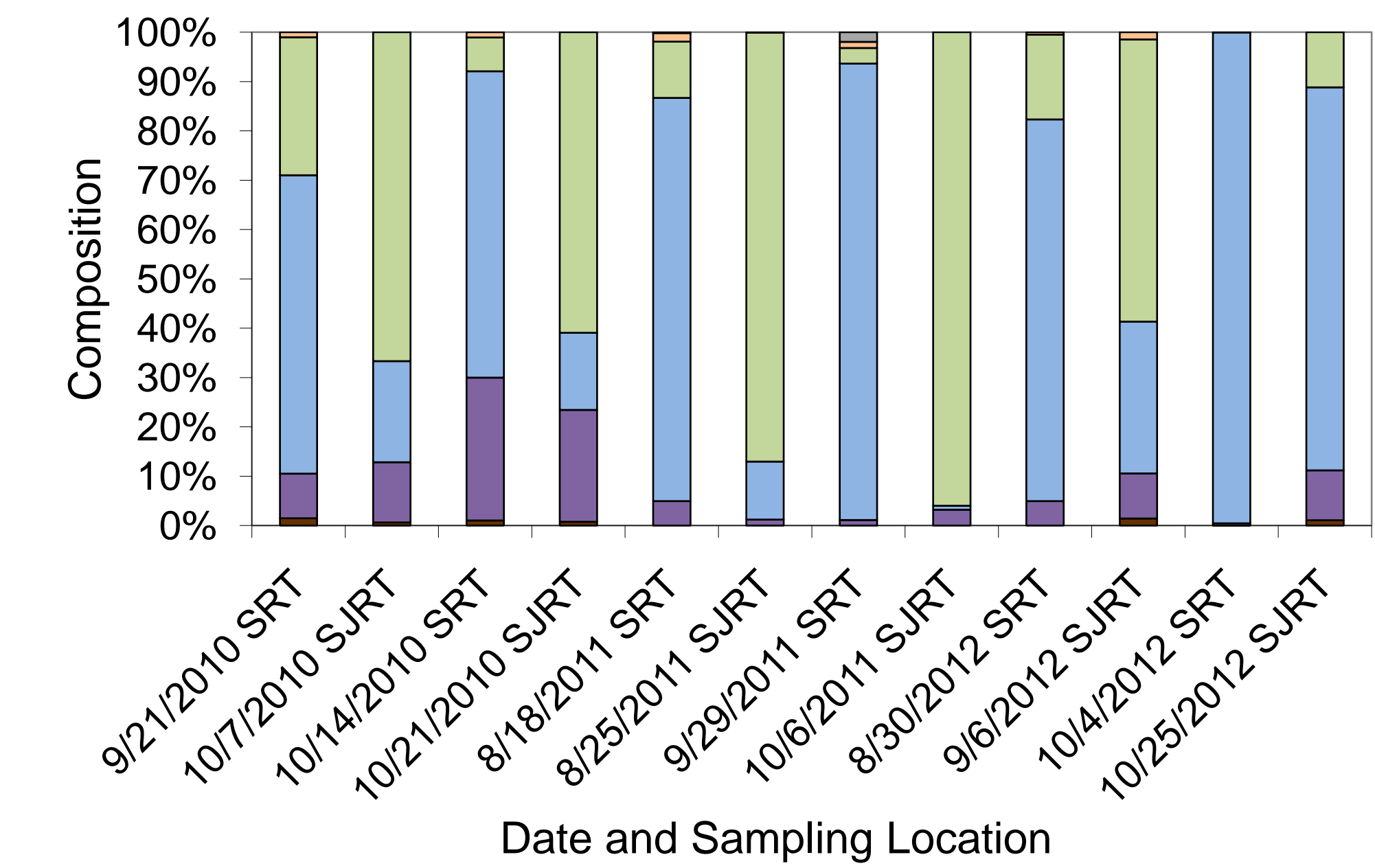
Figure 6. Percent composition in the low salinity zone.



Composition was similar in 2010 and 2012 2011 was different possibly due to high flow

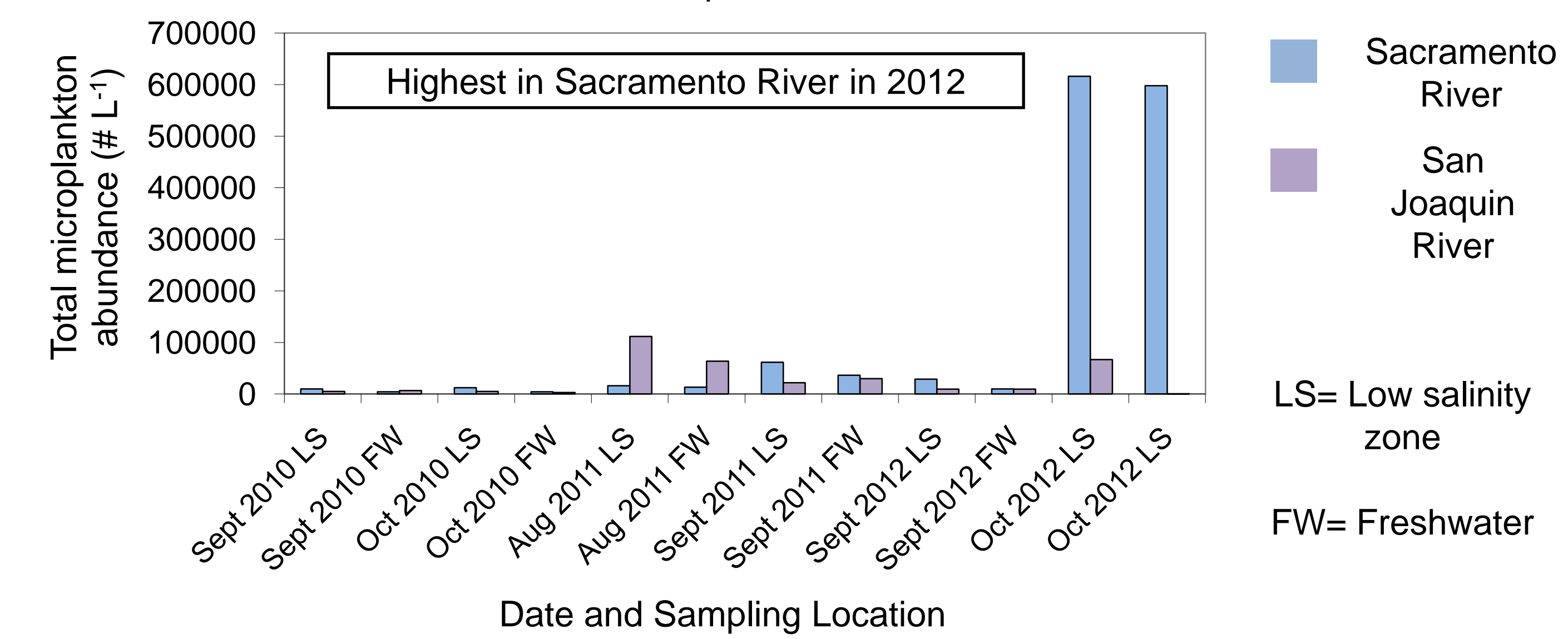
## Results

Figure 7. Percent composition in freshwater.



Dependent on river

Figure 8. Total microplankton abundance (# L<sup>-1</sup>) in the Sacramento and San Joaquin Rivers.

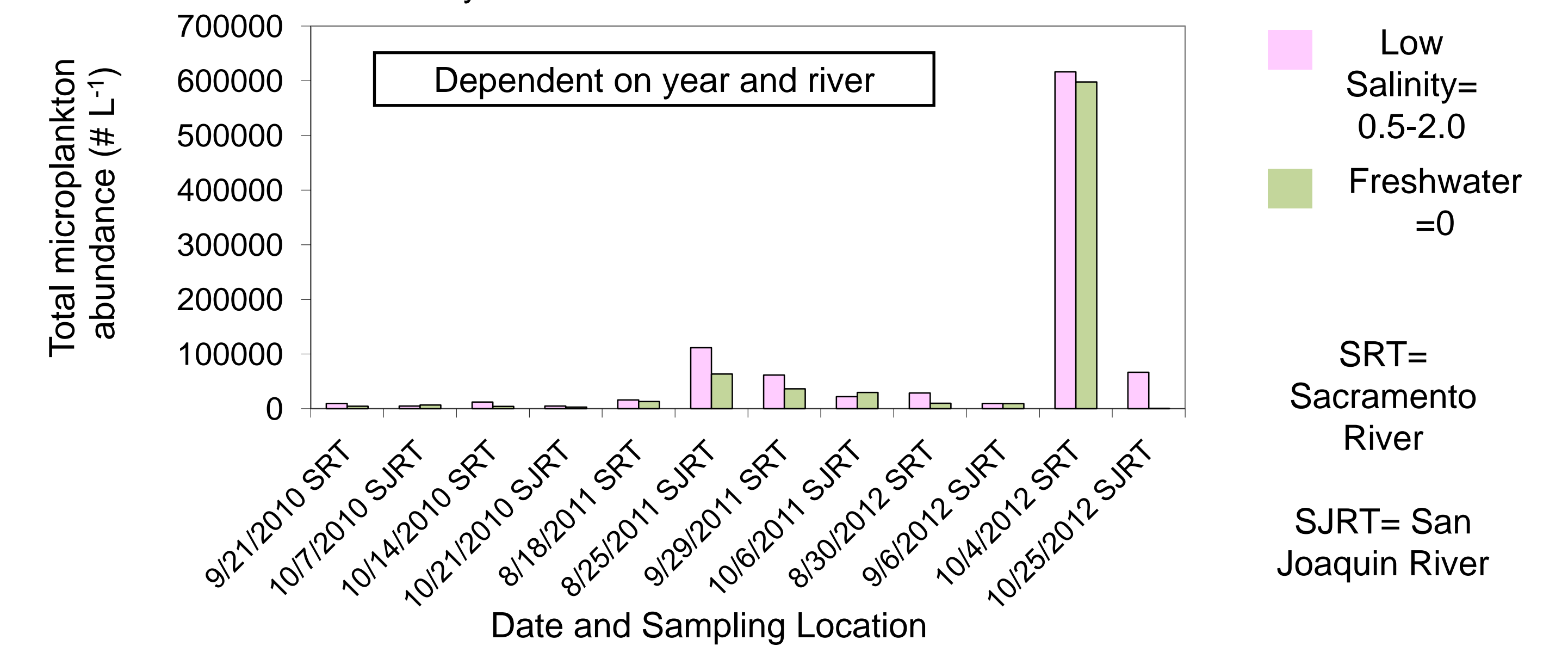


Highest in Sacramento River in 2012

■ Sacramento River  
■ San Joaquin River

LS= Low salinity zone  
FW= Freshwater

Figure 9. Total microplankton abundance (# L<sup>-1</sup>) in the low salinity zone and freshwater.



Dependent on year and river

■ Low Salinity= 0.5-2.0  
■ Freshwater =0

■ SRT= Sacramento River  
■ SJRT= San Joaquin River

## Discussion

- The abundance and composition of microplankton varied in space and time.
- More information is needed to discern annual patterns and their causes.
- Quantifying microplankton abundance will help scientists understand the food availability for copepods and further up the food web to protected fish.

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