SFCWA State and Federal Contractors Water Agency

FACT SHEET

How does the Low Salinity Zone Perform in a severe Drought Year? (15-03)

Deliverables: EET or Bay Delta Science Conference presentation October 2014 (describing project and raw data but not including analysis) Draft manuscript February 2015

Status: In Progress

Primary Investigator: Richard Dugdale	**Recipient Organization:** SFSU
Project Cost: $111,761	**SFCWA Funding:** $111,761

Partners: A. Parker, California Maritime Academy

Figure 1. Tricia Lee (grad student) sampling in the Low Salinity Zone.

Introduction

We have an unparalleled opportunity to study phytoplankton responses to the extreme drought conditions of 2014. Phytoplankton (especially diatoms) are key components in the pelagic Bay-Delta food web, with bottom-up links to the success of estuarine pelagic fishes. There are still uncertainties as to the controls on phytoplankton bloom initiation in the Bay-Delta system, and especially how blooms may be impacted by extreme conditions such as drought. Intensive sampling of the Low Salinity Zone (LSZ) in spring 2014 will help us to constrain these uncertainties by adding data of the same type and quality as we have collected over the last four years (2010-2013).

Objective

We are testing two opposing hypotheses for the LSZ (Suisun Bay):H1. In a drought year, low flow and lower dilution rates result in higher than normal ammonium (NH_4) concentration and low chlorophyll-a concentrations; the algal community is dominated by NH_4-favored species, e.g. cryptophytes, flagellates. Alternatively, H2, in a drought year, low flow and increased residence time, with increased pelagic nitrification rates in the Sacramento River, result in lower than normal NH_4 concentrations, high rates of nitrate (NO_3) uptake and phytoplankton blooms dominated by diatoms. Modeling and field data suggest this to be the most likely outcome in a low flow year.

Results

None available yet.

Relevance

These results will inform nutrient monitoring, management and modeling efforts directed at understanding environmental controls on phytoplankton production in the LSZ. Our transect data will complement other DWR and USGS monthly monitoring in Suisun Bay, however our proposed survey plan will provide greater temporal and spatial sampling necessary to capture ephemer-

al phytoplankton blooms (Kimmerer et al. 2012) and includes phytoplankton rates and physiology along with pelagic nitrification rates. This project will contribute scientific information for management decisions especially in drought years

Conclusions

To be determined

Next Steps

To analyze the dissolved inorganic carbon and mass spectrometry samples to obtain ammonium, nitrate and carbon uptake rates to incorporate with the nutrient and chlorophyll and HPLC data.