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Nutrient and phytoplankton distributions during the fall low salinity habitat (FLaSH) study in Suisun Bay

Abstract: As part of the FLaSH program we sampled water from Suisun Bay during September to early November 2011 to evaluate how nutrients and chlorophyll responded to the increased freshwater flow and more seaward location of X2. A transect of up to nine stations within the Sacramento River and Suisun Bay between Rio Vista and Avon Pier were sampled on eight occasions for nutrients, dissolved inorganic carbon, chlorophyll, phytoplankton community composition and rates of primary production and nutrient uptake. Continuous underway surface sampling system also measured temperature, salinity and *in vivo* fluorescence. During the last two cruises (October 26 and November 2) a phytoplankton bloom (chlorophyll $\sim 30 \mu\text{g/L}$) was observed at Sacramento River stations. The bloom was dominated by the chain forming diatom *Aulacoseira* that had very long chains, typically 15-20 cells per chain. At these stations, nutrients were lower with ammonium concentrations $< 2 \mu\text{M}$ and nitrate $\sim 15 \mu\text{M}$. The role of water column light availability was unclear as Secchi depth measurements were similar between bloom and nonbloom stations. Fall blooms are rare for this region of the estuary, and the 2011 bloom may have been a consequence of the increased freshwater flow.

Statement of Relevance: These data will be used to evaluate the hypothesis that river flow and Sacramento River ammonium concentration are significant regulators of primary production and phytoplankton nitrogen uptake in Suisun Bay. The results could be used in adaptive management of fall outflow for delta smelt protection and water supply reliability.