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## **Comparison of Seston Composition and Sources in the Delta during two High-flow Falls (2006 and 2011)**

**Abstract:** As part of several state-funded studies 2005-2011, we have used a multi-tracer, multi-isotope approach to assess biogeochemical processes and the sources of organic matter, nutrients, and water at several score main-channel and tributary sites in the northern Bay, Delta, and Sacramento and San Joaquin Rivers. Since this large dataset overlaps the three main fall habitats of delta smelt (Suisun Bay, the San Joaquin River Confluence, and Cache Slough sites), we are evaluating whether the additional insights provided by a multi-fingerprinting approach might explain more of the variance in smelt presence-absence than the X2-habitat curve approach (Feyrer et al. 2010). The water year types for 2005-2011 range from critically dry to wet. Sacramento River flow was relatively high in the falls of both 2006 and 2011 as a result of the preceding wet springs. To compare the habitat characteristics for these two high-flow falls, bulk seston (POM) was collected on 0.7 micron pre-combusted GFF, and analyzed for bulk  $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ,  $\delta^{34}\text{S}$ , and C:N. The filtrate was further processed for DOC- $\delta^{13}\text{C}$ ,  $\text{NO}_3$ - $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$ ,  $\text{NH}_4$ - $\delta^{15}\text{N}$ , and water  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$  analyses; these analyses are in progress. Splits of all samples were analyzed for nutrients, chlorophyll, and other constituents. Many of our studies piggybacked on state-funded monitoring projects which provided the chemical and hydrological data for the sample splits. The dataset for fall 2006 includes the same isotope suite (except for  $\text{NH}_4$ - $\delta^{15}\text{N}$ ) and the same chemical and hydrologic data, but no samples were collected from Cache Slough sites.

This presentation will compare the estimated contributions of POM from (1) different organic matter types (i.e., phytoplankton, bacteria, terrestrial organic matter) and (2) different geographic sources (i.e., Cache/Yolo, Sacramento River, San Joaquin River, Bay) for a range of sites sampled approximately monthly during transects in fall 2011 vs fall 2006.

**Statement of Relevance:** This study was funded by Delta Science to use the biogeochemical insights provided by our multi-isotope approach to address questions about why 3 regions of the Delta appear favorable for smelt in the fall. This talk provides a preliminary assessment of temporal and spatial variation in habitat characteristics during 2 high-flow falls, to be later compared with data from a wider range of flow conditions.