**Updated Evaluation of Nutrient Concentrations, Loads, and Trends to the Sacramento-San Joaquin Delta From Two Major Riverine Sources**

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**Proposed work:** Statistical analyses and water quality modeling has identified treated wastewater effluent from the Sacramento Regional County Sanitation (Regional San) District's Wastewater Treatment Plant (WWTP) as one of the main sources of total nitrogen (TN) and phosphorus (TP) to the Sacramento-San Joaquin Delta (Saleh and Domagalski 2015, Domagalski and Saleh, 2015, Jassby and others, 2002, and Novick and others 2015). Treatment plant improvements at the Regional San WWTP are expected to decrease nitrogen loads to the Delta as these upgrades come online (Krich-Brinton and others 2012). It is important to understand how the loads and concentrations of various forms of nitrogen and phosphorus to the Delta will change as a result of new treatment processes so that managers might understand potential ecological effects. For this study we are proposing using data from two monitoring sites, the Sacramento River at Freeport and San Joaquin River at Vernalis to model the concentrations, loads, and associated trends of nutrients upstream of Regional San, and into the South Delta. These rivers supply most of the freshwater and therefore contribute the bulk of the nutrient load to the Delta outside of the Regional San WWTP. Data from these two sites will be used to evaluate nutrient concentrations, loads, and trends using the Weighted Regressions on Time, Discharge, and Season (WRTDS) model developed by Hirsch et al. (2010) for the 1975 to 2019 period. Previous WRTDS analyses for this region were completed by Schlegel and Domagalski (2015) for the time period up to 2013. We will also use results from the newly developed 2012 and the previous 2002 SPARROW (SPAtially Referenced Regressions On Watershed attributes) model to evaluate the specific sources (landscape, agriculture, etc.), spatial distribution, and transport of nutrients to the Delta from the upstream portion of the two watersheds. This time period for the WRTDS analysis will capture transitions from wet years (1997) and through drought years (2012-2016). Trend estimation will include total nitrogen, nitrate (NO3), ammonia (NH3), orthophosphate (PO4) and total phosphorus allowing managers to understand the watershed contribution of various forms of bioavailable nutrients. Concentration and discharge data for the sites for the time period of the study are available from U.S. Geological Survey National Water Inventory System (NWIS) and other sources.

**Products:** USGS Open-File report describing major finding completed by September 30, 2019.

**Affirmation:** It is understood that award funds will need to be expended within FY ’19, all products will be completed by the end of FY 19, no additional PES funds are assumed, and funds awarded cannot carried be carried over to FY 20.

**Funding Request:** to complete this work I am requesting $40,000 for 300 hours of Dina Saleh’s time be expended within FY 19.

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