

## EXHIBIT A: EXECUTIVE SUMMARY

This proposed study addresses how changes in nutrient form, ratio and loading (water quality) affect the lower pelagic food web that ultimately determines the quality and quantity of food for Delta fishes. Shifts in algal composition and food availability have been implicated in fish decline, but identifying the changes at the base of the food web that are linked to changes in nutrients has been difficult because of the complexity of factors contributing to stress on the foodweb. Phytoplankton productivity in the Bay Delta is generally low due to light limitation. Nutrients may shape community composition in complex ways; they do not have to be "limiting" to be important drivers of plankton communities, and thus of food webs. Elevated nutrients, particularly chemically reduced forms of nitrogen (N), may be inhibitory, rather than stimulatory for phytoplankton production. We hypothesize that when  $\text{NO}_3$  is proportionately abundant relative to  $\text{NH}_4$  (and the N:P ratio is suitable), diatoms will dominate, but when  $\text{NH}_4$  is proportionately abundant, cyanobacteria or flagellates will dominate. Reduced light availability will lead to communities with higher bacterial abundance, and/or higher proportions of flagellates able to alter their nutrition towards mixotrophy. This proposal will directly test these relationships by conducting experimental manipulations with different ambient communities from different sites and seasons. Data will be interpreted with respect to the long-term trends reported for the Bay Delta and supplied as an integrated product for management efforts concerned with water quality and fisheries.