Executive Summary

Many fish and birds in the San Francisco Delta and Estuary exhibit high levels of contaminants (metals and organic pollutants), which have been shown to affect their behavior and reproductive success, yet routes of exposure and assimilation pathways remain unclear. Understanding the pathways by which contaminants are assimilated is essential to appropriately manage habitat areas.

The interplay of physical, chemical and biological processes in shallow and intertidal habitats provides a significant unquantified pathway of exposure. It remains unquantified because it is difficult to measure. The shallow and intertidal areas are trophically important because algae and microorganisms that live there excrete polymers that increase the food value of the sediment. But the polymers also preferentially concentrate mercury, metals and other contaminants. And they increase the effective sediment grain size after resuspension, causing them to be grazed at higher trophic levels than the fine-grained sediments themselves.

The goals of this research are to quantify the process of contaminant concentration and resuspension of shallow and intertidal cohesive sediments at sites along the salinity gradient from Prospect Island to San Pablo Bay. There are three components to the study: 1) a geochemical investigation of the contaminant concentration, nutritive quality, and carbon source in resuspended sediments; 2) a field investigation that quantifies the physical, environmental, and chemical properties that control contaminant concentration and resuspension; and 3) a synthesis of the study results in a regional model that identifies the areas where biota would be most susceptible to this route of exposure, and that could be used to forecast the effects of land-use and climate change.