

## **MONITORING FOR LOCALIZED BIOACCUMULATION OF MERCURY**

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### **ABSTRACT**

The Sacramento River, California's largest, has elevated levels of mercury in fish. The mercury is largely naturally occurring, but is exacerbated by historic mining, ongoing atmospheric deposition, and other sources.

The Sacramento Regional County Sanitation District (SRCSD) operates the Sacramento Regional Wastewater Treatment Plant (SRWTP), which treats wastewater from the Sacramento metropolitan area. SRWTP discharges approximately 160 millions gallons per day of treated wastewater into the lower Sacramento River, at the boundary of the San Francisco Bay Delta.

State regulators are developing a mercury Total Maximum Daily Load (TMDL) for the Delta. SRCSD has been investigating the potential for using offsets as a means of complying with future TMDL and discharge permit requirements for capped or reduced mercury loads. One concern with offset programs is the potential for causing a localized "hot spot".

To address the concern for an offset program to create a hot spot, SRCSD recently conducted a localized mercury bioaccumulation study. Monitoring sites were established at two upstream and two downstream points in relation to the SRWTP outfall, and within the effluent plume. Monitoring was conducted monthly during a period of low flow in the river (July – December 2006) at each river site and in raw effluent. Monitored media included water, sediments and biota. Sampled biota included resident and transplanted Asiatic clams (*Corbicula fluminea*) and microseston. In addition, biosentinel fish (characterized as small, high site-fidelity and ubiquitous) were sampled at the upstream and downstream extents of the study area plus at other sites farther upstream.

The clam and fish data were analyzed for statistically significant upstream-downstream differences in mercury bioaccumulation. Clam data were also analyzed for correlations with other water quality measurements to account for the observed spatial and temporal variability. Results to be presented indicate that mercury levels in most media were slightly elevated (~10% increase) downstream of the SRWTP outfall. Fish tissue mercury was found to be elevated regionally, but not consistently locally. Monitoring data at the watershed scale point to diffuse regional sources rather than localized hot spots. This study is the first of its kind to monitor mercury bioaccumulation in biosentinel organisms associated with a municipal wastewater discharge.

### **KEYWORDS**

mercury, bioaccumulation, clams, hot spot, wastewater