

## **COPPER CONTROLS (C.13)**

### **C.13.e Studies to Reduce Copper Pollutant Impact Uncertainties**

This MRP provision requires Permittees to conduct or cause to be conducted technical studies to investigate possible copper sediment toxicity and technical studies to investigate sub-lethal effects on salmonids. These uncertainties regarding copper effects in the Bay are described in the amended Basin Plan's implementation program for copper site-specific objectives. Compliance with this provision has been achieved through continued participation in the RMP, whose Multi-year planning process addresses these gaps through studies overseen by the Exposure and Effects Work Group. While the MRP requires no reporting for this provision in FY 2012-13, the RMP continued efforts to address these uncertainties:

A study of the olfactory effects of copper on seawater-phase salmonids was completed in 2012 and found inhibition of the olfactory nerves of young (smolt stage) Chinook salmon in salt water was induced at higher copper concentrations than in previous freshwater studies. The study concluded that existing regulatory thresholds for copper in San Francisco Bay are likely to be protective for salmonids. A final summary of the study results is available at

[http://www.sfei.org/sites/default/files/SeawaterEOG2012report12202012\\_final.pdf](http://www.sfei.org/sites/default/files/SeawaterEOG2012report12202012_final.pdf)

In 2013 additional external funding was provided to the RMP for further evaluation of the copper olfactory effects at intermediate salinities. Due to the effect of federal budget cuts on study facilities, the additional tests will be conducted with coho salmon instead of Chinook salmon used in previous tests, resulting in extension of the project timeline into 2014.

Ongoing exploration of the causes of moderate sediment toxicity in San Francisco Bay included an expert workshop in November 2012, the second in a series of discussions on stressor identification. Workshop participants identified a number of possible chemical and non-chemical stressors that could affect the laboratory organisms used for the toxicity tests (the amphipod *Eohaustorius estuarius*), and a follow-up proposal to test the effects of sediment particle size and shape was recommended for 2014 pilot / special studies funding.