

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION
OFFICE OF INFORMATION, MANAGEMENT AND ANALYSIS
JUNE 21, 2011**

ITEM 7

SUBJECT

INFORMATION ITEM: SUMMARY ASSESSMENT OF TOXICITY IN CALIFORNIA WATERSHEDS AND COASTAL WATERS USING DATA FROM THE SURFACE WATER AMBIENT MONITORING PROGRAM (SWAMP) AND PARTNER PROGRAMS.

DISCUSSION

The report describes where toxicity has been observed in California waters and sediment; assesses the magnitude of the observed toxicity; compares the results among waters draining urban, agricultural, and other land uses; summarizes studies identifying the chemicals implicated as the cause of toxicity and the ecological implications; and compares results using U.S. EPA's new statistical methods for assessing toxicity.

Toxicity test organisms are surrogates for aquatic species found in the environment. Toxicity tests are especially useful in water quality monitoring because they can detect the effects of all chemicals (whether measured or not) and respond to pollutant mixtures. A number of different species, including crustaceans, algae, fish, and mollusks are used, following widely accepted test protocols with strict quality assurance. Endpoints are the measured effects on test species (e.g., lethality, reproductive success, growth, etc.).

Toxicity has been observed in all Regions. Streams in upper watersheds and mountainous areas tend to produce fewer toxic samples, while samples from downstream sites in the valleys and along the coasts tend to be more toxic. Consistent sediment toxicity has been observed in many bay and harbor sites. Of the 992 sites in this assessment, 473 (48%) had at least one sample in which toxicity was measured in either water or sediment with at least one endpoint (e.g., lethality to one of the species tested). Of these, 129 (13% of the total) were classified as high toxicity sites. Samples from sites in agricultural and urban areas had significantly higher toxicity than sites in less developed areas, and had a greater magnitude of toxicity.

Toxicity identification evaluations (TIEs) have identified the causes of toxicity in ambient water and sediment samples from California waterbodies, from 1991 to the present. With the exception of ammonia, all of these ambient TIEs implicated pesticides, primarily organophosphates and, more recently, pyrethroids. The pesticides are implicated as causing toxicity in streams draining residential and urban areas as well as agricultural land. A small number of studies have measured chemistry, toxicity, and ecological indicators to investigate relationships between observed toxicity and observed impacts on stream and estuarine ecosystems. In most of these studies, the connection between observed toxicity and ecosystem impacts has been well established. The studies measured declines in aquatic invertebrate population densities at sites where toxicity was observed, degradation of marine communities at sites exhibiting sediment population declines of the resident amphipod where sediment toxicity was observed.

The State Water Board Draft Policy for Toxicity Assessment and Control includes new numeric objectives for chronic and acute toxicity, a new statistical methodology for determining whether a sample is toxic that is based on the U.S. EPA's Test of Significant Toxicity (TST) and monitoring requirements for wastewater, stormwater and some non-point source discharges. To demonstrate the TST approach for ambient toxicity programs, SWAMP data from 409 chronic tests for *Ceriodaphnia dubia* (crustacean) and 256 chronic tests for *Pimephales promelas* (fish) were used by the U.S. EPA to compare results of the two statistical approaches. In general, the statistical methods resulted in similar numbers of samples identified as toxic.

POLICY ISSUE

None – Informational Item Only

FISCAL IMPACT

None – Informational Item Only

REGIONAL BOARD IMPACT

None – Informational Item Only

STAFF RECOMMENDATION

None – Informational Item Only

State Water Board action on this item will assist the Water Boards in reaching Goal 4 of the Strategic Plan Update: 2008-2012 to comprehensively address water quality protection and restoration throughout California's water planning process. In particular, this item will assist in fulfilling Objective 4.3 to achieve near term priority Basin Plan amendment needs.