SWAMP
Surface Water
Ambient Monitoring
Program

CENTRAL COAST SOLID PHASE ADSORPTION TOXIN TRACKING (SPATT) MONITORING FOR MICROCYSTIN

What is it?

In coordination with Dr. Raphe Kudela at U.C. Santa Cruz, the Central Coast Ambient Monitoring Program (CCAMP) conducted an initial screening to determine the extent to which microcystins, which are biotoxins produced by blue-green algae, are present in the Central Coast Region's coastal watersheds. This exploratory work was conducted because blue-green algae blooms are becoming more prevalent in the state, and have caused toxic blooms in Pinto Lake in the Pajaro watershed, as well as in other systems statewide. These blooms can be toxic to birds and wildlife, and even to domestic animals like dogs. Furthermore, scientists have related at least 21 California sea otter deaths to microcystin toxicity (Miller et al., 2010). CCAMP deployed Solid Phase Adsorption Toxin Tracking devices (SPATT) at coastal confluence sites during three consecutive months during the 2011 dry season. SPATT are constructed and analyzed at the U.C. Santa Cruz Ocean Sciences Laboratory where the technology was developed. Microcystin was detected in SPATT from 20 of 33 coastal confluences, implying that toxin-producing blue-green algae are fairly widespread in the Central Coast Region. In seven of these watersheds microcystin was detected more than once, including in some watersheds that are considered relatively pristine. Sites with multiple detections included the

Carmel River, the Big Sur River, Willow Creek along the Big Sur coastline, the Old Salinas River, the Santa Ynez River, and Atascadero and Mission creeks in Santa Barbara County. Microcystin was also detected in a bloom condition in Lopez Lake. Highest concentrations were found in the Old Salinas River, the Arroyo Grande watershed (including Lopez Lake), and Willow Creek.

Why is it important?

This work was important for several reasons. First, this initial screening demonstrated the applicability of SPATT technology for routine screening purposes in SWAMP monitoring programs. This will be useful to consider at an upcoming SWAMP workshop on developing biotoxin monitoring recommendations for the State. Second, it provided Water Board staff with information about the widespread nature of blue-green algae, which may be present at undocumented locations in watersheds, potentially in lower concentrations than would be seen in a "bloom" condition. Third, it provides information about which watersheds may represent highest risks for blooms, and potentially could be selected for an additional follow-up study.

How will this information be used?

Since this is the first time this technology has been used in this capacity, CCAMP staff intends to collaborate with U.C. Santa Cruz to do additional monitoring in 2012 to support findings. This monitoring has detected presence of the microcystin toxin in a number of watersheds, but has not located actual blooms, which may be located anywhere in the watershed above the sampling site. Microcystin toxins detected by SPATT may not be from bloom conditions, but from blue-green algae that are present in lower concentrations, potentially at levels that represent low risk for birds or wildlife. SWAMP will further explore ways to identify locations of blooms and to monitor those blooms through the upcoming biotoxins monitoring workshop. At Pinto Lake, where the blooms have been well-documented, two grants are being implemented that will help understand the mechanisms driving the blooms and will help develop implementation measures to control them.

For more information contact Karen Worcester (805-549-333 or kworcester@waterboards.ca.gov)