SWAMP
Surface Water
Ambient Monitoring
Program

Assessment of Toxicity in California Waters (Statewide)

What is it?

Toxicity measurement is an integral part of many water monitoring programs, ranging from evaluations of wastewater impacts at a single site to national-scale surveys of overall conditions and trends. Toxicity tests are used to estimate biological effects associated with pollutants in samples of water and sediment collected in California streams, lakes, estuaries, and coastal waters. The use standardized methods to place sensitive aquatic organisms into ambient samples, and carefully record differences between their rates of survival, growth or reproduction with those of organisms exposed to clean water controls or reference samples. Toxicity assessments are frequently used in studies designed to increase our understanding of the causes, sources, and magnitude of biological effects, often in waters where impacts are expected, but also in reference areas or waterways of unknown condition.

SWAMP conducted Statewide Assessment of Toxicity in California Waters by bringing together toxicity data from multiple statewide and regional SWAMP programs, as well as from partner programs, to provide a statewide perspective for water resource management. Because the sites in the different programs were selected to address different monitoring objectives, this assessment only applies to the sites surveyed, and it is important not to make inferences about regional patterns or conditions at unmeasured sites.

The questions this assessment addresses include:

1) Where has toxicity been observed in California waters?
2) What is the magnitude of observed toxicity?
3) What chemicals have been implicated as causing toxicity?
4) What are the ecological implications of aquatic toxicity?
5) How do the results of toxicity measurements compare among waters draining urban, agricultural, and other land cover areas?
6) How are test results affected by the statistical methods applied, particularly with respect to use of the EPA Test of Significant Toxicity?

In 2010 SWAMP published a summary report addressing these assessment questions that drew on toxicity data collected between 2001 and 2009. A more detailed report will be released in early 2011.

Why is it important to the State?

Human activities lead to the introduction of hundreds if not thousands of chemicals into California streams and other waterways. Many monitoring programs measure concentrations of up to 150 of these chemicals, but it is difficult to know whether these and the many unmeasured chemicals are capable of impacting aquatic ecosystems. Toxicity tests directly measure the biological effects of pollutants in water and sediment samples. Also tests measure the cumulative effects of all chemicals present, something that is virtually impossible to do only with knowledge of the chemical concentrations. Toxicity assessments, combined with ecological assessments of the organisms present in waterways and measurements of pollutant concentrations in tissues of aquatic organisms, provide valuable indications of the effects pollutants have on aquatic life. This knowledge is critical for determining whether the chemicals in our waters are at safe concentrations or need greater management.

Why is it important to me?

We all have streams, beaches, lakes and other waterways that are important to us, and we want to know whether we are protecting the aquatic life that is an essential part of these natural systems. The Statewide Assessment of Toxicity in California Waters covers approximately 1,000 sites in California waters and provides an indication of whether pollutants are adversely affecting aquatic life.

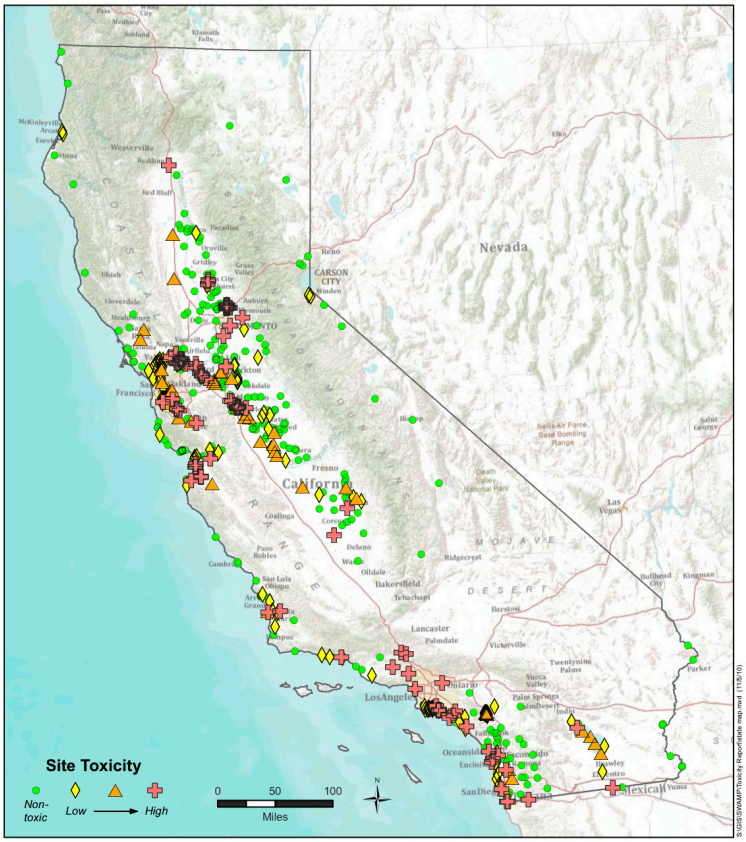
Equally important, this assessment lets us know whether we need to do more to protect our waters. Pesticides are among the compounds most often found to cause toxicity in our streams and coastal waters. Many pesticides are used in greater amounts by individuals around their own homes and workplaces than by commercial agriculture. This toxicity assessment shows that urban streams have substantial toxicity, and lets us know we can do more to be careful about the types of products we use and how we use them. It also informs us of potential problems in agricultural and industrial areas where chemical use needs better management.

How will the data be used?

This assessment is designed to provide perspective for decision makers, including members of the State and Regional Water Boards, as they evaluate policies for water management, including the regulation of chemical products, waste water treatment, and urban and agricultural runoff. The data

provide the public with information on the condition of waterways they care about and how they can be better protected.

All monitoring data will be entered into the SWAMP database, where they will be available for a number of uses, including:

- Statewide 305[b] reporting and 303[d] listing as required by the Clean Water Act
- Enhancing Regional monitoring programs
- Evaluating the success of TMDL, Regional, and statewide management programs
- Determining relationships between stressors and effects for NPS programs
- Providing perspective for and enhancing agricultural waiver monitoring
- Providing perspective for and enhancing urban stormwater monitoring
- Assisting with sediment quality objective development
- Examining trends related to particular stressors of concern
- Providing a framework for prioritizing individual issues for further investigation

For more information on this assessment click here.