SWAMP
Surface Water Ambient Monitoring Program

STREAM POLLUTION TRENDS MONITORING PROGRAM

What is it?

The Stream Pollution Trends (SPoT) Monitoring Program is part of the long-term statewide monitoring being conducted to assess the health of California streams. This program analyzes 100 watersheds for sediment contaminants, toxicity, and correlations with local land use. The three primary goals of this program are to:

1. Determine long-term trends in stream contaminant concentrations and effects statewide.
2. Relate water quality indicators to land-use characteristics and management efforts.
3. Establish a network of sites throughout the state to serve as a backbone for collaboration with local, regional, and federal monitoring programs.

Monitoring sites are located at the base of the watersheds, at points where sediment-borne contaminants from mixed land uses are likely to accumulate. These sites are similar in design to the "integrator" sites used in the USGS National Water Quality Assessment (NAWQA) program. To monitor long-term water quality trends, sediment samples are collected annually at 100 established sites in a state divided into approximately 200 major hydrologic units. Because most water-borne pollutants tend to bind to sediment particles and remain with the sediments when they are deposited downstream, monitoring at these sites provides an estimate of the cumulative contribution of contaminants from throughout the target watersheds. The sediments are analyzed for a suite of contaminants and for toxicity to aquatic organisms.

The annual surveys are designed to link water quality with land use and management activities within watersheds. This involves the collection and spatial analysis of supplementary data such as land cover, chemical application rates, and hydrologic variables. By comparing changes in contaminant levels and changes in land use over time, water quality managers will have tools to assess linkages between management practices and water quality.

Why is it important?

Aquatic habitats may be affected by contaminants transported in the watershed. SPoT provides both annual snapshots and a long-term assessment of the mobilization of contaminants within California's watersheds. Toxicity testing informs water quality managers of the potential for adverse biological impacts in the State's streams, and land use analyses provide information about the potential sources or reductions of contaminants and beneficial uses over time.

Californians value clean water and the activities and wildlife it supports. Because human activities in our watersheds are constantly changing, long-term trend monitoring is a critical component for managing the health of California's waters. Understanding the connections between these activities, the changing landscape, and the quality of our waters is essential for the preservation of aquatic life, human health, and the prosperity of California's economy. SPoT is designed to detect changes in the watersheds at time scales appropriate for decision making by water quality managers.

How will this information be used?

SPoT provides data to inform decisions related to water quality protection, and can be used for the following purposes:

- 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 human activities and stream pollution for NPS programs
- Providing perspective for and enhancing agricultural waiver monitoring and 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.

To date, approximately one quarter of sediment samples tested have been significantly toxic, and toxicity has been observed in all nine state water quality regions. In 2008 stream sediment pollutant concentrations and toxicity were greatest at sites draining urban watersheds. Many sites statewide yielded elevated concentrations of a number of pollutants, with pyrethroid pesticides frequently exceeding concentrations previously linked directly to acute amphipod toxicity.

In 2010 and 2011 a subset of watersheds was also assessed with toxicity tests conducted at 15°C. The standard EPA test is conducted at 23°C, but the statewide average stream temperature is less than 23°C. Pyrethroids are known to be more toxic at cooler temperatures, and when tested at 15°C, twice as many samples were toxic when tested at 15°C.

Levels of most pollutants in stream sediment increased as urban land cover in the watershed increased. Industrial compounds, some metals, and many other pesticides were found at higher concentrations in urban watersheds than in agricultural or other watersheds statewide.

Many of the statewide SPoT stations also provide additional data used to meet NPDES stormwater monitoring requirements, and are integrated into agriculture runoff monitoring programs. Data from these stations are currently being identified. As annual monitoring proceeds, data from SPoT stations will be compared with data from these other programs to assess linkages between sediment toxicity and contamination and watershed ecological health.

For more information on SPoT, click here.