EVALUATION OF MERCURY AND PCB TRENDS IN SAN FRANCISCO BAY REGION STORMWATER

BACKGROUND

San Francisco Bay TMDLs seek reductions in stormwater loads of PCBs (90%) and mercury (65%) in the next ~20 years. Stormwater concentrations and loads have varied considerably among years and individual storms in monitored watersheds. Data from watersheds previously monitored were analyzed to evaluate patterns toward meeting TMDL goals.

METHODS

Whole-water grab samples were collected at 24 sampled locations by uncrewed surface vessel (USV) from 2002-2014 in 12 stormwater basins in the San Francisco Bay region. Composite samples were collected across a range of flows, but focused on moderate to high flow events, with multiple samples typically collected at each storm event. Concentrations of PCBs and mercury were measured for each sample.

RESULTS

Data from watersheds previously monitored were analyzed to evaluate trends among years and individual storms in monitored watersheds.

SUMMARY

The preliminary analysis of previously collected data on water concentrations suggests that expected decreases of 95% for PCB loads and 65% for mercury loads may be detectable for most watersheds with a moderate level of effort. The effects sizes (Cohen’s d) for these PCB and mercury indicators suggest 30 or fewer grab samples collected over about a decade were each for before and after periods may be enough to detect the desired changes.

FUTURE WORK

A number of other trend indicators are also being considered for evaluation of management effectiveness including loads and bed sediment concentrations. Indicators will be evaluated for the potential to identify trends in stormwater concentrations, that can be monitored across specific basins to identify overall trends in seasonal, land use groupings, and other methods. For example, a constraint considering only grab samples collected during moderate (25% to 75%) flows reached a moderate improvements in detection power (~12% to 30% increase in Cohen’s d of Z=4).

For more information, see the links in the reference material.