

Special Study Proposal: Small Tributaries Loading POC Watershed Characterization Reconnaissance Monitoring

Summary: The goal of the Small Tributaries Loadings Strategy (STLS) Program over the next few years is to continue to provide information to RMP Stakeholders and the public that directly supports the identification and management of PCBs and Hg sources, concentrations, loads, and the determination of trends in relation to management efforts and beneficial uses in San Francisco Bay. To support a weight-of-evidence approach for the identification and management of PCBs and Hg sources, the outcome of this proposal will be further knowledge about concentrations and particle ratios in stormwater in areas that have a historically and disproportionately larger area of older urban and industrial land use.

Estimated Cost: Option 1: \$200k

Oversight Group: STLS/SPLWG

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PROPOSED DELIVERABLES AND TIMELINE

Task	Deliverable	Due date																	
		2016				2017										2018			
		S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
A	Site selection	!																	
B	Wet season monitoring		!	!		!		!	!										
C	QA & Data Management									!!									
D	Interpretation & reporting														!				!!

[MQ] = Management Questions given in Provision C.8.f. of the Municipal Regional Stormwater Permit (MRP 2.0)

! = STLS check in for review and course corrections

!! = SPLWG oversight and review

Background

The San Francisco Bay Hg and PCBs TMDLs call for a reduction in loads by 50 and 90% by 2028 and 2030, respectively. In response, the first Municipal Regional Permit for Stormwater (MRP) Provision C.8.f. (SFRWQCB, 2009) called for a range of actions including gaining a better understanding of which Bay tributaries contribute the most loading to sensitive areas of biological interest on the Bay margin, better quantification of loads of sediments and trace contaminants on a watershed basis and regionally, a better understanding of how and where trends might best be measured, and an improved understanding of which management measures may be most effective in reducing impairment. These same needs were reflected in the small tributary loading strategy (STLS) (SFEI, 2009). On November 19, 2015 of the second MRP was issued and provided an updated set of management questions (provided below) (SFRWQCB, 2015).

During water year (WY) 2015, the RMP funded the new phase of a watershed characterization reconnaissance study aimed at locating more high leverage watersheds and sub-watersheds and developing a remote sampler method designed to decrease costs and increase ease of data collection in locations where sampling may be logistically challenged. The results from 20 locations collected using manual methods and for three locations using the remote sampler methods were recently reported (McKee et al., 2016 in SPLWG review). This report also collated previous data collected at 25 other sites in the Bay Area and provided a ranking of 45 sites. During the wet season of WY 2016, the same study design was continued with the successful collection of a further 17 locations using manual methods and for a further five locations using the remote sampler methods for a total of 66 sites now characterized¹.

¹ Data were also collected by the Santa Clara and San Mateo Stormwater programs using the watershed characterization reconnaissance study design. This data should be made available in later fall for comparison to the RMP data during the reporting phase of the project.

Through these efforts, an additional half dozen locations have been located that are showing highly elevated concentrations. Initial results also indicate that there is a reasonable comparison for PCBs between the particle concentrations observed from the remote samplers and particle ratios observed in the manual samples; data appear to indicate remote methods may be less well suited for Hg. Grainsize work completed in WY 2016 is expected to help resolve the differences observed and more nuanced interpretations. Also during 2016, funding was provided for further development and calibration of the RWSM and for development of the watershed loadings *Trends Strategy*. Data from the watershed characterization reconnaissance study is being used to help calibrate and verify the model outputs and will help to form the baseline of data to support future trends evaluations.

Study Objectives and Applicable RMP Management Questions

The main study objectives are two-fold:

1. Find watershed or sub-watershed locations with high concentrations of PCBs, Hg and other priority pollutants and rank these locations relative to each other and sources.
2. Develop and test two remote sampler designs (the Hamlin and the Walling tube) for characterization of particle concentrations and comparison to manual methods.

These address management question (MQ) 1 and 2 primarily but also support MQ 4 by providing calibration data for the Regional Watershed Spreadsheet Model and MQ 5 as possible baseline data for regional stormwater trends assessment, and less directly MQ 3 by providing a regional map of concentrations and loads for baseline comparison to the effects of BMP application.

MRP 2.0 Q1: Source Identification / Leverage: Which sources or source areas provide greatest opportunity for load reductions?

MRP 2.0 Q2: Impairment: Which source areas contribute most to impairment of Bay?

MRP 2.0 Q3: Management effectiveness: Provide support for planning future management actions or evaluate existing actions.

MRP 2.0 Q4: Loads: Assess POC loads, concentrations, or presence/absence.

MRP 2.0 Q5: Trends: What are the spatial and temporal trends in loads or concentrations?

Approach

A wet weather field monitoring program proposed to continue in the WY 2017 winter sampling season that will largely mimic, with the exception of some minor improvements, the program implemented during WY 2011 (McKee et al., 2012), WY 2015 (McKee et al., 2016, in SPLWG review), and WY 2016 (preliminary results presented at the May 2016 SPLWG meeting).

- Monitoring Design:
 - Collection of 1 composite stormwater sample per site collected during a rainfall event that is forecast to exceed 0.5 inches of rainfall in a 6-hour period using one of three manual sampling techniques employing clean hands protocols (D95, b-reel, and boom-truck water quality sampler at sites with larger watershed areas, DH81 water quality sampler, or an ISCO pumping sampler)
 - Collection of 1 settled suspended sediment stormwater sample per site collected during a rainfall event that is forecast to exceed 0.5 inches of rainfall in a 6-hour period using one or both of two remote sampling techniques (Hamlin or Walling tube)
- Site Selection: A balance between two overarching rationale:
 - Nested sampling design to track sources upstream in known polluted areas to help better define source areas and management options.
 - Finding new polluted watersheds or sub-watershed areas (watershed locations near the Bay margin or further downstream than the source tracking approach).

- Other selection rationale:
 - Larger watersheds with an existing USGS gauge
 - Re-sampling potential false negatives especially where there is putative evidence
 - Contingency for resampling Guadalupe River for trends
 - Filling gaps along environmental gradients in relation to source areas (most specifically to support RWSM development [MQ4])
- Number of sites: Dependent on site logistics, proximal site associations, analytes, budget and other factors, but likely 10-12 sites.
- The 2016 analytes list be continued (PCBs, Hg, SSC, TOC, grainsize, salinity)

Reporting

The outcome of the study will be a technical report (draft in December 2017; final in March 2018). The draft report will include the 2017 data and perhaps some more interpretative reporting including statistical analysis of the land use and source areas context and comparison to selected literature. The main objectives of the report will be to 1) document the outcomes of the remote sampler sub-study and describe the circumstances for its possible inclusion into future sampling programs; and 2) report and rank concentrations and particle ratios observed at each location and compare these to existing data.

Linkages to other RMP Workgroups

Some of the sampling sites may be selected in the watersheds of the Priority Margin Units (PCB WG) and monitored for emerging contaminants with funding from the ECWG.

References

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