

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

Summary: 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 disproportionately larger area of older urban and industrial land use. The proposal is primarily a field study. The level of effort will be tailored to the amount of budget available. There is no phasing proposed.

Estimated Cost: \$175k

Oversight Group: STLS/SPLWG

Proposed by: A Gilbreath, J Hunt, J Wu, L McKee and D Yee (SFEI) with oversight from the STLS team (J Scanlin, C Sommers, B DeBerry, L Sabin, L Paquette, R Looker, J O’Hara)

Proposed Deliverables and Timeline

Task	Deliverable	Due date																	
		2018				2019										2020			
		S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
Wet weather field monitoring																			
A	Selected site list	!																	
B	Wet season water samples collected and sent to the labs for analysis		!	!	!			!	!										
C	Laboratory analysis, QA & Data Management								!!										
D	Interpretation & reporting																!		!!

! = STLS check in for review and course corrections

!! = SPLWG oversight and review

Background

The San Francisco Bay Hg and PCB TMDLs call for a 50% reduction in Hg loads by 2028 and a 90% reduction in PCB loads by 2030. 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 the second MRP was issued and provided an updated set of management questions (provided below) (SFRWQCB, 2015).

During water years (WYs) 2015 - 2018, the RMP funded a watershed characterization reconnaissance study aimed at locating high leverage watersheds and subwatersheds and developing a remote sampler method designed to decrease costs and increase ease of data collection. Over these four years of watershed characterization as well as a similar effort in WY 2011 (McKee et al., 2012), a total of 75 sites have now been characterized for PCB and Hg concentrations and particle ratios during at least one storm (Gilbreath et al., 2017; Gilbreath et al., 2018 in SPLWG review)¹. In addition, a total of 14 sites have now been characterized using the remote sampler methods (Gilbreath et al., 2018 in SPLWG review; Gilbreath et al., in preparation). Through these efforts, 21 sites for PCBs have been sampled showing highly elevated concentrations (>0.2 ug/g, or 140x the TMDL target), and six sites have been sampled showing highly elevated concentrations for Hg (>1 ug/g, or 5x the TMDL target) (Note: These data only reflect WYs 2011, 2015, 2016 and 2017; results have not yet been returned for sampling in WY 2018). Initial results of the remote sampling pilot indicate that there is a reasonable comparison between the particle concentrations observed from the remote samplers and particle ratios observed in the manual water samples.

Study Objectives and Applicable RMP Management Questions

The main study objectives are two-fold:

1. Locate more high-leverage watersheds. Primarily use remote samplers in new sample locations to determine if they are likely high-leverage. Use these results to rank these locations relative to each other and sources.
2. Re-sample some watersheds. Use manual water composite sampling methods to revisit previously sampled locations to learn more about concentrations in those watersheds.

These objectives address management question (MQ) 1 and 2 primarily, 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?

¹ Data were also collected by the Santa Clara and San Mateo Stormwater programs using the watershed characterization reconnaissance study design.

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

Wet weather field monitoring (\$175k)

A wet weather field monitoring program is proposed to continue in the WY 2019 winter season sampling watersheds, subwatersheds or finer scales for management priority. The sampling program will largely mimic the program implemented during WY 2011 (McKee et al., 2012), WY 2015 (McKee et al., 2016), WY 2016 (Gilbreath et al., 2017), WY 2017 (in SPLWG review), and WY 2018 (in preparation) and augmented/alterd using the improved sampling methodologies and decision tree for site and storm characteristics developed by the advanced reconnaissance data analysis (in preparation).

- Monitoring Design:

At each site, collect a minimum of:

- One composite stormwater sample during a rainfall event that is forecast to exceed 0.5 inches of rainfall in a 6-hour period using a manual sampling techniques and/or
- One remote sampler (settled suspended sediment) sample during a rainfall event that is forecast to exceed 0.5 inches of rainfall in a 6-hour period using one or both remote sampling techniques (Hamlin or Walling tube).

- Site Selection:

- Rationale 1: Finding new high-leverage watersheds or sub-watershed areas (watershed locations near the Bay margin or further downstream than the source tracking approach). In these watersheds, remote samplers will be used. Approximately half of the field labor and analysis budget will be allocated to this effort.
- Rationale 2: Re-sampling in locations where additional information is necessary to inform ranking. In these watersheds, the method used will be manual water composite sampling. Approximately half of the field labor and analysis budget will be allocated to this effort.
- Other selection rationale:
 - Larger watersheds with an existing USGS gauge
 - Re-sampling potential false negatives
 - Contingency for resampling Guadalupe River for trends
 - Priority margin unit watersheds
 - Nested sampling design to track sources upstream in known polluted areas to help better define source areas and management options

- Number of sites: Dependent on site logistics, proximal site associations, analytes, budget and other factors, but likely 15-25 sites.

- The 2018 analytes list will be continued (PCBs, Hg, SSC, TOC, grainsize) in WY 2019

Reporting

The outcome of the study will include a concise technical report. The main objective of this report will be to report and rank concentrations and particle ratios observed at each location and compare these to existing data. More advanced analysis may be applied to these data based on methods developed from and completion of the Advanced Data Analysis project.

Linkages to other STLS elements

Data collected in this project element is being used to provide useful context for development of the watershed loadings *Trends Strategy*. Data from the watershed characterization reconnaissance study is being used to inform the framework proposed for the necessary baseline data collection to support future trends evaluations.

Linkages to other RMP Workgroups

The PCB WG has allotted funds for WY 2019 to sample in watersheds draining to the Emeryville Crescent and San Leandro Bay (both Priority Margin Units). That study will benefit the POC reconnaissance effort primarily by resampling some watersheds and assessing the variability. Some of the sampling sites chosen for this project may likewise be selected in the watersheds of the Priority Margin Units (PCB WG). Additionally, the emerging contaminants workgroup (ECWG) is proposing a stormwater monitoring study, primarily focused on assessing for roadway contaminants. The ECWG and SPLWG stormwater studies may be able to piggy back on one another where desirable sampling watersheds overlap.

References

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