RMP Sources Pathways and Loading Workgroup Meeting Summary
May 23rd, 2018, 9:30am - 4:30pm

In attendance:

WG Member	Affiliation	Representing
Dan Cain	USGS	Science Advisor
Barbara Mahler	USGS	Science Advisor
Dan Wang	CDPR	
Chris Sommers	EOA	SCVURPPP
Lisa Sabin	EOA	
Bonne DeBerry	EOA	SMCCWP
Richard Looker	SFB Regional Water Quality Control Board	
Lucile Paquette	CCCWP	
Luisa Valiela	EPA Region 9	
Lisa Austin	Geosyntec	Contra Costa County
Aroon Melwani	AMS	
Bridgette DeShields	Integral Consulting	RMP TRC
Ryan Mayfield	City of San Jose	
Bryan Freuh	City of San Jose	
Jan O'Hara	SFB Regional Water Quality Control Board	

SFEI/ RMP Staff:

Lester McKee, Phil Trowbridge, Alicia Gilbreath, Don Yee, Jen Hunt, Jay Davis, Jing Wu, Rebecca Sutton, Diana Lin, Ila Shimabuku

1. Introduction

Phil Trowbridge welcomed participants, allowed for introductions, and presented the objectives of the meeting - provide updates on and discuss 2018 special studies, as well as overview and prioritize 2019 special studies.

2a. Information: Review of management questions

Richard Looker gave a brief review of SPL management questions and how they relate to the 5-year (2016 - 2020) Municipal Regional MS4 Permit (MRP). In decreasing order of completion, the four main focuses of the permit are control measure implementation, assessment of PCB and mercury load reductions, performing Reasonable Assurance Analysis for green infrastructure, and preparation of implementation plans to achieve TMDL allocations. He also illustrated how RMP data has helped to inform different aspects of the permit through augmentation of data collected by the stormwater agencies.

2b. Information: Overview of related stormwater program activities and objectives

Chris Sommers provided an overview of Bay Area Stormwater Management Agencies Association (BASMAA) stormwater activities. He summarized the spatial scope of the MRP as well as the funding structure, and also discussed the uniqueness of this MRP and contextualized it within the current state of California's stormwater efforts. The primary drivers for POC monitoring are: TMDL implementation for PCBs and Hg; green infrastructure planning and implementation; and characterizations of potential/emerging issues (CECs and nutrients). Chris explained how RMP data allowed the BASMAA to classify whether a site is a "high interest area" for PCBs, and then move forward with identifying PCB source properties. RMP data are and will continue to inform two ongoing BASMAA tasks: (1) evaluating progress made on the current MRP and future Performance Criteria; and (2) planning for the next MRP and onward. Ongoing data needs include tracking loads, developing data analysis techniques, assessing emerging contaminants, and assessing treatability of contaminants.

3. Information: Overview of proposed special studies

Phil Trowbridge introduced the following four presentations on 2019 special studies and solicited feedback on work to-date and the proposed studies.

3a. Proposal: Reconnaissance characterization monitoring

Alicia Gilbreath provided a high-level summary of past pollutant of concern (POC) reconnaissance characterization monitoring and identified the main goal of this work: to identify locations that contribute high POC loads to the Bay. She showed where monitoring has taken place and summarized major results from the 75 sites sampled through this monitoring effort. For 2019, Alicia presented a $175,000 proposal to continue reconnaissance monitoring.

Alicia discussed the pilot testing of passive samplers for replacing or augmenting the traditional manual composite method. She compared sediment concentrations from the passive samplers to sediment concentrations from the manual water composite samples and asked whether the passive sampler data align well enough with those from the manual sampling to move the passive-samplers out of the pilot phase. Science advisors and meeting participants examined the data and argued that the passive samplers may be more accurate than the manual composites because the passive samplers provide volume-averaged particle composites rather than time-averaged particle composites. The former, in theory, provides a better assessment of contaminant loads and source contributions. And for passive samplers, the 500 ng/L threshold used to classify a “high interest area” may need some rethinking.

Alicia brought forward a “super remote sampler” idea that would involve using a passive sampler at one site during an entire storm season either by deploying it during every storm or leaving it in one location for the duration of a wet season. The accuracy of this method would need to be tested with using side-by-side results from individual storms.

Participants discussed the tradeoffs of replacing the manual sampling method with passive samplers and also related management questions and data needs, e.g., passive samplers only provide sediment concentrations but not water concentrations that could be used in the Advanced Data Analysis (ADA). The workgroup agreed that the passive samplers would provide reliable enough PCB-sediment concentrations to rank watersheds. They arrived at the following decisions and recommendations:

- At least 50% of the reconnaissance budget should be used to deploy passive samplers at new sites. The remaining budget should fund manual composite sampling at repeat sites that were expected to have higher concentrations than those seen or with distinct congener profiles.
- Carry out sampling at new sites with the remote samplers and use the manual sampling at repeat sites. Sampling at revisited sites should target a specific storm type (first flush, high intensity mid season, or late season storm) depending on what has been previously sampled at the sites of interest. These classes of storms are proposed based on the conceptual models being developed in the Advanced Data Analysis project that is currently underway.

Action Items

- Re-analyze the accuracy of passive samplers (Alicia Gilbreath, 6/1/18):
    - Revise the linear regression plots by switching the axes so that the manual water composite data are on the y-axis.
    - Perform a linear regression of the Hamlin data against the Walling tube data.
- Evaluate usability of new passive sampler created by the City of Seattle. (Alicia Gilbreath, 6/1/18)

- Revise reconnaissance monitoring proposal by integrating feedback from SPLWG. (Alicia Gilbreath, 6/1/18)

3b. Proposal: Advanced data analysis

Advanced Data Analysis presentation had two parts: 1) Lester Mckee's presentation on using underinterpretted stormwater data to develop a new ranking method, and 2) Jay Davis's presentation on developing and applying a congener-profile-based comparative method for helping to identify areas of greater management interest.

Lester began the presentation with the motivation and objectives of the project, and a brief workplan. He then provided an overview of previous ranking methods using water concentrations and particle ratios and discussed their limitations, which provided the rationale and context for a new ranking method. For the proposed new normalization method, Lester walked through the assumptions made and calculation used at each of the six steps to normalize the data for ranking watersheds: (1) estimate runoff volume; (2) compute storm load; (3) adjust loads to a "standard storm;" (4) generate yields based on adjusted loads and land area of interest; (5) compute uncertainties associated with assumptions; and (6) compare watersheds using tables and graphically incorporating the results of the uncertainty analysis. Lester noted that the initial findings seem promising and hoped to complete the analysis soon for the SPLWG to review. He thanked Dan Wang for her contributions to the project and solicited feedback on the proposed normalization methodology.

There was discussion about three source transport mechanisms and how all three are based off the assumption that landscapes act as static PCB reservoirs that release PCBs under certain circumstances. Richard Looker suggested that there may be a fourth transport mechanism where PCBs are stochastically or randomly available, i.e., development/demolition, spills, etc. He recommended that, even though signs of this mechanism are difficult to detect with existing data, it should be factored in as a mechanism or, if it is too difficult to model, add it to the list of possible mechanisms and be explicit about this gap in understanding.

Overall, the committee was positive about the ADA project as a whole but wanted more time to understand the assumptions and methodology of the proposed method before provided any specific comments. Chris asked about how ranking based on the new methodology compared to previous ranking based on the concentrations and particle ratios. Lester responded that for this pilot is presently hard to comment conclusively but that conceptually he feels there should be some large changes. Chris requested that those comparisons be in the project report. Does the new ranking method change how we would make decisions? Lester agreed that this is an important question to answer and also added that he expects to include a large matrix with the rankings, the congener classes, and other lines of evidence. Lester ended the presentation with a $50,000 proposal for 2019 to continue the development and application of the new

ranking method as well as the PCB congener profiling method.

Jay Davis began his presentation by providing a brief summary of past work with using congener profiling as a tool for many applications. For four different Aroclors, Jay had identified four PCB congeners that were mostly unique to each Aroclor and developed numeric criteria to quantify congener profile-Aroclor matches. Jay used a visual of his Aroclor findings in the Guadalupe watershed to demonstrate how this tool could be used to draw connections between different upstream land uses within a watershed. He identified lack of understanding on the linkages between Aroclors and their associated uses as the most limiting data gap.

Analyzing homologs, multivariate approaches to connect aroclors to PCBs uses, and positive matrix factorization were all discussed as additional techniques that could be used to enhance the congener analysis. The workgroup recommended preliminary exploration of these techniques to evaluate whether they may be of any use. Barbara Mahler recommended using the 16 indicator congeners as an input to the multivariate models to constrain the number of variables and help to learn more about Aroclor contributions.

Action Item

- Add discussion of a fourth transport mechanism where PCBs are stochastically or randomly available, i.e., development/demolition, spills, etc. to the report. Add it to the list of possible mechanisms and be explicit about this gap in understanding. (Lester McKee, 7/20/18)
- Add a flowchart to the ADA technical report that visualizes assumptions made as well as sources of uncertainty at each step of the normalization process. (Lester McKee, 7/20/18)
- In the report, add a table showing how the ranks have changed relative to the “old” ranking methodologies. (Lester McKee, 7/20/18)

3c. Proposal: Trends strategy

Jing Wu began her presentation with the three trends specific questions for the STLS: 1) Investigating trends in sources and uses in watersheds, 2) Assessing trends in POC concentrations or loads, and 3) Predicting management actions and associated trends. She then summarized six elements that can be combined together to answer trends questions at both watershed and regional scale: 1) POC monitoring; 2) Source property identification; 3) BMP effectiveness evaluation; 4) O&M action inventory; 5) Monitoring in Bay Margins; and 6) Regional modeling. Using regional modeling to understand POC trends at regional scale was identified as the initial focus for the trends strategy, as such, Jing presented a multi-year plan that includes developing a model implementation plan and a phased model development approach to obtain answers by 2021. She solicited feedback on her proposal to allocate $100,000 in 2019 to develop a model implementation plan and regional model for hydrology and sediment, as year one of a three-year effort.

Some discussion centered on Jing's comparison of the Hydrological Simulation Program - FORTRAN (HSPF) and Stormwater Management Model (SWMM) platforms. Barbara Mahler mentioned a past, unsuccessful effort of using HSPF for simulating sediment for the Guadalupe River watershed and asked what's changed since then. She suggested including in the modeling plan a description of why this past project was derailed, any lessons learned from that effort, and what's changed since then that would give stakeholders confidence to support HSPF as the recommended model platform. The workgroup recalled that main reasons for that derailed modeling effort were the lack of (1) sufficient Guadalupe sediment calibration data, (2) appropriate parameters and coefficients, and (3) the lacking expertise and knowledge base at the time. As a result, the STLS made a decision in 2010 to develop a simpler model, the Regional Watershed Spreadsheet Model (RWSM). Since then, more data have been collected at Guadalupe, North Richmond, San Leandro, Sunnyvale, and Pulgas that can be used to support model development. The region has also collectively more understanding of sources and pathways of PCBs which will help inform the HSPF model development. In addition, the HSPF model has been widely and successfully applied to similar water bodies (e.g., Chesapeake Bay), and currently, there are a number of active HSPF modeling effort in the region, including a recent calibration of Bay Area Hydrologic Model by SFEI and uses of HSPF in relation to Reasonable Assurance Analysis (RAA), that can help better develop this model for regional trends analysis.

There was discussion about how to provide review and oversight. Lester mentioned that similar discussion took place during the development of the RAA guidance for the region. Lester asked if BASMAA had put together a regional review group for development of the RAA and if so, this would be an idea group to provide review for this project. Jing commented that she had also been putting some thought into an appropriate review structure but at this time no decision had been made. Chris commented that no such review team had been put together to oversee the RAA modeling effort but there was still some discussion going on inside BASMAA about that.

Workgroup participants were in favor of a regional model for trends analysis but thought the proposed budget and timeline were too aggressive and under-funded. After some discussion, they recommended:

- Increase the year 1 budget to $110,000 ($60,000 for planning and $50,000 for a beta hydrologic model) with an understanding that future budgets, timelines, monitoring needs, etc., will be revisited and determined on an ongoing, iterative, as-needed basis, and this is year one of a multi-year project that is not limited to three years as was written in the draft proposal. This flexibility will allow the project to better align with the development of other tangential projects (monitoring, advanced data analysis, and RAA, etc.) and to incorporate additional monitoring data that represent changes in the landscape.

- Seek out the applicability of model add-ons like the System for Urban Water Treatment and Analysis Integration (SUSTAIN) that could increase the robustness of the regional model.
- Explore and address the implications of the apparent overlapping interest in regional modeling with the Sediment Workgroup, Emerging Contaminants Workgroup, and Nutrient Management Strategy. Could funding be shared? Oversight and guidance?
- The STLS could function as the technical advisory committee in the short-term.

Action Item

- Revise the "Regional model development to support trends strategy" proposal to incorporate SPLWG feedback. Include in the modeling plan a description of why the past Guadalupe model was discontinued, any lessons learned from that effort, and what's changed since then to help provide greater confidence to support HSPF as the recommended model platform. (Jing Wu, 6/1/18)

3d. Proposal: Contaminants of Emerging Concern (CECs) stormwater screening

Phil Trowbridge introduced Rebecca Sutton and her talk of a CECs stormwater proposal that is supported by the Emerging Contaminants Workgroup (ECWG) and in need of some guidance from the SPLWG. Rebecca explained that the RMP CEC team has collaborated with Ed Kolodziej (University of Washington) on a proposal to screen stormwater for a list of roadway CECs, as both part of Ed's West Coast screening and also next steps after non-targeted analysis revealed high levels for a number of roadways CECs in San Leandro Bay. The ECWG ranked this proposal as a very high priority and was in favor of leveraging this effort to monitor an additional three classes of CECs: (1) PFASs; (2) phosphate flame retardants; and (3) ethoxylated surfactants. The $395,000 proposal was to screen these four CEC classes in Bay stormwater over two years and would ideally involve sampling methodologies informed by the SPLWG and based upon those used in reconnaissance monitoring.

The SPLWG provided some ideas on site selection and sample design:

- Monitor at airports to characterize their rubber burning and surfactant use.
- Look for CEC signatures that could link types of roadways (e.g., combustive CECs from diesel particulates indicating roads heavily trafficked by trucks as opposed to more arterial roads) with their uses and associated sources of contaminants.
- Ensure the absence of any possible matrix interference issues with lab analysis.
- Monitor in the dry season.
- Prioritize the sites by layering targeted criteria on top of a standardization of desired range of stream area. Use existing catchment layers to prioritize sites.
    - Dan Wang of CA DPR will be building a database on watershed characteristics and pollutant transport that can be aggregated to any scale. This database should be done by Spring/Summer 2019 and may be of some use.

- Separate the desired sampling locations into two tiers: primary sites (must sample) versus secondary sites (more flexible and longer list to choose from as sampling logistics allow for sampling and/or reconnaissance monitoring takes place)
- Consider writing a proposal for grant funding from the Water Environment Research Foundation (http://www.werf.org/i/Funding/Open_RFPs/c/zMiscellaneous/Requests_for_Proposa.aspx?hkey=05bda2a1-23af-4891-badf-815b2960d4f3).

The Workgroup also brainstormed some ideas to lower costs:

- Where possible, join efforts with reconnaissance monitoring.
- Remove well-understood analytes (e.g., imidacloprid and fipronil) from Ed's list of analytes.
- Lengthen the timeline to more than 2 years. This would allow more opportunity to sample logistically-difficult sites and would necessarily allow more flexibility for iterative, stepwise planning for such a large project.

The Workgroup discussed different sampling methodologies and highlighted the necessity of a clear, robust sampling plan. This plan should include decisions made regarding primary vs secondary sites, target land use types and catchment size, target storm types, time- versus flow-weighted composite, sampling methods and frequency, container/handling requirements, etc. The workgroup was in favor of overlapping CEC stormwater efforts with POC efforts so long as it did not greatly disrupt existing reconnaissance monitoring efforts.

Action Item

- Revise CECs in Urban Stormwater proposal to incorporate SPLWG feedback. Increase timeline and budget. (Rebecca Sutton, 6/1/18)

4. Discussion: Recommended studies for 2019

Jing Wu gave a quick summary of the program management proposal. Alicia Gilbreath summarized the PCB Priority Margin Unit (PMU) study, an add-on to reconnaissance monitoring that was supported by the PCBWG.

Chris Sommers set the stage for the discussion by noting that the high importance of all 2019 SPL studies up for prioritization (by SPLWG) and approval (TRC and SC), and the planning budget of $555,000 exceeds the summation of the current list of proposal budgets of $365,000. The SPLWG would prioritize all studies for SPL funding except for the PCB PMU Stormwater Monitoring and CEC Stormwater Monitoring proposals, for which the SPLWG would offer a statement of support. The workgroup discussed how to best plan timelines and budgets in order to allow for related monitoring, models, and other studies to support one another.

Action Item

- Discuss the deprioritization of Richmond Harbor as a Priority Margin Unit site with Lucile Paquette. (Jay Davis, 7/1/18)

5. Decision: Recommendations for 2019 special studies funding

Project leads left the room and Chris Sommers oriented the workgroup to make the decisions on each proposal. Barbara Mahler and Dan Cain commented on the proposals. Then there were some open discussion and prioritization and ranking of the proposals. Outcomes from the closed session discussion are summarized in the following tables.

	SPL to Prioritize for Funding				
Study #	**Study Name**	**Budget**	**Modified Budget**	**Priority**	**Comments**
1	Small Tributaries Loading POC Watershed Characterization Reconnaissance Monitoring	$175,000	$175,000	1	Develop sampling plan for repeat sites, 50/50% cost split for remote/manual sampling with minimum of 50% for remote (sediment) sampling, determine whether City of Seattle new passive samplers would be appropriately applied. Could feed into PCB control actions.
2	Advanced Data Analysis, Phase II	$50,000	$50,000	3	Could support repeat sampling plan for small tributary loading POC **r**econnaissance monitoring. Year 2 of a valuable multi-year study designed to provide more confidence in management action locations.
3a	Planning for STLS Regional model development to support trends strategy	$100,000	$60,000	2	Plan to include visioning, statement of goals, clear stakeholder input, evaluation of data availability & needs. Extra 10k for modeling advisor. Collaboration & benefits with nutrient, ECWG, & sediment group. Should notify TRC that this is the beginning of a multi-year, iterative process.

3b	Beta hydrology model for STLS Regional model development		$50,000	4	See benefit of initiating hydrology model in 2019 for early lessons learned and to inform modification of scope for 2020 work.
5	Small Tributaries Program Management	$40,000	$40,000	Highest	Essential for STLS
	Total	**$365,000**	**$375,000**		
	Planning budget	***$555,000***	***but was $302k in 2018***		

	SPLWG Statements of Support to TRC		
1 Add-on	Priority Margin Unit Stormwater PCB Monitoring	$40,000	Supportive.
4	Contaminants of Emerging Concern (CECs) in Urban Stormwater	$395,000: Year 1 $100,000; Year 2 $295,000	Supportive. BASMAA already has info on some analytes of interest. Planning effort needs to be significant in terms of sampling locations, methodology, etc. 2-year study may not be possible to get to all sites in 2 years. Field cost budget is probably too low. Consider dry sampling. Consider applying to grant from WERF.

Adjourn

About the RMP

RMP ORIGIN AND PURPOSE

In 1992 the San Francisco Bay Regional Water Board passed Resolution No. 92-043 directing the Executive Officer to send a letter to regulated dischargers requiring them to implement a regional multi-media pollutant monitoring program for water quality (RMP) in San Francisco Bay. The Water Board's regulatory authority to require such a program comes from California Water Code Sections 13267, 13383, 13268 and 13385. The Water Board offered to suspend some effluent and local receiving water monitoring requirements for individual discharges to provide cost savings to implement baseline portions of the RMP, although they recognized that additional resources would be necessary. The Resolution also included a provision that the requirement for a RMP be included in discharger permits. The RMP began in 1993, and over ensuing years has been a successful and effective partnership of regulatory agencies and the regulated community.

The goal of the RMP is to collect data and communicate information about water quality in San Francisco Bay in support of management decisions.

This goal is achieved through a cooperative effort of a wide range of regulators, dischargers, scientists, and environmental advocates. This collaboration has fostered the development of a multifaceted, sophisticated, and efficient program that has demonstrated the capacity for considerable adaptation in response to changing management priorities and advances in scientific understanding.

RMP PLANNING

This collaboration and adaptation is achieved through the participation of stakeholders and scientists in frequent committee and workgroup meetings (see Organizational Chart, next page).

The annual planning cycle begins with a workshop in October in which the Steering Committee articulates general priorities among the information needs on water quality topics of concern. In the second quarter of the following year the workgroups and strategy teams forward recommendations for study plans to the Technical Review Committee (TRC). At their June meeting, the TRC combines all of this input into a study plan for the following year that is submitted to the Steering Committee. The Steering Committee then considers this recommendation and makes the final decision on the annual workplan.

In order to fulfill the overarching goal of the RMP, the Program has to be forward-thinking and anticipate what decisions are on the horizon, so that when their time comes, the scientific knowledge needed to inform the decisions is at hand. Consequently, each of the workgroups and teams develops five-year plans for studies to address the highest priority management questions for their subject area. Collectively, the efforts of all these groups represent a substantial body of deliberation and planning.

PURPOSE OF THIS DOCUMENT

The purpose of this document is to summarize the key discussion points and outcomes of a workgroup meeting.