



RMP Sources, Pathways, and Loadings Workgroup Meeting
October 23rd, 2013
Meeting Summary

In Attendance:

Luisa Valiela (EPA)	Richard Looker (Water Board)	Bonnie DeBerry (EOA)
Arleen Feng (ACCWP/BASMAA)	Tom Mumley (Water Board)	Jennifer Hunt (SFEI)
Roger Bannerman (WI DNR)	Khalil AbuSaba (AMEC)	Meredith Williams (SFEI)
Peter Mangarella (Geosyntec)	Jim Kuwabara (USGS)	Don Yee (SFEI)
Greg Shellenberger (USGS)	Rob Carson (Contra Costa County)	David Gluchowski (SFEI)
Michael Stenstrom (UCLA)	Kelly Moran (TDC Environmental)	Jay Davis (SFEI)
Paul Salop (AMS)	Lester McKee (SFEI)	Jing Wu (SFEI)
Chris Sommers (EOA/BASMAA)	Alicia Gilbreath (SFEI)	Nicole David (SFEI)
Barbara Mahler (USGS)	Lisa Austin (Geosyntec)	

Summary of action items from the day

1. In the context of providing a record of the current main management drivers for redesign of our STLS monitoring and modeling program, Regional Board to produce a “1-page” summary of management actions for the workgroup.
2. In the context of a variety of challenges and admitted delays for producing a useable RWSM for sediment, PCBs and Hg loads at the regional and sub-regional scale, layout the timeline for each RWSM modeling step between now and December and give a date of complete by the end of next week.
3. In the context of the RWSM being designed as an open source model, identify a few high priority users to receive training as a way of testing the utility of the model.
4. In the context of lack of available data on PCBs and Hg for parameterization of more sophisticated models such as HSPF, continue to develop the spreadsheet model being mindful of ways to increase its validity at smaller and smaller scales.
5. In the context of greater information for a lesser cost and more flexibility with regard to permit compliance, Lester and the rest of the STLS local team to come up with a proposed monitoring program for the WY2015 season and send to SPLWG for review and input. Set up and implement a series of face-to-face meetings to refine a set of detailed sub-questions and explore the cost effectiveness and feasibility of various monitoring designs. Factors to take into account include but are not limited to identifying source areas, continuing to support the development of the regional watershed spreadsheet model performance at finer scales of granularity, and emerging analytes of importance. Options on the table include but are not limited to:
 - a. a change in the number of sites, effort (within annual and between year), and analyte list for POC loads monitoring sites,
 - b. implementation of reconnaissance (storm flow) monitoring at both the watershed and site management near-field scales
 - c. testing the deployment of surrogate technologies such as lipid bags

1. Introduction and Overview of SPL activities and Objectives [Meredith Williams]

The group conducted introductions and Meredith Williams initiated the meeting by noting that the speakers have articulated questions throughout the presentations that they would like the workgroup to address. Meredith also laid down a set of basic ground rules to be followed.

2. Answering POC management questions

2a. Check in on the Management questions – how are they evolving?

Richard Looker and Tom Mumley provided a summary on the evolution of management question for PCBs, Hg, and other pollutants. Richard presented 4 management questions:

1. Can we find high leverage watersheds and source areas?
2. What are loads of pollutants?
3. What are the trends in loads?
4. What is the effectiveness of the management strategies?

Richard also discussed what the needs of the urban runoff permit are. The first period of the Municipal Regional Permit (MRP) is coming to an end and there is a need to reflect on what has been learned. The second term of the MRP will take the most promising strategies based on pilot testing and apply them to areas that have been prioritized with a need to further monitor. PCBs are the driving force, but they secondarily benefit Hg and other contaminants. Richard continued to say that regional scale loads for PCBs are less of a priority. Tom Mumley chimed in saying that the current PCB framework treats the Bay as 1 unit and that attention could shift to more focused areas of the Bay (ex. South Bay, parts of South Bay). Richard brought up the Regional Watershed Spreadsheet Model (RWSSM) and what improvements could be made to it to get finer resolution estimates of loads. Richard also explained the need to assess effectiveness of LID. Areas with low-medium concentrations of pollutants could employ LID as a broad management measure. He reiterated that management is driven by PCBs and will probably continue to be.

Discussion

Arleen Feng started the conversation saying that we are re-shifting the way the management questions have expanded and taken over a high level focus. Richard Looker described high leverage areas as places that contribute a high mass of pollutant into the Bay, but noted that where the load enters the Bay could have a major impact. There is a difference between a pollutant entering a high energy area where it may be dispersed more easily versus into a sub-embayment that is not very well mixed. He continued to say that we have to rely on the information we have on loads and concentrations in watersheds to base decisions on where to take management action and that there may be a need to focus on the Bay in terms of biology.

Chris Sommers went on to say that we have reached a pivotal point on issues of scale and that we have been focused on the large scale while the management actions are taking place at a street block level. There is a need to focus monitoring efforts at a smaller scale than a watershed for management actions. Tom Mumley mentioned the RMP need to generate information to inform decisions. It may be beyond the scope and affordability of the RMP but it is still a good platform to push municipalities. Bay sediment and fish data could also help in determining what is occurring in the Bay margins/watersheds.

Richard Looker described pollutants of concern as more than PCBs and Hg. The Water Board is still interested in Se, legacy pesticides, and emerging contaminants. The SPLWG doesn't need to provide much support with regards to Se and legacy pesticides. Richard is confident that the Bay will be delisted for legacy pesticides and that they are becoming a lower priority, but still necessary to sustain focus on localized areas. For other emerging contaminants there isn't a need to find high leverage watersheds since management actions would involve phasing out of certain products.

Tom Mumley also described nutrients as becoming a bigger issue due to the changing physics of the Bay (ex. less turbid). There are algal toxins in the Bay that may be of concern. Jim Kuwabara replied that nutrients shouldn't take a back seat position to PCBs/Hg because they regulate the trophic transfer of contaminants and are especially important to biological targets. It was agreed that there would be more communication of contaminants of emerging concern and nutrients to the SPLWG but there was no discussion how that should functionally occur.

Action Item: Water Board to produce a 1-page summary of management actions for the workgroup.

2b. Monitoring program outcomes [Jennifer Hunt, Lester McKee, David Gluchowski]

Jen Hunt began the presentation by introducing a series of questions for the workgroup:

1. What success criteria indicate when there is sufficient information to answer the MQs?
2. What are the decision criteria for shifting to different watersheds?
3. Do we need to reallocate loads monitoring resources to other efforts e.g. source area monitoring?

David Gluchowski went on to describe the methods that have been used since long term monitoring at the Guadalupe River and Zone 4 Line sites, to the water year 2011 reconnaissance study, to the MRP pollutant of concern monitoring that has been ongoing since WY 2012. Jen then presented the current and futures uses of the data that ~~have been~~ have been collected and how it applies to identifying high leverage watersheds/source areas, calibration/verification of the RWSM, and determining temporal trends in loads monitoring. The particle ratio data (ranked by watershed) for PCBs and Hg were then shown for 25 sites that have had data collected. Tom Mumley noted that the targets shown for PCBs and Hg are desired future conditions for the Bay. Lester McKee went on to describe the quality of the particle ratio data and how the ranking of watersheds would change depending on the number of samples collected and which storms were sampled. Khalil AbuSaba noted that Lower Marsh (one of the current loads monitoring stations) is at the bottom of the rankings for PCB particle ratio and near the bottom for Hg. Lester then went on to describe the data quality of loads analysis and proposed 2 questions to the workgroup:

1. Are the data representative of climactic variation?
2. Are the data representative of the source-release processes of the contaminant of interest?

Lester proposed that the lengths of monitoring programs could be based on the climactic variability and pollution levels of the individual sites. He examined the long term average PCB load at the Guadalupe River based on 1, 2,3, and 4 years of consecutive sampling with 19 scenarios tested. Jen Hunt then went on to discuss the current amount of information and remaining needs at the 6 POC loads stations. Jen also discussed the cost analysis of difference type of studies (literature review to RWSM to POC loads station) and finished the presentation by proposing some alternative monitoring scenarios.

Discussion

Mike Stenstrom questioned how much dilution with clean sediments we can expect to see as well as how far away from reaching the future desired target of PCB and Hg levels in the Bay. Kelly Moran asked if there was a correlation between the size of a storm and whether or not the sediments are clean or dirty. Lester replied saying probably, but the field program is more opportunistic and there isn't necessarily a choice to be made based on storm size. On the topic of particle ratio data quality and variability, Arleen Feng said that high absolute loads aren't important for management actions, but characterizing loads are. The watershed rankings are used to find a range, but management decisions aren't based on the rankings. Chris Sommers added that management won't include diverting 100 square kilometers to treatment, but rather managing at a street block level. The modeling wants best estimates of pollutants, but management looks at disproportionately producing loads.

Roger Bannerman discussed using composite samples as opposed to discrete samples. He was able to stratify by flow when using composite samples. Composite samples also give a better idea of EMC. Arleen Feng responded that analyses were decided on when studying Guadalupe and Zone 4 Line A and it was determined that discrete samples were a better option. Kelly Moran reiterated that there is a potential for dilution of dirty sediment with clean sediment from upstream. Lester responded saying the largest storms do have lower particle ratios. Chris Sommers added that including sample numbers on the yields and loads graphs would be helpful because there is a wide range of samples collected at each site.

Richard Looker wondered if characterizing a yearly load hampers efforts to find high leverage and source areas. He also added that switching focus to capturing storm types that are most dominant and contribute more may be beneficial. Tom Mumley added that this was a good effort at capturing different scenarios and later in the afternoon the group would figure out which options to explore and come to a decision.

Lester added they can come up with the most likely options, and then we will meet with the local STLS to explore them further.

2c. Marsh Creek Case Study (Contra Costa) [Khalil AbuSaba]

Khalil AbuSaba presented on what has been learned from the loads monitoring site on Marsh Creek in Contra Costa County, especially in regards to Hg. He showed the Hg concentration and particle ratios that had been collected so far are not very high at all and that they fall in line with most baseline concentrations throughout the Bay Area. He also called to attention the fact that only one Hg sample collected so far captures water that came from the spillway in the upper watershed. Based on this detailed case study, what information would be needed to support a technical recommendation to reduce or cease monitoring effort at the Marsh Creek in relation to the management drivers?

Discussion

Khalil started the discussion asking if it makes sense to hold off on small storms and wait for large storms. He continued that he still has to meet the required number of storms prescribed in the permit. It was suggested that the site isn't in the right location to see the signal from the mercury mine and that it should've been better suited to be located further upstream. The Army Corps has a much larger study in the same area and the plan is to populate the current dataset and hand it off to the Corp since they have more resources. Kelly Moran wondered if they were interested in the mine site, why a more upper watershed site wasn't selected from the beginning. Khalil replied that they were initially interested in the lower watershed as well and the urban runoff from Brentwood. Now they are confident in the lower watershed numbers and that's why they would like to focus on the larger storm events. The reservoir in the upper watershed also appears to be protecting the lower watershed from high concentrations of Hg.

Khalil reiterated that there was very little information on Hg concentration from the Contra Costa mines so this has been a good investment of resources since no one knew what it looked like previously. Lester added that the Marsh creek study helps to bracket the cleanest and dirtiest watersheds and we are now seeing that it may fall in the cleaner category.

2d. Modeling program using the regional watershed spreadsheet model (RWSM) [Lester McKee]

Lester McKee began the presentation by proposing several questions for the workgroup to consider:

1. What success criteria indicate the model is good enough to answer the MQs?
2. What improvements can/should be made to increase model confidence in regional scale loads and ranking watersheds?
3. Can the RWSM be improved to address the source area emphasis (high granularity) (or would SWMM or some other model be more appropriate)?
4. Are there cost efficient alternative methods that could be considered to answer our management questions?

Lester continued by recounting the reason the RWSM exists and gave an overview of the modeling methods and the available sediment data. The model calibration technique was then described and the results of the sediment model calibration were presented to show how the model is currently overestimating loads. Lester went on to describe the pollutant modeling method, the source area mapping, and the land use based model input coefficients. The preliminary PCB calibration results were then presented along with preliminary sub-regional loads for loads for discharge, sediment, and copper. Lester then described the next steps which include climactic parameterization for the sediment model and exploring different parameterization combinations for the PCB and Hg models. Lester concluded the presentation by asking what the success criteria for the model may be and what future uses of the model could entail.

Discussion

Paul Salop began the discussion asking about clean sediment erosion. Arleen Feng responded saying that the model excludes areas that are behind dams. Tom Mumley asked about the model only being used at the watershed scale and Lester responded saying that the scale of calibration watersheds ranges from >1 square miles to 600 square miles (about half that for the larger watersheds if reservoir area is excluded).

Tom Mumley was curious about the difference between “open” and “open compacted” in the model coefficient inputs and why the “open compacted” had such a high value. Alicia Gilbreath responded that the “open compacted” areas included vacant lots in urban areas. The land use types are based on ABAG 2005, but whittled down to more manageable categories. Chris Sommers added that it’s possible to use GIS and Google Earth to zoom in to areas to see if they have been redeveloped. Mike Stenstrom added that how the land use categories are narrowed down is important and that it’s good to keep good records and to be able to make changes at some future time as more information is gathered. Alicia responded saying the land use categories can be lumped and split as the user dictates.

Kelly Moran asked where the data for the model input coefficients have come from. Lester replied saying they are from creeks, ~~stormdrains~~ storm drains, curbs and other areas where soils and sediments were collected by BASMAA and SFEI mainly from public right-of-ways and analyzed for PCBs and Hg – there are over 700 data points in the SFEI data base. The data on hand were used to find an average concentration in relation to land uses and source areas using a GIS to overlay all the data. Chris Sommers added that the majority of the samples collected are street and curb dirt from urban landscapes. Roger Bannerman was concerned about the data quality remarking grain size could confound the interpretations. Chris Sommers responded that preferential sampling for finer grain size materials occurred as samples were being taken. Some of the samples also had corresponding TOC and particle size analyses (sand-silt split most commonly) performed. In relation to the Santa Fe outlier on the preliminary calibration, Chris asked if there were other source related watersheds used in the calibration and Lester responded that Ettie St pump station and Pulgas North and South data were also used.

Richard Looker suggested that the Cu load from San Pablo Bay West looks much higher than all the other values and suggested a sanity check on Bay data in the area. Questions of when to stop and when is “good enough” came up in the discussion. Lester said that there are no standards or a range of values for goodness of fit statistical parameters. Important to look at the relative order/magnitude and use best professional judgment. A comparison of the model outputs to water and sediment EMCs of pollutants will be used.

Tom Mumley added that they have been anxiously waiting to have the RWSM available as a tool and they recognize there is a degree of caution that must be exercised when using the model. Mike Stenstrom concluded the discussion saying that this is the largest, most significant spreadsheet model to-date and what has been done so far is quite an accomplishment.

2e. MQ4 What are the projected impacts of management actions (including control measures) on tributaries and where should these management actions be implemented to have the greatest beneficial impact? [Chris Sommers]

Chris Sommers began the presentation by talking about what has been learned in the last 5 years in regards to PCB/Hg sources and summarized how they are evaluating management measures. He went on to discuss how RMP/STLS data are helping in answering where management actions should be taken. He also discussed any data that are missing that could be beneficial in evaluating management actions.

Discussion

Roger Bannerman started the discussion saying that it is important to know particle size and that different management methods control different particle sizes. He also noted that the BMP database does not have much data on particle size.

Several questions were raised: What is the load reduction benefit of controlling PCB loads from highly contaminated drainages and what can we expect to achieve? Where should we focus on Bay impairment in the future? What are the most effective approaches to assessing progress on TMDL allocations? Are there any surrogates or other analyses for PCBs that are more cost effective?

Roger Bannerman asked if we still need to do more to identify hot spots because it looks like there is a fairly good idea of where they are currently. Arleen Feng responded saying we know patches and “smeary” areas on the map, but there is still a lot to do in order to identify sites and inlets. Tom Mumley agreed, more information is needed to make decent decisions.

Chris Sommers concluded the discussion saying we have to use what data we have available. Then we can go verify land use, and understand the area so we can make sure we don’t have a false negative. Sediment becomes a surrogate for everything we are trying to look at. Roger Bannerman added that you want to get to the solution phase as quickly as possible; there is always room for refinement and learning more.

3. Programmatic level evaluation - Alternative monitoring and modeling design to address changed management emphasis [Lester McKee]

Lester McKee began this presentation by proposing a set of questions for the workgroup:

1. What combination of monitoring and modeling are most appropriate to address current permit provisions and the management focus proposed for MRP 2.0?
2. What are the pros and cons for the monitoring/modeling alternatives?
3. Are there tools other than monitoring and modeling that should be considered?
4. What is a cost effective design going forward?

Lester then went through some lessons from the reconnaissance, loads and composite monitoring stations, and suggested some alternative monitoring designs. He then went through the lessons learned for the RWSM and proposed some alternative designs.

Discussion

In regards to the composite sampling, Khalil AbuSaba added that they miss the “pollutograph” and first flush characteristics at the site. Tom Mumley added that it may be necessary to employ a hybrid sampling design and there may not be one-size-fits-all. Roger Bannerman added that the cons listed for composite sampling were more of constraints and challenges. Arleen added that the lessons learned applied to individual sites and analytes, but not necessarily to the program as a whole. She also noted that a recon study sounds good on paper, but during the last recon study a number of sites were ruled out due to feasibility/safety issues. With regards to sampling pump stations, many may be too small or have configurations that negate sampling. Lester agreed and commented that if we were to focus on pump stations in industrial areas, of the 73 currently identified for further exploration, it is possible that less than one half may be feasible and safe to sample.

Chris Sommers suggested that each pollutant needs to be evaluated and we have to come up with a set of management questions for each particular pollutant. Tom Mumley added that there are 4 categories that must be focused on: PCBs, first order loading, characterization, and management effectiveness. Tom Mumley then informed everyone about the new MRP in terms of timing. The application is due in June 2014 and that includes the proposed monitoring program therefore the next plan needs to be ready in 6-8 months from now.

4. Workgroup general discussion

4a. Prioritize discussion topics from the list generated throughout the day [Meredith Williams]

Meredith Williams lead a discussion collecting a list of questions that haven’t been asked or addressed in the discussions so far. A lengthy list of topics was generated and Meredith helped to narrow them down and prioritize them for the group in order to have a more efficient discussion.

4b. Discuss priority topics

Regional Watershed Spreadsheet Model

Are there major impediments to completing modeling?

Jing Wu started the discussion saying that it all depends on the sediment model calibration and whether there will be reasonable confidence in the model. Lester McKee added that they are exploring climactic

parameterization and that there aren't any other ways to improve the model beyond that. Meredith Williams added that she doesn't anticipate any impediments to completing the modeling with the appropriate confidence level. Modeling Hg in urban areas is driven by deposition (driven by impervious area) and is not highly associated with sediment transport. Tom Mumley reiterated that the Regional Board would really like the tool and has been anxiously waiting since July.

ACTION ITEM: Layout the timeline for each step between now and December and to give a date of complete by then end of next week

What are the appropriate uses of the RWSM?

Mike Stenstrom began by discussing how the RWSM could be the building block for a nutrient model. He also stated that it is important to start rolling the model out to some high priority users so we can better assess how it worked. Chris Sommers added that all end users should be able to use the RWSM. Caution should be used in using the model to prioritize watersheds. The model should be used to identify polluted watersheds, then verification though field monitoring should occur ~~possibly~~ possibly followed by management controls. The modeling cannot be used for identifying trends but it can be used for predicting the potential change that could result from management actions at various scales.

ACTION ITEM: Identify a few high priority users to receive training as a way of testing the utility of the model.

What do we continue to invest in RWSM and do we need to consider other models to answer existing questions?

For the next modeling tool it is import to take small spatial scale into consideration. HSPF models have been used at the watershed scale and for measuring management effectiveness in Southern California. While places in California have laid the framework for other models, the Bay Area is geographically different leading to some major challenges. In addition, our pollutants of concern differ substantially. There is a pure lack of coefficients available to properly ~~parameterise~~ parameterize more sophisticated models such as HSPF for PCBs and mercury let alone PBDEs and other potential future analytes. The lack of available coefficients negates the use of HSPF in most situations.

ACTION ITEM: Continue to develop the spreadsheet model being mindful of ways to increase its validity at smaller and smaller scales.

Monitoring

Peter Mangarella began the discussion by reiterating that trends are a lower priority and identifying high leverage source areas is a high priority, but the two are linked. Richard agreed that high leverage areas are a very high priority but it is important to not forget about trends in terms of baseline information. It's important to establish a baseline for source areas so we can measure effectiveness of management actions. There is a need to normalize to weather and a control site would increase robustness of ability to measure change.

It would be beneficial to collect additional information during monitoring such as transport, reconnaissance, and site dirtiness. Kelly Moran questioned whether there was value in monitoring bed sediments in creeks, but monitoring has found low PCBs in bed sediments. Barbara Mahler brought up the possibility of using passive samples such as lipid bags. It was suggested that we mine the existing RMP data to help identify high leverage area; could look at sediment and fish data by Lester pointed out that this has largely been done through the recent PCBs synthesis and that there may not be too many further avenues to explore at this time.

The group was in support of a reconnaissance based source area monitoring effort in which the specific design may depend on the individual pollutants. Smaller sites might see a response soon once control measures are implemented. Lester pointed out that we are using the previous reconnaissance data in

ways we didn't originally think of, such as, calibration of the RWSM. Arleen Feng pointed out that there would need to be some coordination with the nutrients strategy.

ACTION ITEM: Lester and the rest of the STLS local team to come up with a proposed monitoring program for the WY2015 season and send to SPLWG for review and input. Set up and implement a series of face-to-face meetings to refine a set of detailed sub-questions and explore the cost effectiveness and feasibility of various monitoring designs. Factors to take into account include but are not limited to identifying source areas, continuing to support the development of the regional watershed spreadsheet model performance at finer scales of granularity, and emerging analytes of importance. Options on the table include but are not limited to:

- a) a change in the number of sites, effort (within annual and between year), and analyte list for POC loads monitoring sites,
- b) implementation of reconnaissance (storm flow) monitoring at both the watershed and site management near-field scales
- c) testing the deployment of surrogate technologies such as lipid bags

5. Review meeting outcomes/ adjourn

Roger Bannerman said that some great progress has been made and that the RWSM has some real value, but isn't sure if we can model PCBs at critical sites. It takes time to see a response/changes and monitoring style and actions could be based on audience. Lester McKee added that he will take the recommendations from the SPL meeting and develop an agenda for a local meeting to further explore monitoring alternatives. Barbara Mahler noted that the change in focus is shifting to a more granular/parcel size scale and that the reconnaissance method seems to be the most promising method to get the information needed. It won't be able to answer all of the questions and leaves out sediment loads, but there are tradeoffs as we start focusing on a smaller scale. It is also important to be able to look at trends 10 years down the road. Paul Salop noted that management actions would most likely be taken downstream from where we have the majority of our baseline data. Mike Stenstrom added that the RWSM can be used for ranking places to go to reduce contaminants more and can be used in combination with GIS to display things you may not have seen otherwise. He suggested more use of GIS as a means of communication.

The group discussed the next meeting possibly being in May 2014 so discussion can occur before drafts of the new MRP go out. Meredith Williams concluded the meeting and adjourned the group.