



RMP
Technical Review Committee
September 17th, 2013
San Francisco Estuary Institute
Meeting Summary

Attendees

Bridgette DeShields, Arcadis/WSPA
 Luisa Valiela, USEPA
 Karen Taberski, SF RWQCB
 Tom Hall, EOA, Inc. (South Bay Dischargers)
 Chris Sommers, EOA, Inc. (BASMAA)
 Mike Connor, EBDA
 Amy Chastain, AECOM/ SFPUC
 Paul Salop, AMS
 Bonnie de Berry, EOA, Inc.

Meg Sedlak, SFEI
 Jay Davis, SFEI
 Emily Novick, SFEI
 David Senn, SFEI
 Rebecca Sutton, SFEI
 Lester McKee, SFEI
 Meredith Williams, SFEI
 Don Yee, SFEI
 Ellen Willis-Norton, SFEI

I. Introduction and Approval of Agenda and Minutes [Bridgette DeShields]

Karen Taberski motion to approve the previous TR's summary. Chris Sommers seconded; Bridgette DeShields asked if all members were in favor, and the summary was unanimously approved.

II. Information: Steering Committee Report [Meg Sedlak]

Meg Sedlak informed the group that the Steering Committee approved the TRC recommended pilot and special studies proposals. The only modification the SC had was that alternative flame retardant special study should not only monitor the compounds in ambient Bay water, but also in effluent and stormwater. The additional monitoring will cost \$24,000, which will most likely come from the RMP reserve. The revised proposal was attached to this quarter's TRC package.

Meg also noted that Ellen Willis Norton completed the 2008- 2012 SQO report, which she presented at the SC meeting and sent out to the SC, TRC, and the EEWG. After her presentation, the SC approved the TRC's recommendation to defer the benthos and toxicity portion of the 2014 S&T sediment cruise. Meg mentioned that the TRC will need to decide at what frequency the RMP should check in on SQOs.

The SC also discussed the RMP's communication strategy at the last meeting. During the meeting Judy Kelly from *Estuary News* came to talk about how the sequester was affecting *Estuary News*' budget. She asked if the RMP could provide \$10,000 in funding annually for the next two years. The SC approved the request noting that by funding the newsletter, the cost and effort of producing the RMP Estuary Insert would be lower and RMP could be featured more

prominently in *Estuary News*. Meg noted that the RMP also has the opportunity to serve on *Estuary News*' editorial board. Jay ended the discussion by stating that a comprehensive RMP communication strategy will be brought to the next SC/MYP meeting on October 15, 2013 (*this has been deferred to the January meeting*). Meg will send a note to the TRC about the SC/MYP meeting.

Action items:

1. Meg will send a note the TRC about details of the SC/MYP meeting on October 15.

III. Discussion of Possible Changes to Status and Trends (S&T) Monitoring [Don Yee, Rebecca Sutton, Meg Sedlak, Jay Davis]

Meg Sedlak stated the goal of the following discussion was to focus on each element of S&T monitoring (e.g., water, sediment, bivalves, sport fish), discuss the management questions related to each element, and opportunities for changes based on current information needs.

Water Monitoring [Meg Sedlak]

Meg began the discussion on S&T water monitoring by asking the TRC if there was value in monitoring organics in water, which are now sampled every 4 years. The monitoring data provides limited information for management decisions, mainly because the compounds are hydrophobic and thus it is difficult to distinguish spatial and temporal trends. Additionally, organics monitoring in water is some of the most expensive analyses the RMP completes, ~\$100,000 to analyze each contaminant. Meg asked the TRC if organics monitoring in water should continue as is, if only one class of compounds (e.g., PCBs) should be analyzed to serve as a reference point, or if the sampling should be dropped altogether and periodically revisited under special studies. Meg then reviewed inorganics sampling in water, which is analyzed every other year. She noted the sampling is relatively inexpensive and informs several management decisions. Therefore, she recommended continuing to sample inorganics in water biennially.

Meg then moved on to discuss current use pesticides (CUPs), which are currently monitored as part of pilot and special studies. Sampling of CUPs is prioritized based on the contaminant's CEC tier classification. For example, fipronil is a Tier 3 contaminant, of moderate concern, and was analyzed in Bay water and stormwater. Once the concentrations in Bay water are reported the RMP will decide whether to sample fipronil more frequently. Meg recommended maintaining the same approach for monitoring CUPs. Similarly, CECs are monitored based on their tier classification. In 2013, alternative flame retardants, Tier 1 contaminants, will be monitored in stormwater, effluent, and Bay water. The inclusion of Pharmaceuticals and Personal Care Products in an S&T sampling effort is still to be determined.

Discussion:

Jay Davis reiterated that this is a first round of screening of possible changes to the S&T sampling program. Luisa Valiela asked how long it takes for the changes to come into effect after a decision is made. Meg responded that any changes to water sampling wouldn't occur until 2015. Chris Sommers asked about how the decision process will work; Jay replied that RMP staff will look at the TRC recommendations from today and come back to the TRC for a second round of discussions.

Chris wondered if the concentrations of organics in water were useful for modeling efforts. Jay responded a contaminant model is not currently being developed per se as the focus for modeling is on nutrients. However,; even if a model was being created, there is already a significant amount of historical water data and the organic contaminant concentrations are correlated with suspended sediment concentrations. Bridgette DeShields noted that data that may not seem useful now may be important for trend analysis in the future; for example, the data for PAHs in water was useful during the oil spill in the Bay. Jay replied that the RMP will look into whether the data is being used for permit requirements.

Bridgette said that she was worried about eliminating the monitoring of an analyte completely because of permit requirements. Tom Hall responded that there are only a handful of permit triggers/limits anymore. Nevertheless, the RMP will look into whether the data is being used for permit requirements. Luisa suggested looking into the permit cycle, possibly every 10 years, to determine if the frequency of sampling organics in water can be reduced. Chris Sommers noted that management decisions happen on a shorter timeframe than every 10 years. Chris asked Meg and Jay to come back to the TRC with figures that show whether there is any spatial or temporal variance of organic contaminant concentrations in water. If the concentrations are all close to the detection limit or if there are no trends over time, then reducing the frequency of sampling or putting sampling on hold until there is a new information need makes sense.

Regarding CEC monitoring, Jay stated that monitoring CEC pathways (e.g. stormwater and effluent) is more appropriate than looking for CECs in the open Bay. Chris Sommers responded that we care about effluent that is affecting the Bay; therefore, ambient Bay concentrations should be monitored alongside effluent. He added that stormwater is difficult to monitor and monitoring in the Bay may be a better starting point. Don Yee responded that because of dilution in the open Bay, source and pathway monitoring is most likely more productive for CECs with low concentrations. Meg replied that monitoring is occurring in Bay water, effluent, and stormwater all at the same time.

Action items:

2. RMP staff will look into whether the organic contaminant S&T water data is being used for permit requirements.
3. Meg Sedlak will analyze and present any spatial or temporal variance of organic contaminant concentrations in water during the next TRC meeting.

Bivalve Monitoring [Meg Sedlak]

Meg Sedlak reviewed the existing bivalve monitoring program, which includes monitoring organics biennially and monitoring inorganics every five years. Transplanted bivalves are placed at fixed locations in the Bay and resident bivalves are sampled at the River stations. Bivalve sampling is relatively inexpensive and Meg recommended the program continue with the status quo.

Discussion:

Chris asked if there are some contaminants that are never detected that could be removed from the analyte list. Meg complied that she cannot think of an analyte that currently isn't providing a helpful story.

Sediment Monitoring [Don Yee]

Don Yee explained that sediment monitoring is essential because it is the primary matrix for hydrophobic contaminants and is a pathway for biota exposure. Currently, sediment monitoring occurs biennially, alternating between the wet and dry seasons. Don listed the pros and cons of measuring sediment chemistry, toxicity, and benthic community condition. Sediment chemistry information is used to compare against toxicity thresholds, to make bioaccumulation predictions, and to determine if dredged material contaminant concentrations are similar to ambient conditions and can be used for beneficial reuse. Sediment toxicity has been sampled as a direct indicator of pollutant effects. Benthos sampling has also been monitored to compare impacted versus un-impacted area.

Don listed questions about possible changes to sediment monitoring for the TRC to consider including whether to drop benthos and toxicity sampling completely; if the frequency of sampling lower priority organics (e.g. OCPs and PBDEs) and non-bioaccumulative trace elements can be reduced or eliminated; whether the number of stations sampled during the dry season can be reduced to 27 (matching that of the wet season); if Tier 3 CEC contaminants should be added to S&T sediment monitoring; and whether margin sampling should be completed.

To help answer whether the number of stations should be reduced during dry season sampling, Don showed the power analysis results from Melwani et al., 2006. The results indicate that if all analytes acted like PCBs, there is > 90-95% power even with four samples per segment (except for Suisun Bay).

If only 27 sites are sampled during the dry season, the funds could be reallocated to sampling the margins. The TRC needs to decide whether the sampling should be deterministic or ambient; Don supports a combination of both, with the initiation of ambient margins monitoring program supplemented by sampling at known hotspots. Sediment chemistry, toxicity, and benthos could be sampled the margin stations.

Discussion:

Chris asked why the RMP was sampling during the wet season if the top 5 cm is sampled and sediment only accumulates at the rate of around 1 cm/yr. Don replied that the sediment can move location from one year to the next and there is no disadvantage to sampling during the wet season. Jay added that the RMP saw a pattern of higher toxicity during the wet season and Meg stated that contaminants associated with large storm events may be missed if sampling only occurred during the dry season. Mike Connor stated species composition and toxicity may be more affected by seasonality than sediment chemistry, making it difficult to compare between years. Chris argued that the benthic indices are not applicable during the wet season; Bridgette and Karen Taberski then suggested only sampling benthos during the dry season. Mike stated that sediment toxicity and benthos sampling are already on hold and he does not support eliminating benthos sampling completely since his main concern is whether the biological community is healthy. Karen agreed that both sediment toxicity and benthos sampling should be revisited.

Jay wondered if managers were actually using the OCP and PBDE maps produced by the RMP to watch for trends and answer management questions. If not, the organics analyte list or the frequency of sampling could be reduced. Luisa responded that S&T sediment data informed cleanup activities in San Leandro Bay. Mike asked Jay and Don to summarize and support their hypotheses for whether we are seeing a change over time for OCPs and PBDEs.

Chris thought the spatial variation provided by sampling 47 sites during the dry season was useful. Don responded that there is still greater than 90% power if only four stations are sampled per segment (27 sites in total), excluding Suisun Bay because of its inherent variability due to its location near the Delta.

Chris ended the discussion by noting that the RMP will only save \$110,000 by eliminating benthos and toxicity sampling during the 2014 S&T sediment cruise. He stated that only a few margin sites could be sampled with \$110,000. Don replied that sampling a few sites is a start and if the number of stations sampled in the dry season was reduced to 27, more funds could be allocated to margin sampling.

Action Items:

4. Jay and Don will create maps and trend graphs to support their hypotheses for whether OCP and PBDE concentrations are changing over time.

Small fish Monitoring [Jay Davis]

Jay Davis began the discussion by stating that small fish monitoring has already occurred as a part of RMP pilot studies. Small fish monitoring (for PCBs and Hg, and possibly CECs that aren't metabolized) as a part of the S&T program is useful because tissue concentrations show distinct spatial variations at a local scale. Watershed cleanup efforts are happening in older industrialized areas including Richmond, Eddie Street, Pulgas Creek in San Bruno, and Leo Avenue in San Jose. Small fish monitoring downstream of those watersheds could help determine if actions upstream are having an impact. Small fish monitoring could be performed before and after the completion of the watershed cleanup efforts, continuing over multiple years.

Discussion:

Chris Sommers noted that the cleanup efforts Jay mentioned are small and the RMP may not be able to see a change. Jay responded that the sampling design is very preliminary and a mass balance for each of those areas needs to be completed before monitoring occurs. Jay added that small fish monitoring on the margins is another monitoring idea that could easily connect to the sediment margin sampling work. If a random design is used, segment scale impairment of small fish tissue could be revealed.

General Discussion of Possible S&T Monitoring Changes:

Karen asked that the next TRC package include proposals with the options for changes to the S&T program clearly listed with pros and cons for each option. Chris would like to see graphical representations of the data to support the various options.

Chris supports both sediment and small fish sampling in the margins, stating that understanding how urban runoff may be affecting Bay biota or sediment is useful. However, Chris thinks the

two efforts may overlap and the RMP should be careful to not duplicate efforts. Chris added that the sampling effort should be focused on specific areas of the Bay where there is cause for concern and where sampling would lead to management action. Bridgette asked that the options for small fish and sediment monitoring in the margins be proposed together.

Bridgette supported the option of small fish and sediment margin sampling in hotspot locations prior to sampling ambient conditions. Chris added that margin sampling program should not just focus on PCBs and Hg, but emerging contaminants. Don replied the Chris's point is an argument for ambient monitoring because you don't know hotspot locations for CECs. Chris agreed, but stated the management actions for urban runoff are going to be for specific watersheds. Don responded that if you found out the whole shoreline was contaminated, the management approach will change. The discussion ended with a request by the TRC to send out the agenda three weeks before the meeting so the members have time to review and discuss with their respective agencies.

Action Items:

5. Meg Sedlak and Ellen Willis Norton will send out the fourth quarter TRC agenda package on November 21.

IV. Information: RMP Annual Meeting Sneak Peek [Becky Sutton, Meg Sedlak, Dave Senn]

Meg Sedlak, Rebecca Sutton, and David Senn gave shortened versions of the presentations they will give at the SOE Conference/RMP Annual Meeting on October 30th, 2013.

Perfluorinated Compounds in the Bay [Meg Sedlak]

Meg first reviewed the tiered classification system for CECs, highlighting that PFOS is a Tier 3 contaminant (of moderate concern), and explained the structure of PFOS and PFOA. Her presentation focused on PFOS since it is accumulating in biota. Meg described what PFOS is used for, its effects, and the RMP's extensive sampling effort for PFOS in bird eggs, small fish, harbor seals, sediment, and water in 2012. She presented trend graphs and maps for PFOS in the different matrices. She highlighted the concentration decrease in cormorant eggs, but noted that seal concentrations remain elevated. She compared concentrations in Bay bird eggs and sediment to those reported internationally. At the end of her presentation she stated that PFOS precursor concentrations are equal to that of PFOS. She reviewed potential sources of precursors and PFOS, including WWTPs, point sources, and urban tributaries, while making clear the source of PFOS remains elusive.

Feedback:

Chris Sommers asked if AFFF, a source of PFOS, is used by a forest fires. Meg responded that she's not sure, but will find out. Paul Salop suggested including information on possible PFOS replacements.

Flame Retardants – Effects of Flammability Standards and Bans [Rebecca Sutton]

Becky began her presentation by explaining the California flammability standards and the various kinds of PBDEs that were produced to meet the standards. She noted the San Francisco Bay became a hotspot for PBDEs and that with growing toxicity concerns, contaminant was

phased-out. Becky then introduced the RMP and described how the RMP has documented the reduction in PBDE levels over time in bivalves, sport fish, and cormorant eggs. She ended her discussion of PBDEs by stating that they are still of moderate concern and will continue to be monitored by the RMP. She noted that US Manufacturers have now switched over to using alternative flame retardants, for which there is little information on the toxicity. She reviewed recent efforts to monitor alternative flame retardants in the Bay and ended her presentation with a description of possible regulatory changes.

Feedback:

Paul Salop suggested making clear the regulatory changes were partly driven by research completed in the Bay. Chris asked why the decline in PBDEs was so rapid if they are found in products that have a long lifespan. Becky responded that PBDEs are additive chemicals so they leach out of furniture and get into house dust. As a result, when items are washed or discarded, they enter the wastewater effluents or potentially urban streams (if the items are dumped). Don wondered whether the emission rate of PBDEs from house dust is consistent over time or whether there is a decay function. Mike Connor then asked why PBDEs behave differently from PCBs. Becky responded that their rates of decline are consistent with a fairly quick degradation and Don added that PBDEs undergo photo and microbial degradation. Additionally, the inventory PBDEs in the Bay is smaller than PCBs. Mike suggested adding a slide on the rate of degradation.

. Chris added that Becky should mention Arleen Blum. Chris suggesting deleting the pie chart that lists the RMP's annual budget and focus on what issues RMP has worked on. Jay said that Becky should mention the Pulse and the CEC contaminant profiles.

Science to inform nutrient management decisions in San Francisco Bay [Dave Senn]

Dave Senn began his presentation by stating that he will focus on the scientific side of the nutrient strategy and is still working on choosing two or three topics to cover in more detail. He first described how nutrients are essential, but may become problematic if loadings are too high. He stated that there are many agencies that are coming together to determine if San Francisco Bay is nutrient-impaired. The problem statement the partners put together informed the nutrient conceptual model, which identified the highest priority issues and goals for determining whether nutrients will become problematic in San Francisco Bay. Dave noted the main recommendation for the conceptual model was that a strongly integrated modeling, monitoring, and process study program was needed. He gave examples of where monitoring was needed and how modeling will help determine what future conditions will look like and which management actions will be most effective.

Dave then went over possible topics to explore more detail including results from the loading study; historic water quality data in the Lower South Bay; looking at how nutrients are affecting dissolved oxygen (DO) concentrations in Lower South Bay; preliminary results from new moored sensor stations; or Suisun/Delta phytoplankton composition.

Feedback:

Chris like the idea of discussing DO in Lower South Bay because Dave can show how the region has inherently low DO at times because it is effected by the tides. Mike Connor said that the

slide discussing phytoplankton composition needs to explain which color represents which phytoplankton community.

Dave stated that he wants to emphasize how much data is available that isn't being analyzed currently; Meredith Williams suggested showing a list of the available data. Mike replied that phytoplankton is more interesting than a slide listing available data. Mike added that he found the second half of the presentation, where specific topics are discussed in detail, more interesting than the introduction. Jay agreed that is better to focus on information that we can interpret.

V. Decision: Update on the Nutrient Model [Jing Wu]

Jing Wu began her presentation by stating that stormwater loads could be a substantial nutrient source in certain Bay segments, especially in San Pablo Bay. The Nutrient team is interested in refining initial loads estimates for the segments where stormwater loads are predicted to be significant. The proposed study was to compare Regional Watershed Spreadsheet Model (RWSM) estimates to other model-derived load estimates and to develop a hydrological simulation model to improve load estimates and explore uncertainty. The initial effort was focused on the Napa River watershed because of the relatively high nutrient load, the existence of two highly hydrologic and one nutrient model for the watershed, and because sparse monitoring data from the watershed is available.

Jing found that the RWSM estimated higher nutrient loads than two other models developed for the Napa River watershed (SWAT and WARMF). At this point, she does not know which model is correct. The RWSM estimate is more similar to the concentrations reported by the literature; however, unlike the SWAT model, the RWSM does not take into account the nutrient loss rate, which could bring estimates down to 1,300 kg N/day (currently 3,680 kg N/day).

Jing asked the TRC's input on which of the four options listed below is the appropriate next step:

1. Develop a mechanistically-based hydrological and nutrient load model
2. Apply existing Brake Pad Partnership Cu model or Bay Area Hydrological Model
3. Refine the existing WARMF model to focus primarily on the nutrient-related uncertainty
4. Stop, or pause for the time being. Reallocate \$50,000 to within-Bay modeling

Jing noted that the TRC agenda package included a memo detailing each option, including the pros and cons.

Discussion:

Mike Connor asked why data collection wasn't included in any of the options. Dave Senn responded that to monitor five storms would cost around \$250,000; Dave said that the \$50,000 available for this study could be used to either collect more data or try to better understand and explore the uncertainty of the models. Even without data collection, by exploring uncertainty you could find that stormwater loads are lower than initially modeled or that the load estimates are correct. Mike then asked if receiving water data could be used; Dave replied that receiving water data is limited around the Delta.

Mike stated the main problem is that the model's climatic inputs don't make sense for the region. The question is whether the yields make sense given the Mediterranean climate. Jing agreed and

said that she is interested in finding out difference the nutrient load for vineyards versus agriculture. Mike replied a book published by UC Davis that reports nitrate concentrations in groundwater in the Central Valley, which would help determine the nitrate loads from vineyards.

Dave asked the TRC how much do they care about stormwater loads. Chris Sommers said that the question may need to be answered a later time, but Mike responded that the load into San Pablo Bay is a big deal. Dave said that the focus on San Pablo Bay is helpful because the loads are an order of magnitude higher than other regions; if we determine that the loads are lower than expected, then the RMP is saved the effort of monitoring stormwater loads in other subembayments.

Chris noted that Napa agencies do not contribute to the RMP and thought the people from Napa should be involved if we want to put money into modeling the watershed. Meg indicated that several of the wastewater treatment facilities contribute to the RMP. Dave replied that the Napa River was chosen because it was one of the largest watersheds with significant nitrogen yields and there was more nutrient data available to calibrate the data. Lester added that the Sources, Pathways, and Loading workgroup chose Guadalupe River to monitor PCBs because of the size of the river and because it was polluted; the results are more accurate when the largest tributary load to the Bay is modeled. Amy Chastain asked how resolving the uncertainty about nutrient loads from vineyards and the Napa River would help resolve stormwater loads to the whole Bay; Dave replied that the results will be localized.

Mike asked why SUNTANS cannot be used as the model. Dave replied that gauge flow data and runoff coefficients could be used to run SUNTANS; however, Jing noted that only data close to the Napa River's mouth is useful. Chris ended the discussion by stating he would choose option three (refine the existing WARMF model to focus primarily on the nutrient-related uncertainty) because of the minimal cost. Luisa Valiela suggested getting stormwater agencies to buy in to the study, but Dave disagreed noting that the RWSM could be the upper bound of nutrient loads.

VI. Information: Update on the Watershed Spreadsheet Model [Lester McKee]

Lester McKee provided the TRC with an update on the Regional Watershed Spreadsheet Model (RWSM). He began his presentation by stating that 25% of the 2013 budget (\$468,000) for the Small Tributaries Loading Strategy was dedicated to developing the RWSM. The RWSM will be used to improve regional estimates of suspended sediment and pollutant loads, helping prioritize watershed "patches" for management. Lester reviewed the model's basic structure and plan for development. He described how the initial model water multiplied flow by land use based concentrations to estimate the loads. The initial model was not similar to concentrations measured in the Bay; therefore, a new model was generated that included three slope classes and five geology classes. The suspended sediment loads data set was also updated and the loads were then adjusted for the delivery ratio, to remove the effect of area.

Next steps include adding a climatic factor, completing version three of the sediment RWSM, and improving version two of the PCB and Hg model as soon as the sediment model is calibrated. Lester ended his presentation by stating that the RWSM will continually adapt and improve as management questions change.

Discussion:

Mike Connor was surprised that the Hg loads for different source areas were not extremely different from one another. Lester replied that the variations around the mean (1,437) were greater for PCBs than Hg. Mike also noted that the Napa River sediment load was stunningly high compared to other regions. Luisa Valiela replied that the sediment load is high because of the bare soils. Lester noted that the input side of the model is less important than the calibration data set, which informs the different contaminant concentrations for land use areas that we choose to include in the model.

VII. Information: Update on Pulse and Annual Meeting [Jay Davis]

Jay Davis stated that Linda Wanczyk is working on the design of the Pulse and it will be sent to the printer the beginning of October. Meg Sedlak noted that at least two outside reviewers (ECWG science advisors) read each of the articles. Meg said that the RMP Annual Meeting is also on track, the keynotes are lined up and the agenda is available on the SOE website. TRC members should have received a note to register on the SOE page.

VIII. Information: Update on Workgroups and Scorecard [Meg Sedlak]

Meg Sedlak stated that she presented to the Water Board last week about the RMP and received positive feedback from the Board, who appreciated the collaborative nature of RMP. Jay Davis and Becky Sedlak flew to SCCWRP to work on a statewide plan for CEC monitoring in the RMP also got praise for our CEC monitoring program.

The SPLWG next meeting is on October 23rd and the agenda will be sent out to the group in a couple of weeks. The Tidal Marsh Restoration Workshop was scheduled for October 9th at CDPH (*however, due to the federal government shutdown it has been postponed*). Meg finished the update by stating that “Above and Below” exhibit at the Oakland Museum of California exhibit is now open and that the Delta RMP is going well.

IX. Action: Set date for next meeting and Plus/Delta

The TRC next meeting is scheduled for Thursday, December 12.