



**RMP**  
**Technical Review Committee**  
**June 26<sup>th</sup>, 2013**  
**San Francisco Estuary Institute**  
**Meeting Summary**

**Attendees**

Luisa Valiela, USEPA	Rod Miller, SFPUC
Karen Taberski, SFRWQCB	
Bridgette DeShields, Integral/WSPA	Meg Sedlak, SFEI
Eric Dunlavey, City of San Jose	Jay Davis, SFEI
Nirmela Arsem, EBMUD	Emily Novick, SFEI
Chris Sommers, EOA, Inc. (BASMAA)	David Senn, SFEI
Mike Connor, EBDA	Meredith Williams, SFEI
Naomi Feger, SFRWCQB	Don Yee, SFEI
Amy Chastain, AECOM/ SFPUC	Ellen Willis-Norton, SFEI
Rob Lawrence, US Army Corps of Engineers	

**I. Introductions and Approval of Agenda and Minutes [Bridgette DeShields]**

Karen Taberski motioned to approve the previous TRC meeting summary. Rob Lawrence 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 SC approved the new dredger fees for the next three years. The fees remained the same (although the volumes for the top five dredgers changed because they are calculated on a rolling average). She also noted that the SC agreed to move away from a deterministic contaminant model and focus on nutrient modeling; a tactical plan is in development for the nutrients model.

**III. Action: Recommendation for Special Studies for 2014 [Meg Sedlak, Jay Davis, Emily Novick]**

Meg Sedlak and Dave Senn provided an overview of the 14 proposed special studies for 2014 and asked the TRC to prioritize the special studies. The available budget for the special studies is \$1,266,393, while the estimated cost for completing the entirety of the proposed studies was \$1,440,140. Mike Connor noted that the TRC is then charged with eliminating \$173,747 from

the proposed special studies budget. Meg added that \$300,000 is available in the RMP reserve if the TRC agrees that all of the studies are of equal merit and should be completed in 2014. Meg stated that Ellen Willis-Norton will present SQO data from 2008-2012 to determine if the TRC is still in agreement about eliminating the toxicity and benthos portion of the S&T sampling for 2014. If so, then \$110,000 will also be available for use in the S&T or special studies budget.

Other funding decisions that may be forthcoming are: 1) including margins sampling in the S&T program (not part of the special studies budget) and 2) completing special studies originating from PCB synthesis recommendations. Chris Sommers responded that work relating to the PCB synthesis recommendations will not occur until 2015 or 2016; therefore, it does not need to be discussed today. Meg proceeded to briefly describe each of the proposed special studies.

*1. Alternative Flame Retardants (\$83,000-\$137,000):* The study idea is based on observed decreases in PBDE concentrations; which may result in increased detections of PBDE alternatives in the Bay. The flame retardants the RMP is targeting include: phosphates, compounds that are part of Firemaster 550, and compounds listed on Howard and Muir (2010) top 10 lists. The budget ranges from \$83,000 to \$137,000. The \$54,000 difference is because the higher range budget includes analyzing seal sample archives for PBDEs to determine temporal trends in concentrations and conducting an inter-lab comparison study between Da Chen laboratory at Southern Illinois University and AXYS Analytical.

*2. Updating EC Strategy (\$20,000):* The 2014 EC Strategy budget is dedicated to staying informed of the latest CEC toxicity, effects, and occurrence studies.

*3. Bioanalytical Tools (\$56,000):* The bioanalytical tools study is in its second year of funding. The overarching goal of the study is to identify endocrine disruptor effects at the molecular level and correlate those effects to organism level effects.

*4. Assessing Dredging Impacts on Benthos (\$50,000):* The dredging impacts on the benthos study will evaluate whether dredging adversely impacts fish foraging by disturbing the benthic community. The total budget for the study is \$150,000, but \$100,000 will likely be obtained from LTMS/BCDC as a result of mitigation measures for the from America's Cup. In the MYP, \$50,000 of RMP funding was set aside for the study. The study is a high priority for the Long Term Management Strategy for Dredging (LTMS) and the National Marine Fisheries Service. A caveat of the study is that the proposal authors have not yet identified a technical lead.

*5. Reference Sites for Bioassays (\$27,000):* The LTMS also proposed a smaller study that seeks to find a reference site to compare to dredged materials. There are three sites that the RMP has included in previous S&T monitoring that are possible reference site locations. The proposal includes conducting toxicity tests at one or two of the stations to determine if the site could become a reference site. This study is of lower priority than the study assessing dredging impacts on the benthos.

*6. Moderate Toxicity Follow up (\$119,000):* This study proposal was the result of the 2012 workshop at which approximately 30 experts met to discuss the possible causes of moderate toxicity in the Bay. The study, proposed by Brian Anderson and Steve Bay, analyzes the

correlation between particle shape and size and amphipod mortality. Amphipod health would be analyzed simultaneously, using lipids as a proxy. The budget for winter and summer sampling is \$119,000, the budget for only sampling during the summer is \$80,000. Karen Taberski and Bridgette DeShields asked where the winter sampling locations would be located. Meg responded that the sampling strategy was not articulated in the proposal.

*7. Stormwater Loads Monitoring (\$352,000):* The stormwater loads monitoring study will monitor six watersheds in 2014; the RMP will continue to monitor two of the six locations (Sunnyvale and Richmond).

*8. Updating the Spreadsheet Model – Year 5 (\$30,000):* Year five of the spreadsheet model will develop and refine Hg and PCB loads estimates using single watersheds for calibration and verification. Mike Connor asked about the benefit of continuing the study another year. Chris Sommers responded that this year the spreadsheet model team will increase the model's calibration potential, which will increase the accuracy of the model. Chris added that the model may be completed for Hg and PCBs by the end of this year. Meg will include a presentation on spreadsheet model updates in the September TRC agenda.

*9. Land Use/ Source Specific EMC Development (\$80,000):* This study would further develop Event Mean Concentration (EMC) data (i.e., estimating contaminant loads from different land uses) for the spreadsheet model (described above). Mike Connor asked how the two studies (number 8 and 9) were different from one another. Chris Sommers responded that the EMC development study allows the model to be populated with concentrations from specific land uses, while the spreadsheet model study uses bottom of the watershed concentrations to then calibrate the model.

*10. Management Support for STLS (\$25,000):* A portion of the special studies budget is typically set aside to coordinate STLS studies and the STLS team.

#### Nutrients Funding

Dave Senn began his 2014 nutrient studies presentation by listing all the recent and on-going nutrients work (including both RMP and non-RMP funded studies) that provided a foundation for deciding which studies to fund in 2014. Special study ideas are driven by the Nutrient Science Plan, which includes modeling, monitoring and synthesis, and process studies to address the highest priority issues and goals. Dave then provided a brief overview of the three proposed nutrient studies.

*11. Combined Nutrients Proposals: Monitoring and Program Management (\$320,000):* The study proposal includes monitoring program development, moored sensor network expansion, continuation of stormwater monitoring, and program management.

*12. Hydrodynamic and WQ modeling (\$150,000):* This study proposal was based on the recommendation by the SC to move forward on a nutrients model. The study includes drafting a modeling white paper, developing a work plan, and developing the hydrodynamics and water quality model.

*13. Stormwater Load Estimates (\$50,000):* The nutrient loading study indicated that stormwater loads are not insignificant in some regions during certain portions of the year. The goal of this study is to improve load estimates and conduct an uncertainty analysis (for either Napa or Sonoma).

*14. Dioxin in Sportfish (\$24,000):* The study objective is to evaluate dioxins in shiner surfperch and white croaker because concentrations in the sportfish are exceeding Water Board targets.

Dave added that BACWA is also contributing funds to 2014 nutrient studies. Dave described the studies that will be funded by BACWA, which are listed below (bold indicates studies that overlap with the RMP funded studies):

1. Synthesis and science plan
2. **Moored sensor program development** Improved phytoplankton composition (i.e., improved techniques for measuring phytoplankton composition, study will take a year to complete)
3. **Nutrient monitoring program development**
4. **Science oversight and coordination**
5. Coordinate technical review

Naomi Feger asked about last year's moored sensor programs budget. Emily Novick responded that the budget last year was \$200,000 (\$50,000 more than this year). Dave gave a brief update on the moored sensor program. The sensors were tested at the Tiburon Oceanographic Center and now Emily and Dave are working with USGS Sacramento to get the sensors synced with their data logger. The sensors will be placed on the Dumbarton Bridge; the proposal for the second year of the study is to add two additional stations. The RMP will fund the purchase of the instruments, logistics, and data management. BACWA will fund the personnel, design and implementation of the experiments, data analysis, and the web interface/visualization.

### **Discussion:**

#### *Nutrients:*

Before the discussions on the special studies began, Chris Sommers asked how the nutrients program will be managed in the future. Chris was concerned that the nutrient studies do not have the appropriate stakeholder oversight. Dave Senn responded that discussions regarding the creation of an overarching governance structure are underway. The structure would include a Stakeholder Advisory Group (SAG) that would vote on the distribution of funds, which the RMP would be a part of. Naomi Feger and Dave added that Dave Ceppos from the Center for Collaborative Policy is working on creating a governance structure with a technical advisory group that includes both stakeholders and scientists.

Rod Miller noted that the cost for dischargers to release the nutrient data was not included in Dave Senn's funding table. Naomi added that the State Board is contributing money for the Dissolved Oxygen Synthesis, which should be included under Task 1.1 in Dave Senn's funding table. Dave will update the nutrients funding table and send the excel version of the table to Naomi.

*EEWG, ECWG, and STLS Special Studies:*

Chris Sommers began the discussion on the 2014 special study ideas by stating that the \$1 million is being spent on stormwater and nutrient studies alone. Meg responded that stormwater and nutrients are two of the RMP's main priorities and budgeting approximately \$1 million is consistent with the multi-year plan. Amy Chastain asked to what extent the results of the PCB synthesis would alter the direction of the spreadsheet model or EMC development work. Jay Davis responded that the PCB Synthesis recommendations are consistent with the STLS strategy. Naomi Feger asked why nonylphenol and PFOS monitoring, both Tier III contaminants, was not included in any special study proposals. Meg responded that PFOS concentrations were recently analyzed in bird egg and harbor seals and the RMP is about to send small fish to AXYS for PFOS analysis. The data from those sampling efforts will be synthesized this year. Regarding nonylphenol, the contaminant is included in the bioanalytical tools study, but the RMP is currently unsure on how to incorporate nonylphenol into the S&T program.

Mike Connor stated that the two proposals that do not have a direct regulatory impact are the two dredging studies (dredging impacts on benthos and the Bay reference site studies). Rob Lawrence agreed that both projects do not affect regulatory decisions, but they will help determine how to manage dredged materials. For example, Meg noted that locating a Bay reference site will inform dredgers on whether to dispose of dredged materials at in-Bay locations. Naomi added that conducting toxicity tests with organisms other than *Eohaustorius estuarius* may be of interest to the RMP. However, Luisa Valiela noted that the Bay reference site study was a lower priority for LTMS and could be pushed back a year. Naomi reminded the TRC that the dredging impacts on the benthos study satisfies the essential fish habitat (EFH) agreement. Rob Lawrence made clear that the dredging impacts study was not a benthic recovery study, but a comparison of dredged and undisturbed sites. The TRC agreed to wait to complete the Bay reference sites study until 2015 and to fund the dredging impacts on the benthos study as long as the study's design and lead scientist are acceptable to the EEWG. If the dredging impacts study was not approved, the TRC recommended that the Bay reference site study be funded for 2014.

Mike noted that the two proposals with flexible budgets are the alternative flame retardant and moderate toxicity studies. Naomi Feger mentioned that she was also interested in completing another sediment hotspot study; however, Karen thought that it would be useful to determine the cause of moderate toxicity before completing another hotspot study. Chris Sommers asked why the Moderate Toxicity proposal stated sampling could occur only during the summer, instead of just during the winter. Mike responded that it would be cheaper to collect during the summer of 2014 in conjunction with the RMP sediment cruise. Karen Taberski noted that the EEWG strongly agreed that the study was not using the right method for particle analysis, but the proposal was not revised to reflect that opinion. Mike Connor replied that funding could be contingent on using the correct method. Chris Sommers volunteered to send Meg information on a centrifuging method that is used to analyze runoff. Bridgette DeShields suggested funding the summer sampling this year. Karen Taberski added that Chris Beegan at the State Board was allocated \$50,000 for this work. Therefore, the RMP will only need to contribute \$30,000 to complete the study.

Naomi Feger stated that a significant portion of the alternative flame retardant budget is dedicated to seal data, but the Water Board is interested in sampling effluent or stormwater to locate alternative flame retardant sources. Meg responded that by examining apex predators you can find compounds that aren't detected in the sediments due to biomagnification. Brominated and chlorinated compounds, for example, are found more frequently in apex predators. Mike was concerned with focusing on seal data because they do not inform regulatory decisions and their home range is large. Jay responded that the phase-out of PBDEs was largely due to the high concentrations found in seals. Chris and Jay agreed that temporal trends are also clearer in apex predators. The TRC agreed to fund sampling alternative flame retardants in seals, but not fund the analysis of PBDEs in archived seal samples. The TRC also decided to not conduct the inter-lab comparison study. Therefore, the cost of conducting the alternative flame retardant study is \$83,000.

In summary, the RMP will not fund the Bay reference site study this year. The dredging impacts on the benthos study was approved contingent on securing America's Cup funding, identifying an acceptable lead scientist, and the EEWG's acceptance of the study design. If the study is not completed, then the Bay reference site study could be funded. The Moderate Toxicity study was accepted, but only summer samples will be analyzed and funding from Chris Beegan is needed. The alternative flame retardant study was also accepted, but the archived seal data analyses and the inter-lab comparison study will not be a part of the study. The rest of the studies were approved by the TRC. Therefore, \$3,000 will need to be mobilized from the RMP reserves. Chris made a motion to approve the decision, Mike seconded the motion, and all were in favor.

#### **Action Items:**

1. Meg will include a presentation on spreadsheet model updates in the September TRC agenda.
2. Dave Senn will update the nutrients funding table and send the excel version of the table to Naomi Feger.
3. Chris Sommers will send Meg information on a centrifuging method used to determine particle size.

#### **IV. Discussion: PCB Synthesis [Jay Davis]**

Jay Davis provided an overview of the recently completed draft PCB synthesis that is currently being reviewed by the PCB strategy team. The RMP has analyzed PCBs in both sport fish and small fish. PCB concentrations in the sport fish shiner surfperch are some of the highest in the state; the high PCB concentrations in Oakland harbor and the San Francisco waterfront led to a no consumption recommendation for the species. Surprisingly, small fish concentrations rival the levels found in sport fish (e.g. northern anchovy concentrations are similar to shiner surfperch concentrations), despite being at a lower trophic level. Even the small fish sampled at relatively cleaner sites still had high PCB concentrations (~200 ppb). If the small fish and sport fish were members of a common food web, then the concentrations in sport fish are expected to be greater because of biomagnification. Interestingly, a correlation between fish PCB and sediment PCB concentrations was observed.

With regards to temporal trends in sediment, concentrations were relatively stable in 2002/2003 and then dropped significantly from 2004-2006 and then increased again in 2007. The

concentrations observed in biota do not follow this trend. With the exception of DDT, other contaminants either do not follow the same trend or do not exhibit the same order of magnitude decrease. Thus, the trend remains unexplained. Jay recommended re-analyzing archived samples to ensure the trend is real.

Jay then described the modeling approach he would recommend moving forward. He proposed a new model that would distinguish the open Bay from the margins. The open Bay would be divided by subembayments while the margin units would be delineated based on the home ranges of the small fish and locations of watershed inputs. Jay supports this new modeling scheme because the margins are characterized by high concentrations, high spatial heterogeneity, a strong linkage to sediment, and a slow decline in PCB concentrations; while the trends in the open Bay are opposite with moderate concentrations, low spatial heterogeneity, a weak linkage to sediment, and some signs of decline in PCB concentrations. Jay recommended additional small fish monitoring, ideally with simultaneous sediment monitoring, and follow-up work to determine the drop in PCB concentrations from 2004-2006. Jay ended his presentation by inviting the TRC members to the PCB meeting on July 9, 2013.

**Discussion:**

Amy Chastain suggested informing CDPH of the spatial heterogeneity of the sport fish and small fish concentrations so health advisory signs could be strategically placed. Chris Sommers asked if there was potential that sediment from the open Bay is migrating back into the margins. Jay responded that it is happening to some extent, but the majority of the contamination is from trapping and storage of sediments in the margins. Amy wondered if the elevated PCB concentrations in Oakland harbor and the San Francisco waterfront were driving PCB concentrations in biota located in other parts of the Bay. Jay responded that cormorants and least terns forage on the margins and then move into the open Bay.

Chris sees a need for the type of model Jay proposed, but noted that the model should be completed in a way that does not repeat the efforts of the small tributaries loading team. Chris said that if Jay is planning on using the Regional Watershed Spreadsheet Model (RWSM), he should be aware that it analyzes contaminant loads on a large scale. The RWSM will not be able to accurately connect contaminant loads in one small tributary to loads in the margin unit downstream. Naomi Feger added that the Flood Control 2.0 project could be used to determine where sediment is accumulating at the bottom of the watersheds.

Mike Connor suggested that Jay create a frequency histogram of PCB concentrations from all the Bay sediment samples to ensure that the old, one-box PCB model estimation is significantly different from the average concentrations in the Bay before moving forward on a new model. Karen Taberski subsequently asked about the cost for completing Jay's recommendations. Jay responded that the small fish sampling analysis cost around \$150,000 annually. Jay noted that Don is proposing to include margins sampling in the S&T program; therefore, if margins sampling is conducted as part of S&T, the cost for PCB work may decrease.

Chris noted that even if the new model is completed, the PCB target for the Bay is unattainable; Mike added that PCBs have already been banned and he asked what other management actions could be taken. Jay responded that the topmost layer of sediment is what is most likely getting into the food web; therefore if the inputs into the highly contaminated margins are identified,

then the associated watershed loadings can be reduced. Chris replied that he is worried that there are not many unidentified high priority watersheds where active loadings have already been characterized.

#### **V. Information: Proposal for Margins Sampling [Don Yee]**

Don Yee presented a potential pilot program that will incorporate margins sampling into the RMP S&T program. Currently, the S&T program excludes margin sites partially by design and also because of logistics. Don noted that we think the margins are different from the open Bay, but there is limited data available to confirm our assumptions. Don maintained that data is needed from representative sampling in the margins to determine the process in which contamination reaches the open Bay. Don mentioned that small fish can be sampled as a surrogate of what is occurring in the margins, but it is difficult to determine where the fish has spent time (their home ranges are around 4km). Therefore, sediment sampling should be conducted with food web sampling.

The limits of the margins sampling is that it does not pinpoint hotspots or sources and temporal coverage will likely be insufficient for some needs. However, existing data is not a suitable substitute for understanding the current state of the margins; additionally, sediment sampling is an important complement to biomonitoring. Don's proposed approach is a spatially distributed probabilistic design (similar to the Bay S&T), with exclusions zones set to reduce sampling overlap. The first sampling effort could only include chemistry; but, toxicity and benthos data would provide a baseline indicator of sediment quality's effect on biota. Don suggested three possible options for the field sampling effort:

1. Conduct margins sampling throughout the entire Bay in one year. The RMP sampling effort would be doubled for one year or the Bay S&T could be completely replaced for one year;
2. Complete the margins sampling of the entire Bay in two to three years; or
3. Only sample around a dozen sites every year the Bay S&T sediment cruise occurs. To capture all 50 margins sites, the sampling effort would take around 10 years to complete.

#### **Discussion:**

Mike Connor wondered why Don would not simply conduct sampling on a gradient to determine how sediment moves from the margins into the open Bay. Karen agreed that a targeted approach would be more useful. Don responded that sampling on a gradient is useful if you are interested in specific source locations; but, this sampling effort is making sure that our assumptions about processes are correct. Chris Sommers agreed with Mike that for legacy contaminants a targeted approach is warranted; however, a stratified random design will help determine the source locations of emerging contaminants, which is currently unknown.

Chris wondered about the spatial scale of the sampling; both Chris and Mike were worried that too many samples will be necessary to sufficiently characterize the heterogeneous margins. Don responded that based on a typical small fish species home range, the sampling locations could be spread out every 4 km, but he understands that sampling at that level is not possible in a 10 year



time frame. He added that the sampling effort had to start somewhere and statistical power could be achieved after multiple years of sampling.

Karen Taberski ended the discussion by stating that the decision whether to conduct margins sampling will not be answered within the time frame allotted in the day's agenda. Bridgette DeShields suggested allocating time during the September TRC meeting to discuss the issue further. Naomi Feger stated that the Water Board is interested in coming up with a way to characterize the margins and she is also interested in discussing the topic at the next meeting.

**Action Items:**

4. Meg Sedlak will allocate time during the September TRC meeting to further discuss adding margins sampling to the S&T program.

**VI. Information: Update on SQO Monitoring [Ellen Willis-Norton]**

Ellen Willis-Norton presented the SQO assessment results from 125 S&T stations, sampled from 2008 through 2012. The study's goal was to evaluate the spatial and temporal trends of sediment quality in the Bay using the narrative objectives. A prior SQO study, a 2000 USEPA WEMAP survey, determined that 77 percent of the Bay was listed as Possibly Impacted. Similarly, at least a third of the sites were listed as Possibly Impacted every year from 2008 through 2012. None of the sites were listed as Clearly Impacted during all five years, indicating that severe impacts on the benthic community were not observed. The only subembayment with an average station assessment of Likely Unimpacted was in San Pablo Bay; all other subembayments' average station assessment was Possibly Impacted. The entire Bay was characterized by moderate toxicity; moderate or high toxicity was observed at over 50 percent of the stations every year. The benthic community condition was highly or moderately degraded at over 40 percent of the sites in 2008 and 2010 (mainly in Suisun and South Bay). Ellen noted that sediment quality may have improved over time, with the number of Likely Impacted sites decreasing in 2011 and 2012.

**Discussion:**

Karen Taberski noted that the moderate or high benthic community disturbance in Suisun Bay makes sense because a benthic community index that is not calibrated to an oligohaline environment was applied to a subembayment with high freshwater inputs. Chris Sommers noted that the results are difficult to interpret, especially since there is a lack of understanding on how elevated chemistry affects the benthic community condition and toxicity. Naomi Feger added that number of chemicals included in the analysis is limited; therefore, the effect of many unmeasured contaminants is unknown. Mike Connor suggested redirecting the funding for toxicity and benthos sampling; the TRC agreed to put the sampling on hold.

**VII. Information: Update on Hg Wetland Workshop [Jay Davis]**

Jay Davis briefly updated the TRC on the Hg wetland workshop, which is planned for the Fall (September or October). The workshop planners are in the process of selecting a date and creating management questions that will help develop consensus on the science. External scientists, such as Rob Mason and Jim Weiner, have been invited to join the workshop.

**VIII. Update on 2013 Pulse and SOE Conference/RMP Annual Meeting**

*2013 Pulse*

Jay Davis informed the TRC that he had received comments on all of the Pulse articles. At least two experts from the ECWG reviewed each article. Linda Wanczyk is now working on the design for the document. Jay noted that the next Pulse is scheduled to be published during the same year as the State of the Estuary Report (2015). Therefore, Jay needs to decide if a full Pulse should be published in 2014 or 2016 instead. Luisa Valiela noted that the State of the Estuary report may not be published due to budget cuts; Jay will check to see if the report will in fact not be published in 2015.

*Annual Meeting*

Meg Sedlak went over the RMP Annual Meeting schedule, which will be held on the second day of the State of the Estuary conference (October 30). The RMP will host two sessions in the afternoon on CECs and Nutrients. The morning will feature Debbie Raphael, Derek Muir, and Jim Cloern as keynote speakers. The Save the Date card will be sent out soon to RMP members. RMP members will be able to attend the second day of the conference for free; RMP members will also receive a reduced rate to attend the first day of the conference by signing up on the RMP site, receiving a code, and then registering on the SOE site.

**Action Items:**

5. Jay will check to see if the State of the Estuary report will in fact not be published in 2015.

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

The date for the next TRC meeting is September 17th, 2013. Bridgette DeShields ended the meeting by stating the TRC was efficient in deciding how to fund the 2014 special studies.