RMP Contaminant Fate Workgroup Meeting
May 12th, 2011
San Francisco Estuary Institute
Meeting Summary
DRAFT

Attendees:

Barbara Baginska (RWQCB)
Joel Baker (Univ. of Washington)
Patrick Barnard (USGS)
Mike Connor (EBDA)
Naomi Feger (RWQCB)
Arleen Feng (ACCWP representing BASMAA)
Frank Gobas (Simon Fraser Univ.)
Jim Hunt (UC Berkeley)
Craig Jones (SEI)
Megan Kaun (USACE)
Dave Krabbenhoft (USGS)
Richard Looker (RWQCB)
Trish Mulvey (SFEI Board)
Dave Schoellhamer (USGS)
Rachel Allen (SFEI)
Jay Davis (SFEI)
Ben Greenfield (SFEI)
Aroon Melwani (SFEI)
Meg Sedlak (SFEI)
Don Yee (SFEI)

1. Introductions and Review of Agenda [Jay Davis]

Jay Davis reviewed the agenda and the goals for the meeting:

1) presentation and discussion of Margins Conceptual Model (MCM) report
2) preview and discussion of Bioaccumulation Conceptual Model (BCM) report
3) updates on other Bay modeling
4) green light to scope abiotic modeling special study for 2012 and a multi-year abiotic modeling workplan
5) preliminary vetting of concepts for bioaccumulation modeling and methylmercury modeling to decide whether to pursue special study funds in 2012

Arleen Feng asked when the group would discuss the procedure for decision making. She noted that decisions about the direction of the MCM were made initially by the forecasting strategy team, and if properly continued those discussions would continue to go on outside of and between the CFWG meetings. Jay Davis indicated that this process may be clarified after the update on the RMP Master Planning activities.

2. RMP Planning Update [Jay Davis]

Jay Davis presented the most recent version of the RMP Master Plan, which summarizes RMP objectives and plans in 20 pages for use by managers and for decision making on a broad scale. In the new planning process, the Steering Committee (SC) provides ("top-down") guidance to the program in the form of priority information needs and budget

commitments. The Technical Review Committee (TRC) solicits projects to fulfill the information needs, and the workgroups, including the Contaminant Fate Workgroup (CFWG), have the dual role of vetting work to help fill the priorities of the RMP as well as "bottom-up" identification of additional or alternative priorities based on the scientific expertise of the panels. Communication between the groups occurs via the participatory agencies, each of whom has a representative on the TRC and the SC, as well as by RMP staff.

Specific priorities for the CFWG include helping develop information to feed into the next generation of Hg and PCB TMDLs (Total Maximum Daily Loads) as well as helping to develop a strategy for nutrient work. This dual role of the workgroups illustrates the combined "top-down" and "bottom-up" planning process the RMP is implementing. Coming out of the 2011 Master Planning meeting were a list of priorities for 2012 Special Studies (SS). As part of this, the SC allocated $100,000 to modeling work in 2012, with the desired development of a forecasting strategy plan and quantitative models over the next 3 years under the guidance of the forecasting strategy team and review of the CFWG. The SC places a high priority on the Small Tributaries Loading Strategy, with discussion of "locking in" a large portion of the SS budget for 2012-2014 to support that Strategy. The SC also anticipates the development of a nutrients strategy for SF Bay, and is setting aside $100,000 in 2012 for this work. USGS, which has traditionally led nutrient monitoring in SF Bay, plans to defund this work over the next 5 years. The RMP is leading the development of a nutrients strategy for the Bay, and will be one of many programs to collaborate to fill this funding gap.

Discussion:

Joel Baker noted that the Master Plan should present the budget currently categorized as "Program Management" differently, to more accurately represent the use of funds.

Arleen Feng asked for clarification about the reporting of data management and QA costs. Meg Sedlak indicated that data management/QA costs for special studies are generally included in the budgets for individual projects. What the Master Plan budget lists as "Data Management" applies primarily to the Status and Trends (S&T) elements of the program.

Jim Hunt asked for more details on the SC information needs, beyond a funding amount. Jay Davis indicated that the second half of the Master Plan does provide details on these priorities, and will be updated to reflect the current plans shortly.

Action Items:

- Update the Master Plan.

3. Bay Margins Conceptual Model Report [Craig Jones, Don Yee]

Craig Jones presented an overview of the Margins Conceptual Model report, highlighting the management questions and recommendations over the technical details. He asked specifically for input from the workgroup regarding how to illustrate the conceptual model, and what types of "cartoons" would be most effective – to educate managers about the conceptual model, or provide technical support for the document?

The report is organized by the modeled ecosystem components: hydrodynamics, sediment transport, chemical transport and fate, and biotic processes, with the goal of linking existing knowledge in order to develop a holistic picture of the margins.

The report also reviewed previous modeling efforts in SF Bay and gave recommendations. There are three types of models: conceptual, empirical and analytic, and numerical, which build upon one another to integrate data and support management decisions. Simple "one-box" numerical models of Hg and PCBs already exist for SF Bay. For forecasting contaminant fate on the Bay margins, a mechanistic numerical model was recommended, as multibox models would not have sufficient resolution to capture margin processes. Guidelines for model development from the EPA were reviewed to identify key steps before beginning work on a numerical model.

Craig Jones also emphasized that an appropriate model is not necessarily the most advanced, but needs to be good enough to make management decisions. Therefore, the important question is "what management decisions is the model needed for?". Dr. Jones described available numerical models (for hydrodynamics and sediment transport), and recommended that a 3D model such as DELFT3D or EFDC would be useful for addressing RMP needs, and could be developed within a 2-3 year time frame to meet the SC desired timeline. If the CFWG approves of it, it will go to the TRC as a recommendation from the CFWG. Dr. Jones predicted that one of the models would be ready for preliminary use after a $300-$400,000 investment.

Discussion:

Richard Looker noted that the report focuses on margins in terms of their "contributions to regional impairment", but management priorities are concerned with the answers to the questions: "are there hotspots of contaminant entry to the food web on the margins?" and "what are the concentrations of contaminants in birds and fish?" as a result of management actions. Regulators may be interested in modeling individual locations, to the extent that management of particular areas can provide greater "bang for the buck".

Joel Baker observed that the RMP is interested in numerical models in part because the box models are not able to address these questions about the margins. Asking about margins is the right question because that's where biota are, but it hasn't really been done elsewhere. It is still unclear if contaminants are spread from the margins to the bay as a whole by bay species coming to feed in the margins or by the dispersion of contaminants via physical processes.

Dave Krabbenhoft suggested that diagrams in the Margins Model report include one showing the interconnections between model components and other important ecosystem factors. The diagrams as they exist now show the source loadings of the contaminants of interest, which is already well known by everyone involved. A more needed and effective diagram (or set of diagrams) would be one that shows the interactions between the Margins Model, the Bioaccumulation Model, and other important ecosystem factors, such as the effects nutrient loading (particularly nitrate) and primary productivity (organic carbon production) have on methylmercury production and bioaccumulation. Others such as the effects of hydrology on wetting and drying cycles, as well as selenium (all forms) may be important as well, but may not be appropriate or represented in these models.

Don Yee noted that there is not much existing data on contaminants in the bay margins, although they are hypothesized to be a significant factor in contaminant processes. The bay margins are not well-defined, by default they are the areas not sampled by RMP Status & Trends monitoring, which generally share some physical characteristics (e.g., shallow waters).

Jim Hunt asked three questions of the group as a whole:

1) Who is the intended audience of the MCM?
2) Why are the margins marginalized? This report is only 20% about the margins.
3) If hotspots have been remediated in the past without requiring modeling, what precedent is there to require modeling on future remediation work?

In response to (1):
Jay Davis indicated that the document is intended for a technical audience, such as Regional Water Board staff who has to make management decisions. It is also intended to provide a solid technical basis upon which to build the RMP modeling strategy. Arleen Feng suggested that the audience includes scientists and regulators more broadly, but that the introduction to the report should more clearly spell out what various audiences can expect to get out of the report.

In response to (2):
Richard Looker indicated that the MCM includes an attempt to bring together information to inform future modeling strategy. While it does have a bay-wide focus, reflecting existing information, and while the margins are linked with the bay and are subjected to the same driving forces, if processes in the margins are potentially at a different scale, we will have to look closer in.

In response to (3):
Richard Looker pointed out that the dischargers do not like relying on the 1-box model for the Hg and PCB TMDLs, and that updating them using an improved model will receive support. Naomi Feger noted that use of a model for superfund remediation vs. TMDL development is very different, especially with regards to the enforcement power of the Water Board.

Barbara Baginska suggested that the management questions and model development are in a feedback loop. Once the managers know more about the ability of the model and its trajectory, they can refine the questions and possibilities to explore with it. The crucial requirement is to make informed stepwise decisions that are defensible for stakeholders and have the long term interests of the Bay in mind.

Joel Baker suggested using the simplest model possible that will serve the required purposes. He noted the previous one-box models as an excellent implementation of this principle, but next iterations would need to address the margins, and how these would differ from linked water and land models. Ecological habitats and resources would be particularly important to capture in any model.

Jay Davis noted that the report is still in draft form, and will be revised and expanded upon receipt of written comments from the workgroup.

Action Items:

- Address comments on draft report, including revisions as necessary.

4. USACE Modeling Update [Megan Kaun]

Megan Kaun informed the group about modeling work at the USACE. Work began Summer 2010 to link the Bay-Delta UnTRIM hydrodynamic model to sediment transport and wind wave models (SediMorph and SWAN). A draft report was submitted in January 2011 that documents the full bay linkage. The team is currently calibrating the model, focusing on the North Bay. Once the model is calibrated, they will apply it to study sediment fate after placement at various disposal sites, as well as short term impacts of sea level rise and changes in sediment supply in the North Bay as they relate to first flush events. After that, they plan to extend it to the South Bay and the Delta. They are interested in coordinating with other modeling efforts in the Bay, and she invited the RMP to participate in the technical discussions about the UnTRIM model.

Discussion:

Megan Kaun noted that she is familiar with the SUNTANS work, and while they are communicating and coordinating efforts, there are no plans to link the models as they are being developed for different purposes.

Dave Schoellhamer asked if the model is being used for the South Bay shoreline study (an ecosystem restoration and flood protection project in the South Bay). Megan Kaun indicated that once it is fully developed, it will be used for that purpose.

5. USGS Modeling Update [Patrick Barnard]

Patrick Barnard informed the group about USGS efforts to develop a model for physical processes in SF Bay. They have used the DELFT3D platform, which is currently

successful at modeling hydrodynamic processes like tide heights. As part of the next phase of data gathering, NOAA will deploy 27 Acoustic Doppler Current Profilers (ADCPs) throughout the bay. The USGS team implementing the model has been working in close contact with Deltares, the model developers.

USGS has recently used the tool to model sand provenance, and will soon extend the effort into mudflats to examine mud provenance. The model predicts reasonably well sediment (sand) transport and flux around the Golden Gate.

In San Pablo Bay, the team is working on modeling morphological changes. They are achieving some success using the model to hind cast, and are beginning to work on forecasting. USGS is also performing vulnerability modeling throughout California, looking at the combined effect of climate change and rare flood events to predict high risk areas.

A special issue of *Marine Geology* summarizing sediment transport research in the San Francisco Bay coastal system will be published within the next year.

Discussion:

Richard Looker asked whether any of the studies were looking at fine sediments. Patrick said USACE had taken some samples but he had no results yet.

Dave Schoellhamer noted that while the RMP generally focuses on the connection between the watersheds and the Bay, the Bay is also linked to the ocean, and both end members need to be considered for successful modeling.

6. Bioaccumulation Conceptual Model Report [Aroon Melwani]

Jay Davis indicated that the Bioaccumulation Conceptual Model (BCM) report is nearing completion. A discussion on the report following Aroon Melwani's update will help the authors fine tune the document. Aroon Melwani noted that he is looking for comments on the direction of the report.

The BCM first summarizes available information on target chemicals and indicator species for those chemicals, then presents the conceptual model for bioaccumulation in the Bay, and finally gives recommendations for future modeling efforts, although the last section is still under development.

The overview of target chemicals reveals that sediment and the benthic food web is the source of many, but not all, contaminants to biota. He showed an example from an analysis for development of SQOs, for which some contaminants like ppDDE had a significant water column (pelagic food web) contribution. A list of 16 fish, bird, invertebrate, and mammal species were suggested as indicator species based on habitat, dietary guild, movement range, historical use as indicators, and abundance. The conceptual model is an extension of the Gobas food web model developed for PCBs. It

considers spatial and temporal factors influencing bioaccumulation, mechanisms of uptake and elimination, and food web linkages.

Discussion:

Arleen Feng noted that the material is well organized, but it is unclear how it will link up with the quantitative (abiotic contaminant fate) modeling efforts.

Jay Davis asked whether the RMP should work on developing spatially explicit models for bioaccumulation.

Jim Hunt suggested that bioaccumulation is not unique in SF Bay. Because the list of contaminants, organisms, and pathways are not unique, a tailored analysis of bioaccumulation may not be necessary. He asked if other locations have already created a model for bioaccumulation that could be applied in the Bay. Ben Greenfield noted that Frank Gobas has already modeled PCB food web transfer for SF Bay organisms.

Don Yee noted that any food web bioaccumulation models ultimately need to link up to exposure from modeled or monitored ambient abiotic (water or sediment) concentrations.

7. Modeling Strategy [Don Yee, Craig Jones, Aroon Melwani, Ben Greenfield, Jay Davis]

Don Yee, Craig Jones, Aroon Melwani and Ben Greenfield presented ideas for proposals for the next RMP modeling efforts. Jay Davis indicated that the group should ask questions about the ideas as they are given, and give their opinions during the closed session after the researchers have left the room. Following the recommendation from the workgroup, the researchers will develop more detailed proposals on the selected ideas for revision by the workgroup and submission to the TRC.

There are three potential directions for focusing modeling work in 2012:

A) Abiotic Modeling
B) Bioaccumulation Modeling
C) Methylmercury Modeling

To date, the SC has envisioned commencing on the development of an abiotic model using the $100,000 that has been allocated for this work in 2012. The group needs approval or rejection of this idea today. Jay Davis noted that while $100,000 has been allocated for modeling in 2012, funds for the RMP are currently overtapped and this amount is not set in stone. There are also other potential pools of money to draw from depending on the details of the proposal.

A) Abiotic Modeling

Don Yee and Craig Jones presented the strategy scope for abiotic modeling. A coarse scale approach has already been done (one-box model) for many contaminants, so they

recommend focusing on an intermediate-fine approach, such as the DELFT3D or EFDC models. A six-phase pathway was laid out, beginning with grid and hydrodynamic development, followed by sediment and contaminant transport, and concluding with an investigation of priority questions and addition of a methylmercury model. Craig Jones estimated that with about $380,000 and intensive effort by two experienced modelers over 2 years, all six phases of model development could be completed.

Discussion:

Joel Baker asked if the data was already gathered together, as this is often the bulk of the effort. Craig Jones suggested that most of the data exists in a usable form for modeling, and this was not accounted for in the budget. Dr. Baker noted even if much of the data exists, pulling it together is often a greater effort than anticipated.

Barbara Baginska asked if there were qualified modelers already identified. Jay Davis indicated that there are no specific people in line to do this work, but that they are looking into using a post-doc or a contractor. Jim Hunt suggested that this work might require more experience and scope of knowledge than is reasonable to expect of a post-doc.

Patrick Barnard noted that Deltares is considering opening an office in Santa Cruz, and if DELFT3D is used, the work could benefit from this local expertise. Craig Jones noted that even if DELFT3D is used in collaboration with USGS, this timeline is still reasonable because of the modifications that will be required.

Richard Looker asked how nutrient modeling fits into this plan. He noted that the modeling effort should be a living system, sustainable beyond a single staff member or contractor. Jay Davis noted that if the timeline is reasonable, then it will feed in to nutrient modeling after 2 years, which is ideal for the nutrient strategy. Modeling is central to the nutrient strategy.

Frank Gobas asked how a sediment transport model would help answer the question of how the margins contribute to overall loadings. Craig Jones suggested that this would reveal general trends of sediment cycling and contaminant fate from different locations and sources.

Joel Baker suggested that the report clarify why a margins conceptual model is needed. There is currently a disconnect between the report's focus on abiotic aspects and the focus in the Management Questions on impairment in biota. Richard Looker noted that an abiotic model is needed to link management actions to environmental concentrations, and a biotic model is needed to link management actions with the food web. He asked which tools will be needed to link sources of contaminants with biology.

Arleen Feng asked if the Sediment Quality Objectives (SQO) work would be linked with management decisions. Barbara Baginska indicated that this is still unclear.

Jay Davis clarified that the model will focus on the whole bay, from the tributaries to beyond the Golden Gate, not just the margins.

B) Bioaccumulation Modeling

Don Yee and Aroon Melwani suggested options for bioaccumulation modeling, and Jay Davis outlined a range of 5 options ranging from simple and inexpensive to more detailed and expensive. The options were:

(1) No model, just monitor
(2) Simple Correlational Linkage Models
(3) Baywide General Gobas Model
(4) Site-Specific Gobas Models
(5) Ecological Studies

Don Yee suggested that a simple correlation model could be developed on a low budget ($30,000, 4 months of work) for a number of contaminants, building upon the analyses that have already been done for SQO work. If for some contaminants, such as mercury, the correlation analysis is not sufficient, this low-cost effort would provide justification for further pursuit of the mechanistic model.

Alternatively, a mechanistic food web model has already been developed for PCB bioaccumulation (Gobas 2010), and could likely be transferred to other organic analytes with a $30-40,000 and 6-12 month investment per analyte group.

Discussion:

Richard Looker asked if structure/activity relationships that apply to organics, such as rate of reaction, could be applied in this context. Frank Gobas indicated that such relationships are taken into account in the model.

Jim Hunt noted that the driver for modeling is primarily biologic, so the necessity for abiotic modeling is unclear. Arleen Feng suggested that while the regulatory endpoints are biologic, monitoring is still done in simpler matrices, which require modeling as well. There were discussions of alternative conceptual models of contamination in the margin, “hotspots” versus “bathtub ring” distribution and how that might impact modeled bioaccumulation.

Joel Baker suggested than an intermediate option, between (3) and (4), is available. In this approach, the probability distribution of fish data would be assessed, with a focus on the tails. Understanding where the variability in concentrations comes from, whether it is spatial or due to bioaccumulation processes in the organisms, will refine the bioaccumulation models. He recommended talking with a fisheries biologist to parse this out.

C) Methylmercury Modeling

Jay Davis indicated that methyl mercury dynamics are more complicated, and therefore a bigger challenge to model. Ben Greenfield noted that the previous proposals push modeling of methyl mercury off for a few years. However, he provided an alternative perspective: that the science for modeling methyl mercury has reached a point where it can address questions such as "what is the effect of loads reduction on concentrations in biota?" and "are sediments a source of methyl mercury?". He suggested that the RMP focus on methyl mercury modeling.

Discussion:

Frank Gobas indicated that this has been partially done in the Bay of Fundy, and that they noted a very slow time scale of reaction to changed mercury loads. Mike Connor suggested that methyl mercury synthesis include ideas on methyl mercury modeling from other locations. Dave Krabbenhoft noted that there is a lot of methyl mercury data for SF Bay, and that a quick examination of the information is available in the Pulse is suggestive of drivers that need to be pursued in more detail. For example, the time series for mercury in stripped bass when compared to other relevant time series (e.g., loads from the Guadalupe and Sacramento Rivers; sediment mercury concentrations; annual rainfall) are possibly good leads for what should be followed up on to assess the importance of various loads.

Richard Looker asked if it is possible to "black box" model methyl mercury (i.e. without mechanistic understanding). Craig Jones indicated that this is not feasible, as there are too many non-linearly dependent variables.

Action Items:

- Update/revise the MCM with comments from the CFWG.
- Talk with a fisheries biologist to start understanding where fish get methyl mercury.
- Include a discussion of methyl mercury modeling and the plans for developing this capability in the methyl mercury synthesis.

CFWG Closed Session – May 12, 2011

Jay Davis explained that the goal of the closed session was to identify which ideas should be written up as proposals for funding in 2012.

Stakeholder, Regulator, and Expert Input

RMP Process

- How are comments from the workgroups communicated within the RMP?
- In person comments on technical documents (like the MCM) are more valuable than written comments
- Can the workgroups get more guidance from the SC, other than "$100K is allocated to modeling in 2012"?

- The MCM should have received more strategy team oversight, so that the final product addressed stakeholder needs more accurately.

Manager Needs

- As a first attempt the 1 box models for PCBs and Hg worked quite well. Will a 1 box model work for contaminants other than PCBs and Hg?
- For Hg and PCBs, a better quality model is needed, that links sediment transport in the Bay and the margins, and forecasts the impact of managing the margins.

Abiotic modeling and Bioaccumulation modeling

- Bioaccumulation modeling should start on the margins. Techniques exist for modeling bioaccumulation, but they would need to be adapted to the specific conditions. One approach would be to develop a small set of specialized models to look at multiple sites.
- Synthesis of all aspects has to happen before starting modeling—this hasn't been done yet.

MeHg modeling

- It is a good idea and worth pursuing, but not in 2012.
- One advisor indicated that the mercury synthesis should be finished before any attempt to begin MeHg modeling. A model is a great tool for applying on data sets and conceptual models, but they need to have synthesized data to build them off of first. There are a lot of simple MeHg questions that have not yet been answered, including the impact of the margins on MeHg bioaccumulation. A basic question regarding the Bay-Delta and mercury contamination that has never been addressed as far as the advisor knew, is to ask whether the food web is really any more contaminated with mercury than any other estuary on the east or west coast. He noted that the Striped bass are elevated, but not seemingly what is observed in the same species in the Chesapeake Bay. If the significantly increased load that the Bay-Delta receives from the riverine inputs (largely particulate associated mercury) is really important, why don't the Striped bass reflect this (i.e., why are their mercury concentrations not significantly greater than what is observed for Striped bass elsewhere?) A careful examination of mercury levels in similar species (or trophic positions) in the Bay-Delta and the Chesapeake (or other estuaries) is critically needed in order to provide some indication of the relative importance of the riverine and point dischargers compared to atmospheric deposition, which remains a poorly defined mercury source in this area. The work that Blum did with the RMP was very illuminating, but was restricted to the open water portions of the Bay. Extending this work to the "margins" would potentially be very useful for understanding how important the shallow water systems, and the sediment underlying them, are for propagating mercury contamination throughout the Bay-Delta ecosystem.

- Another advisor suggested that the MeHg model should be developed now– the synthesis won't be complete until it is developed. With the existing data, this model could be created.

Focus on the Margins

- The next improvement to Hg and PCB TMDL should shift towards the margins. Modeling is a key tool to establish linkages between sources and loading.
- More field data from the margins is needed. This is a chance to push the science forward, because it has been challenging to collect, very little data exists.
- The margins are important because they are more contaminated than the bay as a whole, and more biologic activity occurs there.
- Consider performing carbon flow calculations between the margins and the bay.
- Consult with expert ecologists to ecologically classify sites within the margins.

Host a workshop on "Modeling the Margins"

- Bring in national experts and managers from other parts of the country to discuss the state of the science and the difficulties in modeling and management.
- A conference will provide this region with the best information on the topic, and demonstrate to stakeholders why progress is not as fast as might be expected – this is hard to do.
- Joel Baker offered to help organize such an effort.

Tactical Plan

- Develop a tactical plan that would address the practicalities of modeling before moving ahead with individual modeling projects.
- How would all 4 components (hydrologic, sediment transport, contaminant transport, and bioaccumulation) of modeling be addressed?
- Who would lead the modeling work? What about ongoing maintenance and support?
- When should the work be done, and at what funding levels? When can breaks in the work occur, if need be?
- Modeling work could still be prioritized by allocating funds, contingent upon the formation of a plan (as was done for the SUNTANS work).
- If the mercury coming from the tributaries is not biologically important, how would management questions and management actions change? What effect would this have on the use of a model?
- Can the RMP modeling approach be to develop an integrative model that is usable by anyone, including managers?
- How can existing models, such as DELFT3D and SUNTANS be built upon and expanded for RMP purposes, to avoid duplicating work?

- If forecasting recovery is important, that's an additional cost after developing the model.

Action Items:

- Complete the MeHg synthesis before making any MeHg modeling proposals.
- Send out the BCM report and the MeHg synthesis report for review to the CFWG.
- Create a timeline & process for developing a modeling tactical plan in consultation with forecasting strategy team.

Next CFWG Meeting: The date for the next CFWG has not been set yet and will be chosen via email.

#	**Action Items – June 2010**	**Who?**	**When?**	**Status 5/20/2011**
1	Update the Master Plan to reflect input	Jay Davis	Next iteration of the Master Plan	
2	Address comments on Margins Conceptual Model draft report	Craig Jones, Don Yee		
3	Talk with a fisheries biologist to start understanding where fish get methyl mercury			
4	Include a discussion of methyl mercury modeling and the plans for developing this capability in the mercury synthesis	Jay Davis		
5	Complete the MeHg synthesis before making any MeHg modeling proposals	Jay Davis		
6	Send out the BCM report and the MeHg synthesis report for review to the CFWG	Aroon Melwani, Jay Davis	July 2011	
7	Create a timeline & process for developing a modeling tactical plan in consultation with forecasting strategy team	Jay Davis, Meg Sedlak, Forecasting Strategy Team		