

Attendance:

Jay Davis, SFEI	Rich Breuer, SWRCB	Chris Foe, CVRWQCB
Karen Taberski, SFB RWQCB	Michael Lyons, LA RWQCB	Jim Wiener, University of Wisconsin-La Crosse
Carrie Austin, SFB RWQCB	Autumn Bonnema, MLML	Margy Gassel, OEHA
Patrick Morris, CV RWQCB	Cassandra Lamerdin, MLML	Robert Brodberg, OEHA
Gary Ichikawa, CDFW	Carol DiGiorgio, DWR	Stephan Louie, CV RWQCB
Dylan Service, MLML	Jon Marshack, SWRCB	Scott McReynolds, DWR
Lori Lim, OEHA	Jennifer Salisbury, SWRCB	
Karen Worcester, Central Coast RWQCB	Chad Loflen, SDRWQCB	
	Lori Webber, SWRCB	

Item 1: Introductions, Agenda Review, Goals of Meeting [Jay Davis]

Information:

Jay Davis reviewed the goals of the meeting, which were to determine the overall scope and objective of the 2014 lake monitoring effort. Additionally, the group should attempt to identify any potential partners since the sampling effort is resource intensive. After the meeting, Moss Landing Marine Laboratory will draft a sampling plan that will be considered at the next BOG meeting.

Item 2: Background [Jay Davis]

Four options are under consideration, separately or in combination: 1) identification of clean lakes; 2) response to reduced atmospheric deposition; 3) supplemental data to support 303(d) listing decisions; 4) reference lake trend monitoring.

Presentation and Discussion:

Jay Davis opened the meeting by reviewing previous high-impact efforts by the BOG over the past couple years. Jay stated that the BOG needs to continue to be successful in generating useful information, for the public and decisions-makers, in a cost-effective manner. Priorities for the BOG's monitoring efforts include coordination, identifying long-term statewide trends, and identifying safe fishing locations.

Jay then listed information gaps the BOG could address in the future. The BOG has so far focused on impairment, but could shift attention to water bodies with low contaminant concentrations. The BOG could also look at lakes that lack data to support 303(d) listings. Additional information gaps include Hg in wetlands and time series trends.

The idea to complete a clean lakes study was a result of discussions the BOG had in early November and a conversation with the leads for the Hg Reservoir TMDL (Carrie Austin and Patrick Morris). The BOG and the TMDL leads agreed there was an information gap regarding lakes with lower Hg concentrations. Carrie and Patrick were interested in understanding why the lakes had lower concentrations to help managers replicate those conditions in other reservoirs.

The timeline for the clean lakes study includes preparing a draft sampling plan, discussing the plan with the review panel in late March, preparing the QAPP, and sampling in May 2014. Autumn Bonnema stated that she could have a rough draft of the QAPP by the time the review panel meets in March.

Action Items:

- MLML will prepare a draft sampling plan and QAPP before the review panel meeting in March.

Item 3: Decision: Scope of Study [Jay Davis]

Presentation and Discussion:*Benefits and Objectives of the Clean Lakes and Atmospheric Deposition Studies*

Jay Davis stated that at the January 10, 2014 BOG meeting there was support for identifying clean lakes and for using the remaining funding sample lakes where models have predicted declines in Hg atmospheric deposition. Lori Webber asked if reference lakes could be identified as part of the clean lakes monitoring effort. Jay replied that some of the clean lakes can be used as reference lakes, but if the concentrations are already low it may be difficult to detect downward trends. Lakes with more moderate concentrations would have a stronger signal and may be better choices for reference lakes.

Jay listed the benefits of the clean lakes study including generating information products of high public interest, shifting the focus from problem water bodies, helping reduce human exposure, informing adaptive management strategies, and improving the accuracy of the information obtained in the original lakes survey.

Jay then described the potential atmospheric deposition monitoring study, which came from a model that showed three lakes where there may be potential reductions in atmospheric deposition: 1) Indian Valley Reservoir (Lake County) 2) El Dorado Park Lakes (LA County) and 3) Puddingstone Reservoir (LA County). The TMDL team was interested in the BOG conducting sport fish sampling in the three lakes.

Autumn Bonnema noted that Michael Lyons sampled Puddingstone Reservoir in 2013 and El Dorado Park in 2010. Michael stated that there is a considerable amount of data available from Puddingstone; Gary Ichikawa added that his team also collected 25 largemouth bass and 25 carps from Puddingstone. Stephan Louie noted that there were issues with previous monitoring efforts in El Dorado Park and stated that the BOG was unlikely to observe concentration changes in the Park lakes. The BOG agreed that additional data from Puddingstone was not needed and agreed that Indian Reservoir in Lake County appeared to be the one lake that could be sampled to observe changes in atmospheric deposition. Jay noted Indian Reservoir could not be included as part of the clean lakes study.

Jay then reviewed the two objectives of the clean lakes study:

1. Promote exposure reduction by identifying lakes that the state can recommend to the public as places where fish are “safe to eat.”
2. Support management by gathering supplemental data that can help explain why these lakes have low MeHg concentrations in the food web.

Jon Marshack suggested adding a third objective, which is “to clarify whether lakes that appear to be clean in the survey actually are clean.”

To address objective one, there needs to be repeated observations of low concentrations in multiple species, the sample size needs to be adequate, and the species sampled should have high statistical power (e.g. black bass). To address objective two, Hg concentrations need to be sampled at multiple trophic levels and in water and sediment; the sampling effort should also include the collection of standard water quality parameters. Margy Gassel suggested monitoring PCBs as well because it is difficult for OEHA to determine if a particular lake is safe without also understanding PCB concentrations.

Action Items:

- Jay Davis will add a third objective to the clean lakes study, which is “to clarify whether lakes that appear to be clean in the survey actually are clean.”

Costs and Scope

Jay then reviewed the cost of completing the clean lakes study, noting that around \$240,000 is available for monitoring. Biota sampling costs \$6,000 per lake and includes sampling largemouth bass and two other species. Autumn noted that biota sampling would increase by around \$500 per lake if prey fish and invertebrates were also sampled. Tissue sample compositing and archiving costs \$240 per lake, Hg analysis in individual largemouth bass costs \$825 per lake, and Hg analysis for composite samples costs \$150 per lake.

Regarding sediment sampling, Autumn noted that in the cost estimate it was assumed that sediment sampling would be one grab sample in the shallows rather in the deeper part of lakes. If BOG members are interested in sampling in deeper waters, the cost would increase. Stephan stated that one grab sample won't be that informative and he would recommend taking three to five sediment grabs in the deepest part of the lake for total Hg (THg) analysis. Gary stated that a different boat is needed for sampling the deeper part of the lake; therefore, sediment sampling will need to occur after biota and water sampling.

For water sampling, Stephan suggested one depth specific grab sample (one sample at top, middle, and bottom of the lake). Autumn stated that another water grab sample should also be taking when Gary returns to collect the sediment samples. Jay noted that both MeHg and THg should be included in the analysis and that water sampling would also include ancillary field measurements.

Carol DiGiorgio thought that nutrient analyses would also be valuable. Patrick Morris replied that chlorophyll a levels would be the most valuable, but with limited funding, measuring the redox potential would be sufficient. Autumn will determine if the YSIs have a probe for measuring redox potential.

Jay then asked the group how many prey fish should be included in the sampling effort. Carrie Austin and Jay suggested collecting two to three species per lake. Stephan suggested including both shad and silversides; Gary replied that in a trout dominated lake there will be less species and he is unsure what prey fish he will be able to collect. Gary added that he will keep whatever species he can find in the lakes. For invertebrate sampling Jay stated he was unsure what would be useful to collect; Stephan suggested collecting insects. Jay said he will ask for Jim Wiener's input and will get back to the group. Scott McReynolds stated that USGS completed a study in Trinity Lake that included invertebrate analyses; he recommended that Jay read the document to see what was sampled.

Chad Loflen asked if the sampling plan for every lake includes understanding food web dynamics. Jay replied that the group has not decided whether to sample at the same intensity at every lake or just at a subset of lakes. Rich Breuer stated that he was concerned that there was not enough funding for the level of effort the group just outlined. Rich suggested looking back at the science question the TMDL team is attempting to answer and determine the sample size necessary to synthesize the information. A BOG member asked if it was necessary to understand the food web dynamics in a lake that was previously labeled as clean. Carrie replied that there isn't a robust data set for clean lakes and it is important to understand whether the lake is clean because of low Hg concentrations or because of the food web dynamics.

Rich suggested a sampling plan in which clean lakes were simply identified this year (2014) and next year food web dynamics were analyzed to answer the question of why concentrations were low. Jon Marshack agreed that it may be useful to complete the food web analysis once the BOG understands which lakes are actually

clean. Autumn cautioned that funding may not be available next year. Michael Lyons ended the discussion by stating that his region would be willing to help out with the sampling effort.

Action Items:

- Autumn Bonnema will determine if the YSIs have a probe for measuring redox potential
- Jay Davis will read the USGS study on Trinity Lake and will ask for Jim Wiener's input on what to collect for invertebrate analyses.
- Autumn Bonnema will incorporate the group's suggestions into the cost estimate and will report back with a revised estimate.

Item 4: Decision: Process for Selection of Lakes to Study [Jay Davis]

Jay Davis then opened the discussion of how to select lakes for the clean lakes study. The lakes should have prior data, have high fishing pressure, be distributed around various regions, and possess supporting limnology data. Jay then asked the group the definition of "clean." There are very few lakes with Hg concentrations in largemouth bass that are less than 0.07 ppm. But, as you increase the threshold (0.15 ppm – one serving threshold and 0.44 ppm – no consumption threshold), more lakes fall within the limit. Bob Brodberg noted that lakes that are very clean (less than 0.07), but do not have any fishing pressure are not important. Therefore, Bob recommended defining lakes as clean if the largemouth bass Hg concentration was below 0.44 ppm. Patrick stated that the TMDL team is currently considering an Hg threshold in fish that allows people to eat one meal per week. However, the threshold does not take into consideration the benefits of eating fish, which Bob's threshold does. Jennifer Salisbury noted that the group also needs to consider clean lakes where largemouth bass were not caught. Jay recommended defining "clean" by looking at the Portal and determining at what threshold a number of popular lakes start to appear on the map.

Bob noted that a sampling challenge this year is the drought in California; there are a number of lakes where it will be difficult to launch a boat. Additionally, the low water levels may affect contamination levels because fish that are stressed have a lower body mass, which increases their relative Hg concentrations. Jay noted that this challenge underscores the value of reference lakes. Regional trends could be separated from local management action signals. Jennifer and Stephan noted that there is prior data from the clean lakes, which could be used to determine if the drought is affecting concentrations (particularly the fish growth and age data). Jennifer added that sampling during the same month as the previous sampling effort would help with the concentration comparisons. Bob noted that there is no data on inter-annual variation, which may affect concentrations. Stephan noted that he completed a study that analyzed inter-annual variation and the differences were relatively small. Autumn ended the discussion by stating that she needs a list of lakes in February to put together the sample plan.

Action Items:

- The BOG will provide Autumn with a list of lakes to include in the clean lake study in February.