



## **DELTA TRIBUTARIES MERCURY COUNCIL**

**Tuesday, September 28, 2021**

**Via GoToMeeting virtual meeting**

**Facilitator:** Stephen McCord, McCord Environmental, Inc. (MEI)

**Meeting Summary by:** Stephen McCord, MEI

### **Attendees**

Stephen McCord, MEI  
Jon Miller, Albemarle  
Nicholas Graham, The Sierra Fund  
Carrie Monohan, The Sierra Fund  
Carter Jessup, USEPA  
Carol DiGiorgio, DWR (retired)  
Jamie Anderson, DWR  
Reed Harris, RHE Ltd.  
Jay Davis, SFEI  
Wes Heim, MLML  
Peggy O'Day, UC Merced  
Josie Tellers, City of Davis  
Debbie Dumroese, USDA  
Stefanie Helmrich, UC Merced  
Jon Mistchenko, Dept. Conservation  
Petra Lee, DWR

Robin Merod, CV RWQCB  
Jordan Hensley, CV RWQCB  
Leah Jones, CV RWQCB  
Ed Hancock, CV RWQCB  
Rebecca Fitzgerald, SWRCB  
Carrie Austin, SF Bay RWQCB  
Lauren Valentino, City of San Diego  
Bruce Monson, MN Poll. Ctrl. Agency  
Kent Parrish, Wood PLC  
Julianna Manning, DWR  
Connor Mcvey, \*\*  
Tyler Hayduk, UC Davis  
Yujia Cai, MEI  
Heidi Oriol, Regional San  
Nicole Sears, Sac Sewer  
Joseph L Domagalski, USGS

### **I. Introductions and Agenda Review**

No comments on the summary of the May 19, 2021 meeting.

### **II. Project Updates & Upcoming Events**

Announcements are attributed to Stephen McCord (MEI) unless otherwise noted. Our “live” table of mercury-related projects in the region: <https://docs.google.com/document/d/1EzeDOiS-vrM1MsjfNZC18Zoz9XWOSiorPSI3RJxrS9s/edit?usp=sharing>.

#### **Mine Site Cleanups**

- Albemarle, working with MEI and Burleson Consulting, this fall will be completing field trials of proprietary treatments for mercury-rich soils on a mercury mine site on private property in rural Sonoma County. MEI is now seeking new field trial sites in aqueous systems and at other mine sites.

- Carter Jessop (USEPA): Klau/Buena Vista Mine feasibility study for OU2 by USEPA in coordination with state. Pilot project using physical controls (aeration, sedimentation) starting soon or next spring.
- Peter Graves (BLM): The Clyde Mine draft EE/CA was available in August for public review/comment. The proposed non-time-critical removal action will address heavy metals contamination at the abandoned gold mine in Colusa County. More information about the proposed project is available at <https://go.usa.gov/xsu7g>.
- A Nevada Co. coalition is addressing multiple abandoned mine sites, and soon will apply for cleanup grants.

## **Mercury Studies and Monitoring Activities**

- Jay Davis (SFED): Sampling for the BOG (now Safe to Eat Workgroup) mercury in fish studies is sampling ~35 lakes this year, as well as coastal areas. Planning to monitor valley floor rivers in 2022 as input to a future TMDL.
- Charlie Alpers (USGS): (1) For the Cache Creek Settling Basin, USACE and Conaway Ranch, DWR has renewed the agreement between DWR and USGS to continue stream gaging and Hg (and nutrients) monitoring to characterize trapping efficiencies. Future changes in basin operation and land uses will be considered. (2) Proposals for Clear Lake watershed model (SPARROW, HSPF) of nutrients and mercury (with lake in 3-D), with sediment “fingerprinting,” plus Scotts Creek monitoring loads over next 3 years.
- Petra Lee (DWR): Staff are addressing comments on control study report.

## **Regional and Statewide Mercury Regulation**

- Rebecca Fitzgerald (SWRCB): The statewide reservoirs mercury TMDL has recently been assigned to staff. Considering alternatives to statewide TMDL approach.
- The 2018 integrated report (a.k.a. the 303(d) list) posted at [https://www.waterboards.ca.gov/water\\_issues/programs/water\\_quality\\_assessment/2018\\_integrated\\_report.html](https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2018_integrated_report.html) has been approved and finalized. A 2020-2022 integrated report will be considered for adoption in early 2022. The 2024 report will be initiated soon.
- Robin Merod (RWQCB): Delta MeHg TMDL update, data merger completed for multiple sources; drafting data review, new implementation goal, and linkage analysis; aiming for peer review to start in 2022.

## **Recent & Upcoming Conferences**

- Jay Davis: CALMS conference, noon-1:15pm Mon-Thur, Oct. 4-7. San Francisco Bay RMP conference (Oct. 14) will provide an update on recent mercury monitoring. Both are online only.

## **Grant Funding Opportunities**

- EPA Brownfields Grant Proposals are due December 1, 2021. See <https://www.epa.gov/brownfields/solicitations-brownfield-grants> for more information.
- DTSC will soon announce a brownfields grant program with \$200 million available.

## Other News & Updates

- OEHHA recently issued new fish advisories with safe eating advice for several lakes (<https://oehha.ca.gov/fish/advisories>): Updated for Folsom Lake (El Dorado, Placer, and Sacramento Counties), Lake Natoma (Sacramento County), Black Butte Lake (Glenn, Tehama Counties) and Stevens Creek Reservoir (Santa Clara Co.); new for Indian Valley Reservoir (Lake Co.). A new statewide fish advisory was issued for about 100 California Lakes and Reservoirs without Site-Specific Advice provides updated safe eating guidelines for fourteen species, including new advice for seven species. This advisory supersedes the previous advisory, which was released in 2013. \*\*Natoma & Folsom

## III. Presentations

Four presentations were given.

### **1 – Findings from the first four years of monitoring (Jay Davis, SFEI; Wes Heim, MLML)**

Delta Regional Monitoring Program (RMP) monitoring since 2016 covered the entire Delta, divided into subareas consistent with the Delta MeHg TMDL. Included water, fish (both juvenile and sportfish).

Levels in fish and water tended to be higher in Delta margins while lower in the central Delta. Nonetheless, the trends vary among subareas. Length-normalized fish data are much more consistent. Higher levels exceed almost any fish monitored in lakes statewide.

Strong correlation is observed between fish mercury and the previous year's water-year index, indicating that hydrology is a key driver. Evaluation of TMDL linkage analysis (MeHg concentrations relationship for water to fish) supports that foundation for the TMDL, although Yolo Bypass data is an outlier.

The monitoring report, finalized in June 2021, will be available on the RMP website (<https://deltarmp.org/>).

Future RMP mercury monitoring will continue to focus on black bass at several stations, plus water monitoring in March, April and September. Prey fish monitoring is currently not allowed for concern with taking endangered Delta smelt.

For more information: Jay Davis ([jay@sfei.org](mailto:jay@sfei.org)); Wes Heim ([wheim@mlml.calstate.edu](mailto:wheim@mlml.calstate.edu)).

### **2 – Review of open water mercury modeling effort for the Delta, adding to DSM2 (Reed Harris, RHE Ltd; Jamie Anderson, DWR)**

The California Department of Water Resources' flow and water quality model, the Delta Simulation Model 2 (DSM2), was extended to include mercury to support the Delta MeHg TMDL. This new Delta mercury model, known as DSM2-Hg, includes methylmercury MeHg, inorganic mercury Hg(II), elemental mercury Hg(0), suspended sediment concentrations and a sediment bed. It does not simulate mercury in the food web. The mercury and suspended sediment simulation represent conditions from 10/1/99 to 8/1/06.

The study used existing data, which were often limited in the context of quantifying sources, sinks and key processes for a Delta TMDL, but sufficient for a meaningful analysis. Sediment and mercury calibrations were performed during different historical periods. Suspended sediment

concentrations calibrated well. Simulated total and methyl mercury concentrations also reasonably reflect available data.

Simulations found the Delta a significant net sink for suspended sediments, as well as total and to a lesser extent, methyl mercury, confirming the “donut hole” indicated in monitoring data. Annual loads for total and methylmercury each varied six-fold over the simulation period. There was also a high degree of short-term variability (e.g., monthly and event scales). The Sacramento River was the major source of sediment and mercury, because it is the major source of water. The Yolo Bypass was a more variable source of MeHg to the Delta, ranging from a few percent in some years to roughly 50% in others.

A sensitivity analysis was carried out to identify which factors had the greatest influence on MeHg export from the Delta (not presented) but no in-Delta load reduction scenarios (i.e., controls) were simulated. The simulation period did not overlap with Delta RMP monitoring. Future effort could focus on better quantifying sources, sinks and key processes for MeHg and THg in the Delta, and examining options to address upstream sources of THg and MeHg. This would best be accomplished through a coordinated Delta-wide effort designed to collect information required from a TMDL perspective. Enhancement could be made to the model framework, but would require a parallel effort to obtain more field data, as described above, to be warranted.

The mercury cycling and transport model for the Sacramento-San Joaquin Delta is available on the California Natural Resources Agency’s Open Data website <https://data.cnra.ca.gov/dataset/dsm2> (See link from there DSM2-Hg / Open Water Mercury Program inputs). The Final Report for Compliance with the Delta Mercury Control Program can be found at: <https://deltacouncil.ca.gov/delta-science-program/independent-science-review-of-the-delta-mercury-control-program>.

This work was coordinated with several DWR staff, as well as other agencies represented in the Open Water Mercury Technical and Modeling Workgroup. For questions about the model, please contact Min Yu (Min.Yu@water.ca.gov).

For more information: Reed Harris (Reed.Harris100@gmail.com); Jamie Anderson ((Jamie.Anderson@water.ca.gov).

### **3 – An early-look at EPA’s draft cleanup plan for the Sulphur Bank Mercury Mine (Carter Jessop, USEPA)**

USEPA has worked at this mine site for several decades. There are several operable units (OUs) delineated for monitoring, analysis, and cleanup plans. Herman Impoundment is most problematic OU. Waste rock dam allows shallow groundwater discharge from the impoundment to Clear Lake.

2006 feasibility study was amended and revised/finalized in March 2021 with more detailed analyses of site conditions, water movement, risk assessment and cleanup alternatives. Proposed remedies were constrained by existing regulations of two TMDLs and Title 27. Projected flux from impoundment to the lake remains highly uncertain, with estimates varying by two orders of magnitude.

The tentative preferred cleanup alternative is a phased approach, with Phase 1 consolidating and capping waste, diverting stormwater around the impoundment, and monitoring. Phase 2 would excavate a portion of the waste rock dam and cap remaining areas. Consolidation and capping

remediation goals vary for on-site vs off-site work. Estimated cost is about \$50 million. Remedial action could begin in 2024.

USEPA now has an agreement with USGS to study the relationship between the mine site and lake mercury contamination with monitoring and modeling.

For more information: Carter Jessop (jessop.carter@epa.gov).

#### **4 – Grizzly Creek Hydraulic Mine Biochar Pilot Project (Carrie Monohan, The Sierra Fund; Debbie Dumroese, USDA)**

Previous work by The Sierra Fund in Humbug Creek highlighted the large contribution of hydraulic mine sites to downstream sediment and mercury loads. Tahoe National Forest's upcoming Trapper Forest Health Project encompasses 63 hydraulic mines covering about 1200 acres. So these areas warrant work to enhance watershed health.

Biochar has been identified as a potential topsoil treatment for stabilizing highly erodible landscapes. Furthermore, column tests indicated that biochar could sequester mercury. However, different biochar feedstock and processing conditions can produce a range of biochar characteristics. Lab tests have experimented with various forms and doses of biochar, informing upcoming proposed storm sampling and field trials. The clearest driver of effluent total mercury concentrations is turbidity

The Grizzly Creek Diggins site stormwater was monitored in 2018-2020 to quantify sediment and mercury loads. The remediation design focused on fuel reduction, recontouring for erosion control, and biochar treatment. Several biochar test plots will be sampled in 2022-2023, if funded. Biochar supplied will also be analyzed for contaminants and physical properties.

For more information: Carrie Monohan (carrie.monohan@sierrafund.org); Debbie Dumroese (debbie.dumroese@usda.gov).

## **IV. Meeting Wrap-Up**

Key follow-up activities:

- Post presentations
- Contact leads for future agenda items.

Agenda item suggested for the next meeting:

- Recap of a recent pilot project to treat mine waste material for leachate control (Jon Miller & Dan Griffin, Albemarle)
- Incubation experiments on Cache Creek sediments (J Fleck, C. Alpers, P O'Day, M Beutel)
- Measuring mercury loads across a tidal wetland inlet (Petra Lee, DWR)
- CASCaDE Project ([www.cascade.wr.usgs.gov](http://www.cascade.wr.usgs.gov)) a combined hydrodynamic and water quality model of mercury transport and dilution in the Bay-Delta estuary (Robin Stewart and Lisa Lucas, USGS)

Agenda items for future meetings:

- MnO treatment for mercury-laden soil stabilization (Peggy O'Day and Marc Beutel, UC Merced)

- Mercury from SPACE—Development of high-resolution mapping of multiple parameters using field meters, satellite imagery, and more (Mark Marvin-DiPasquale, USGS)
- Cache Creek long-term mercury loads synthesis (Charlie Alpers, USGS)
- Due Diligence in the Sierra Nevada Gold Country (Carrie Monohan, TSF)
- Clear Lake mercury loadings and in-lake cycling (Charlie Alpers, USGS)
- Mercury cycling modeling (Stefanie Helmrick, UCM)

#### Next Meeting

- **Date:** Tentatively January 2022\*\*
- **Location:** \*\*