



DELTA TRIBUTARIES MERCURY COUNCIL

Wednesday, May 19, 2021

Via GoToMeeting virtual meeting (<https://www.gotomeet.me/McCordEnv/dtmc>)

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

Meeting Summary by: Stephen McCord, MEI

Attendees

Stephen McCord, MEI	Lauren Smitherman, CV RWQCB
Jon Miller, Albemarle	Robin Merod, CV RWQCB
Nicholas Graham, The Sierra Fund	Jordan Hensley, CV RWQCB
Carrie Monohan, The Sierra Fund	Leah Jones, CV RWQCB
Debbie Webster, CVCWA	Melanie Lowe, US Bureau of Recl.
Chris Eckley, USEPA	Stephen Christopher Carlson
Carter Jessup, USEPA	Peggy O'Day, UC Merced
Karen Ashby, Larry Walker Assoc. (LWA)	Peter Weiss, UC Santa Cruz
Brian Laurenson, LWA	Andrew Richie
Eunice Roh, Legislative Analyst's Office (LAO)	Sarah Watson, USEPA
Frank Jimenez, LAO	G Fred Lee, G Fred Lee & Assoc.
Carol DiGiorgio, DWR (retired)	Anne Lee, G Fred Lee & Assoc.
Dan Deeds, US Bureau of Recl.	Josie Tellers, City of Davis
Brian Currier, CSU Sacramento	Jim Weigand, BLM
Andrew Bain, Albemarle	Carey Chang, Scotts Valley
Cindy Weiss	Belle Zheng, UC Santa Cruz
	TaraBryn Grismer, UC Santa Cruz

I. Introductions and Agenda Review

No comments on the summary of the February 9, 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

- Carrie Monohan (The Sierra Fund): (1) Grizzley Creek Hydraulic Mine grant from US Endowment through US Forest Services research arm will be piloting biochar onsite and applying it onsite to evaluate effectiveness at sequestering mercury and other contaminants. (2) Stormwater sampling in Trapper region in coordination with Regional Board TMDL unit was postponed by lack of rain, so may instead sample at hydraulic mine sites and debris control dams.

Mercury Studies and Monitoring Activities

- The Delta Regional Monitoring Program’s plans to continue to sample fish annually, throughout the Delta, in fall, has been delayed. An interpretive report on the first three years of mercury monitoring remains in progress.
- Sampling for the BOG mercury in fish studies has started. Lakes are being sampled this year.
- Jacob Fleck (USGS): (1) Mercury from Space project is linking multiple sampling platforms (satellite imagery, optical measurements, synoptic mapping events, 4 fixed stations over tidal cycles) to compile 300 mercury samples over 24 months.

Regional and Statewide Mercury Regulation

- The statewide reservoirs mercury TMDL remains stalled, pending staff assignment at the State Board.

Recent & Upcoming Conferences

- The 2021 Bay-Delta Science Conference included several mercury topics. See for talk recordings and posters: <https://deltacouncil.ca.gov/delta-science-program/11th-biennial-bay-delta-science-conference>.
- The Sierra Fund has been hosting a series of Monday workshops this May titled “Due Diligence in the Gold Country—Remediating California’s Abandoned Mine Lands”. This workshop series presents The Sierra Fund’s newest report outlining a strategy to finally remediate California’s dangerous legacy mines so that headwater and downstream communities’ water, soil and air support healthy places to live, work, and thrive. Download the [FULL REPORT \(https://sierrafund.org/wp-content/uploads/Due-Diligence-in-the-Sierra-Nevada-Gold-Country-1.pdf?blm_aid=158849\)](https://sierrafund.org/wp-content/uploads/Due-Diligence-in-the-Sierra-Nevada-Gold-Country-1.pdf?blm_aid=158849) and the [EXECUTIVE SUMMARY \(https://sierrafund.org/wp-content/uploads/Due-Diligence-in-the-Sierra-Nevada-Gold-Country-Executive-Summary.pdf?blm_aid=158849\)](https://sierrafund.org/wp-content/uploads/Due-Diligence-in-the-Sierra-Nevada-Gold-Country-Executive-Summary.pdf?blm_aid=158849).

Grant Funding Opportunities

- Awards for Brownfields grant application submitted in October 2020 (7 months ago) were recently awarded. The Westside Sac IRWM Group’s application to assess abandoned mercury mine sites in the Cache-Putah region was not awarded, again.
- None noted.

Other News & Updates

- OEHHA recently issued new fish advisories with safe eating advice for several lakes: Silverwood Lake (San Bernardino Co.), Success Lake (Tulare Co.), Senator Wash Reservoir (Imperial Co.) and Hensley Lake (Madera Co.). <https://oehha.ca.gov/fish/advisories>.
- Carrie Monohan (The Sierra Fund): Expanding locations for posting fish consumption advisories into the Feather River watershed.

- “Society and sediment in the Mining Rivers of California and Australia” article was recently published by DTMC participants Allan James, Carrie Monohan and Alex Keeble-Toll. <https://link.springer.com/article/10.1007/s12685-020-00273-1>.

III. Presentations

Four presentations were given.

1 – Delta MeHg TMDL Review (Lauren Smitherman & Robin Merod, CV RWQCB)

For Phase 1 of the TMDL, staff have reviewed all control studies submitted. The Independent Scientific Review Panel (sponsored by the Delta Science Program) reviewed most studies, but has been delayed in reviewing the more recently submitted tidal wetlands and open water study reports.

The original linkage analysis relied on a small set of unfiltered aqueous methylmercury (MeHg) and largemouth bass (LMB) total mercury (THg) samples collected in each Delta subarea in 2000. Staff developed a regression model between the data to determine an aqueous MeHg implementation goal of 0.06 ng/L. The aqueous MeHg goal was used to determine the allocations for the current TMDL. Staff have currently merged multiple datasets providing 19 years of additional aqueous and fish data. QA & QC of the data merger has been challenging.

Looking ahead, staff hosted a CEQA Scoping Meeting on February 24, 2021, for planning Phase 2 of the TMDL. Four entities submitted written comments. The next step in a lengthy process is to develop the Phase 2 control program. The TMDL’s linkage analysis, allocations, implementation goals, and other conditions will all be re-evaluated. The expected compliance date remains year 2030. Key questions for the revised linkage analysis include how to segregate and combine data points (water year type, fish species, ancillary conditions), how to link fish tissue targets to water column concentrations and how to get it all done within the available time, expertise and budget constraints.

Discussion points included:

- Consider doing a broader statistical analysis of the available data, correlating various forms/matrices of mercury, areas and time periods (years back, hydrologic cycles, etc.).
- Staff have a fundamental understanding of predictive modeling and statistical learning techniques and would appreciate additional references to resources or contacts that may help expediate implementing these methods.
- Staff presented several options on how to pair aqueous data with fish data. They are currently considering pairing yearly fish samples with 5 years of preceding aqueous data. They welcome any feedback.

For more information: Lauren Smitherman, 916-464-4668,

Lauren.Smitherman@Waterboards.ca.gov; website

https://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/.

2 – Combie Reservoir sediment removal (Jacob Fleck, USGS)

Many partners implemented and supported this project of removing sediment over 43 acres from a major flow-through reservoir in the gold mine-dense Bear River basin in water year 2019 (both

wet and dry excavation). USGS was tasked to quantify ecological effects of sediment removal operations within Lake Combie. Samples were generally collected in the upper (near stream mouths where excavated) and lower (near dam outlet) regions of the reservoir.

USGS sampled biota (zooplankton and fish), water, bed sediments and sediment pore water, all in multiple areas and depths, in 6 events over 3 seasons before and after dredging operations, to elucidate MeHg transport and transformations. Water samples were collected at multiple depths and in reservoir inflows and outflows. Fish sampling post-excavation will continue this August, but Hg analyses of their tissue has been delayed.

Preliminary assessment indicates:

- Sediment removal did not have a major/obvious impact on (or improved) in-reservoir or downstream MeHg conditions. They did not see any hypoxia at depth, likely due to the lake's short residence time and shallow depth inhibiting stratification.
- Zooplankton samples at two depths didn't clearly change in MeHg pre- vs post-excavation.
- Fish sampled during excavation showed no significant change in MeHg uptake.
- MeHg concentrations in inflows and outflows, as filtered and particulate fractions, correlated well to hydrologic factors, providing nearly continuous (hourly-daily) estimates of MeHg loads. The reservoir was a net sink and source of MeHg in different years.

Analyses are ongoing even though the sediment removal site work has been completed. Further monitoring of less anomalous water years may be needed to provide conclusive results.

For more information: Jacob Fleck, 916-278-3063, jafleck@usgs.gov.

3 – Lichen bioindicators for mercury contamination (Peter Weiss-Penzias, UC Santa Cruz)

Atmospheric deposition tends to be largely unknown contribution to mercury impairments. Research has included monitoring fog, and more recently lichen, around sites impacted by mercury mines. Lichen is a useful tool for identifying atmospheric mercury deposition hotspots because all of its material comes from the air (not its physical host) and is a long-lived plant found in most areas. The research challenges are that Hg bioaccumulation depends on various factors, lichen can be unevenly distributed, and standardization protocols are lacking. Reactive mercury species—a key source to watersheds—can now be analyzed with a new instrument to match with dominant sources and correlate with lichen.

Weiss sampled several species of lichen around New Almaden Mine and Lake Berryessa (post-LNU Complex fire), and measured multiple forms of mercury (lichen primarily update HgII). Obvious signals within 1 km of mine sites were found, consistent with the literature. Levels were also elevated along the shoreline of Lake Berryessa. Multiple lichen species exhibited similar patterns and concentrations.

The current research aims to: (1) Calibrate Hg in lichen concentration maps, with atmospheric RM measurements and dry deposition modeling, and (2) Compare speciated Hg in lichen with atmospheric RM speciation to determine potential sources of Hg deposition.

A 2019 publication is: "Marine fog inputs appear to increase methylmercury bioaccumulation in a coastal terrestrial food web" Scientific Reports (<https://www.nature.com/articles/s41598-019-54056-7>).

For more information: Peter Weiss, 831-459-1616, pweiss@ucsc.edu.

4 – State government response to abandoned mines (Frank Jimenez & Eunice Roh, Legislative Analyst's Office)

The Legislative Analyst's Office is a non-partisan agency that supports the legislature's interests in monitoring agency activities to implement legislation. The LAO report "Improving California's Response to the Environmental and Safety Hazards Caused by Abandoned Mines" written by now-retired Shawn Martin was published in August 2020. The report is available at <https://lao.ca.gov/Publications/Report/4258>.

There are ~47,000 abandoned mines scattered throughout California, many started during the Gold Rush and well before mining regulations. About two-thirds of the mines are on federal land, 31% on private land, and a small portion are on state and local government lands. Contamination from mines occurs in many ways—land, air, and water—from about 10% of the documented mine sites. Many sites have features that render the sites dangerous to humans and wildlife, on site and downstream. Few mine sites have been assessed.

Multiple federal, state, and local agencies are responsible for mine sites as they manage associated lands and waters, regulate environmental conditions, and provide technical assistance. Two state agencies (DTSC and State Water Board) and one federal agency (USEPA) regulate mine lands. The state's Department of Conservation's Abandoned Mine Lands Program inventories and assesses AMLs for physical safety hazards. This situation with so many responsibilities calls for coordination in many ways.

Key impediments to remediation include: (1) no systematic approach for prioritizing and assessing sites has been developed; (2) funding is limited relative to the great need; (3) site access is constrained by jurisdiction and landowner cooperation.

Report recommends for the legislature: (1) designate a single lead agency [Cal EPA?] to coordinate mine remediation activities; (2) lead agency should develop a statewide strategic plan to systematize and prioritize projects; and (3) develop a new/single state fund targeting mines, managed by the lead agency and consistent with the strategic plan.

For more information: Frank Jimenez (Frank.Jimenez@lao.ca.gov) or Eunice Roh (Eunice.Roh@lao.ca.gov).

IV. Meeting Wrap-Up

Future agenda item suggested:

- Collective findings from mercury characterization and control studies in wetlands managed by DWR (Petra Lee, DWR)
- Measuring mercury loads across a tidal wetland inlet (Petra Lee, DWR)
- Lake Mercury improvement projects—Sulphur Bank Mercury Mine Superfund site remediation plan (Carter Jessup, USEPA)
- MnO soil coating for Hg control (John Collins, AquaBlok)

- MnO treatment for mercury-laden soil stabilization (Peggy O'Day and Marc Beutel, UC Merced) [anytime]
- Due Diligence in the Sierra Nevada Gold Country (Carrie Monohan, TSF)
- Grizzley Creek Hydraulic Mine biochar pilot project (Carrie Monohan, TSF)
- Biochar bench-scale study (Debbie Dumrose, Rocky Mtn. Research; Madison Brandt, CSU Chico)
- Incubation experiences on Cache Creek sediments (J Fleck, C. Alpers, P O'Day, M Beutel]

Next Meeting

- **Date:** Tentatively September 28, 2021
- **Location:** Online only