



Mercury Pollution in Northern California
Delta Tributaries Mercury Council



DELTA TRIBUTARIES MERCURY COUNCIL

Tuesday, March 7, 2023

Via Teams virtual meeting

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

Meeting Summary by: Stephen McCord, MEI

Attendees

Stephen McCord, MEI
Hope Taylor, Sacramento Co.
Josie Tellers, City of Davis
Peter Graves, BLM
Brett Poulin, UCD
Austin Baldwin, USGS
Jon Miller, Albemarle
Mike Boulland, TBCI
Heidi Oriol, Regional San
Wes Heim, MLML
Lauren Smitherman, CV RWQCB
Gerardo Martinez, SF Bay RWQCB
Robin Merod, CV RWQCB
Brian Mahoney, City of Sacramento
Debbie Webster, CVCWA
Chuck Salocks

Mike Cox, Friends of Los Alamitos Watershed
Marc Beutel, UC Merced
Debbie Webster, CVCWA
Peggy O'Day, UC Merced
Jay Davis, SFEI
Wayne Praskins
Bill Tu, Valley Water
Tom Grovhoug, LWA
Jason Muir, Geocon
Mark Seelos, Valley Water
Jim Downing, Valley Water
Ray Krauss
Aaron Angel, Delta Sci. Program
Rachael Klopfenstein, Delta Sci. Program
Hannah Page, Teichert
Jordan Hensley, CV RWQCB
Daniel Deeds, USBR

I. Introductions and Agenda Review

No comments on the summary of the October 18, 2022 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

- A project team of MEI and Terracon oversaw the remediation of Elgin Mine, an abandoned mercury mine in the Sulphur Creek watershed. The former owner had been issued a Cease & Desist Order from the Regional Board pursuant to the 2005 Cache Creek Mercury TMDL. The new landowner implemented the work plan with technical

support from the project team, MercLok contributed by Albemarle, and oversight from the Central Valley Regional Water Board.

- Peter Graves (BLM): The federal Bureau of Land Management hired a consultant to conduct assessment/studies/work at AML sites in the Cache/Bear and Putah creeks watersheds. The contractor visited Harley Gulch (downstream from Abbott-Turkey Run Mine and Clyde Mine (upper Sulphur Creek watershed). BLM is also conducting a five-year CERCLA review of Rathburn Mine (Rathburn North and Rathburn South repositories). BLM plans to remove 2200 yd³ of tailings at Clyde Mine and conduct a 5-yr review of repository repairs identified at Rathburn Mine. New federal budget funding will allow for watershed investigations in the Sulphur Creek mining district, including from Petray Mine to Cache Creek.
- Michael Cox: The New Almaden cleanup of small piles of remaining calcines along Alamitos Creek (Hacienda Furnace Yard and Deep Gulch) will take place after the 2023 rainy season.

Mercury Studies and Monitoring Activities

- A special issue of the *International Journal of Environmental Research and Public Health* titled “Artisanal and Small-Scale Gold Mining Related Environmental and Health Problems” was published in September 2022 with many mercury studies (https://www.mdpi.com/journal/ijerph/special_issues/Artisanal_Gold_Mining_Environmental_Health_Problems). McCord peer-reviewed one of the articles.
- Lake Nacimiento mercury cycling work “Evaluating the influence of seasonal stratification on mercury methylation rates in the water column and sediment in a contaminated section of a western U.S.A. reservoir” was published in *Environmental Pollution* journal in January 2023. <https://doi.org/10.1016/j.envpol.2022.120485>.
- Wes Heim (MLML): Submitting manuscript to *Science of the Total Environment* on a Yolo Bypass study on the effects of various vegetation management practices on methylmercury production.
- Tom Grovhoug (LWA): SFEI is producing an interpretive report on last 6 years of mercury monitoring in Delta. Last fish mercury sampling was fall 2022.
- Lauren Smitherman (RWQCB): Safe to Eat Workgroup reviewing 2022 streams monitoring data for fish tissue mercury levels.

Regional and Statewide Mercury Regulation

- Lauren Smitherman (RWQCB): Peer review of Delta Mercury Control Program control study reports has been completed. Staff are preparing a draft staff report and will submit it to scientific peer review, concurrently releasing it to tribes and the public. The Central Valley Water Board will host meetings to discuss proposed findings and modifications around Fall 2023.
- Lauren Smitherman (RWQCB): The Statewide Mercury Control Program for Reservoirs webpage is out of date. Staff are still exploring available options for addressing mercury in reservoirs before they update the page. In the meantime, they have reassigned Steve Camacho to other projects. Zane is currently taking the lead on the Statewide Mercury Reservoir project until they decide on the best option moving forward.

Recent & Upcoming Conferences, Workshops and Webinars

- Jon Miller (Albemarle): Albemarle presented on its MercLok technology in a pilot study for mercury mine remediation and a bioavailability study at the Battelle Sediment Conference on January 9-12, 2023, in Austin, TX.
- The U.S. EPA, Office of Water, is holding virtual National Forums on Contaminants in Fish (Fish Forum) in Feb-Mar 2023 to bring together interested stakeholders to discuss the many issues related to human health and contaminants in fish.
<https://www.epa.gov/fish-tech/2023-national-fish-forum>.
- Albemarle is hosting (DTMC members Stephen McCord and Greg Reller are presenting) a webinar on mercury contamination in mining and summarizing the successful application of MercLok at an abandoned mercury mine; 9-10am on March 23. Register at <https://events.teams.microsoft.com/event/29290994-16a1-495c-ba27-5f3557e5a986@3cd20f76-d0b4-4aa6-9d7d-60152662831f>.
- Albemarle is considering hosting a workshop in June in Sacramento to discuss mercury contamination problems and potential MercLok applications. More information will be shared later via the DTMC listserv. Contact the DTMC facilitator for more information or to request an invitation.
- Brett Poulin (UC Davis): Interagency research in the watershed conference (CUAHSI) presenting a special session on mercury in reservoirs in June 5-8, 2023.

Grant Funding Opportunities

- None identified.

Other News & Updates

- OEHHA recently issued new fish advisories with safe eating advice for:
 - A new Statewide Advisory for Eating American Shad, Chinook (King) Salmon, Steelhead Trout, Striped Bass, and White Sturgeon in California Rivers, Estuaries, and Coastal Waters. <https://oehha.ca.gov/advisories/advisory-fish-migrate>.
 - A new Statewide Advisory for Eating Fish from the Central and South Delta. <https://oehha.ca.gov/advisories/advisory-fish-migrate>.
 - Two updated fish advisories for Castaic Lake (<https://oehha.ca.gov/advisories/castaic-lake>) and Castaic Lagoon (<https://oehha.ca.gov/advisories/castaic-lagoon>) in Los Angeles County add safe-eating advice for several species.

Presentations

Three presentations were given.

1 – Mercury components of 2022-2026 Delta Science Action Agenda (Aaron Angel and Rachael Klopfenstein, Delta Stewardship Council’s Delta Science Program)

The Agenda produced in 2022 is the second iteration of the Program’s 5-year roadmap for science (and funding it) generating knowledge to inform decision-making in the Delta. The new plan is built around management questions and recognizes the need for integration of scientific progress.

The plan was produced through a highly engaging process with over 30 groups (including the DTMC), individual surveys, workshops, draft reviews, and multiple contributors. These efforts generated (or proposed) over 1200 questions and 150 actions. These were distilled into 6 management need areas, each with multiple management questions and underlying science actions to address them. At least 2 of those actions related to mercury:

- 2A. Monitoring Programs: Evaluate and update monitoring programs to ensure their ability to track and inform the management of climate change impacts, emerging stressors, and changes in species distributions
- 5E. Chemical Contaminants: Quantify spatial and temporal patterns and trends of chemical contaminants and evaluate ecosystem effects through monitoring, modeling, and laboratory studies

Download the Agenda at: <https://scienceactionagenda.deltacouncil.ca.gov/pdf/2022-2026-science-action-agenda.pdf>.

Many other actions could have a mercury component, as well. The next round of proposals will be solicited in fall 2023. For guidance on funding:

<https://scienceactionagenda.deltacouncil.ca.gov/pdf/2023-02-13-a%20researchers-guide-to-funding-and-tracking-priority-science.pdf>.

For more information: Rachael Klopfenstein, rachael.klopfenstein@deltacouncil.ca.gov.

2 – Mercury Mining in California with some details regarding mercury use (Michael Cox, retired)

The colorful history of mercury mining in California provides useful insight for how to improve mercury pollution management today. Nonetheless, the problem is complicated in multiple ways, so collaboration and cooperation are essential. The key large-scale uncertainty is the fate of the 220,000,000 pounds of Hg produced in CA, and the same uncertainty can be significant at the site-specific scale where Hg was released in several process steps in multiple forms. Global Hg use continues, although its use in the US is decreasing.

In South San Francisco Bay, Hg has been tracked in mine site soils, in sediments in the bay and local creeks, water bodies and various receptor organisms. Loss from mine sites tends to be highly episodic, challenging our ability to estimate releases.

New Almaden Mine was the largest Hg mine in the US. Production and waste (predating environmental regulations) occurred prior to construction of reservoirs and urban development. Today much of the degradation is hidden under vegetation and structures, and distributed along watershed streams and lakes. Calcine tailings around former processing areas are key sources, especially dust from furnace dust precipitators.

Significant calcines piles in Quicksilver County Park have been contained and capped. Some minor piles are scheduled for removal and containment soon. Calcines downstream of the district mines remain in bank and bed deposits. Large bank deposits have been removed and/or encapsulated, but some minor deposits remain.

Experience at New Almaden suggests the importance of understanding a site's history, inventorying current conditions, tracking Hg from erosion to deposition areas, and dealing with large-scale areas collectively.

For more information: Michael Cox, mercury.miner@gmail.com.

3 – Guadalupe River Watershed Hg TMDL Implementation and Reservoir Hg Management (Mark Seelos, Valley Water)

Valley Water provides water supply, flood protection and related environmental stewardship to most of the San Jose region. They own and manage 10 reservoirs, all of which are mercury impaired. Central to the mercury contamination is the New Almaden Mining District, which was the largest Hg producer in the nation. Mining was conducted prior to the reservoirs, which now are impacted by that legacy of pollution (compounding the naturally Hg-enriched native soils).

To address the Guadalupe River Hg TMDL, Valley Water takes a 3-tiered approach of field research, bench-scale lab study, and field trials. Field research consists of 3 components: source identification, cycling in reservoirs and bioaccumulation in fish. The most obvious factor driving methylmercury (MeHg) in reservoirs is dissolved oxygen (DO). However, the four hypolimnetic oxygenation systems primarily mixed the water sending MeHg-enriched bottom water towards the surface and warmer water withdrawn from the bottom downstream (harming downstream cold-water fisheries). Current research is testing sorbent amendments in lab-scale trials to evaluate their ability to adsorb MeHg efficiently in various application methods.

Key lessons learned, particularly relevant to reservoir managers, is to recognize the shared interests of agencies that manage water and regulate it, to work methodically, and to spend public funds prudently. Keys to success are consistent funding and messaging to support it.

For more information: Mark Seelos, MSeelos@valleywater.org.

III. Meeting Wrap-Up

Agenda items suggested for the next meeting included:

- The CASCaDE Project (www.cascade.wr.usgs.gov) is a combined hydrodynamic and water quality model that was employed to evaluate the physical components (the model does not include a mercury cycling submodel) of mercury transport and dilution in the Bay-Delta estuary. (Robin Stewart and Lisa Lucas, USGS)
- Recap experience of remediating the abandoned Elgin Mine in the Sulphur Creek watershed with hydrologic and chemical treatment controls (Stephen McCord, MEI; Greg Reller, Burlison Consulting)
- USEPA Region VIII CAMLAG-like experience (Jean Wyatt, Wyatt.Jean@epa.gov)
- Regional Hg TMDL in Oregon (Rebecca Fitzgerald or Brian Creutzburg); OR Hg TMDL
- Central Valley regional mercury mine site cleanup priorities (Kyle Johnson, RWQCB)
- Delta MeHg TMDL and peer review (Lauren Smitherman, RWQCB)

- Genomic techniques to identify mercury methylators (Ben Peterson, bdpeterson@ucdavis.edu; student of Brett Poulin, Dept Envir. Tox.)

Next Meeting Date: Tentatively a Tuesday in September 2023 (online).