

Delta Methylmercury TMDL Annual Report for 2015

A slightly shortened version of this report is incorporated into the Executive Officer's Report to the Central Valley Regional Water Quality Control Board for December 10/11 2015

1. Methylmercury Control Studies

For the Delta Mercury Control Program Phase 1 (2011 – 2018), the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) requires that responsible entities perform studies of methods to control methylmercury. The purpose of the control studies is to test and evaluate methods of limiting methylmercury entering Delta waterways in order to reduce the levels in Delta fish and achieve water quality objectives. Responsible entities submitted methylmercury control study work plans in April, 2013. The work plans were reviewed by staff and an independent technical advisory committee, revised as needed, and approved by the Executive Officer. Work plans submitted to the Water Board encompassed most of the types of methylmercury sources named in the Total Maximum Daily Load (TMDL) report, namely seasonal and tidal wetlands, municipal wastewater, urban and industrial storm water, and open water channels. These work plans are now being implemented.

Methylmercury Control Study progress reports were due on 20 October 2015. The table below lists the studies and their current status. The Basin Plan requires that final methylmercury control study reports be submitted in October 2018 unless need for extension until 2020 is granted and approved by the Executive Officer.

Methylmercury Study Project and Authors	Summary of Study Progress
Central Valley Clean Water Association Methylmercury Special Project (group study that includes Delta and non-Delta municipal wastewater treatment plants)	Project measured methylmercury in influent and effluent at all participating facilities and evaluated the data: (1) with respect to facility treatment type and (2) in comparison to pre-TMDL effluent concentrations. The project also predicts changes in methylmercury loads to the Delta under several future treatment upgrade scenarios. Data collection from local facilities and most analyses are complete. Data show that treatment systems with nitrification-denitrification processes consistently have near-or non-detectable levels of methylmercury in effluent. The report proposes a small amount of additional work, pending comment from the technical advisory committee.
City of Stockton and County of San Joaquin Methylmercury Control Study (urban stormwater)	The study objectives are to sample inflow and outflow of a detention basin within the MS4 permit area and evaluate effectiveness of settling basins at trapping MeHg. Data from completed sampling events were presented in the Progress Report. Additional data and analyses will be completed for the Final Report.
Sacramento Stormwater Quality Partnership Methylmercury Control Study (urban stormwater)	The project tested effectiveness of one management practice, low impact development (LID), at reducing MeHg loads and concentrations. Two urban sites with and without LID features were monitored. Methylmercury loads were reduced by LID due to the reduction in discharge volume. At one site methylmercury concentrations in discharge were also lower after LID installation. The final report will contain evaluation of effectiveness, cost, and timelines of meeting wasteload allocations and is expected by Oct. 2018.
City of Sacramento for its Combined Storm Sewer System	Objectives were to a) evaluate methylation potential in plant and conveyance systems and b) evaluate possible reductions in influent volume and methylmercury loads by modeling proposed LID and capital improvement

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(wastewater and stormwater)	projects. City of Sacramento collected influent and effluent samples during five winter storm events and laboratory tested methylmercury produced by sediments deposited in the holding facilities. Work remaining is to collect during two more runoff events, perform one more bench test, and perform modeling.
Contra Costa Clean Water Program (urban stormwater)	This project a) monitored methylmercury in urban drains in East Contra Costa County for comparison with TMDL estimates and b) monitored outflow from two biofiltration systems, which are a type of LID management practice. Data collection is complete.
Deuel Vocational Institute (wastewater treatment for California Department of Corrections facility)	This individual study completed monitoring of methylmercury in influent and effluent. Data indicate that the treatment process is effectively removing methylmercury and no additional mercury source investigation or plant optimization is needed.
Port of Stockton Methylmercury Control Study (industrial stormwater)	The objective of this individual study is to determine whether additional maintenance of stormwater collection systems is needed to reduce methylmercury loads discharged to the San Joaquin River. Due to lack of runoff and sediment accumulation in the targeted collection system, monitoring will occur in winter 2015/2016. Data and final analyses will be complete by 2018.
Open Water Workgroup Progress Report (group led by Department of Water Resources and involving State and federal water and land management agencies)	This group project is a combined modeling, field data, and laboratory approach to evaluate the potential effects of operational changes on methylmercury in Delta channels. Department of Water Resources is developing two mathematical models, one each for the Delta and Yolo Bypass that will allow testing of various land and water management scenarios. This is a particularly detailed effort, as both new data for model inputs and new modelling code are needed. The final report for this study is expected to be complete at the end of 2019.
Delta Mercury Control Progress Report for Tidal Wetlands (Department of Water Resources)	To inform planning for future tidal wetland restorations, this project is monitoring methylmercury concentrations and loads in existing tidal wetlands. Data collection at one tidal wetland in the Yolo Basin Wildlife Area is complete (10 tidal cycles/one year). Collection has begun at a second site in the Suisun Marsh. The challenge for this study will be to complete monitoring at a sufficient number of wetlands by 2018 so that comparisons between different tidal wetlands and effects on methylmercury can be made.
Effects of Maintenance Dredging on Methylmercury (US Army Corps of Engineers)	During annual maintenance dredging of the Sacramento and Stockton Deep Water Ship Channels, the US Army Corps of Engineers evaluated methylmercury concentrations in dredge material return flow and effect on the San Joaquin River. Although discharge concentrations of methylmercury were relatively high, no effect on the river was observed. This study is a continuation of studies begun in 2009 to evaluate management practices (vegetation removal at dredge material disposal sites, timing of dredge return flow) and characterize methylmercury loads.
Methylmercury Management in seasonal wetlands	This study is evaluating the effect of passing water from seasonally flooded wetlands (shallow, typically with high methylmercury concentrations) through permanent ponds (deep areas designed to promote methylmercury settling and degradation by ultraviolet light). Final report is due in 2017.

Methylmercury Study Project and Authors	Summary of Study Progress
Mercury Control Studies for the Cache Creek Settling Basin Report of Findings (Department of Water Resources)	This report was submitted in response to the Basin Plan requirement that agencies responsible for managing the Cache Creek Settling Basin (CCSB) evaluate the feasibility of reducing loads of mercury that exit the basin. In the dry period characterized in this study (water years 2010-2014), the CCSB trapped 60% of mercury entering the basin. Monitoring of methylmercury concentrations in birds nesting in the basin showed some species may be experiencing reproductive impacts. The report examines potential management solutions under consideration for the CCSB to meet other flood control and Yolo Bypass management needs. These alternatives (raising the outlet weir, stockpiling sediment within the CCSB, enlarging the CCSB footprint, and combinations of such measures) could increase the mercury trapping efficiency by up to 15%, but are not expected to reduce methylmercury concentrations within the CCSB.

Staff has completed a preliminary review of the progress reports listed above. In addition to completing its review, staff will obtain comments from the independent Technical Advisory Committee (TAC). For review of the Progress Reports, staff intends to follow a format of providing progress reports with associated, focused questions to subgroups of the seven-member TAC. The subgroup for each review will be selected by the TAC Chairman, based on areas of expertise and interest. Staff and the TAC Chairman agreed to this format as being most appropriate for the progress reports, as most studies are not yet complete or ready for integration into a full review of the Delta Mercury Control Program. Staff will report the TAC's comments and recommendations for additional work to the Water Board in spring 2016.

In addition to studies specific to methylmercury control, the Basin Plan requires development and implementation of a plan to reduce loads of mercury leaving the Cache Creek Settling Basin. By trapping sediment and associated mercury, the Cache Creek Settling Basin prevents this mercury from entering the Yolo Bypass. The Basin Plan directs that, in parallel with the methylmercury control study progress reports, the agencies responsible for the Cache Creek Settling Basin submit a report describing a) environmental benefits and costs of maintaining the settling basin indefinitely and b) potential alternatives for improving trapping efficiency. The Department of Water Resources, assisted by the US Geological Survey and UC Davis, has conducted a multi-year study of mercury and methylmercury entering and within the settling basin. The Department of Water Resources has committed to providing a report containing a summary of these studies and the report components described above by the end of November 2015.

Along with the studies being conducted on the TMDL Phase 1 timeline, staff is tracking other methylmercury monitoring, research, and synthesis efforts.

- Characterization of methylmercury concentrations and loads leaving flood- and furrow-irrigated fields (conducted by US Environmental Protection Agency Region 9 and Central Valley Water Board). Methylmercury concentrations in outflow are higher than expected by evapoconcentration alone, suggesting that methylmercury is being made during irrigation. Concentrations of methylmercury are generally higher in field outflow than inflow. Estimates of methylmercury loads (concentration times water volume) suggest that fields are nevertheless sinks for methylmercury during most of the growing season. Water volumes were estimated from literature values and are uncertain. This study will be posted on the Central Valley Water Board webpage

- Preliminary investigation of the effects of aquatic vegetation on methylmercury concentrations and production in Delta channels (conducted by Moss Landing Marine Laboratories under contract to Central Valley Water Board).
- Methylmercury management practice studies for seasonally-flooded, managed wetlands and rice previously conducted in the Yolo Bypass (California Department of Fish and Wildlife and Moss Landing Marine Laboratories) and Cosumnes River Preserve (conducted by US Bureau of Land Management and US Geological Survey utilizing a Nonpoint Source Program 319(h) grant).
- Five-year monitoring effort at Mayberry wetland restoration and subsidence reversal project on Sherman Island in the western Delta.
- The Delta Science Program is leading the convening of a mercury expert panel and a series of public workshops to review knowledge gained since the 2002 Mercury Strategy for the Bay-Delta Ecosystem and identify new or persistent data gaps. The 2002 Strategy was written for the CalFed program. The first workshops are planned for the end of January 2016.

These efforts add to the picture of methylmercury and potential for management in the Delta. Staff will continue to provide information from these projects to the TAC and the Water Board. At the end of Phase 1 of the Delta Mercury Control Program, staff will provide the Water Board with a review and possible revisions for the entire program, including the methylmercury load and wasteload allocations and implementation actions.

A more detailed discussion of the findings from the various studies will be provided to the Board in early 2016.

2. Delta Mercury Exposure Reduction Program

The Delta Mercury Exposure Reduction Program (MERP) is a collaborative effort of the Central Valley Water Board, California Department of Public Health, the Delta Conservancy, and the Office of Environmental Health Hazard Assessment. It is supported by funds from the Cleanup and Abatement Account and Delta dischargers. The goal of the Delta MERP is to protect public health by reducing exposure to mercury in fish caught in the Delta. Accomplishments of the Delta MERP include:

- hosting quarterly meetings for education and networking among community stakeholders;
- training small grant recipients to conduct education in their communities;
- outreach to numerous local agency and community organizations in 5 Delta counties; and
- developing educational materials, including translations into eight non-English languages.

Delta MERP's small grant program is providing assistance to three community organizations: the California Indian Environmental Alliance, Asian Pacific Self-Development and Residential Association, and Lao Khmu Association.

A quarterly community stakeholder meeting was held on 30 September in Stockton. Attendees received an update on the development of a low-literacy fish consumption advisory pier sign to be posted at locations throughout the Delta. Also discussed were a research project analyzing demographic information about Delta populations, the role of media advocacy in education about fish contamination, and an online educational tool CDPH is developing to train community groups in effective communication of fish contamination messages.

The fourth quarterly community stakeholder meeting is scheduled for 2 December, 9:30 AM – 12:00 p.m., at the East Bay Regional Park District – Big Break Visitor Center in Oakley, CA.