

Review of DMCP

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12/16/2024

2/26/2025

[Note that is an amended original report in response to clarity sought by Central Valley Regional Board \(RB5\) regarding findings for Conclusion #4d.](#)

I am reviewing Delta Mercury Control Program (DMCP) Staff Report and the findings reported therein.

Based on my expertise and experience, I am reviewing the findings, assumptions, or conclusions I agreed I could review with confidence.

In general, the DMCP Review's linkage analysis, methylmercury source analysis, and methylmercury allocations described in the TMDL that I reviewed is a substantial and well-written document. The conclusions are based on years of scientific research. The assumptions used are generally highly defensible. I generally accept this report in its current form and I only have minor suggestions. In my review, I have considered all the points for each statement, and addressed the conclusions as written in the letter of request.

Conclusion # 1: Concerning proposed linkage model applies appropriate quantitative data analysis methods.

Section 4.1: Perhaps additional language fully defining and explaining what the significance is of using the 350 mm standardized Hg concentration should be added.

I agree that keeping the Sacramento subarea in the linkage analysis is important and a good justification for using all available black bass species (p 37, 47)

When multiple years are included in the black bass standard and evaluation, there are some years in some locations with non-representative data. I agree with the justification for whether the extrapolated concentration of the 350 mm standardized black bass mercury concentration should be included in the analysis (p 38, 47).

I agree with the method to group aqueous Hg concentration data (pooling for the lifetime of the fish).

I agree with grouping all years and expressing the central tendency of the data as a median.

The comparison of regression models adds confidence to the report's findings.

Using the Standard Error of Regression as a criteria statistic for selecting the best model is an important contribution to the field of environmental science.

Even though there are only 5 data points in Figures 5.2 and 5.3, each of these data points represents the central tendency of other data sets and I think the linkage equations generated have scientific merit.

I agree with the exclusion of the fish Hg concentrations from Marsh Cr, YB, and Cache Creek – not enough data and non-representative flows (Table 5.1).

Conclusion # 2: Concerning proposed margin of safety.

Page 56 – I understand the benefit of randomly resampling the data to find the probability distribution and select criteria concentration. Perhaps the justification for all the details chosen by the Board should be explained a bit better. Random sampling “with” or “without” replacement is a bit murky. In the first paragraph where it states that Board staff created a custom function, a citation should be used. What is the general approach? I am not an expert in this area, so the explanation reads a little like “take our word for this”. I see the footnotes below but they are hard to decipher. Would an equation help to explain the procedure you used?

Otherwise, I think the general finding of 0.059 ng/L as the aqueous MeHg implementation goal is reasonable, and an important finding.

I also think the statement “margin of safety” on page 57 should be more clearly defined or described. In particular, what calculation was used to reach this value of 3.3%?

Conclusion # 3: Concerning proposed water balance and methylmercury mass balance (Source Analysis).

The water balance (Table 6.3) is presented clearly.

Page 77, please include a reference for the “whole ecosystem monitoring” technique of determining MeHg sources by landcover type.

I agree with the methods of calculating the MeHg loadings for the tributary inflows (sec 6.2.1).

The MeHg load calculations look good to me.

The revised (lower) open water flux rate of 4.5 ng/m²/day is acceptable (p 103). It would be clearer if the process of MeHg fluxing from the sediments was spelled out in more detail. Sometimes the sediments are a sink for MeHg? I assume that is what the -58 to 120 ng/m²/d refers to on p 103.

It is a bit unclear how the atmospheric deposition load in the DMCP review was 141 g/y, which is ½ the load found in the 2010 report (p 160) but according to figure 6.4,

the size of the atmospheric deposition bar is smaller for the DMCP review compared to the 2010 TMDL staff report.

In general Section 6, the source analysis is very thorough. The text, tables, and figures are clear.

Section 6.3 on methylmercury losses is clearly written.

Figure 6.15 has some cross-hatching on the bar within the 2010 report category that is not identified in the legend.

Figure 6-29 is especially nice and encapsulates a lot of work and good science.

Conclusion # 4.c: Proposed load allocations and waste load allocations should result in aqueous concentration reductions.

Section 8: the use of medians instead of averages and using a longer dataset compared with the 2010 staff report are important improvements in the DMCP report.

Table 8.1 It is unclear why Delta TMDL Subareas are listed twice. Is the only difference the Dataset Ranges? Also a reminder of why some calculated % reductions used pooled medians vs. regression medians would be helpful.

I agree that the proposed load and waste load allocations should result in aqueous MeHg concentration reductions.

Conclusion # 4.d: Proposed water quality objectives are attainable.

I have reviewed Conclusion 4d and Section 8 of the report and I do agree with the conclusion "that as the median concentration of methylmercury in each Delta TMDL subarea decreases to the aqueous methylmercury implementation goal, the targets for fish tissue will be attained."

A minor suggestion is to include a phrase that indicates that this conclusion is based on your load and assimilation calculations and the state of knowledge about mercury biogeochemistry.

Section 8: In the "key points" section at the end please address the issue of whether the water quality objectives are attainable. The phrase is used: "Board staff anticipates" this could be justified for the reader. Why is it anticipated? Based on the calculations and the known Hg science?

Conclusion # 5: Proposed source analysis, allocations, and compliance calculation methods reasonably account for climatic variability.

I agree with this, since the calculations were made over multiple water years to account for some degree of climatic variability. I don't think this review is an exhaustive examination of the effects of climate change on the Delta mercury cycle, however.

The use of medians is justified for grouping aqueous methylmercury data.