

## 29. People for Children's Health and Environmental Justice

LaDonna Williams  
Letter Date: 30 March 2010

### **Comments:**

Those of us from the environmental justice communities who had been left out of the earlier processes concur with Andria comments below. The draft resolution contains language that misleads the reader and public into believing this process was a collaborative effort that included EJ communities when it was not. Various EJ communities have and continue to voice their concerns of being excluded in activities and processes with the development of the document, processes and numerous previously held meetings where we were excluded. Of special concern for us was there were no African American communities or voices included in these processes although there were those willing and ready to participate. As the process went forward it was clear that input and comments from both affected frontline community based groups, and other stakeholders who are advocating for actual inclusion of community/ stakeholder support, and agency accountability is being minimized by the language. As has been previously stated but we will state again, this process is and has so far continued to be an agency process that cannot be considered a collaborative process that was community inclusive.

The fact that your comments below about the Delta MeHg TMDL Adaptive Management Approach working meeting was forwarded to us (a frontline EJ community based org) by other stakeholders as opposed from you, who have our emails shows that this process is not inclusive but rather selective in who gets to participate and when.

Perhaps a meeting with frontline EJ community groups and other stakeholders with Central Valley Water Board and other Water Agencies would be most helpful in helping you all to understand what constitutes real inclusive and collaborations related to EJ community groups and other stakeholder involvement in these processes.

Sincerely,  
LaDonna

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People for Children's Health  
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**Response:** In her emailed comments, Ms. Williams refers to emails sent by other stakeholders. In an email sent to Board staff (Patrick Morris) and others on 30 March, Andria Ventura (Clean Water Action) wrote that the stakeholder process to develop the Delta methylmercury TMDL was not adequately inclusive and that draft Resolution findings #30 and 31 (which refer to the stakeholder process and development of the adaptive management plan) inappropriately imply that all stakeholders were equally

involved. In response to this comment from Ms. Ventura, Board staff revised the resolution text to describe the work of a “subset of stakeholders”. Ms. Ventura’s email message also contained the text of short emails that had been sent to her and others, but not to Ms. Williams, from Mr. Morris and Stephen McCord (Larry Walker Associates). These emails contained date, time, call-in information, and agenda material for a meeting of the Adaptive Management Approach Workgroup on 30 March 2010 at 9:30 am.

Board staff agrees with Ms. Williams that participation by Delta fish consumers and community-based organizations in development of the Delta methylmercury control program and the Adaptive Management Approach document was limited. Staff and the stakeholder process’ professional facilitator actively worked to encourage participation by community-based organizations. No groups or individuals were ever deliberately excluded from the process. Staff regrets all situations in which people were not able to participate because they did not receive notification of the meetings.

Staff maintains an email list that contains names of more than 700 people who have expressed interest in the Delta mercury program. Staff used this list and the Regional Water Board’s website to notify stakeholders of meetings of the large stakeholder group. For the Adaptive Management Approach Workgroup and other workgroups, staff asked stakeholders (during large group meetings and via the large email list) to identify if they wanted to be included on smaller email lists for each workgroup. Staff used the smaller workgroup-specific email lists because some stakeholders objected to the large number of emails and associated file attachments that they received related to the stakeholder process. However, staff recognizes that workgroup inclusiveness could have been improved if, during the stakeholder process, staff had made repeated queries to the large group and to the 700+ person email lists for new workgroup participants. Hereafter, staff will ensure that workgroup meeting information is made more widely available through the 700+ person email list and the Regional Water Board’s website. Staff appreciates the efforts of other stakeholders to forward meeting information to their colleagues who may not be on the Regional Water Board email lists.

Staff agrees with the suggestion that Regional Water Board staff meet directly with community-based organizations and environmental justice groups to discuss their needs and ways to improve collaboration. Staff would like to arrange additional discussions with Ms. Williams and other community groups soon after the April 2010 hearing.

## 30. Eugene Mullenmeister

California Registered Professional Geologist, PG 7611

Letter Date: 19 April 2010

*Mr. Mullenmeister's comments refer to text in the February 2010 draft Basin Plan Amendment Staff Report.*

### **Mullenmeister Comment #1.**

Please accept my comments on the Basin Plan Amendment for the Control of Methyl and Total Mercury in the Sacramento-San Joaquin Delta Estuary. They are as follows:

#### **Page 17, Last Paragraph:**

Indicates that Alternative 2 is already approvable and meets the USEPA criterion for MeHg in fish tissue. But it is not recommended because it is not protective of the population that eats TL 4 fish.

**Response:** Chapter 3 of the draft Staff Report provides an analysis of five alternative fish tissue objectives that vary based on the amount and trophic level of fish that can be safely eaten by people and wildlife. Alternative 2 is based on the USEPA's default consumption rate of 17.5 grams/day of freshwater/estuarine fish from a variety of trophic levels (TL2, TL3 and TL4) and 12.46 g/day of marine (commercial) fish. However, CDFG creel surveys (CDFG, 2000-2001) and information provided by CDFG staff (Schroyer, 2003) indicate that many Delta anglers do not take home TL2 species. As described in Figure C.1 in Appendix C of the February 2010 draft TMDL Report, the creel surveys indicate that Delta anglers may target an almost even mix of TL3 (American shad, salmon, sunfish, splittail) and TL4 (catfish and striped bass) fish in the Sacramento and Mokelumne Rivers subareas of the Delta, and primarily TL4 species (striped bass and catfish) throughout the rest of the Delta. Information provided by CDFG staff (Schroyer, 2003) indicates that even in the rest of the Delta, many anglers take home a mix of TL3 and TL4 fish species. In Delta consumption, anglers reported taking home catfish, striped bass, carp, bluegill, salmon, largemouth bass, crappie, sturgeon, and crayfish (CDHS, 2005 and 2006; Ujihara, 2006).

Although Alternative 2 is consistent with USEPA's recommended ambient water quality criterion of 0.3 mg/kg methylmercury in fish tissue, it is not protective of people who by custom, need, or enjoyment, more frequently eat Delta fish (especially bass and catfish) and also is not protective of several fish-eating wildlife species, including bald eagle, osprey, river otter, grebe, common merganser, and least tern. Alternative 2 is not fully protective of the WILD beneficial use because the alternative exceeds the safe methylmercury levels identified by the U.S. Fish and Wildlife Service for some wildlife species. Alternatives 3 through 5 fully protect the WILD beneficial use. Alternatives 4 and 5 are more protective of people who by custom, need, or enjoyment, more frequently eat Delta fish. Alternative 4 is also consistent with the consumption rate (one meal/week) incorporated in the fish tissue objective adopted for the San Francisco Bay mercury control program.

Please refer to Chapter 3 of the draft Basin Plan Amendment Staff Report, and Chapter 4 of the TMDL Report, for a detailed review of this topic and associated citations.

### **Mullenmeister Comment #2.**

How big is the population we are trying to protect? The combined population of the Central Valley and San Francisco Bay is approximately 13.5 million. The combined sport fisherman and subsistence fisherman population has been optimistically estimated at 300,000 (Morris, 2007), 2.5% of the total population. Are we talking about a subset of this population? Many of these sport fishermen only fish a few times per year.

**Response:** To clarify, Board staff estimated that about 300,000 licensed anglers fish in the Delta each year, along with an unknown number of unlicensed anglers. As reviewed in Chapter 4 and Appendix C of the TMDL Report, sport and subsistence fishing is common throughout the Delta and takes place year-round. Although anglers are typically male, many respondents in the Sacramento River and Delta/San Joaquin River angler surveys said that they supply fish for their household. Thus, the subpopulation at risk includes women and children women and children who eat Delta fish. A University of California Davis researcher who surveyed Delta anglers reported that approximately half of anglers and their families are estimated to consume mercury above the US Environmental Protection Agency's safe level or reference dose (Shilling *et al.*, 2010)<sup>1</sup>. Shilling reported that are approximately 10,000 anglers and 40,000 associated family members who are consuming greater than 10 times the USEPA recommended dose of mercury, which puts them at immediate risk of neurological and other harm.

On average, sport fishing license sales in the six Delta counties account for 19% of all licenses issued in the State (Table C.2). Although some of these licenses may have been purchased for use elsewhere, a survey of anglers indicates similar popularity of the Delta for fishing. The Delta Protection Commission and the Department of Parks and Recreation evaluated fishing in the Delta by surveying, via mail, adults who purchased fishing licenses in California in 1996 (DPRrec, 1997). Of all California licensed anglers, 23% reported fishing in the Delta. Delta anglers spent an average of 14 days per year fishing. Authors of the survey multiplied the number of anglers that use the Delta by the average days spent fishing from boat and shore, and in tournaments. In 1996, the total of fishing days in the Delta by licensed anglers was about 21.6 million. Fishing from boat was most popular (11.8 million activity days), followed by fishing from shore (9.6 million activity days) and tournament fishing (0.2 million activity days).

Creel surveys and interviews also provide evidence that sport and subsistence anglers actively fish the Delta waterways year-round by boat and from banks. CDFG's creel surveys indicate that a variety of species are caught and kept (Table C.3, Figure C.1). Fishing derbies for striped bass, black bass and sturgeon take place in the Delta annually. The CDHS Environmental Health Investigations Branch staff conducted interviews of community-based organizations in the Delta region and found that members of many communities regularly eat local fish, especially striped bass, catfish, salmon, sturgeon, crappie, and carp (CDHS, 2004). In addition to the species listed in Tables C.1 and C.3, Sacramento blackfish and shimofuri goby may also be collected from the Delta (e.g., Moyle, 2002).

A recent fish consumption and advisory awareness survey of low-income women at a WIC2 clinic in Stockton indicated that 32% of the 500 survey participants consumed sport fish, and 29% consumed a combination of commercial and sport fish that exceeded the USEPA/FDA national advisory limit (Silver *et al.*, 2007). For participants who ate any fish in the 30-day period prior to the survey, the geometric mean consumption rates equaled 13, 33, and 35 grams

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<sup>1</sup> Shilling, F., A. White, L. Lippert, and M. Lubell. 2010. Contaminated fish consumption in California's Central Valley Delta. *Environmental Research* doi:10.1016/j.envres.2010.02.002

uncooked fish per day for Delta, commercial, and total fish, respectively. Cambodian, Asian/Pacific Islander, and African American participants had the highest mean consumption rates (24, 22, and 18 grams uncooked fish per day, respectively).

California Department of Public Health staff interviewed members of communities thought to have high consumption rates (CDHS, 2004) and conducted several pilot fish consumption surveys in the Delta (CDHS, 2005 and 2006; Ujihara, 2006). From the interviews, CDPH learned that being able to safely eat Delta fish is important to many people. Members of all races and many ethnic groups fish in the Delta. The CDPH conducted small surveys of anglers in three parts of the Delta (CDHS, 2005 and 2006; Ujihara, 2006). Of boaters docking in Contra Costa County surveyed in 2005, 3% reported eating Delta fish more than once per week. Of boat and shore anglers on the Sacramento River between Rio Vista and the American River interviewed during salmon season in 2003, 17% ate Delta fish more than once per week. Shore anglers at two southern Delta and two San Joaquin River sites outside the Delta were interviewed in October/November 2005. Of the total respondents who ate any fish in the 30-day period prior to the survey, the geometric mean consumption rates were 22, 17, and 27 grams uncooked fish per day for locally caught, commercial, and total fish, respectively; these rates are less than one 8-ounce meal per week.

Please refer to Chapter 4 and Appendix C of the draft TMDL Report for a detailed review of this topic and associated citations. Please also see a report of mercury intake by Delta fish consumers prepared by Dr. Shilling that is available on our website:  
[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/other\\_technical\\_reports/char\\_high\\_mercury\\_mem.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/other_technical_reports/char_high_mercury_mem.pdf)

**Mullenmeister Comment #3.**  
**Pages 19, 20, Alternatives 3 and 4:**

Proposes fish tissue criterion below the EPA recommended level to protect a subset of the above population (>2.5%). Is this fair to impose this financial burden on the entire population so that a small percentage can consume Delta caught fish once a week?

**Response:** The Central Valley Water Board regulates many dischargers whose discharge has the potential to impact relatively few people. The Board needs to address impairments and fully protect beneficial uses. There is a range of fish tissue objectives that the Board can consider that would fully protect the use. The proposed objective seems reasonable and is about as low as can be reasonably attained given available information.

Also, a fishery with mercury-contaminated fish is an environmental justice issue and a threat to wildlife. For example,

- In 2005-2008, researchers from University of California Davis interviewed anglers and community members in the Delta about eating fish (Shilling, 2009<sup>2</sup>). The study area included the Sacramento River between Rio Vista and the American River and the Sacramento Deep Water Ship Channel. The average and 95th percentile rates of

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<sup>2</sup> Shilling, F. 2009. Characterizing High Mercury Exposure Rates of Delta Subsistence Fishers. University of California, Davis, Department of Environmental Science and Policy. Prepared for the Central Valley Regional Water Quality Control Board, May. Available at:  
[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/other\\_technical\\_reports/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/other_technical_reports/index.shtml)

consumption of locally caught fish were 11 and 52 g/day uncooked fish/day, respectively. Women and men ate fish at similar rates. Average consumption rates of locally caught fish were highest for Lao, African American, and Vietnamese participants. UC Davis researchers found that approximately half of Delta anglers and their families take in methylmercury above the USEPA reference dose and 5% are exposed to methylmercury at **10 times the reference dose** (Shilling, 2009). Methylmercury intake at 10 times the reference dose affects memory, fine motor control, and audiovisual learning in children (NRC, 2000<sup>3</sup>).

- A recent fish consumption and advisory awareness survey of low-income women at a WIC<sup>4</sup> clinic in Stockton indicated that 32% of the 500 survey participants consumed sport fish, and 29% consumed a combination of commercial and sport fish that exceeded the USEPA/FDA national advisory limit (Silver *et al.*, 2007<sup>5</sup>). Cambodian, Asian/Pacific Islander, and African American participants had the highest mean consumption rates (24, 22, and 18 grams uncooked fish per day, respectively).
- The highest fish tissue levels observed in the Delta were in the lower Cosumnes River (Davis *et al.*, 2008; Slotton *et al.*, 2007<sup>6</sup>), an area of intensive wetland restoration efforts. Extensive multi-year and seasonal fish mercury monitoring conducted in the lower Cosumnes River observed small fish mercury levels that were 5 to 29 times the small fish mercury objective proposed in Chapter 3 of the draft Basin Plan Amendment Staff Report (Slotton *et al.*, 2007). Slotton and others (2007, pages 58-59) observed extreme (400-500%) increases in silverside mercury at the Cosumnes site in July 2006, when concentrations in 45-75 mm (2-3 inch) silversides reached levels averaging an “astounding” 0.869 ppm, with individual fish as high as 2.0 ppm. According to the authors, “these were concentrations that should be of serious concern, particularly in relation to wildlife exposure.”

The Clean Water Act Section 303(d) requires states to identify water bodies that do not meet their designated beneficial uses and to develop programs to eliminate impairments. The Porter Cologne Water Quality Act directs the State to regulate activities and factors which may affect the quality of the state to attain the highest water quality which is reasonable, considering all demands being made and to be made on the waters and the total values involved (California Water Code Section 13000). In 1990 the State Water Resources Control Board adopted the 303(d) List that identified Delta waterways as impaired for mercury because of the presence of a fish consumption advisory. The 1998 303(d) List identified the TMDL control program for mercury in the Delta as a high priority.

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<sup>3</sup> NRC. 2000. Toxicological Effects of Methylmercury. National Research Council, Committee on the Toxicological Effects of Methylmercury (NRC). Washington, DC: National Academy Press. Available at: <http://www.nap.edu/books/0309071402/html>.

<sup>4</sup> Special Supplemental Nutrition program for Women, Infants, and Children (WIC).

<sup>5</sup> Silver, E., J. Kaslow, D. Lee, S. Lee, M.L. Tan, E. Weis, and A. Ujihara. 2007. Fish consumption and advisory awareness among low-income women in California's Sacramento-San Joaquin Delta. *Environmental Research*, 104: 410-419.

<sup>6</sup> Davis, J.A., B.K. Greenfield, G. Ichikawa, and M. Stephenson. 2008. Mercury in sport fish from the Sacramento San Joaquin Delta region, California, USA. *Science of the Total Environment*, 391:66-75.

Slotton, D.G., S.M. Ayers, and R.D. Weyland. 2007. CBDA Biosentinel Mercury Monitoring Program, Second Year Draft Data Report Covering Sampling Conducted February through December 2006. May 29, 2007. Available at: <http://www.sfei.org/cmrfishmercury/DocumentsPage.htm>

Board staff provided an evaluation of economic factors in the Basin Plan Amendment Staff Report, in which staff acknowledged that the potential costs associated with the proposed control program are substantial. Please see Sections 3.2.4 and 7.4 of the Basin Plan Amendment Staff Report for a discussion of economic considerations relevant to staff's analysis. The Central Valley Water Board Members will consider this economic information when they consider the adoption of a mercury control program for the Delta. Note, this discussion satisfies the requirements of Water Code section 13241, which does not dictate that the Board undertake a cost/benefit analysis. Furthermore, in prior decisions interpreting Water Code section 13241, the courts have opined that "[t]he plain language of ... [section] 13241 indicates the Legislature's intent in 1969, when these statutes were enacted, that a regional board consider *the cost of compliance...*" (Italics added), and does not mention that these costs must be compared to the relative benefits provided by the Board's action. *City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 625. Appendix C of the Basin Plan Amendment Staff Report provides a detailed explanation of how Board staff developed cost estimates for the reasonably foreseeable methods of compliance with the proposed control program and a range of alternatives, and Table 4.5 in the Staff Report provides a summary of the cost estimates.

Also, as described on page 137 of the February 2010 draft Basin Plan Amendment Staff Report, implementation costs estimated for the proposed control program for the Delta are comparable to costs estimated for other TMDL implementation programs in the region. Board staff is aware of the potential financial burden placed on public and private landowners in the Delta to complete the requirements of the proposed Basin Plan amendments (BPA). To reduce duplication and save costs, the proposed BPA allows dischargers, including private landowners, to work together to conduct the studies. The Board staff recognizes the limitations of government assistance for private entities but is willing to explore opportunities to help the private landowners meet their obligations under the proposed Delta mercury control program. Section 7.4 in the draft Basin Plan Amendment Staff Report identifies other possible cost-saving measures and potential sources of funding.

Staff worked with stakeholders during the formal stakeholder process after the April 2008 hearing meeting to develop the below text to address stakeholder concerns regarding the balancing of methylmercury controls and other competing issues, such as cost:

*"By [nine years after Effective Date] at a public hearing, and after a scientific peer review and public review process, the Regional Water Board shall review and reconsider, if appropriate, the Delta Mercury Control Program and may consider modification of objectives, allocations, implementation provisions and schedules, and the Final Compliance Date."* (page BPA-8)

*"The Regional Water Board shall assess: (a) the effectiveness, costs, potential environmental effects, and technical and economic feasibility of potential methylmercury control methods; (b) whether implementation of some control methods would have negative impacts on other project or activity benefits; (c) methods that can be employed to minimize or avoid potentially significant negative impacts to project or activity benefits that may result from control methods; (d) implementation plans and schedules proposed by the dischargers; and (e) whether methylmercury allocations can be attained."* (page BPA-9)

However, federal law does not give the State license to allow the methylmercury impairment to remain or worsen. The State must develop coordinated programs that address multiple impairments, protect all beneficial uses, and achieve environmental objectives. This is a daunting effort and is the reason staff recommended a phased approach to TMDL

implementation in the 2008 and 2010 draft BPA and staff reports. This concern was further addressed by the formal stakeholder process after the April 2008 hearing meeting and the February 2010 draft BPA and staff reports, and should be further discussed during the ongoing stakeholder process as the proposed Phase 1 methylmercury control studies take place and the upstream control programs are developed.

#### **Mullenmeister Comment #4.**

**Page 23, 5<sup>th</sup> Paragraph:**

##### **“Alternatives Compared to Regional Mercury Levels and Their Attainability”**

Compares fish mercury concentrations for Delta fish to those fish mercury concentrations for the western United States not to background levels for the Delta.

The validity of this comparison is questionable. Most of the production of mercury in the US came from California.

The Delta watershed contains naturally occurring Hg deposits that produced an estimated 220,000,000 pounds (99,790 Tonnes) of Hg between 1850 and 1981 (Churchill, 2000). Compare this to 85,104 Tonnes produced in the entire US between 1904 and 1997 when all production in the US ceased (Kelly, 2010).

How can a target level be set without knowing what the background level is in the Delta and what the long term base load will be from natural sources?

The only mercury sources listed are abandoned mines and sites where the mercury is efficiently converted to methylmercury. However, in a 2009 report prepared by the Water Environment Research Foundation, it was stated that “It appears that mining sources have among the lowest % MeHg levels, typically 1% or less” (Dean and Mason, 2009). Are we looking in the right places?

**Response:** To clarify, the February 2010 staff reports identify a broader suite of inorganic mercury and methylmercury sources in the Delta and its tributary watersheds. Sources of inorganic mercury in the Delta include tributary inflows from upstream watersheds, atmospheric deposition, urban runoff, dredging activities, and municipal and industrial wastewater. Sources of inorganic mercury in the watersheds upstream of the Delta include gold and mercury mine sites, legacy mercury in the stream channel sediments, geothermal springs, atmospheric deposition, urban runoff, and municipal and industrial wastewater. Sources of methylmercury in Delta waters include tributary inputs from upstream watersheds and within-Delta sources such as methylmercury production in wetland and open water habitat sediments, municipal and industrial wastewater, agricultural drainage, and urban runoff.

Staff considered possible Delta fish tissue objectives with respect to (a) the observation that fish mercury concentrations in the Central Delta approach or already achieve the proposed objectives and (b) a survey of mercury concentrations in fish from 626 sites in 12 western states, including areas not affected by mercury and gold mining (Environmental Science and Technology 2007, vol 41, pg 58-65). About 30% to 40% of the sampled waterways in the 12 western states supported a fish population with mercury concentrations lower than the proposed fish tissue objectives for the Delta, which indicates that the proposed objectives may be attainable with implementation of a vigorous control program. Because the Delta’s exact

baseline is uncertain, staff recommends setting a water quality objective that has evidence of being achieved while providing protection for wildlife and allowing a significant level (e.g., one meal/week) of consumption by people.

Section 8.2 of the February 2010 draft TMDL Report provides a preliminary scoping of potential watershed total mercury load reductions that incorporates estimates of background suspended sediment mercury concentrations. However, it is important to note that the proposed TMDL implementation approach focuses on “controllable processes” (see Chapter 3 in the draft TMDL Report), not some determination of background levels of inorganic mercury or methylmercury in ambient water. Focusing on controllable processes is expected to increase the number of control options at our disposal and enable more rapid improvements.

Note, in general there are many factors that have changed during the past century, for example (but not limited to): the routing, timing, and water characteristics (e.g., temperature and EC) of “natural” flows has fundamentally changed with the implementation of the federal and state water projects and creation of numerous reservoirs; invasive species (e.g., largemouth bass, striped bass, and Asian clam) have fundamentally altered the food web in the Delta and many of its tributary water bodies; extensive tracts of “natural” habitats have been lost to urbanization and agriculture; and other local and global sources of anthropogenic mercury have increased substantially. The Central Valley of today defies comparison to the Central Valley of the 1800’s, so much so that it would be hazardous to guess at methylmercury conditions of the past without a well-considered, multi-variable model or some form of historic data that is water-body specific, and it would not be reasonable to have a control program based on historic natural background conditions that are no longer applicable.

Please also refer to “Staff’s Initial Responses to Board and Stakeholder Questions and Comments at the April 2008 Hearing”<sup>7</sup> (in particular, Section A.1) for discussion on why Board staff recommends a control strategy that focuses on sources of both inorganic mercury and methylmercury. Additional explanation is available in the February 2010 staff reports.

#### **Mullenmeister Comment #5.**

**Page 25, 2<sup>nd</sup> Paragraph, discusses Hg inputs:**

Discussion of natural inputs:

There is no information that a complete local base load determination for Hg in the Delta has been performed. One that takes into account the contribution of Hg from all naturally occurring sources:

- 1) Sediments naturally enriched in Hg from over 500,000 years of erosion of Hg deposits
- 2) Thermal Springs
- 3) Groundwater

Churchill and Clinkenbeard, 2004, report natural background Hg concentrations in stream-channel alluvium up to 280 ppm.

**Response:** Please refer to Board staff’s response to “Mullenmeister Comment #4”, which addresses this comment. Note, while some areas of the Coast Range are naturally enriched in

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<sup>7</sup> This document is available at the following Board website:  
[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/stakeholder\\_meetings/25nov08\\_hearing\\_rtc.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/stakeholder_meetings/25nov08_hearing_rtc.pdf)

mercury, such high levels as that cited by Mr. Mullenmeister (“280 ppm”) are not the norm. For example, the concentrations of mercury in suspended sediment and soil collected from unmined areas of the Cache Creek watershed, both upstream (Churchill and Clinkenbeard, 2004; Percy and Petersen, 1990; Cooke *et al.*, 2004; Foe and Bosworth, 2008) and downstream of mines and reaches of contaminated sediment (Foe and Croyle, 1998; Foe and Bosworth, 2008) are typically about 0.25 mg/kg (ppm).<sup>8</sup> For comparison, the concentration of mercury in suspended sediment in the Sacramento River averages about 0.09 mg/kg from Redding to Colusa (Louie *et al.*, 2008<sup>9</sup>). There are relatively few mercury mine sites and modern point sources in the Sacramento River watershed upstream of Colusa.

#### **Mullenmeister Comment #6.**

##### **Page 29, Third Bullet:**

Suggests that fish tissue mercury concentrations observed elsewhere in the United States can be achieved in the Delta.

Significant natural deposits of Hg remain in the rocks of the Coast Range. Thermal springs are actively precipitating 1 to 300 ppm Hg (Percy, 1990) Churchill and Clinkenbeard, 2003), (Domagalski, et al., 2004).

Don't we need to know what the long term base load of Hg is coming into the Delta from natural sources in order to determine whether the removal of anthropogenic Hg inputs will have any effect?

Data presented by Palen AbuSaba, 2006, suggest that there is no correlation between MeHg Production and total Hg below 100ng Total Hg.

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<sup>8</sup> Churchill, R. K. and J. P Clinkenbeard. 2004. Assessment of the Feasibility of Remediation of Mercury Mine Sources in the Cache Creek Watershed. Task 5C1 Final Report., California Department of Conservation, California Geological Survey. Prepared for the CALFED Bay-Delta Program Directed Action #99-B06. Available at: <http://mercury.mlml.calstate.edu/reports/2003-reports/>. August.

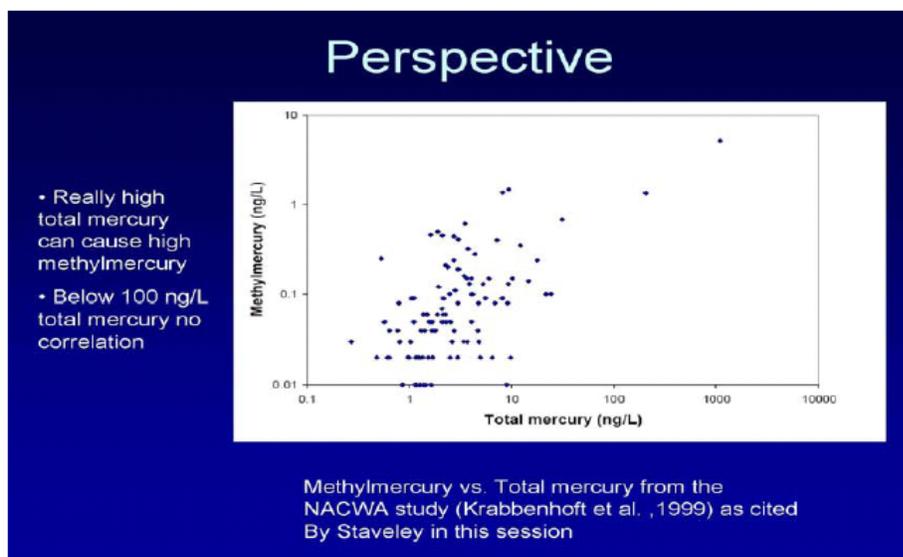
Cooke, J., C. Foe, A. Stanish and P. Morris. 2004. Cache Creek, Bear Creek, and Harley Gulch TMDL for Mercury. Central Valley Regional Water Quality Control Board staff report. November.

Foe, C. and W. Croyle. 1998. Mercury concentrations and loads from the Sacramento River and from Cache Creek to the Sacramento-San Joaquin Delta Estuary. Staff report, Central Valley Regional Water Quality Control Board, Sacramento, CA. June.

Foe, C. and D. Bosworth. 2008. Mercury Inventory in the Cache Creek Watershed. Staff report, Central Valley Regional Water Quality Control Board, Sacramento, CA. February. Available at: [http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/cache\\_sulphur\\_creek/](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/cache_sulphur_creek/)

Percy, E. and U. Petersen. 1990. Mineralogy, geochemistry and alteration of the Cherry Hill, California hot-spring gold deposit. *Journal Geochemical Exploration*, 36: 143-169.

<sup>9</sup> Louie, S., C. Foe, and D. Bosworth. 2008. Mercury and Suspended Sediment Concentrations and Loads in the Central Valley and Freshwater Delta. Final Report submitted to the CALFED Bay-Delta Program for the project “Transport, Cycling and Fate of Mercury and Methylmercury in the San Francisco Delta and Tributaries” Task 2. Central Valley Regional Water Quality Control Board. Available at: <http://mercury.mlml.calstate.edu/reports/reports/>



**Response:** In general, methylmercury in ambient Delta water can be reduced by reducing sources of mercury-contaminated sediment to the Delta, reducing direct discharges of methylmercury to the Delta (e.g., from urban runoff, municipal wastewater, and agricultural return flows), and controlling processes that affect methylmercury production and loss in open-water and wetland habitats. Staff estimated that about 30% of total mercury entering the Delta comes from legacy<sup>10</sup> mercury, about 5% from modern point sources (e.g., NPDES urban and facility discharges) in the Central Valley, and about 65% from naturally mercury-enriched soils, atmospheric deposition, and geothermal springs [please see “Staff’s Initial Responses to Board and Stakeholder Questions and Comments at the April 2008 Hearing”,<sup>11</sup> item A-1, pages 3 through 12]. In addition, even if control actions are implemented to remediate legacy mercury and reduce modern point sources of inorganic mercury in the Delta and its tributary watersheds, it would likely take natural processes many centuries to completely remove the legacy mercury already in Central Valley river beds and channels. Evidence supporting this assertion comes from the source analysis of total mercury that continues to enter the Delta years after the mercury and gold mining period and studies of contaminated sediment transport conducted elsewhere. The magnitude of legacy, mine-related mercury spread through river beds and banks downstream of major dams that continues to erode the Delta and difficulties in controlling these loads is discussed under Question #1 (page 3) and additional discussion about the time needed for natural processes to flush in-channel sediments from the Delta are included under Item #22 (page 44) in staff’s “Initial Responses to Comments at the April 2008 Hearing”. As a result, even if legacy mercury loads could be reduced to zero, we would still need to be concerned about activities in and around the Delta that contribute methylmercury. Given available information about wetland restoration goals for the Delta (e.g. the Record of Decision (ROD) for the California Bay-Delta Authority commits it to restore 75,000 to 90,000 acres of additional seasonal and permanent wetlands in the Delta, which represents about a three to four times increase in wetland acreage from current conditions (about 21,000 acres)), and their

<sup>10</sup> Board staff refers to mercury from historic mining operations in the Coast Ranges and Sierra Nevada that was released to Central Valley waterways by historic operations as well as by past and present erosion of excavated overburden and tailings as “legacy mercury”.

<sup>11</sup> Available at:  
[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/stakeholder\\_meetings/25nov08\\_hearing\\_rtc.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/stakeholder_meetings/25nov08_hearing_rtc.pdf)

potential to increase methylmercury loading to the Delta, we need to have a mercury control program that is more comprehensive and protective of the environment and subsistence fishers who cannot wait for centuries for improvements.

Please also refer to Board staff's response to "Mullenmeister Comment #4", which explains why Board staff's proposed control strategy focuses on controllable processes rather than some determination of background levels.

Mr. Mullenmeister noted that data presented by AbuSaba (2006) "suggest that there is no correlation between methylmercury production and total mercury below about 100 ng Total Hg". The figure included in Mr. Mullenmeister's comments indicates that these data are for water, not sediment. Board staff expects that concentrations of methylmercury in water and fish are expected to decrease as sediment mercury concentrations decline due to total (inorganic) mercury source control actions. Maximum methylmercury production (primarily by sulfate reducing bacteria) occurs at the oxic-anoxic boundary in sediment, usually several centimeters below the surface. As described in Section 3.3 in Chapter 3 of the February 2010 TMDL Report, methylmercury production has been found to be a function of the total mercury content of the sediment. Methylmercury concentrations adjusted for the organic content of the sediment increased logarithmically with increasing total mercury concentration in a study of 106 sites from 21 basins across the United States. The slope of the relationship was linear to approximately 1 mg/kg total mercury before commencing to asymptote. Similar linear relationships have been observed in the Delta between methyl and total mercury concentrations in sediment (Table 3.1). The statistical significance of the correlation increases when data from one land use type (e.g., marshes) are used. This implies that methylation rates may also be a function of habitat type. The results are consistent with laboratory experiments where increasing concentrations of inorganic mercury were amended into sediment and the evolution of methylmercury monitored. The efficiency of the conversion of total to methylmercury was linear to about 1 mg/kg before commencing to level off. Please refer to Chapters 3 and 5 in the TMDL Report for additional information on this topic and citations, as well as for a summary of studies that observed declines in fish methylmercury concentrations at contaminated sites after control measures were instituted to reduce incoming mercury loads.

#### **Mullenmeister Comment #7.**

##### **Page 29 5<sup>th</sup> Paragraph:**

Recommends "An expanded exposure reduction program should be implemented to protect people with the highest consumption rates of Delta fish even before consumption studies are conducted or MeHg reductions are achieved."

What is the size of the highest consumption rate population? The combined population of the Central Valley and San Francisco Bay is approximately 13.5 million. The combined sport fisherman and subsistence fisherman population has been optimistically estimated at 300,000 (Morris, 2007). There has been no accurate documentation on the number of individuals that actually subsist on fish from the Delta. Is this just a "*Big Fish Story*"? Is this the right thing to do at this time, when the State is struggling to keep its head above water? Making rash and overly quick decisions on issues that are not fully understood could over regulate industries and cause the loss of jobs.

**Response:** As described in Board staff's responses to Mullenmeister Comments #2 and #3, interviews of local community-based groups and pilot surveys have taken place in the Delta. Of

particular relevance are the results of the 2005-2008 interviews of anglers and community members in the Delta conducted by researchers from the University of California Davis (Shilling, 2009). The study area included the Sacramento River between Rio Vista and the American River and the Sacramento Deep Water Ship Channel. The average and 95th percentile rates of consumption of locally caught fish were 11 and 52 g/day uncooked fish/day, respectively. Average consumption rates of locally caught fish were highest for Lao, African American, and Vietnamese participants. UC Davis researchers found that approximately half of Delta anglers and their families take in methylmercury above the USEPA reference dose and 5% are exposed to methylmercury at 10 times the reference dose (Shilling, 2009). [Methylmercury intake at 10 times the reference dose affects memory, fine motor control, and audiovisual learning in children (NRC, 2000).] The UC Davis researchers estimated that there are approximately 10,000 anglers and 40,000 associated family members who are consuming greater than 10 times the USEPA recommended dose of mercury, which puts them at immediate risk of neurological and other harm.

Board staff recognizes that a comprehensive survey of consumption of Delta fish has not been conducted. For this reason, staff examined San Francisco Bay and national fish consumption studies, as well as several localized and pilot studies in the Delta, to develop Delta-specific consumption scenarios and ultimately recommend targets for human protection. These consumption scenarios were a component of the earliest technical staff report released in August 2005 and have been updated to include the results of more recent surveys. Board staff first began collecting and compiling data for the TMDL and associated control program in 2000. (Please see a review of the data provided in the TMDL Report.) In addition, staff has held a CEQA scoping meeting, two public workshops, two Board workshops, one public hearing before the Board, and numerous stakeholder meetings to receive comments and information from local, state and federal agencies, dischargers, and other stakeholders during the preparation of the proposed Basin Plan amendments, and has received and responded to comments from scientific peer reviewers contracted by the State Water Resources Control Board. Staff also sought input from the scientific community beyond the State Water Board's scientific peer review process. Please refer to Chapter 8 and Table 8.1 in the February 2010 draft Basin Plan Amendment Staff Report for more information about how Board staff obtained input from the scientific community and public, including the formal stakeholder process that took place in 2008-2009.

It is important to recognize that staff's recommended water quality objectives are based on a consumption rate of one meal (8 ounces uncooked) per week of Delta fish. Rates that characterize subsistence and "high consumer" are 4-5 meals per week or higher.

As noted in staff's earlier response, federal law does not give the State license to allow the methylmercury impairment to remain or worsen. The State must develop coordinated programs that address multiple impairments, protect all beneficial uses, and achieve environmental objectives. This is a daunting effort and is the reason staff recommended a phased approach to TMDL implementation in the 2008 and 2010 draft BPA and staff reports. The proposed Basin Plan amendment language cited in staff's response to Mullenmeister Comment #3 and other text in the proposed BPA commits the Board to establishing a Technical Advisory Committee to help design and review the results of the proposed Phase 1 control studies, obtaining input from stakeholders throughout Phase 1, and assessing the potential costs and economic feasibility of potential methylmercury control measures before the second phase of the control program would begin. Staff appreciates Mr. Mullenmeister's concerns about the possibility of over regulating industries and causing the loss of jobs. These concerns are addressed by the phased, adaptive management approach proposed for the control program.

### **Mullenmeister Comment #8.**

#### **Final Comment:**

The modifications made to the delta, such as the Yolo Bypass and the canal system has changed the environment, which may, in itself increase methylation. Probably more important, these modifications have interrupted the natural movement of mercury by streams, through the delta and out of the Bay. Is the state willing to re-create a more natural system and remove these artificial conveyances?

**Response:** As acknowledged in the Basin Plan Amendment Staff Report and TMDL Report, activities such as water management and storage in and upstream of the Delta and Yolo Bypass, maintenance of and changes to salinity objectives, dredging and dredge materials disposal and reuse, and management of flood conveyance flows affect the transport of mercury and the production and transport of methylmercury. As a result, the proposed BPA assigns joint responsibility for the methylmercury TMDL allocation for methylmercury produced by sediments in open water habitats within channels and floodplains in the Delta and Yolo Bypass to the agencies with jurisdiction over “waters of the State” and water diversions and flood management, e.g., the State Lands Commission, Department of Water Resources, and Central Valley Flood Protection Board.

In addition, the proposed BPA requires state and federal agencies whose activities affect the transport of mercury and the production and transport of methylmercury through the Yolo Bypass and Delta, or which manage open water areas in the Yolo Bypass and Delta, including but not limited to Department of Water Resources, State Lands Commission, Central Valley Flood Protection Board, U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation, to conduct Phase 1 methylmercury control studies. If appropriate during Phase 1, the Board Executive Officer will require other water management agencies whose activities affect methylmercury levels in the Delta and Yolo Bypass to participate in the Phase 1 control studies. Staff expects that a variety of possible total mercury and methylmercury control options will be evaluated during Phase 1.

### **Mullenmeister Comment #9.**

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Thank you for accepting my comments.

**Response:** Board staff appreciates Mr. Mullenmeister's comments and citations. No additional responses are necessary.

## 31. Southeast Asian Assistance Center (SEAAC)

Laura Leonelli, Executive Director

Letter Date: 20 April 2010

### **SEAAC Comments:**

Thank you for keeping me on the mailing list. Unfortunately I have a time conflict on Thursday and won't be able to appear since it looks like the public portion of the hearing will be in the morning.

I know that Patrick Morris was on the call for the meeting at Larry Walker Associates on April 13, which I attended. I hope that Patrick heard most of my comments about the ability of community organizations to participate in the stakeholder process. From our past experience organizing meetings with anglers from various ethnic groups, I believe that many people are concerned about the water quality of the rivers where they fish daily. There is a general perception that "the government" should initiate and fund cleanup efforts, but little understanding about how that actually happens. The need for capacity building is great, but the time frame for action is now. I sincerely hope that the lack of attendance at meetings does not convey the impression that community based organizations are not interested in participating as stakeholders in the TMDL/BPA planning process. There are many barriers which are probably familiar to you - time, technical knowledge/expertise, language skills, unfamiliarity with government agencies, limited ability to travel to meetings. Especially now, with funding at record low levels, community agencies (like ours) have to do much more with less. Please know that I support the testimony of Fraser Shilling, Sherri Norris, Andria Ventura and others who advocate for methylmercury standards based on a higher level of fish consumption. In any case, it is very helpful to continue to receive updates, so thanks for making that effort to connect.

**Response:** Board staff appreciates SEAAC's concern that action is needed now. Although the proposed Phase 1 implementation period is often referred to as the "Phase 1 study period", the proposed Basin Plan amendments (BPA) also require pollutant minimization programs from the point source dischargers and sediment erosion control from the nonpoint source dischargers to reduce total mercury loads during Phase 1, and NPDES facilities and urban stormwater systems must monitor and report results to the Board during Phase 1. Staff expects that additional actions will be possible once the Phase 1 control studies have been completed. Board staff also will work with stakeholders, including community based organizations, to develop TMDL control programs for the Delta's tributary watersheds that will designate control responsibilities to specific methylmercury and total mercury sources in the upstream watersheds during Phase 1.

Board staff appreciates SEAAC's and other community members' efforts to participate in the stakeholder meetings to the extent possible. Board staff understands the reasons for community organization members' inability to participate more in the stakeholder meetings and that the limited involvement of the community based organizations is not an indication of disinterest. Board staff is available for meeting with community groups to explain the technical background of TMDLs, as we've done for other stakeholder groups. Also, Board staff

participated in all of the large stakeholder meetings and smaller workgroup meetings and tried to ensure that perspectives from stakeholders not at the meetings were considered. Staff worked with Tribal, community organization, and discharger representatives along with other stakeholders to develop BPA language that addresses the range of concerns to the extent possible given the constraints of state and federal regulations and available scientific information.

Staff supports the concept that the water quality objectives should be as protective as possible. However, staff must also demonstrate that the TMDL, with the objectives, has a reasonable assurance of being achieved. Staff believes that the recommended water quality objective based on the consumption of 32 g/day of trophic level 3 and 4 fish will be met but that more stringent objectives may not be reached. In a survey of mercury concentrations in fish from 626 sites in 12 western states, a fish tissue concentration of 0.05 mg/kg (which corresponds to 4-5 fish meals per week) is not observed even in pristine streams (Environmental Science and Technology 2007, vol 41 pg 58-65). Note that the most recent Delta fish advisories identify some fish and shellfish that may safely be eaten at three servings per week by the most sensitive groups (pregnant and nursing women and children). Without more understanding for what activities, management practices, and treatment technologies are available to reduce concentrations of methylmercury, there is no sound scientific rationale at this time for Board staff to recommend more stringent fish tissue objectives. Board staff is sympathetic to the SEAAC's concerns, and the concerns expressed by Fraser Shilling, Sherri Norris, Andria Ventura and others. In the "late revisions" version of the draft BPA, text was added that notes that the Regional Water Board recognizes that some consumers eat four to five meals per week (128-160 g/day) of a variety of Delta fish species. Also, the proposed BPA directs the Regional Board to review and consider modifying the fish tissue objectives after Phase 1.

Please refer to Board staff's responses to the below letters for staff's more detailed responses to comments from Fraser Shilling, Sherri Norris, and Andria Ventura:

13. Clean Water Action & San Francisco Baykeeper (7 April 2010)
14. Community, Environmental, and Tribal Stakeholders Joint Letter (7 April 2010)
18. Fraser Shilling, Ph.D. (31 March 2010)
20. Mechoopda Indian Tribe & California Indian Environmental Alliance (7 April 2010)