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February 17, 2017

VIA E-MAIL

The Honorable Felicia Marcus, Chair
and Members of the State Water Resources
Control Board
c/o Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Re: Comment Letter - Beneficial Uses and Mercury Objectives

Dear Chair Marcus and Members of the Board:

Thank you for the opportunity to comment on the State Water Resources Control Board ("Board") Draft Staff Report, including the Substitute Environmental Documentation for Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California – Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions, issued on January 3, 2017 ("Staff Report"), regarding the Board's regulatory initiative to regulate mercury levels in California water-bodies (hereinafter "Mercury Policy").

I write on behalf of Serrano Water District ("Serrano") to ask that the Board review and consider the attached comment letter and attachments (collectively "Letter") submitted jointly by the Association of California Water Agencies, California Water Association and the California Municipal Utilities Association on the Staff Report and Mercury Policy. The Letter incorporates input provided by Serrano and other water districts throughout California. Serrano requests that the Board make the revisions and clarifications requested in the Letter, which is attached hereto. Serrano hereby incorporates by reference into this comment letter, and asserts as if separately stated herein, all of the contents of the attached Letter.

Again, thank you for the opportunity to comment.

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Attachment

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Control Board
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1001 I Street, 24th Floor
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Re: Comment Letter - Beneficial Uses and Mercury Objectives

Dear Chair Marcus and Members of the Board:

I. INTRODUCTION.

The Association of California Water Agencies, the California Water Association, and the California Municipal Utilities Association thank you for the opportunity to provide comments on the Draft Staff Report, Including Substitute Environmental Documentation for Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California – Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions, issued on January 3, 2017 (referred to hereinafter as the "Staff Report").

The Association of California Water Agencies (ACWA) is the largest statewide coalition of public water agencies in the country. Its 430 public agency members collectively are responsible for 90% of the water delivered to cities, farms and businesses in California. ACWA's mission is to assist its members in promoting the development, management and reasonable beneficial use of good quality water at the lowest practical cost in an environmentally balanced manner. ACWA's public agency members are special districts created to perform specific functions and include irrigation districts, municipal water districts, county water agencies, community service districts, flood control districts and others. ACWA's members carry out highly specialized functions to support their communities and protect public health, ranging from water treatment, and delivery, to wastewater treatment, to recycled water production and distribution, to flood control, to groundwater management and a host of others, ACWA member agencies.

The California Water Association (CWA) is a statewide association that represents the interests of more than 100 investor-owned public water utilities that are regulated by, and subject to the jurisdiction of, the California Public Utilities Commission. CWA's member water companies provide the same types of high-quality water utility services as those provided by the public agency members of ACWA to nearly 6 million people in communities throughout California. CWA provides a forum for sharing best management practices, to optimize utility

operations and customer service, and it promotes sound water policy by representing its members and their customers before the Legislature and regulatory agencies. Further, it creates opportunities for educating the public on the efficient use of water resources.

The California Municipal Utilities Association (CMUA) is a statewide association that represents publicly-owned electric utilities that provide 25 percent of the state's power and 40 public water agency members that deliver water to 70 percent of Californians.

ACWA, CWA, CMUA, and their member agencies and utilities support the designation of beneficial uses that protect human health. Our comments are intended to provide the State Water Board with additional information that it may wish to consider in the adoption of this far-reaching rule-making and incorporate into the Staff Report and the regulatory text of the Provisions to provide guidance to the regional boards, which will be responsible for designating new beneficial uses and adopting WQOs into basin plans and implementing the program to attain objectives to protect beneficial uses.

II. SUMMARY.

Consistent with our missions, ACWA, CWA, and CMUA wish to emphasize that our primary concerns arise with respect to the Mercury Provisions that will apply (1) immediately upon adoption of the proposed mercury program by the State Water Board without further hearings or additional due process or public comment opportunities, and (2) that are not associated with the protection of cultural or socioeconomic driven elevated rates of fish consumption. Specifically, these comments focus primarily on the promulgation and immediate application of the "Non-Tribal/Non-Subsistence Related Provisions" of the mercury program, namely:

- A new Sport Fish mercury objective of 0.2 mg/kg for purposes of protecting human health for those consuming a typical level of fish, which is more stringent than the federal law objective, promulgated to protect COMM, WILD, RARE, WARM, COLD, MAR, EST, and SAL;

- Two new very stringent wildlife water quality objectives (WQO), Prey Fish (0.05 mg/kg) and California least tern (CLT) Prey Fish (0.03 mg/kg), promulgated to protect WILD, RARE, WARM, COLD, MAR, EST, and SAL, rather than beneficial uses directly related to fishable/swimmable goals derived from federal Clean Water Act, 33 U.S.C. § 1251; and

- Three new, exceptionally low effluent limitations (EL) for mercury (ranging from 1 ng/L to 12 ng/L) to be applied upon adoption in all non-stormwater individual NPDES permits, including NPDES permits for effluent discharged from groundwater and surface water supply treatment, wastewater treatment, and water purification/recycled water production, as well as other individual permits such as drinking water system discharges, potable water line dewatering, testing, and industrial discharge NPDES permits.

We have raised concerns regarding the effects that the proposed Tribal beneficial uses (T-SUB and CUL) and Subsistence fishing beneficial use (SUB) could have on minimum

instream flow surface water objectives, and flow-related 401 Water Quality Certification and NPDES permit requirements. However, the Water Board Staff Workshop presentations questions, and testimony at the February 7 Hearing gave us the strong impression that flow and water supply consequences are not intended either by the State Water Board nor by the people that the new beneficial use definitions are being developed to protect. Therefore, we believe that our issues regarding the text of the proposed beneficial uses are relatively limited, and effective text revisions to address those issues should not be difficult to develop to allow their adoption.

The technical evaluation commissioned by the water agencies and attached hereto as **Exhibit A** (Technical Report) and the Staff Report both conclude, however, that the WQOs and the ELs of the Non-Tribal/Non-Subsistence Related Provisions— which were first shared with the regulated community on January 4, 2017 (and were not published as a part of the beneficial use outreach process) — are unattainable even in the extremely long term (multiple decades at a minimum) due primarily to:

- Natural background environmental characteristics of all of the hydrographic units under consideration, including naturally occurring and background levels of mercury in soils and waters. *Cf., Wat. Code* § 13241(b) (requiring consideration of environmental characteristics of hydrographic unit, including water quality).

- The water quality conditions that can be reasonably achieved through controllable water quality factors, given the absence of technologies and methods that enable control of mercury in non-point source discharges of sediment or aerial deposition. *Cf., Wat. Code* § 13241(c) (requiring consideration of water quality conditions that could reasonably be achieved through coordinated control of all factors affecting water quality).

- The absence of measures in the implementation program reasonably designed to achieve the new water quality objectives. *Cf., Wat. Code* § 13242 (a) (requiring implementation program to include a description of the nature of actions necessary to achieve water quality objectives).

- The absence of concurrently adopted compliance protections for dischargers.

III. RECOMMENDATIONS.

1. ACWA, CWA, CMUA, and their member agencies and utilities (the "water agencies") request a time extension pursuant to the United States Environmental Protection Agency (USEPA) Consent Decree in *Our Children's Earth Foundation v. USEPA*, paragraph 35A. The time extension is very much need additional time to work with State Board Staff to integrate all the information and analysis necessary to develop compliance protections and additional implementation program measures to ameliorate the many legal, economic, and environmental issues created by the Non-Tribal/Non-Subsistence Related Provisions.

2. Irrespective of the State Board granting a time extension, the water agencies recommend, among others, the following critical changes to the mercury program established by the Provisions:

a) Assure that the proposed water quality objectives (WQO) and effluent limitations (EL) are properly calculated, and established only after taking into account all factors required by law to be considered and balanced;

b) Properly and comprehensively assess the economic burden on ratepayers likely to be imposed by the Provisions;

c) Amend the Provisions to assure extended compliance schedule authority for NPDES permits to avoid a substantial increase in potential enforcement and third party citizen suit liability;

d) Amend the revised Reasonable Potential Process (RPA) process for mercury currently set forth in the Provisions to require consideration during the RPA analysis of all appropriate factors related to mercury exceedances in receiving waters caused primarily by natural water quality and soils conditions, legacy pollutants and uncontrollable water quality factors;

e) Amend the Provisions to eliminate the disproportionate burden of attaining WQOs placed on dischargers subject to individual non-stormwater permits, MS4 permits and industrial stormwater permits;

f) Amend the Provisions to authorize and clarify permit compliance schedule authority, and to allow compliance schedules of longer duration than currently permitted by the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SWRCB 2005) (SIP) and Resolution 2008-0025.

g) Adopt authority for, and direction to Regional Water Quality Control Boards (Regional Boards) to implement long-term compliance protections for dischargers, including: completion of Use Attainability Analyses (UAAs) to establish temporary water quality objectives for mercury prior to imposition of ELs; authorization for development of mercury site specific objectives (SSOs) for all beneficial uses (not just SUB); general authorization for development and use of variances for NPDES permits and WDRs; and general authorization for use of mixing zones and/or dilutions credits for NPDES permits and WDRs;

h) Bolster the currently insufficient implementation program by adopting additional implementation measures that will lead to meaningful reductions in mercury in the state's water and fish, some of which may be appropriate to offer as alternative compliance pathways for dischargers;

i) Eliminate vague regulations governing wetlands to assure that the Provisions are consistent with and do not impede: the stated intent of the State Water Board, which is not to prevent new wetland projects because of mercury

concerns; requirements of the State Board's "No Net Loss" policy for wetlands and other similar state and federal law requirements;

j) Tailor beneficial uses to eliminate concerns regarding water supply and instream flow objectives; and

k) Provide guidance to Regional Board with respect to designation of the new water quality objectives, compliance protections, and robust implementation measures that should be considered if newly defined beneficial uses and WQOs are considered for designation and adoption by Regional Boards.

IV. DISCUSSION.

A. Request for Time Extension.

A time extension is requested to assure that the mercury program when adopted can achieve the following goals:

- Directs resources toward achieving real, measurable reductions of mercury in fish and the environment, which are caused, as set forth in the Staff Report, primarily by natural background conditions in soils, aerial deposition, and legacy mercury and gold mines;

- Avoids substantial increases in cost for treatment upgrades and development of new technologies, which must be borne by water and wastewater ratepayers, many of whom are socio-economically disadvantaged, without providing measureable reduction in mercury or improvement in human health outcomes;

- Provides clear and permanent compliance protections necessary to avoid substantial costs to ratepayers, many of whom are socio-economically disadvantaged, to fund enforcement penalties, fines and third party citizen suit attorneys' fees since the Staff Report makes it clear that the very low mercury WQOs ranging from 0.2 to as low as 0.03 mg/kg of fish tissue, may never be attainable in most California receiving waters, or at a minimum should be expected to take decades if not centuries to attain;

- Provides additional implementation program control measures, including alternative compliance mechanisms for dischargers as well as additional state programs, to try to attain real and measurable reductions of mercury in fish and the environment; and

- Avoids direction to Regional Boards to regulate wetlands, including wetlands created for natural treatment, water quality polishing, and/or to enhance beneficial uses or avoid net loss of wetlands, without the provision of meaningful guidance and direction as to what types of regulatory controls might be effective and feasible to implement.

Such an extension of the adoption process for at least the Non-Tribal/Non-Subsistence Related Provisions is feasible and should be granted to allow development of additional information,

collaboration among State Water Board Staff, and the regulated community, and development of additional compliance assurances and implementation program measures because:

- While the adoption of new wildlife protection WQOs must be developed pursuant to a United States Environmental Protection Agency (USEPA) Consent Decree in *Our Children's Earth Foundation v. USEPA*, No. 3:13-cv-2857-JSW (2014), paragraph 35A of that Consent Decree enables USEPA to obtain an extension of the due date for adoption of such objectives.

- While we concur that adoption of an implementation program concurrently with the adoption of new, more stringent wildlife water quality WQOs is appropriate and preferable to federal adoption of objectives and a subsequent state process to adopt an implementation program, the implementation program needs considerable work to provide for attainment of the WQOs and to protect dischargers from enforcement for the time period necessary to reach attainment.

- Although the federal Consent Decree is driving the adoption of new WQOs for protection of wildlife, there are no litigation, environmental justice, or other known concerns regarding the protection of human health driving adoption of a new COMM mercury WQO for those Californians eating a typical diet, rather than an elevated amount of fish as a part of their regular diet.

We therefore urge the State Water Board to grant a substantial extension to allow for the development, in coordination with the regulated community, of additional key scientific and regulatory information regarding, at a minimum, the Non-Tribal/Non-Subsistence Related Provisions and detailed and thorough consideration of their regulatory and economic consequences in light of serious attainment challenges.

B. Establishment of Water Quality Objectives.

1. The Wildlife Mercury Water Quality Objectives Will Become Effective Without Any Further Regulatory Action.

The proposed Provisions would amend the Inland Surface Waters, Enclosed Bays and Estuaries Water Quality Control Plan to include new mercury WQOs for Sport Fish, Prey Fish, California Least Tern (CLT) Prey Fish, Tribal Subsistence (T-SUB) and Subsistence (SUB). Of these, the first three would become effective and would apply statewide upon adoption of the Provisions by the State Water Board and approval by the Office of Administrative Law (OAL) and USEPA. This is contrary to the implication – and the understanding of some – at the Staff Workshop and the State Water Board Hearing that the public would have additional opportunity to comment on the proposed Mercury Provisions when Regional Boards designate specific waterbodies with the proposed new beneficial use definitions of T-SUB, SUB, and Tribal, Tradition, and Culture (CUL). Although this is true with regard to the proposed T-SUB and SUB WQOs and the Sport Fish WQO where CUL is designated, it is important to understand that the WQOs for Prey Fish, CLT Prey Fish, and Sport Fish (for all beneficial uses except CUL) will become effective immediately.

The proposed Sport Fish WQO is proposed as a fish tissue concentration of 0.2 mg/kg to protect human health (COMM and CUL) and wildlife, which is lower than the current USEPA-recommended water quality criterion of 0.3 mg/kg. The Sport Fish WQO would apply to all inland surface waters, bay and estuaries, since all such waters with the beneficial use designations COMM, MAR, SAL, EST, WARM, COLD, WILD, and RARE would trigger the Sport Fish objective upon adoption and approval of the Provisions (*see,* Tab. 2.1). The proposed Prey Fish WQO of 0.05 mg/kg was developed specifically to protect wildlife and would also apply to all surface waters, bays and estuaries, with MAR, SAL, EST, WARM, COLD, WILD, and RARE beneficial uses upon adoption and approval of the Provisions; as would the CLT Prey Fish WQO of 0.03 mg/kg (*id.*).

2. The Proposed Water Quality Objectives Are Unattainable – At Least into the Next Century.

The Staff Report acknowledges that the proposed WQOs, particularly the Prey Fish and CLT Prey Fish WQOs, — which will apply immediately without further action by Regional Boards to designate new tribal, subsistence or cultural beneficial uses — are unattainable even in the extreme long term (multiple decades at a minimum): "The legacy of mercury left by historic gold and mercury mining is not easily controlled and may prevent attaining the Mercury Water Quality Objectives for many fish species for the next century in many waters." Staff Report, p. 267; *see also,* p. 266 (recognizing it may take a "significant period of time" to attain WQOs by implementing the Provisions). The Staff Report also notes that mercury from atmospheric emissions may be a significant source of mercury that will "prevent attainment" of the mercury WQOs (pp. 266-267.)

Sections 1 and 2 of the Technical Report also confirm that the proposed mercury WQOs are likely unattainable due primarily to the following:

- Natural background environmental characteristics of all of the hydrographic units under consideration, including naturally occurring and background levels of mercury in soils and waters. *Cf., Wat. Code* § 13241(b) (requiring consideration of environmental characteristics of hydrographic unit when establishing WQOs).

- Human-caused environmental characteristics of the hydrographic units under consideration, including legacy mercury from historic gold and mercury mines and aerial deposition of mercury. *Cf., id.*

- Water quality conditions that can be reasonably achieved through controllable water quality factors, given the absence of technologies and methods that enable control of mercury in non-point source discharges of sediment or aerial deposition. *Cf., Wat. Code* § 13241(c) (requiring consideration of water quality conditions that could reasonably be achieved through coordinated control of all factors affecting water quality when establishing WQOs).

3. The Mercury Water Quality Objectives Are Not Properly Established under Federal Law.

The federal Clean Water Act's implementing regulations require states to adopt WQOs that protect beneficial uses based on sound scientific rationale. 40 CFR § 131.11(a). For toxic pollutants such as mercury, states must "review water quality data and information on discharges to identify specific water bodies" where a toxic pollutant may be adversely affecting water quality or achievement of a beneficial use. *Id.* However, because the Provisions include a mass adoption of WQOs for inland surface waters, enclosed bays, and estuaries throughout the State without regard to site-specific conditions or the discharges affecting specific water bodies, the WQOs do not meet the requirements of 40 CFR section 131.11(a).

Section 10.1.2 of the Staff Report includes a brief discussion of site-specific water quality information (Environmental Characteristics and Water Quality of the Hydrographic Unit under Consideration). However, that section, comprising less than one-half a page in the Staff Report, refers only to the general conditions in the State as a result of legacy and widespread mercury contamination due to mines and atmospheric deposition, respectively. Nor is the section's cross-reference to Appendix D, a "brief description" of the geographic scope and generalized features of the nine regions governed by the Regional Boards, availing.

For example, the State Water Board Staff has indicated that wildlife-protective WQOs, Sport Fish (except for COMM and (future) CUL), Prey Fish and CLT Prey Fish, would apply even in waters where sensitive wildlife species do not occur. This application demonstrates the importance of examining the water quality conditions of specific waterbodies when adopting WQOs: the wildlife WQOs as applied to waterbodies without wildlife species do not serve the purpose of achieving the stated beneficial use. *See Cal. Sportfishing Protection Alliance v. SWRCB* (2008) 160 Cal.App.4th 1625 (site-specific WQO relaxing basin-wide temperature criteria appropriate where substantial evidence supported finding that creek had no viable population of rainbow trout).

Similarly, the Tribal Subsistence WQO was established based on fish consumption information from the Shilling 2014 report. However, no coastal southern California tribes south of Ventura (Chumash) participated in the study; and it is likely that the fish diet of coastal southern California tribal members would differ from that of their northern California counterparts. This underscores the need to look at the species, trophic level, and size of fish consumed at a regional level, not statewide.

The proposed WQOs – particularly the wildlife WQOs of Sport Fish (except COMM and CUL), Prey Fish, and CLT Prey Fish – are not based on nor do they reflect consideration of water quality data and information on discharges with regard to specific water bodies, contrary to the requirements of the federal regulations.

4. The Mercury Water Quality Objectives Are Not Properly Established under State Law.

Water Code section 13241 factors to be considered in establishing WQOs shall include, but not necessarily be limited to, all of the following: (a) Past, present, and probable future beneficial uses of water. (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto. (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water

quality in the area. (d) Economic considerations. (e) The need for developing housing within the region. (f) The need to develop and use recycled water.

The State Water Board is proposing to implement a mass designation of WQOs throughout inland surface waters, estuaries, and enclosed bays for Sport Fish, Prey Fish, and CLT Prey Fish. This fails to take into consideration the environmental characteristics and water quality at the hydrographic unit level. As discussed above, Staff Report section 10.1.2 and Appendix D do not constitute a review of site specific water quality information or environmental characteristics of any hydrographic unit.

The WQOs, particularly the more stringent WQOs established to protect Prey Fish, CLT Prey Fish, and ultimately, potentially, in the future, T-SUB, fail to take into account the water quality conditions that could reasonably be achieved through coordinated control of the factors or conditions affecting water quality insofar as it is acknowledged that it will take decades, if not a century or more, to achieve WQOs under the proposed Mercury Provisions (Staff Report pp. 266-267). The main sources of mercury – natural background conditions, aerial deposition, and legacy mines – are diffuse throughout the environment and not readily controlled through NPDES/WDR permit conditions.

Finally, as documented in section 3 of the Technical Report and Section II.C.3 of this memorandum, contrary to the requirements of section 13241 of the Water Code, the Staff Report fails to fully consider the economic impacts of the new WQOs.

C. Establishment of Mercury Effluent Limitations.

As documented in Sections 5 and 6 of the Technical Report, the proposed effluent limitations for NPDES non-stormwater discharges are problematic for the following reasons:

- They are likely much more conservative than necessary to protect even the most sensitive fish consumers because they are based on overly conservative fish tissue concentrations;
- They are improperly based on national bioaccumulation factors rather than factors that take local conditions into account; and
- They are not based on the best available science.

For these reasons, we urge the State Water Board not to adopt the effluent limitations proposed in the Staff Report until Staff can work with stakeholders to conduct additional review and incorporate the attached Technical Report comments into the analysis.

D. Implementation Program, Compliance and Enforcement Issues and Recommendations.

1. Implementation Program – Legal Framework.

Contrary to law and effective policy the program of implementation is not reasonably designed to address the quality of water as it pertains to mercury, or to attain the proposed

WQOs for mercury. Under State law, Water boards are instructed to consider "water quality conditions that could reasonably be achieved through coordinated control of all factors which affect water quality in the area" (Wat. Code § 13241(c)). Further, the program of implementation for achieving WQOs is required to include the following: (a) A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private; (b) A time schedule for the actions to be taken; and (c) A description of surveillance to be undertaken to determine compliance with objectives (Wat. Code § 13242).

Additionally, under federal guidance published by EPA in April 2016, states and tribes responsible for implementing the Clean Water Act are directed to address implementation as part of the water quality criteria and standards development process, with a focus on addressing implementation issues early that may impede attainability of water quality standards. Priorities for Water Quality Standards and Criteria Programs, FY 2017-2018 (USEPA Apr. 21, 2016).

2. Compliance/Implementation Issues.

a) The program of implementation does not properly consider water quality conditions that could reasonably be achieved through coordinated control of all factors which affect water quality in the area.

Despite the law and guidance requiring that the implementation program must take into account the water quality conditions that could be reasonably achieved through coordinated control of all factors affecting water quality in the area, the Staff Report recognizes that attainment of the new WQOs across the many waters subject to those objectives may take a century and that the legacy of mercury left by historic gold and mercury mining, absence of original mine owners, diffuse distribution of mercury, and mercury emissions to the atmosphere makes coordinated control of contaminants "extremely challenging" (p. 267). The Staff Report further documents that adoption of stringent ELs for mercury for individual NPDES non-stormwater discharges -- and implementation of source controls and advanced treatment to attempt to achieve such ELs – is unlikely to achieve the WQOs:

> Even if all sources of the contaminants are eliminated, the contaminants are likely to remain high for decades, because either they do not degrade or they degrade very slowly. Much of the mercury in fish today is thought to be from historic mining in the late 19th century and early 20th century. Further, current sources may not be directly regulated by the water boards (e.g., atmospheric emissions, naturally occurring in soils, or geothermal sources).

(Staff Report, p. 108.) Nevertheless, the Provisions propose to establish a suite of unattainable WQOs, three of which (Sport Fish, Prey Fish, and CLT Prey Fish) will apply immediately to essentially all inland surface waters, bays, and estuaries, based on the numerous waterbody beneficial uses designations, any one of which triggers application of one or more of the three objectives.

b) The program of implementation does not include a description of the nature of actions which are necessary to achieve the objectives,

including recommendations for appropriate action by any entity, public or private.

The proposed WQOs are not met in the existing condition for most (if not all) of the inland surface waters, bays and estuaries to which they will apply and the implementation program does not identify any means to attain the new objectives because reasonable means to address the naturally occurring, legacy and aerial deposition sources of mercury as necessary to achieve such stringent WQOs do not exist. Consequently, most inland surface waters, enclosed bays and estuaries will have to be listed under Clean Water Act Section 303(d) as impaired for mercury, requiring the time and resource intensive development of TMDLs by the regional boards for all such waters.

c) *The program of implementation does not include a time schedule for the actions to be taken.*

The Staff Report does not include a time schedule for implementation program actions to be taken, other than to declare that the water boards would determine time schedules for compliance with new discharge regulations on a "discharge-by-discharge basis" (Staff Report, p. 268). Substantial reductions of mercury in fish tissue will have to be achieved to meet the proposed WQOs given the baseline levels measured in the State's fish (Technical Report, section 7). According to the Staff Report, achieving the proposed WQOs may take decades, if not a century, due to legacy mercury from mines, widespread aerial deposition and natural background conditions, and the persistent nature of mercury. Such reductions demand implementation program measures that are not focused on individual NPDES permit discharges or industrial or stormwater runoff, but instead are designed to control aerial deposition, and mercury in nonpoint source runoff, particularly within high mercury open space and former mining areas. *See,* Technical Report §§ 3 and 8. Because the Staff Report does not identify sufficient implementation program measures to attain mercury WQOs, it also fails to identify a time schedule for implementation of program measures and actions designed to achieve proposed WQOs.

d) The Effluent Limitations for NPDES Non-stormwater Discharges Will Not Achieve Water Quality Objectives.

Point source dischargers subject to individual non-stormwater NPDES permits represent a minor source of mercury compared to the other sources (Staff Report, pp. 153-54). As such, the implementation program focuses on the wrong mercury discharges and fails to identify actions that would effectively achieve reductions of mercury in fish or the environment to a level that achieves the established WQOs. *See, e.g.,* Staff Report p. 165 (minor reductions that can be achieved through ELs imposed on wastewater and industrial discharges may not translate to noticeable reductions in mercury concentration); *see also*, Technical Report Section 1. As a result, the actual sources contributing the vast majority of mercury to surface waters are not addressed by the proposed implementation program. *See,* Staff Report, p. 108. Instead, the centerpiece of the implementation program is the promulgation of new, very stringent ELs for inclusion in all individual non-stormwater NPDES permits.

Because the proposed ELs (and other implementation measures addressing industrial and urban stormwater runoff) cannot attain the proposed mercury WQOs, and because such

attainment will not, in most circumstances, effectively contribute to mercury reductions, we urge the State Water Board to further amend the revised Reasonable Potential Process (RPA) process for mercury currently set forth in the Provisions to require appropriate consideration during the RPA analysis of appropriate factors related to mercury exceedances in receiving waters caused primarily by natural water quality and soils conditions, legacy pollutants and uncontrollable water quality factors such as aerial deposition, as well as the relatively minor nature of mercury contributed by specific discharges analyzed to determine the *reasonable* potential for such discharges to contribute to mercury pollution, rather than the most conservatively determined potential contribution to mercury pollution theoretically possible as a result of the discharge. The following amendments to the RPA steps set forth in the Provisions are recommended. The operation of these amendments to the RPA process are also graphically set forth in Technical Report § 3, Figures 2 and 3.

Determining Whether a Discharge Requires an Effluent Limitation for Mercury

1. Reasonable Potential Analysis

Step 3: Replace highest *observed* annual average effluent mercury concentration with the ~~highest~~ representative annual average effluent mercury concentration.
This revision allows the RWQCB discretion to consider if any data are inappropriate or insufficient for use in determining the annual average effluent mercury concentration for purposes of determining whether an effluent limitation is required.

Step 6: Replace Step 6 of the SIP with the following: If the B is less than C and mercury was not detected in any of the effluent samples, effluent monitoring is not required. In all other cases, proceed with *Step 7.*
This revision completes the Reasonable Potential Analysis where the observed maximum ambient background concentration is less than the lowest water quality objective for mercury and mercury was not detected in the effluent. This is consistent with the Staff Report, which provides that where the background mercury level is elevated above the lowest EL "it may not be reasonable to require smaller contributors of mercury to reduce their mercury discharge to levels below background." (p. 154)

Step 7: Add to the list of types of information that may be used to aid in determining whether a water quality-based effluent limitation is required the following: existing ambient water quality in the hydrographic unit, background conditions in soil and water, controllable water quality factors, whether the discharge is a significant source of mercury in the waterbody, and whether ELs are an effective means for reducing mercury in fish and the environment.
This information was added to the types of information properly considered in the determination of whether a water quality-based effluent

limitation is required to reflect natural background conditions and legacy mercury in the environment and recognizes the potential limitations inherent in trying to achieve reductions of mercury in fish and the environment. See Technical Report § 3, Figs. 2 and 3.

Step 8: In addition to low volume discharges, the RWQCB may choose to exempt low threat discharges determined to have no significant adverse impact on water quality from this monitoring requirement.
This addition recognizes that certain discharges permitted under an individual NPDES permit pose a low threat to water quality and as such are not expected to contain mercury; therefore these discharges should be exempted from all monitoring requirements provided for in Step 8 for mercury.

e) *The Effluent Limitations for Individual NPDES Permit Non-stormwater Discharges Will be More Difficult to Achieve and More Expensive than Estimated in the Staff Report.*

The Non-Tribal/Non-Subsistence Related Provisions state in Section IV.D.2. that the water quality objectives shall be implemented by the application of very low ELs, ranging from 1 ng/L to 12 ng/L depending on receiving water body flow conditions and beneficial uses for all individual non-stormwater NPDES Permits, 401 water quality certifications, WDRs, and waivers (pp. A-8 – 10).[1] In addition, in the future, other very stringent ELs for other bioaccumulative pollutants must also be developed (e.g., PCBs) to fully protect new wildlife protection and Tribal, Cultural, and Subsistence Fishing beneficial uses if and when designated. See Staff Report, Appendix T).

Although the Staff Report asserts that the proposed 12 ng/L EL "is achievable" with existing secondary treatment technology (with an adjunct mercury source control/minimization program), consistent with the PowerPoint presentation by Thomas Grovhaoug of Larry Walker Associates at the February 7 Hearing, the Technical Report concludes that some NPDES dischargers will not be able to meet this EL without additional upgrades to tertiary treatment. *See,* Technical Report section 2. This means that secondary treatment facilities must be upgraded to tertiary treatment to meet 12 ng/L consistently enough to avoid enforcement of the EL. However, the Staff Report economic analysis fails to consider the costs of the upgrades,

[1] Although there has been some confusion regarding the NPDES permits that the Provisions will apply to, the Provisions clearly require the implementation of effluent limits in, at a minimum, all individual non-stormwater NPDES Permits and WDRs, which encompass many more permits than just permits those issued to POTWs or municipal wastewater plants and individual industrial dischargers. Appendix N defines "municipal wastewater and industrial NPDES permits" as all individual non-stormwater NPDES Permits and WDRs. In addition, the Staff Report indicates that certain General NPDES permits and WDRs already excluded from the SIP or involving low threat discharges should be excluded from the amended SIP analysis and default effluent limits set forth in the Provisions (pp. 145, N-1). However, the regulatory language of the Provisions does not contain express exceptions or clarify whether other General Permits and WDRs, like the Recycled Water WDRs, would also be excluded from the amended SIP analysis and default effluent limitations.

finding instead that for discharges to flowing water bodies that no facility upgrades are required to meet 12 ng/L for the 308 facilities discharging to meet Sport Fish, Prey Fish, and CALT Prey WQOs (*see,* Staff Report, section 7.2.7 and p. 246).

Furthermore, the attached Technical Report § 2 summarizes persuasive evidence that even with tertiary treatment, some facilities will not be able to achieve the 4 ng/L EL consistently, thus requiring additional treatment upgrades to advanced technologies such as RO (*id*.). This analysis is consistent with information presented in testimony and PowerPoint slides presented by Thomas Grovhaoug of Larry Walker Associates at the Hearing. Thus, many tertiary treatment facilities must implement additional treatment upgrades to meet 4 ng/L consistently enough to avoid enforcement. Again, however, the Staff Report fails to consider these costs in their entirety, finding instead that facilities may need, at most, to upgrade to tertiary treatment to assure that discharges to slow moving waters consistently meet Sport Fish, Prey Fish, and CLT Prey WQO and discharges to flowing water bodies consistently meet T-SUB of 4 ng/L *see,* Staff Report, section 7.2.8).

In addition, pursuant to the Technical Report § 2, and as presented in testimony and PowerPoint by Thomas Grovhaoug of Larry Walker Associates at the Hearing, a new, as yet undeveloped treatment technology is required to consistently meet 1 ng/L. The Staff Report concurs with this conclusion, finding discharges to slow moving waters to meet T-SUB and CLT Prey Fish EL of 1 ng/L may require major, but unspecifiable facility upgrades (Staff Report, section 7.2.9). Nevertheless, as documented in Section 2 of the Technical Report, the Staff Report fails to fully consider the costs associated with development and implementation of new technologies necessary to comply with the proposed ELs. Even by the State Water Board's own estimates, the economic impact of compliance is potentially quite high – source control, BMPs, and treatment controls, e.g., RO – and these costs are understated as outlined above.

Further, no known technologies are available to deploy to treat geographically dispersed discharges in compliance with the ELs, *e.g*., discharges pursuant to individual non-stormwater NPDES permits issued for activities such as dewatering, testing, hydrant flushing, groundwater treatment, and remediation. Nevertheless, the Staff Report fails to fully consider the costs associated with invention, development, and deployment of new, as yet undefined technologies necessary for such discharges to comply with the proposed ELs.

Finally, the proposed ELs are well below currently applicable MLs for mercury of 0.5 µg/L and 0.2 µg/L (500 ng/L and 200 ng/L). At a minimum, new and more expensive monitoring methods and equipment must be implemented by dischargers and significant cost and expense to address detection at levels far below existing MLs. Nevertheless, as documented in Section 2 of the Technical Report, the Staff Report fails to fully consider the costs associated with adoption of new monitoring technologies necessary to assure compliance with the proposed ELs.

We urge the State Water Board to consider the substantial evidence provided in the attached Technical Report indicating that treatment technologies for water treatment and wastewater treatment plants alone would cost ratepayers far more than currently estimated in the Staff Report. Further, increased costs of monitoring and upgrades to tertiary treatment, as well as development of new technologies to consistently meet the proposed ELs are not included in the Staff Report economic analysis, but will be expensive. Unfortunately, despite the

significant economic costs of meeting the ELs, all of which must be borne by water and wastewater ratepayers, only a very small reduction in mercury pollution can be anticipated to result because discharges are such a small source of mercury, and the ELs will not result in attainment of the proposed WQOs. Because all available evidence supports a conclusion that the designated uses do not currently exist in terms of compliance of waters with the WQOs, it is unreasonable to require dischargers, and particularly the ratepayers of such dischargers, to incur substantial economic control costs to protect mercury conditions. *Cal. Ass'n of Sanitation Agencies v. State Water Res. Control Bd.* (2012) 208 Cal.App.4th 1438, 1460. The Staff Report fails to articulate why adoption of the WQOs is necessary in these circumstances to assure the reasonable protection of beneficial uses despite the potential adverse economic consequences. *Memorandum of William R. Attwater, Office of Chief Counsel of the State Water Resources Control Board Re: Guidance on Consideration of Economics in the Adoption of Water Quality Objectives or Waste Discharge Requirements,* pp. 1-2 (Jan 4 1994).

f) *The ELs Create Compliance and Enforcement Risk for NPDES Non-stormwater Dischargers.*

The unavailability and cost of treatment technologies that can consistently meet the lowest ELs proposed for adoption raise serious concerns regarding risk of liability for significant fines, penalties, and attorneys' fees as a result of enforcement action or citizens' suit for permittees discharging under individual non-stormwater NPDES permits and WDRs. This disproportionate regulatory impact and risk of liability is noted in the Staff Report, which discusses inevitable enforcement actions by the water boards or via citizens' suits for permit violations that will occur where ELs cannot be achieved, and notes these costs will be borne by point source dischargers with individual non-stormwater NPDES permits, despite the relatively minor source of mercury in those discharges as compared to other sources. *See,* Staff Report p. 153; *see also,* Technical Report, sections 2 and 3; *also as presented* in testimony and PowerPoint at the Hearing by Thomas Grovhaoug of Larry Walker.

This risk of liability is compounded by limitations on NPDES permit compliance schedules. The Staff Report acknowledges that the mercury WQOs cannot be achieved in the short-term, taking multiple decades, if not a century to attain at minimum. The unattainability of WQOs will, in turn, lead to listing of most waterbodies for mercury impairment, and requirements to develop TMDLs. TMDLs, and particularly the data analyses required to support TMDLs, are extremely time intensive to prepare and approve, often taking at least three years, and many times requiring more than 7 years to fully approve per TMDL.

The Provisions do not clearly exempt individual non-stormwater NPDES permits from the SIP, including its limitations on compliance schedules. The SIP allows only up to five (5) years from the date of issuance, reissuance, or modification of an NPDES permit to complete actions necessary to comply with ELs and no longer than 10 years from the effective date of the SIP (2006) – which is past (2016).[2] Due to the fact that the Provisions immediately require

[2] Even if the USEPA had not disapproved longer timeframes, 15 years, and an additional five years, from the effective date of the SIP to develop and adopt a TMDL, and to comply with WQBELs – which it did – they are similarly not of sufficient duration given the nature of, and the limited measures available to reduce mercury in, the environment. *See,* Letter: California SIP; compliance schedule provisions from USEPA to SWRCB dated Oct. 23, 2006

application of ELs in individual non-stormwater NPDES permits to implement the Non-Tribal/Non-Subsistence-related WQOs, facilities will be required to begin upgrades to treatment processes and/or facilities soon after adoption of the Provisions.[3] *See, e.g.,* Staff Report, pp. 177-180; Technical Report § 2. It is unlikely that dischargers can plan, design, engineer, environmentally review, permit, fund, and construct the necessary upgrades within a five year permit term or the (maximum) five year compliance schedule period available under the SIP. However, the Staff Report does not identify interim actions or compliance schedule authority that individual NPDES non-stormwater dischargers can rely on to assure compliance before TMDLs can be fully adopted. The maximum compliance schedule limitations of the SIP also preclude post-TMDL compliance schedules for individual non-stormwater NPDES permits of sufficient length to provide dischargers compliance assurance, but the Staff Report fails to identify actions to implement to remain in compliance with NPDES permits over the course of the decades it will take to achieve the proposed WQOs.

For these reasons, we recommend the Provisions expressly exempt from the SIP all individual non-stormwater NPDES permits regulated under the Provisions to allow sufficient permit compliance schedules before, during, and after development of mercury TMDLs. Such exemption may be intended since Section 10.2 of the Staff Report appears to indicate that timelines for permit compliance schedules should be established pursuant to the State Water Board's Resolution 2008-0025, *Policy for Compliance Schedules in NPDES Permits.*

However, Resolution 2008-0025 also limits the duration of permit time schedules. Specifically, section 6(b) of Resolution 2008-0025 caps compliance schedules at a maximum of 10 years absent the development of a TMDL. Given the large number of TMDLs that will be required to address the very low WQOs and the typical length of time required to prepare and fully approve a TMDL, it is unlikely that 10 years will be sufficient permit compliance schedule protection during the development of all TMDLs as necessary to protect dischargers and their ratepayers from liability risk associated with enforcement actions and citizen suits.

Federal regulations require that a State must authorize the use of schedules of compliance for water quality based effluent limits in NPDES permits if they plan to allow such schedules. 40 CFR § 131.11(j)(1). Therefore, we urge the State Water Board to modify the Provisions to provide clear permit compliance schedule authority and to allow compliance schedules of longer duration than currently permitted by Resolution 2008-0025.

3. Additional Recommended Compliance Protections for Dischargers.

While compliance schedule authority is critical to protecting dischargers subject to individual non-stormwater NPDES permits from the disproportionate risk of enforcement and third party citizen suit liability that they face under the current Provisions, dischargers also need long-term compliance protections due to the substantial period of time that the Staff Report states will be necessary to achieve meaningful reductions in mercury in receiving waters. Accordingly, it is incumbent on the State Water Board that it include in its order adopting the Provisions an implementation program that offers compliance protections that are real and

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[3] The Staff Report acknowledges that mercury reduction measures without treatment process modifications are unlikely to reduce mercury to the point of compliance with the Provisions' bioaccumulative- based effluent limitation (Staff Report p. 165).

implementable statewide. The Water Agencies propose to work in coordination with the State Board to explore appropriate development of the following long-term compliance protections for dischargers: completion of Use Attainability Analyses (UAAs) to establish temporary water quality objectives for mercury prior to imposition of ELs; authorization for development of mercury site specific objectives (SSO) for all beneficial uses (not just SUB); general authorization for development and use of variances for NPDES permits and WDRs; and general authorization for use of dilutions credits for NPDES permits and WDRs.

a) Use Attainability Analyses.

According to staff in the January 9 Workshop and EPA surveys, UAAs[4] are rarely (if ever) approved in California. However, it is not clear why UAAs are not used in California given that the federal Clean Water Act provides for preparation of a UAA most importantly for this case when a use is not an existing use because the water quality standards necessary to support it are not attained, and attainment of the use and WQO is infeasible. 40 CFR §§ 131.3(e), 131.10(d); 131.10(g). More specifically, federal regulations state that that states may permanently or temporarily remove or relax water quality standards if the state can demonstrate that attaining the designated use is not feasible because:

(1) Naturally occurring pollutant concentrations prevent the attainment of the use; or

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(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied…; or

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(5) Physical conditions related to the natural features of the waterbody…unrelated to water quality, preclude attainment of aquatic life protection uses; or

(6) Controls more stringent than those required by section 301(b) and 306 of the Act would result in substantial and widespread economic and social impact. 40 CFR § 131.10(g).

Further, 40 CFR § 131.10(j) provides that states are actually required to conduct UAAs when designating uses not included in the fishable/swimmable uses specified in CWA

[4] A use attainability analysis demonstrates that attaining the use is not feasible due to the following: naturally occurring pollutant concentrations that prevent the attainment of the use; natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use; human caused conditions or sources of pollution prevent the attainment of the use; dams, diversions or other types of hydrologic modifications preclude the attainment of the use; physical conditions related to the natural features of the water body and unrelated to water quality preclude attainment of aquatic life protection uses; or controls more stringent than those required by Clean Water Act sections 301(b) and 306 would result in substantial and widespread economic and social impact. 40 CFR § 131.10(g).

section 101(a)(2)). Prey Fish and CLT Prey Fish uses are not fishable/swimmable uses, but are instead wildlife protection related uses.

USEPA guidance provides that when waters do not meet water quality standards promulgated under the Clean Water Act, and the problems have been produced over many years and it may take many years and substantial changes in resource management to implement desired water quality standards, UAAs are an appropriate tool, conducted alone or in conjunction with the TMDL process, to allow for use attainability over time. *UAAs and Other Tools for Managing Designated Uses*, Preface p. iv (USEPA March 2006) (UAA Guidance). UAAs are appropriate not only to remove a use that is not an existing use, but perhaps more importantly for this situation, UAAs are appropriate for establishing temporary water quality standards, including WQOs, where the goal of the temporary water quality standards is to ultimately, over time, improve water quality to the point where designated uses are fully supported. UAA Guidance, Montana's Temporary Water Quality Standards, at p. ix. As such, temporary WQOs play a key role in the remediation of damaged water resources. *Id.* The duration of temporary standards is set based on an estimate of the time needed to remediate water resources, and, because clean-up of legacy pollutants takes time, temporary standards can be and are issued for multiple years. *Id.*, p. x. States need only to authorize UAAs to use them to set temporary water quality standards as part of a long program of resource management actions designed to improve water quality. *Id.*, p. ix.

Pursuant to the Staff Report, all of the conditions required by regulation to allow, and even to require, conducting UAAs to establish temporary mercury WQOs are satisfied. Accordingly, we urge the State Board to adopt authorization for water boards to conduct such UAAs, and to include in the Provisions a requirement that regional boards shall conduct such UAAs prior to conducting an RPA for mercury or applying ELs in individual non-stormwater discharge Permits. Adopting authority and directing Regional Boards to develop, consider, and where appropriate, to approve UAAs to establish temporary WQO is particularly important given the "mass designation" approach that the State Water Board is following, and the adoption of very low WQOs for all water bodies without considering the natural background conditions applicable to each waterbody or hydrological unit, and without considering the degree to which water quality factors leading to exceedances of the proposed objectives in that hydrographic unit are, or are not controllable. If those factors are not considered now, when adopting WQOs, the only vehicle for consideration of those factors is via a UAA once it is demonstrated the water body cannot comply for the reasons set forth in federal law. A UAA is also the only vehicle available for long-term relief from WQOs and ELs for the entire duration it may take to attain WQOs.

b) Site-Specific Objectives.

Federal regulations (40 CFR § 131.11), Cal. Wat. Code § 13241, and Section 5.2 of the SIP authorize the development of SSOs based on scientifically defensible methods appropriate to the situation and circumstances found in particular regions and waterbodies. The Provisions and Staff Report currently support and authorize regional boards to develop SSOs for the protection of Subsistence Fishing uses because SSOs will more effectively take into account natural conditions and controllable versus uncontrollable water quality factors in the waterbodies for which they are developed, as well as local and regional fish consumption patterns. In fact, this rationale supports authorization and direction to consider mercury SSOs for the protection

of all beneficial uses, including, COMM, WARM, COLD, WILD, RARE, EST, MAR, and SAL. We therefore urge the State Water Board to consider amending the Provisions to advise Regional Boards that it is appropriate to consider adoption of SSOs to replace all the WQOs in light of all the different beneficial uses they are designed to protect in order to better account for local ambient conditions for mercury in each region, subregion or waterbody.

c) Variances.

On August 21, 2015, the EPA published its water quality standards regulation (80 FR 51020), including water quality standards variances (40 CFR § 131.14). The rule explicitly authorizes the use of water quality standards variances pursuant to Clean Water Act sections 101(a) and 303(c)(2) in the same circumstances as those discussed above for UAAs. The federal regulations specify that variances are appropriate when pollutants are persistent in the environment and lack economically feasible control options (80 FR 51020, p. 25).

Like UAAs establishing temporary WQO, variances allow a state to retain the designated use for a waterbody, but to temporarily relax WQOs or ELs as specified in the variance so long as the variance reflects the highest attainable condition identified at the time of the adoption of the WQS variance. 40 CFR § 131.14(b)(ii) and (iii). The relaxed WQOs may then be used for purposes of establishing interim uses and interim WQOs, as well as for purposes of developing NPDES permit limits and requirements, as well as 401 Water Quality Certification requirements. 40 CFR § 131.14(a). Unlike UAAs establishing temporary WQOs, variances with a term greater than five (5) years must be re-evaluated no less than every 5 years, providing less assurance of long-time compliance protection for dischargers. Nevertheless, if any waterbodies may be close to meeting the proposed WQOs, variances may be an appropriate mechanism to use to allow compliance protection for dischargers until new treatment technologies, and particularly those that have yet to be developed, can be identified, planned, designed, environmentally reviewed, permitted, funded and implemented.

However, currently, no consistent statewide mechanism for establishing water quality standards and NPDES permit variances exists; only the Central Valley RWQCB has adopted a variance for salinity (*see, Public Scoping Meeting for the Proposed Statewide Water Quality Standards Variance Policy* (Jan. 23, 2017); Resolution No. R5-2014-0074). Adoption of a general variance policy consistent with federal regulations the State Water Board would provide necessary State implementation authority, establish a consistent procedure for adopting variances across the Regional Boards, and alleviate the burden associated with each regional board having to conduct a public outreach and hearing process to amend their respective water quality control plans to provide such implementing authority.

d) Mixing Zones and Dilution Credits.

The Staff Report notes in several places that water boards have the discretion to allow mixing zones and dilutions credits where appropriate. *See, e.g.,* Staff Report p. 10. However, Staff comments at the January 9, 2017 workshop indicated that the Provisions are not intended to allow regional boards to permit mixing zones and dilution credits, and this position is confirmed by a number of statements in the Staff Report indicating that dilution credits and mixing zones "would be allowed but would not be recommended in most situations since mercury is a bioaccumulative compound …" (p. 156), and shall be prohibited if the mercury

concentration in fish tissue from fish in the receiving water exceeds the applicable WQOs. Staff Report Appendix A, p. A-11. As a matter of practice, mixing zones and dilution credits are not available statewide; they are never applied, at least in Southern California, despite Precedential Order 2001-006, which provides that mixing zones are allowed even in water bodies listed as impaired. *Cf.*, Staff Report pp. 176, 179, 182, 184 (water boards have the discretion to allow dilution credits in waters that currently meet applicable water quality standards). Pursuant to Order 2001-06, a key consideration in determining to establish a mixing zone and/or dilution credit, even for a listed water body, should be a determination of whether even the elimination of a bioaccumulative pollutant from discharges would have had no effect on pollutant concentrations in the waterbody or in fish.

With respect to mercury, the Staff Report and the Technical Report establish that even if all individual non-stormwater NPDES permit discharges were eliminated, reductions in mercury sufficient to attain waterbody compliance with WQOs would not result. Therefore, we urge the State Board to amend the Provisions to expressly authorize the application of mixing zones and dilution credits in circumstances such as those analyzed in Order 2001-06.

4. Recommended Additional Implementation Program Measures.

We also recommend bolstering the currently insufficient implementation program by considering and adopting additional implementation measures that will lead to meaningful reduction in mercury in the state's waters and fish, and some of which may be appropriate to offer as alternative compliance pathways for dischargers. The additional measures should be specifically focused on measures and the development of information and technologies capable of addressing mercury in the environment. We recommend for additional study and consideration six possible additions to the implementation program that the water organizations and member agencies would like to work with Staff to explore:

1. New or more effective control methods for historic mines and tailings;

2. Regional solutions and programs particularly for nonpoint source implementation measures, and which may involve the engagement of other state agencies;

3. Trading/offset programs to allow funding of measures to address actual sources of mercury;

4. A "water funds" approach to support development of studies and pilot projects for design, testing and evaluation of new technologies and control measures that would better target mercury in the environment, including nonpoint source runoff from open space and areas of elevated mercury, wetlands, and sediment;

5. Coordinated development of state funded control programs among the State Board, local agencies, and CARB to address aerial deposition; and

6. Interventions to protect human health developed in other nations dependent upon subsistence fishing, such as Brazil (Passos *et al*. 2007).

E. Insufficiency of Certain Proposed Implementation Measures.

The Staff Report and Mercury Provisions fail to identify and analyze certain reasonably foreseeable compliance methods/management measures, including those imposed on stormwater and wetlands discharges at the discretion of water boards in areas of elevated mercury.

1. Stormwater Implementation Program Measures.

The Provisions impose new requirements as a part of the implementation program on both MS4 and industrial stormwater discharges. Certain mercury control BMPs are specified for inclusion in MS4 permits, and new, much lower action levels are imposed on industrial stormwater permit discharges. However, the Staff Report fails to evaluate the likelihood that the additional MS4 Permit measures specified may reasonably lead to reductions of mercury in receiving waters. Further, the Staff Report fails to identify any treatment technologies that might be available to implement on a geographically dispersed basis to control urban runoff in a manner that would effectively reduce mercury in receiving waters. Because no treatment technologies are identified or evaluated for assuring that industrial stormwater permits meet the new mercury action levels, the Staff Report's substitute environmental analysis of potential impacts of such technologies is missing contrary to the requirements of CEQA that environmental impacts of all reasonably foreseeable pollution control technologies required by mandate must be analyzed. Cal. Code Regs. tit. 14, § 15126.2.

Further, the new implementation program's regulatory requirements applicable to MS4 and industrial stormwater permits raise serious risk of enforcement and third party citizen suit liability for stormwater permittees. Upon adoption, the new, stringent, and unattainable WQOs will become MS4 permit and industrial stormwater permit "receiving water limitations." As a result, any MS4 or industrial stormwater discharges that "cause or contribute to an exceedance of the mercury WQOs" would create a receiving water limits violation for permittees. The vast majority, if not all inland surface waters, enclosed bays and estuaries will exceed the new WQOs for mercury, creating the risk of liability under industrial and MS4 stormwater permit receiving water limitations, regardless of the significance (or relative insignificance) of mercury contributions associated with those discharges.

To attempt to maintain compliance in light of such receiving water limitations, MS4s and industrial dischargers will be required to expand the reasonable assurance analysis mandated by the permits to attempt to show what the Staff Report could not—that the BMPs deployed to control mercury are reasonably likely to bring receiving waters into compliance with the WQOs. In addition, costs of watershed management plans (WMPs) and industrial stormwater pollution prevention plans (SWPPPs) will increase to attempt to control mercury as required by new mercury "receiving water limitations." As WMPs and SWPPPs are modified, new control measures for mercury in urban and industrial stormwater will have to be implemented, even though there are no effective treatment practices or technologies, thus imposing costs for invention, development and implementation of new mercury stormwater control technologies, despite the fact that stormwater discharges are very small sources of mercury. The Provisions should be modified to clarify that mercury WQOs should be excluded from receiving water limitations in both MS4 permits and the Industrial General Stormwater permit.

2. Wetland Mercury Control Measures.

The draft Provisions address wetlands by providing discretionary control to water boards to use existing law to implement mercury controls in areas with elevated mercury concentrations. The draft Provisions include examples of design features and management measures to reduce the production of methylmercury in the wetland that water boards "should consider requiring." Staff Report § 6.10.3. Yet the Staff Report, including the Wetlands Appendix Q, emphasizes that the science on mercury/methylmercury controls is not advanced enough to provide BMPs that will clearly reduce mercury or methylmercury in most situations. Further, the relative importance of the many factors that can influence mercury chemistry can vary from site to site. *See,* Technical Report section 8. This is why the Staff Report states that the science on mercury/ methylmercury controls is not advanced enough to provide BMPs that will clearly reduce mercury or methylmercury in most situations.

The Staff Report provides, "New wetland projects (creation or restoration of wetlands) should not be prevented because of mercury concerns. However, wetland projects should be done in [a] manner to reduce unintended impacts. If practicable, new wetlands should not be created in areas with high levels of mercury." (p. 136)

As an initial matter, this potentially conflicts with State's no net loss of wetlands policy (E.O. W-59-93). Wetland projects are a cost-effective manner to improve water quality by removing contaminants, including sediments to which mercury binds, before entering receiving waters, and they play an important role in the implementation of TMDLs. Wetlands provide an environmentally sound way to address the pollution caused by urban runoff before the runoff reaches sensitive receiving waters. Wetlands provide a cost effective alternative that can be used to address runoff from existing communities that can't easily be retrofitted.

The challenge for wetlands is that this understanding is not translated into the Provisions regulatory language. The regulatory language, which is what will ultimately survive this rulemaking and drive water boards' future actions, does not reflect the State Water Board's position with regard to the scientific uncertainty of the process of methylation and wetlands. Absent revisions, the text implies (a) the listed measures are necessary and appropriate to incorporate into permit conditions for wetlands development [which they are not]; and (b) the listed measures will achieve mercury reductions from wetlands projects [which they may not] – leaving a cloud of regulatory uncertainty over future wetlands projects.

The Staff Report and regulatory language should be amended to reflect the current knowledge of the effectiveness of control measures as it relates to wetlands and other bodies. We believe the regulatory language should clarify that the listed measures are not BMPs and may or may not be appropriate depending on site specific factors. Alternatively, the listed management measures could be eliminated altogether from the regulatory text at section IV.D.7 [Wetland Projects]. Such amendments would ensure that the Provisions are consistent with the stated intent of the State Water Board, which is not to prevent new wetland projects because of mercury concerns. Otherwise, a cloud of regulation on wetland creation/restoration will have the regulated community looking for alternatives to wetland creation, often to the detriment of water quality and other environmental outcomes.

3. Further Analysis of Stormwater and Wetlands Mercury Control Measures is required under the Water Code and CEQA.

Failure to identify and properly analyze mercury stormwater controls and wetlands implementation measures is a violation of Water Code sections 13241(c) and 13242(a). Delete the limitations or properly identify and analyze such controls consistent with the requirements of the Water Code.

Failure to identify and assess environmental impacts of stormwater controls and wetlands implementation measures is a CEQA violation. Delete the limitations or properly identify and analyze such controls.

F. New Beneficial Uses.

1. The New Beneficial Uses Will Likely Result in Further Water Quality Regulations for Pollutants Other than Mercury.

As recognized in the Workshops and at the Board Hearing, the new beneficial use categories of T-SUB, SUB, and CUL will pave the way for listing, WQOs, ELs, and TMDLs for other constituents. See, Beneficial Use handout, p. 5 (stating that the subsistence beneficial uses may require regulation of other bioaccumulatives). Wastewater and industrial facility upgrades may be needed to comply with multiple future statewide or region wide WQOs for other pollutants regulated in association with new beneficial use categories (facility upgrades likely to involve adding nitrification and denitrification steps or adding additional filtration) (see p. 177).

2. The Staff Report and the Regulatory Text Should Include Direction Regarding the Adoption of Flow and Fish Population Objectives.

It is likely that without specific direction in the Staff Report and the Provisions the new CUL beneficial use will result in flow and fish quantity objectives. See, Workshop Beneficial Use handout, p. 2, (stating that the State Board may develop a flow objective to protect the new CUL beneficial use, although “it is not anticipated.”)

For example, in 2011 the Oregon Department of Environmental Quality adopted the strictest standard for toxic water pollution in the United States to protect tribal members and others who eat large amounts of contaminated fish. The human health water quality criteria have been adopted for 113 pollutants, including mercury, flame retardants, PCBs, dioxins, plasticizers and pesticides. However, the new rule could end up costing millions and improvements in water quality are expected to take years, if not decades; yet it's not clear how much the rules will actually reduce pollution.

Similarly, the State of Washington was thereby restricted from developing and operating infrastructure that would hinder fish passage and thereby diminish the number of fish that would otherwise be available for Tribal harvest. *United States v. Washington*, 20 F. Supp. 3d 986, 1000, 1022 (W.D. Wash. 2013). A Florida tribe challenged the State of Florida’s implementation of new water quality criteria for 39 chemical components not currently regulated by the state and revisions to standards for 43 more were for failing to account for the higher levels of fish

consumption by tribe members who subsist on fish and doesn't include sufficient protections for tribe members who subsist on fish and other seafood. *Seminole Tribe of Florida v. Dep't of Envt'l Protection,* No. 2D16-4305.

3. The Staff Report Does Not Properly Document Consideration of Water Code Section 13241 in the Adoption of the New Beneficial Uses.

Contrary to CWC § 13241 the Staff Report fails to consider the relevant factors in establishing the new B/U categories by failing to consider information about background conditions in specific water bodies or regionally, by failing to identify water quality conditions that can reasonably be achieved through the coordinated control of factors that affect water quality, and by failing to properly consider the full scope of economic impacts associated with treatment plan upgrades and associated mitigation measures.

4. The Staff Report Should Include Policy Guidance and Criteria in the Designation of Beneficial Uses to Avoid Unintended Consequences.

In order to provide consistent application of the Mercury Provisions and the designation of beneficial uses throughout the State and to avoid misapplication of the implementation program, we recommend the State Water Board include guidance for the Regional Boards in the Staff Report as follows:

1. State that with respect to the tribal (T-SUB, CUL) and subsistence (SUB) beneficial uses and WQOs flow and fish quantity criteria/objectives shall not be established.

2. Prohibit the designation of tribal (T-SUB, CUL) and subsistence (SUB) beneficial uses where the use is wholly in the past (*i.e.*, not existing and not probable future use). *See,* Staff Report at Appendix T-4 (stating that regional water boards do no designate waters with beneficial uses that occurred solely in the past).

3. Prohibit the designation of tribal (T-SUB, CUL) and subsistence (SUB) beneficial uses where the water quality does not support the use.

For already designated beneficial uses that will immediately trigger the Mercury Provisions, e.g., COMM and RARE, we strongly recommend conducting a UAA to determine whether the use is attainable. *See, Cal. Ass'n of Sanitation Agencies v. State Water Res. Control Bd.* (2012) 208 Cal.App.4th 1438, 1460 (finding that where a water board has evidence that a designated use does not exist and likely cannot be feasibly attained it is unreasonable to require dischargers to incur control costs to protect that use). Alternatively, regional boards could conduct a UAA prior to imposing ELs in NPDES permits.

G. Adoption of the Mercury Provisions is an Unfunded Mandate.

Section 6 of Article XIII B of the California Constitution provides, in relevant part: "Whenever the Legislature or any state agency mandates a new program or higher level of service on any local government, the State shall provide a subvention of funds to reimburse that

local government for the costs of the program or higher level of service." Where a subvention is not provided, the new program – or in this case, regulation – is an unfunded mandate.

The Mercury Provisions are an unfunded mandate because they mandate a higher level of protection (more stringent WQOs) than required under federal law.

First, the proposed Sport Fish WQO of 0.2 mg/kg, which applies to COMM and is protective of human health, is slightly lower the federal Fish Contaminant Goal of 0.22 mg/kg developed by OEHHA (Klasing and Brodberg 2008). While the federal OEHHA value is not enforceable, it is the contaminant goal for mercury in fish, concentrations above which the federal agency has determined warrant advisories to those consuming the fish. Further, the 0.22 mg/kg value has been used by the State since 2012 for water quality assessment purposes in the state, according to the Staff Report (p. 31).

Second, the proposed Sport Fish WQO of 0.2 mg/kg is also more stringent than the federal EPA national water quality criterion and the USEPA federal regulatory objective for fish tissue of 0.3 mg/kg. The USEPA fish tissue criterion has been used to fulfill the narrative toxicity objective in regards to mercury (*id.*).

Third, the proposed Sport Fish WQO of 0.2 mg/kg is also more stringent than the fish tissue concentration for mercury of 0.37 mg/kg used to derive the currently applicable federal USEPA CTR water criterion for protection of human health (*id.*).

All told, even the least protective human health mercury WQO of 0.2 mg/kg – which would apply immediately upon adoption and approval of the proposed Provisions – provides a higher level of protection as compared to all applicable federal limits, therefore constituting an unfunded State mandate.

In addition, the wildlife beneficial uses (Sport Fish (except COMM, CUL), Prey Fish, CLT Prey Fish) are not supported under federal law if the use is not an existing or probable future use or water quality does not support the use because the federal act authorizes designation of only existing or probable future beneficial uses. Where WQOs are already exceeded, it is highly likely that wildlife uses have not been occurring since 1975 given the legacy nature of mercury pollution. Thus, where a designation is based on a wholly past use, and therefore protected under Porter Cologne, but not the federal act it is an unfunded State mandate.

H. CEQA Comments.

1. Failure to Include the Reservoir Program in the Project Description is Piecemealing.

The Staff Report provides, "Many methods of compliance for the Provisions could be similar to those required for the Reservoir Program, including sediment controls, possible wastewater treatment plant upgrades, and mercury monitoring . . . . Reservoir Management Actions [i.e., methods to manage mercury in reservoirs] are different methods of compliance not required by the Provisions, but some of the impacts could be similar as the impacts of the Provisions." (p. 255) This rulemaking's WQOs will be used to determine which waters are impaired and will therefore drive the Reservoir Program – for water districts with multiple

discharges and operations that will be regulated for mercury, it is important to understand how the Reservoir Program, which is under development, will work in conjunction with the Provisions as a comprehensive statewide mercury program.

2. The Project Objectives are Improperly Narrow and Violate CEQA.

CEQA Guidelines § 15124(b) requires a clearly written statement of objectives, including the underlying purpose of the project, which will help the lead agency to develop a reasonable range of alternatives and aid decision makers in preparing findings or a statement of overriding considerations. The process of selecting the alternatives to be included in the EIR begins with the establishment of project objectives by the lead agency. "A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings . . . . The statement of objectives should include the underlying purpose of the project." Cal. Code Regs., tit. 14, § 15124, subd. (b).

However, the Mercury Provisions project objectives are simply listed in the Staff Report and not discussed or explained. CEQA and the State Water Board's implementing regulations require an analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts. Cal. Code Regs., tit. 23, § 3777. Failure to include a meaningful discussion of project objectives undercuts CEQA's requirement to analyze reasonable alternatives.

3. The Staff Report Does Not Evaluate a Reasonable Range of Alternatives.

The SED improperly eliminates alternatives for failing to meet one of a list of five project objectives, where the project objectives are not discussed or explained and no project purpose is identified in the project description (CEQA Guidelines 15126.6(b) [An EIR should not exclude an alternative from detailed consideration merely because it "would impede to some degree the attainment of the project objectives."] Although a lead agency may not give a project's purpose an artificially narrow definition, a lead agency may structure its EIR alternative analysis around a reasonable definition of underlying purpose and need not study alternatives that cannot achieve that basic goal. *In re Bay-Delta etc.,* (2008) 43 Cal. 4th 1143, 1165-66.

However, the Staff Report's project description does not identify a project purpose. For this reason, eliminating alternatives for failing to meet one of five project objectives – particularly where the Staff Report only lists and does not discuss the rationale behind the project objectives – does not comply with the requirement to consider a reasonable range of alternatives.

4. Environmental Impacts Are Not Properly Considered or Analyzed in the Staff Report.

a) *Treatment Facility Upgrades Required to Comply with Effluent Limitations Will Effect Water Supply.*

As a result of planned activities and emergencies, water purveyors have discharges from their drinking water systems, such as line testing. Planned discharges may be scheduled or unscheduled and are due to development and maintenance activities mandated by statutory requirements under the federal Safe Drinking Water Act and the California Safe Drinking Water Act (Health and Saf. Code, division 104, part 12, chapter 4.) Emergency discharges are due to system leaks, facility failures, and catastrophic events.

Drinking water system discharges under the scope of the proposed Mercury Provisions ELs for individual non-stormwater NPDES permits would include both planned and emergency discharges. As discussed above and in Section 2 of the attached Technical Report, added costs to upgrade treatment technologies to meet new ELs as low as 1 ng/L, the lack of treatment technologies to reduce discharges to meet ELs, new listings and associated TMDLs, and the lack of realistic time schedules to comply with the new mercury program pose a significant risk of increased compliance costs, permit violations and penalties, and citizen suit enforcement and attorneys' fees – all of which will increase the cost of water service. While the exemption for small disadvantaged communities will provide some protection, increased cost of service must be passed on to ratepayers or be paid for by eliminating other programs – both of which would adversely affect water purveyors' ability to provide clean, safe and affordable drinking water to their customers.

b) Treatment Facility Upgrades Such as Reverse Osmosis, Necessary to Meet 1 ng/L May Result in Significant Energy Use and Air and GHG Emissions.

As documented in Section 2 of the Technical Report, wastewater treatment facilities with tertiary treatment may need to introduce advanced treatment to meet the proposed 1 ng/L EL for slow-moving waterbodies designated T-SUB. The Staff Report does not offer examples of such treatment options to comply with the 1 ng/L standard; however, the Technical Report indicates that RO could be used. Operation costs for this treatment would require up to twice as much power consumption as tertiary treatment alone. Air quality and climate change effects associated with the concomitant air and greenhouse gas emissions must be evaluated in the Staff Report so that the public and decision makers may understand the scope of potential environmental impacts associated with adoption of the Mercury Provisions.

c) *Sediment Controls to Reduce Mercury May Result in Hydromodification Impacts*

The Provisions recommend water boards impose sediment controls at mine sites and for nonpoint sources in areas of elevated mercury (pp. 171-172). Sediment controls are designed to keep or reduce the amount of sediment from entering into waterbodies. The reduction of sediment in natural stream channels can create "hungry water," resulting in erosion and downcutting of the natural streambed. *See, e.g., Hydromodification Management Plan: County of San Diego* § 6.4.7 (Brown and Caldwell 2011). The Staff Report does not address this potential for hydromodification effects resulting from implementation of sediment control measures as imposed by regional boards.

II. CONCLUSION.

The water agencies appreciate this opportunity to provide comments on the proposed beneficial uses and Mercury Provisions. We support protection of public health, and our comments are focused primarily on concerns with the Non-Tribal/Non-Subsistence provisions. We would very much appreciate the opportunity and time to work with you and your staff to address those concerns.

Sincerely,

Rebecca Franklin
Regulatory Advocate
Association of California Water Agencies

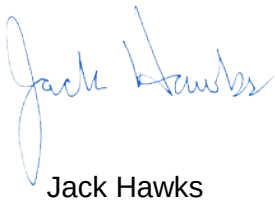

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EXHIBIT A

Exponent®

EXTERNAL MEMORANDUM

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DATE: February 17, 2017

PROJECT: 1608830.000

SUBJECT: Technical comments on proposed California Mercury Provisions

This technical memorandum summarizes Exponent's comments on the State Water Resources Control Board's (SWRCB's) proposed "Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions" (Mercury Provisions), which was released for public review on January 3, 2017.[1] Our comments focus on concerns that the proposal will not produce reductions in mercury concentrations in fish because it fails to address the primary sources of mercury to the State's water bodies and fish. The proposal also contains a number of technical shortcomings that should be addressed before adoption. Our comments fall into seven primary categories, summarized as follows:

1. Point source discharges subject to individual National Pollutant Discharge Elimination System (NPDES) permits (e.g., water treatment plants, wastewater treatment plants, and industrial discharges) are small relative to other mercury sources. Imposing stringent numeric effluent limitations on those sources will have little effect on mercury concentrations in fish and the environment. Stringent numeric effluent limits are inappropriate for most point sources, and alternative implementation mechanisms should be explored and developed by the SWRCB.

[1] SWRCB. 2016. Draft Staff Report, Including Substitute Environmental Documentation, for Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions (Staff Report). State Water Resources Control Board. January 3. Accessed February 6, 2017, at http://www.swrcb.ca.gov/water_issues/programs/mercury/docs/staff_report/hg_staff_report.pdf.

QAID 1608830.000 - 3640

2. The proposed effluent limitations for non-stormwater individual NPDES dischargers may be unattainable (especially 1 ng/L), and treatment upgrades to meet the proposed limits will be more costly than disclosed by the SWRCB.
3. The implementation program in the State's proposed policy should be modified to focus on actions that will lead to meaningful reductions in mercury in the state's waters and fish.
4. The Staff Report's position on dilution credits and mixing zones for NPDES discharges containing mercury is inconsistent with SWRCB precedential orders. The appropriateness of mixing zones and dilution credits should be evaluated on a site-specific basis.
5. The fish tissue objectives proposed to protect wildlife are likely to be overly conservative and should be revised to address this limitation.
6. The water concentration targets derived from the proposed fish tissue water quality objectives are fundamentally flawed and should not be implemented at this time.
7. The proposed human health objectives may be too conservative.
8. The proposed action to address dredging, wetlands, and nonpoint sources of mercury is vague and does not prescribe or prevent any specific actions.

Details of these comments are included below.

1. Point source discharges subject to individual NPDES permits (e.g., water treatment plants, wastewater treatment plants, and industrial discharges) are small relative to other mercury sources. Imposing stringent numeric effluent limitations on those sources will have little effect on mercury concentrations in fish and the environment. Stringent numeric effluent limits are inappropriate for most point sources, and alternative implementation mechanisms should be explored and developed by the SWRCB.

In Appendix N of the Mercury Provisions, SWRCB presents source analysis data for the 14 existing mercury-related TMDLs in the state; these TMDLs are listed in Table 1.[2] Only three of the mercury TMDLs for these water bodies list wastewater and industrial discharges as sources of mercury.[3] As reproduced in Figure 1, Table N-11 from Appendix N indicates that wastewater and industrial discharges constitute 4% of methylmercury discharged to the Delta and 1.5% of total mercury discharged to San Francisco Bay. (The third TMDL, for Calleguas Creek/Mugu Lagoon, lacks a quantitative source analysis.) Sources related to historical mining (tributaries

[2] Appendix N. Wastewater and Industrial Discharges. pp. N-14 to N-15. Note that Figure 3-1 (p. 33) of the Staff Report shows a map of mercury impaired waters on the 2012 303(d) list, which includes many more water bodies than those for which mercury TMDLs have already been developed.

[3] Appendix N, p. N-14.

QAID 1608830.000 - 3640

and water body sediments) account for 93% and 82% of mercury in the Delta and San Francisco Bay, respectively, while atmospheric deposition (direct deposition and urban stormwater generated by mercury-laden precipitation) accounts for 15% of mercury in San Francisco Bay. Thus, data from these two TMDLs indicate wastewater and industrial NPDES dischargers contribute little mercury to affected water bodies relative to other sources, suggesting tight limitations on mercury from such dischargers will not result in significant reductions in environmental mercury concentrations.

Table 1. Waterbodies in California subject to a mercury-related TMDL

Water body	Individual NPDES permit dischargers listed as source?
Sacramento-San Joaquin Delta	Yes
San Francisco Bay	Yes
Calleguas Creek/Mugu Lagoon	Yes
Guadalupe River Watershed	No
Walker Creek	No
Clear Creek and Hernandez Reservoir	No
Las Tablas Creek and Lake Nacimiento	No
El Dorado Park Lakes	No
Puddingstone Reservoir	No
Lake Sherwood	No
Consolidated Slip and Fish Harbor, Los Angeles-Long Beach Harbor	No
Cache Creek	No
Clear Lake	No
Rhine Channel, Newport Bay	No

Source: SWRCB. 2016. Draft Staff Report, Including Substitute Environmental Documentation, for Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions. State Water Resources Control Board. January 3. Appendix M. Summary of Mercury TMDLs. Accessed February 7, 2017, at http://www.swrcb.ca.gov/water_issues/programs/mercury/docs/staff_report/hg_apndx_m.pdf.

QAID 1608830.000 - 3640

Table N-11. Estimated Mercury Loadings from the Sacramento-San Joaquin Delta TMDL (Delta) and the San Francisco Bay TMDL.

Sources	Delta *Methylmercury* (g/day)	San Francisco Bay *Total Mercury* (g/day)	Delta (% total)	San Francisco Bay (% total)
Tributaries (Central Valley)	8.2	1205	57	36
Guadalupe River Watershed (Historic mining, San Francisco Bay only)	-	252	-	8
Sediments in water body (Delta: open water, wetlands. San Francisco Bay: Bed erosion)	5.1	1260	36	38
Atmospheric deposition (San Francisco Bay: direct deposition only. Delta: direct and indirect, so includes atmospheric mercury carried by nonpoint source storm water, but not urban storm water)	0.06	74	0.4	2
Non-urban storm water (San Francisco Bay only: includes mercury enriched sediments and atmospheric mercury. Delta: Atmospheric mercury from non-urban storm water is included in 'atmospheric deposition')	-	68	-	2.0
Urban runoff (Caltrans, MS4s, Construction, Industrial)	0.05	438	0.3	13
Municipal wastewater and **Industrial discharges** (Delta had only municipal wastewater)	0.6	49	4	1.5
Agricultural return flows (Delta only)	0.3	-	2	-
Total	14.31	3348	100	100

Figure 1. Table N-11 from Appendix N of the Mercury Provisions. Source: Appendix N, p. N-15 of "Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions." Accessed February 7, 2017, at http://www.swrcb.ca.gov/water_issues/programs/mercury/docs/staff_report/hg_apndx_n.pdf.

Appendix N states:

> *From the [mercury TMDL source] estimates in Table N-11, atmospheric deposition is not a major source of mercury. In the Sacramento-San Joaquin Delta TMDL, municipal wastewater is more significant than atmospheric deposition. If this information is used to extrapolate relative source contribution to the state as a whole, then for any watershed without historic [sic] gold or mercury mining, wastewater and industrial dischargers can be a significant source of mercury.*[4]

[4] Appendix N, p. N-14.

QAID 1608830.000 - 3640

However, a finding that atmospheric deposition is small does not lead directly to the conclusion that NPDES discharger contributions "can be a significant source of mercury"—instead, the Staff Report should consider the possibility that *neither* source might be significant. Appendix N also suggests NPDES discharges can be significant in "any watershed without historic [sic] gold or mercury mining,"[5] but this assertion is not supported by data or information in the Staff Report, and no evidence is provided to suggest extrapolating data from the Delta or San Francisco Bay to the entire state is appropriate.

In contrast to the proposal's focus on NPDES discharges, the Staff Report indicates that historical mining, natural soils, and direct deposition are "significant" and "major" sources of mercury.[6] The Staff Report notes that "the median and average mercury concentrations in rain in California were 6 ng/L and 12 ng/L" and "the 99.8th percentile of mercury concentrations in rain in the United States was 174 ng/L."[7,8] Thus, a significant fraction of rain samples in California would have concentrations higher than these values, which, as discussed below, are equivalent to the proposed effluent limitations for point source discharges. The Staff Report also indicates that "[m]ercury deposition from atmospheric emissions is thought to be the major source of mercury in some Southern California lakes and reservoirs (U.S. EPA 2012, Tetra Tech 2008)."[9]

Finally, the Staff Report states, "[m]unicipal wastewater treatment plants are generally a relatively minor source of mercury to the environment compared to other sources. Wastewater

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5 Ibid.

6 The Staff Report notes that "elevated mercury concentrations in present-day mine impacted waters and sediments indicate that hundreds to thousands of pounds of mercury remain at each of the many sites affected by hydraulic mining" (Staff Report at p. 47). The Staff Report also notes, "The Coast Ranges are naturally high in mercury… The soils in these areas that are naturally enriched with mercury erode, contributing to the mercury load in waterways… The mercury from mine waste, naturally enriched soils, and geothermal springs is a major source of mercury in the Coast Ranges, the Sierra Nevada Mountains, and also downstream in the Sacramento/San Joaquin Delta and San Francisco Bay" (Staff Report at p. 49). Finally, the Staff Report finds that "direct deposition of mercury to water bodies (vs. deposition on land upstream) has been found to be very important in determining mercury levels in fish. Harris and colleagues applied isotopically labeled mercury (as $HgNO_3$) to a lake and the surrounding watershed. Essentially all of the increase in methylmercury in fish after 3 years was due to the mercury deposited directly to the lake surface… Furthermore, the results could suggest that controlling emissions that are deposited directly on the water surface may have a rapid effect (few years) on mercury level in fish (Harris et al. 2007)" (Staff Report at p. 50).

7 Staff Report at p. 140.

8 It has been widely demonstrated that precipitation in California has significant concentrations of mercury linked to coal-based Asian industrial emissions. For example, Steding and Flegal conclude that their study "demonstrates the impact of Asian industrial emissions on Hg concentrations in rain in western North America. The analyses substantiate previous reports on the influence of those emissions on Hg deposition in the North Pacific." (Steding, D.J. and A.R. Flegel. 2002. Mercury concentrations in coastal California precipitation: evidence of local and trans-Pacific fluxes of mercury to North America. J. Geophys. Res., 107 (2002):D24, p. 11-6.) They estimate mercury deposition via rainfall at approximately 25–50 nmol/year/m^2, which, if applied over the area of San Francisco Bay (approximated as 2,500 km^2), is roughly the same rate reported in the San Francisco Bay mercury TMDL for atmospheric deposition (74 g/day, from Table N-11).

9 Staff Report at p. 49.

QAID 1608830.000 - 3640

treatment plants already remove most of the mercury from the effluent."[10] Because mercury sources attributable to NPDES dischargers are small compared to the dominant sources in the state, imposing stringent effluent limitations on NPDES dischargers such as those proposed in the Mercury Provisions will not result in a significant reduction in water body or fish concentrations. The Staff Report acknowledges this, noting that bioaccumulative pollutants, including mercury, are "generally very persistent in the environment," concluding that:

> *Even if all sources of the contaminants are eliminated, the contaminants are likely to remain high for decades, because either they do not degrade or they degrade very slowly. Much of the mercury in fish today is thought to be from historic mining in the late 19th century and early 20th century. Further, current sources may not be directly regulated by the water boards (e.g., atmospheric emissions, naturally occurring in soils, or geothermal sources).*[11]

In summary, the Staff Report establishes clearly that sources other than NPDES discharges are the primary sources of mercury to the state's water bodies and that imposing controls on NPDES discharges will have little or no effect on ambient mercury concentrations. This information should lead the SWRCB to develop a program to address those major sources.

2. The proposed effluent limitations for non-stormwater individual NPDES dischargers may be unattainable (especially 1 ng/L), and treatment upgrades to meet the proposed limits will be more costly than disclosed by the SWRCB.

As discussed in Section 2 of the Staff Report, the proposed water quality objectives for mercury are expressed as fish tissue concentrations. These fish tissue concentrations are "translated" into water column concentrations proposed to be used to evaluate "reasonable potential" (RP) and to derive effluent limitations applicable to point source discharges. The water column concentrations and their proposed applicability to various water quality objectives (WQOs) and kinds of water bodies are summarized in

[10] Staff Report at p. 151.

[11] Staff Report at p. 106.

QAID 1608830.000 - 3640

Table 2. (Exponent's evaluation of the translation procedures used to derive these water column concentrations is included in Section 6 of these comments.)

QAID 1608830.000 - 3640

Table 2. Proposed water column mercury concentrations for NPDES discharges and their applicability to various kinds of water bodies

Total Hg water column concentrations	Water quality objectives (WQOs) and water bodies to which water column concentration applies
12 ng/L	Sport Fish and Wildlife WQOs in flowing water bodies
4 ng/L	Sport Fish and Wildlife WQOs in slow-moving water bodies; Tribal Subsistence Fishing (T-SUB) WQOs in flowing water bodies
1 ng/L	Tribal Subsistence Fishing (T-SUB) WQOs in slow-moving water bodies
Case-by-case determination	Subsistence Fishing (SUB) WQOs in any water body; Any WQOs in lakes and reservoirs

Source: SWRCB. 2016. Draft Staff Report, Including Substitute Environmental Documentation, for Part 2 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California—Tribal and Subsistence Fishing Beneficial Uses and Mercury Provisions. State Water Resources Control Board January 3. pp. 173–183. Accessed February 7, 2017, at http://www.swrcb.ca.gov/water_issues/programs/mercury/docs/staff_report/hg_staff_report.pdf.

The Staff Report asserts the proposed 12 ng/L effluent limitation "is achievable" with existing secondary treatment technology and (possibly) a mercury source control/minimization program.[12] However, according to a recent study by HDR, typical mercury concentrations after secondary treatment range from 3.0 to 50 ng/L in Publicly Owned Treatment Works (POTWs) and from 10 to 50 ng/L in industrial discharges.[13] The report does not examine the factors responsible for the variability in mercury concentrations in treated effluent, though it likely depends in part on plant influent mercury concentrations. HDR's data suggest some NPDES dischargers will *not* be able to meet the 12 ng/L effluent limitation with secondary treatment and/or a source control/minimization program.

The Staff Report also asserts the proposed 4 ng/L effluent limitation is achievable with tertiary treatment that includes nitrification/denitrification but not with secondary treatment.[14] Data from the Central Valley Regional Board indicate that tertiary treatment can reduce mercury concentrations to 4 ng/L or below in at least some cases but not in every case. On average, the San Jose/Santa Clara Waste Water Treatment Plant (WWTP) achieves a mercury concentration of 4 ng/L limitation using tertiary treatment,[15] while the Onondaga County WWTP does not.[16] Thus, it is likely some plants already employing tertiary treatment will not be able to meet the 4 ng/L water column concentration.

[12] Staff Report, p. 174.

[13] HDR. 2013. Treatment Technology Review and Assessment. Association of Washington Business, Association of Washington Cities, Washington State Association of Counties. December 4, 2013. p. 7.

[14] Staff Report, p. 177.

[15] Central Valley Water Board. 2010. A review of methylmercury and inorganic mercury discharges from NPDES facilities in California's Central Valley Staff Report Final. March 2010. Rancho Cordova, CA. Table 2, p. 57.

[16] Central Valley Water Board. 2010. Table 5, p. 58.

QAID 1608830.000 - 3640

In contrast with the 12 ng/L and 4 ng/L effluent limitations, the 1 ng/L effluent limitation proposed for slow-moving water bodies with a Tribal Subsistence Fishing designation is likely unachievable without extraordinary treatment upgrades and expenditures for most NPDES dischargers. The treatment processes that would be needed to meet a concentration limit of 1 ng/L are not disclosed in the Staff Report. The Staff Report indicates the 1 ng/L effluent limitation may be unachievable for NPDES dischargers not already achieving it (i.e., 73% of such dischargers according to Staff Report data).[17] The Staff Report suggests no treatment methods for NPDES dischargers to meet the 1 ng/L effluent limitation. Instead, the Staff Report states, "the Water Boards may use compliance schedules, site-specific objectives (with extended compliance schedules), TMDLs, or variances if the [1 ng/L] effluent limitation is unachievable."[18]

HDR's review of treatment technologies states, "[t]here is limited information available about achieving ultralow effluent mercury concentrations near the 5 ng/L range."[19] The treatment process that appears most likely to meet the proposed 1 ng/L effluent limitation is advanced treatment employing microfiltration and reverse osmosis (MF/RO), and then under optimal conditions where input concentrations are low.[20] Under these circumstances, HDR found dischargers could achieve mercury effluent concentration in the range of 1.2 to 3 ng/L.[21] However, this level of treatment exceeds tertiary treatment and requires substantial additional expenditures (see below), and the Staff Report does not disclose or examine the costs of this level of treatment.

Appendix R of the Staff Report estimates the cost of upgrades from secondary to tertiary treatment that would be required by the policy to be in the range of $9–15 million/year over 20 years. Exponent believes this range significantly underestimates upgrade costs. For example, Sacramento Regional San—a POTW with a design flow rate of 181 million gallons per day (mgd)—is currently upgrading from secondary to tertiary treatment at a capital cost of approximately $2 billion and $50 million/year in operation and maintenance (O&M) thereafter.[22] These estimates for a single plant surpass the Appendix R total estimate for all plant upgrades in the state.

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17 Staff Report at p. 178: "Based on statewide monitoring data for all facilities that may be impacted by the Provisions, it is estimated that eight facilities would not meet the new effluent limits for the [T-SUB] water quality objective in flowing water bodies and will have to undergo a major treatment plant upgrade if they are designated with the T-SUB beneficial use in the future." And from the Staff Report at p. 180: "Recent data from discharger self-monitoring reports indicates [sic] that about 73 percent of all discharges to waters included in the geographic scope of the Provisions exceeded 1 ng/L, based on 2009-2015 data."

18 Staff Report at p. 180.

19 HDR. 2013. p. 12.

20 HDR. 2013. p. 13.

21 HDR. 2013. pp. 13–14.

22 Data accessed February 8, 2017, from http://www.regionalsan.com/echowater-project.

QAID 1608830.000 - 3640

Given advanced treatment (e.g., MF/RO) will be necessary to achieve the 1 ng/L limitation, costs will be far higher. HDR suggests that the capital cost of upgrading a plant from secondary to advanced treatment (MF/RO) would be about $15–$162 per gallon per day (gpd) of treatment capacity, depending on the size of the plant to be upgraded.[23] This range is 13–142 times higher than the Appendix R estimate of $1.14 per gpd to upgrade to tertiary treatment[24] and would cost $1.5–$16.2 *trillion* for a plant that treats 100 mgd. Clearly, the costs required to upgrade a treatment plant to advanced treatment will exceed the costs to upgrade to tertiary treatment, such that the costs of implementing the SWRCB's proposal will be far greater than disclosed in the Staff Report.

In addition to capital and O&M costs, upgrading POTW treatment to advanced treatment would increase power consumption. For POTW dischargers, HDR estimates advanced treatment would require 50–100% more power than tertiary treatment.[25] Increased power consumption produces increased greenhouse gas emissions. This impact is not considered in the Environmental Document associated with the Mercury Provisions, and no mitigation measures are offered for this potentially permanent, long-term additional source of greenhouse gases.[26]

3. The implementation program in the State's proposed policy should be modified to focus on actions that will lead to meaningful reductions in mercury in the state's waters and fish.

Issue L in the Staff Report addresses the question, "What procedure should be used to determine which municipal wastewater and industrial dischargers would need effluent limitations?"[27] Two options are considered: (1) use a mercury concentration in water; (2) use mercury concentrations in fish tissue. Both options would result in effluent limitations for discharges to most of the state's water bodies, despite the fact that point source discharges are minor contributors to mercury in the state's water bodies; as detailed throughout these comments, such effluent limitations are not likely to result in reductions in ambient mercury concentrations. Although the proposed Mercury Provisions include language stating that the permitting authority is authorized to exempt certain dischargers from some or all of the provisions of the policy if the discharge is found to be "insignificant [de minimis],"[28] it appears that this exemption would be highly limited and unavailable for most dischargers. For this reason, Exponent recommends that the flow charts for both options be modified to consider additional factors and implementation options before concluding that effluent limits are required. Only if the policy is modified to include alternative implementation options will the policy be likely to lead to meaningful reductions in mercury concentrations in the state's waters and fish.

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[23] HDR. 2013. p. ES-2.

[24] Appendix R, Economic Analysis. R-47.

[25] HDR. 2013. p. ES-4.

[26] Staff Report, pp. 220–222.

[27] Staff Report, p. 142.

[28] Staff Report, p. 153.

QAID 1608830.000 - 3640

As shown in Figure 2 and Figure 3, Exponent recommends the addition of decision points based on the relative importance of point sources to mercury loads in the water body, and the consideration of alternative implementation measures. First, if point source discharges are not significant contributors to mercury in the water body, effluent limitations should not be required. The second query recognizes that effluent limitations on point sources may not be the most effective method for reducing mercury concentrations in receiving waters and fish, and indicates that alternative implementation measures (as discussed below) should be required in lieu of effluent limitations. And finally, when effluent limitations are found to be necessary because point source discharges are an important source of mercury, the policy should require consideration of dilution credits, compliance schedules, and variances, particularly for effluent limitations that are infeasible to achieve, or that will require time and resources to implement.

A second concern relates to the Staff Report's recommendation that water column targets be used to determine reasonable potential and to calculate effluent limitations for point source discharges. As detailed in comment 6, the water column concentration targets calculated using nationwide average BAFs fail to consider the behavior of mercury, which is highly site-specific and complex. As a result, the recommendation to use water column targets calculated using BAFs as the basis for RP and effluent limitations is not scientifically appropriate. Exponent therefore recommends that a modified version of the second option, i.e., the use of mercury concentrations in fish tissue, be used to determine the need for effluent limitations, as shown in Figure 3.

Since, in most cases, the point source implementation measures that are the focus of the proposed Mercury Provisions are unlikely to appreciably reduce environmental mercury concentrations due to the dominance of non-point sources, alternative measures offer the best—and perhaps the only—chance to achieve meaningful reductions in mercury concentrations in the environment. Alternative measures should be investigated and discussed in public workshops prior to adoption of the proposed Provisions. Alternative implementation measures that should be considered include, but are not limited to the following:

- A program for trading or offsets
- A "water funds" approach to regional or watershed-based mercury control measures
- Engaging other state agencies in efforts to control non-point sources (e.g., engaging the Air Resources Board in efforts to control atmospheric sources of mercury)
- Programs to address non-point sources.

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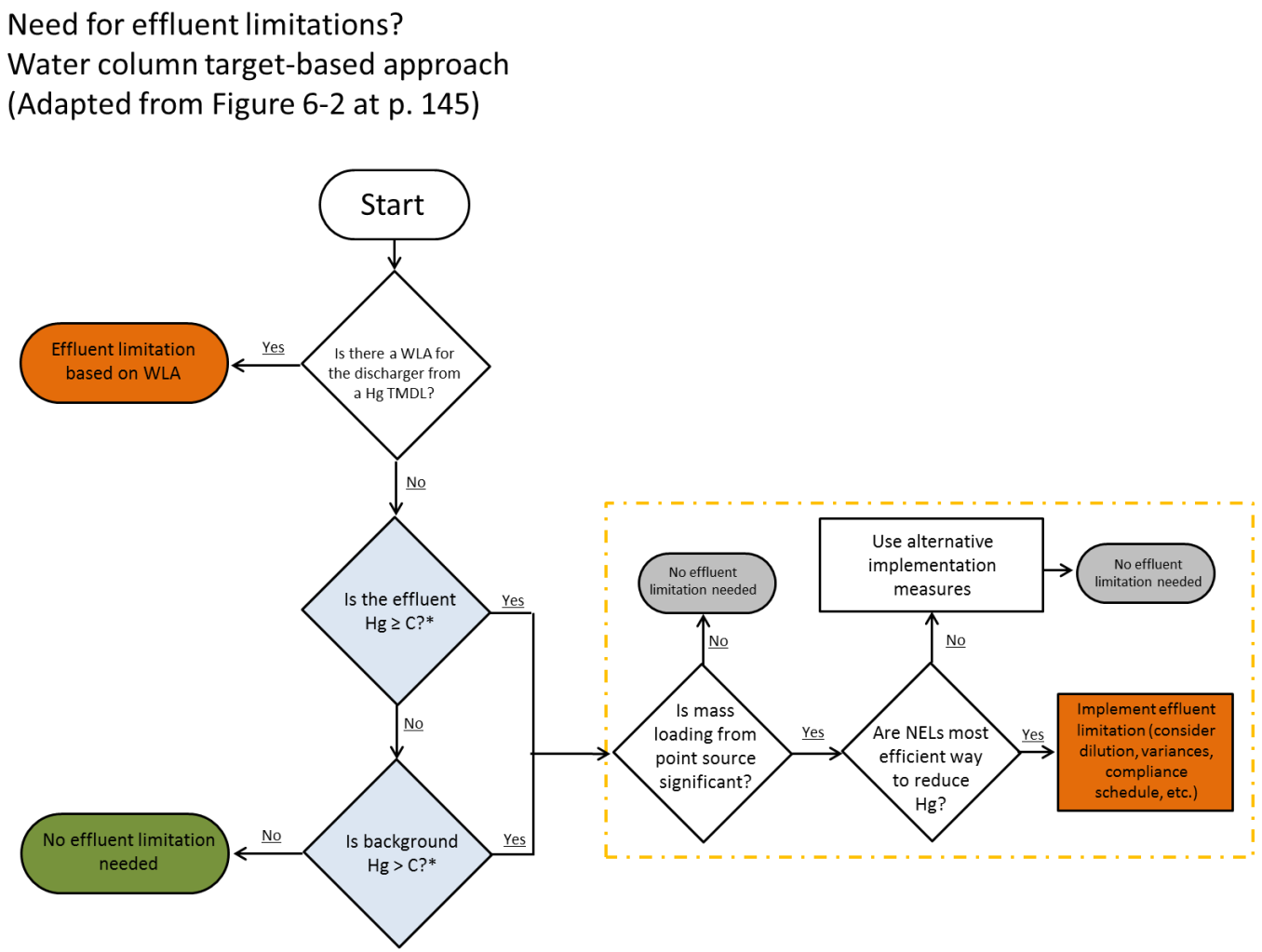

Figure 2. Adapted flow chart for Option 1, a water column concentration-based approach to determining the need for effluent limitations. Only the part of the figure within the dashed orange line has been added. The rest of the figure is identical to Figure 6-2 of the Staff Report (p. 145).

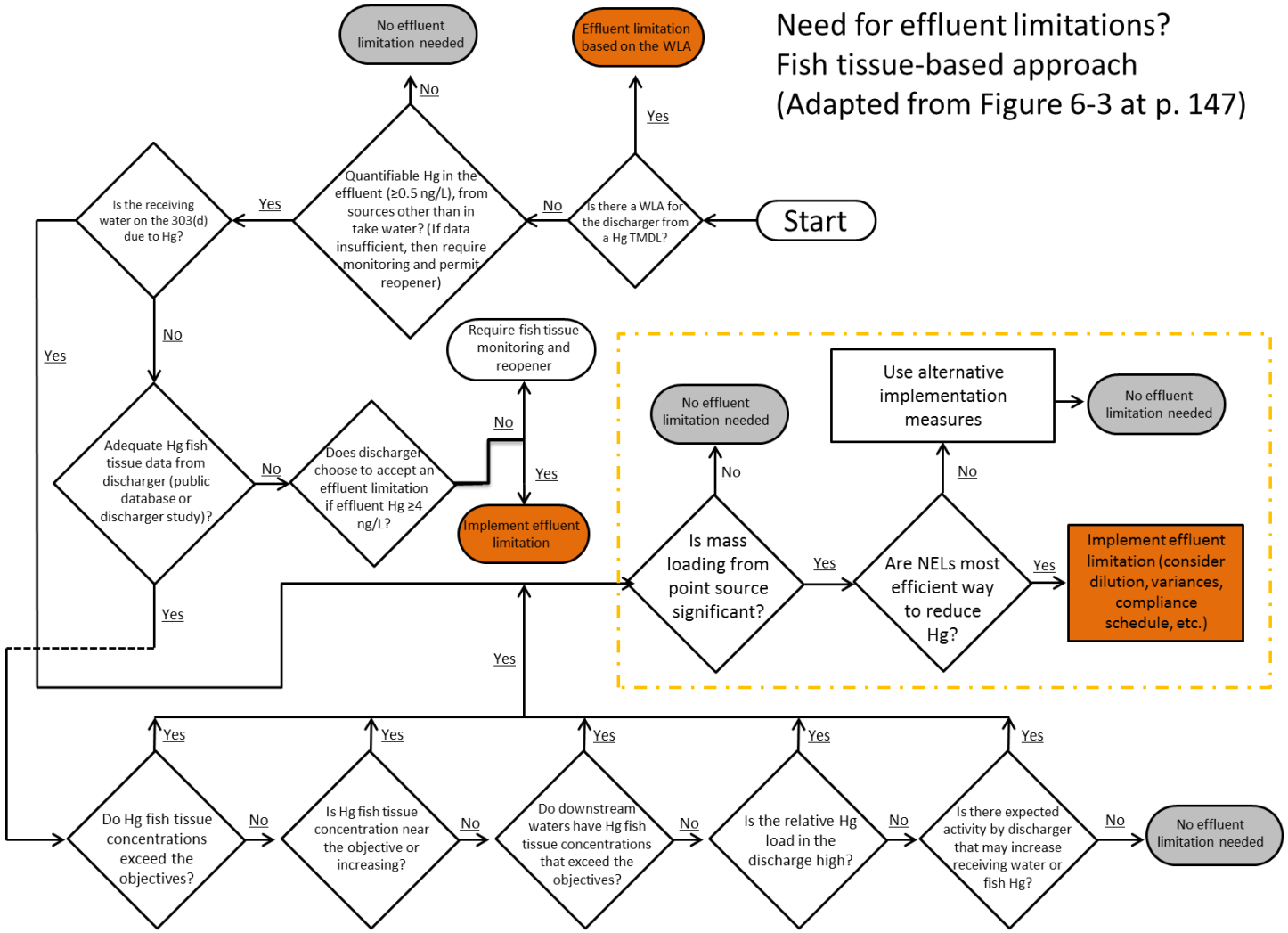

Figure 3. Adapted flow chart for Option 2, a fish tissue-based approach to determining the need for effluent limitations. Only the part of the figure within the dashed orange line has been added. The rest of the figure is identical to Figure 6-3 of the Staff Report (p. 147).

The most effective approaches to mercury control will be those that identify implementation actions for the primary sources of mercury. The implementation measures currently identified in the proposed Mercury Provisions do not effectively target these primary sources. The State's proposed Mercury Provisions should be revised accordingly.

4. The Staff Report's position on dilution credits and mixing zones for NPDES discharges containing mercury is inconsistent with SWRCB precedential orders. The appropriateness of mixing zones and dilution credits should be evaluated on a site-specific basis.

The Staff Report states in several places, "Water Boards have the discretion to allow dilution credits where appropriate."[29] For example, in discussion of the difficulty of meeting the proposed 1 ng/L effluent limitation, the Staff Report states, "if the Water Board exercises its discretion to allow dilution credits, the objective would be much more achievable."[30] The Staff Report also states,

> *Dilution credits would be allowed but would not be recommended in most situations since mercury is a bioaccumulative compound, and the SIP (Section 1.4.2.2.B) and the [U.S. Environmental Protection Agency] recommends limiting dilution for bioaccumulative compounds (U.S. EPA 2010, section 5.3.2). The U.S. EPA explains, "While fish tissue contamination tends to be a far field problem affecting entire water bodies, rather than a narrow scale problem confined to mixing zones, the U.S. EPA's guidance recommends restricting or eliminating mixing zones for bioaccumulative pollutants such as mercury so that they do not encroach on areas often used for fish harvesting (particularly for stationary species such as shellfish). Restriction or elimination might also be used to compensate for uncertainties regarding the ability of aquatic life or the aquatic system to tolerate excursions above the criteria, uncertainties inherent in estimating bioaccumulation, or uncertainties in the assimilative capacity of the water body*."[31]

However, at other points the Staff Report indicates dilution credits would *not* be allowed. For example, the Staff Report indicates the following language would be included in Chapter IV of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE Plan) (the Implementation Chapter): "Dilution shall be prohibited if the mercury concentration in fish tissue from fish in the receiving water exceeds the applicable MERCURY WATER QUALITY OBJECTIVES."[32] Presumably, this prohibition would apply regardless of whether a water body is on the 303(d) list of impaired waters for mercury. SWRCB Staff also indicated at the January 9, 2017, workshop that dilution credits and mixing zones would not be allowed in NPDES permits for water bodies that are impaired for mercury.

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29 Staff Report, p. 10.

30 Staff Report, p. 180. See also a similar statement on p. 182.

31 Staff Report, p. 154.

32 Appendix A of the Staff Report, p. A-11; capitals in original.

QAID 1608830.000 - 3640

Disallowing the use of dilution credits would contradict precedential SWRCB orders. For example, the summary for Order 2001-06 states that "A Regional Water Quality Control Board (Regional Water Board) cannot rely solely on a Section 303(d) listing as the basis for concluding that a receiving water lacks assimilative capacity for an impairing pollutant. Rather, the Regional Water Board must base assimilative capacity determinations on the relevant water quality-related data."[33] The facts before the SWRCB in Order 2001-06 included a water body listed as impaired for bioaccumulative pollutants but where the dilution achieved by individual discharges was so great that even the elimination of those discharges would have had no effect on pollutant concentrations in the water body or in fish. Such facts would have to be established on a site-specific basis but appear to be supported for many water bodies given the information provided in the Staff Report for the proposed mercury provisions.

The Staff Report should be amended to clearly indicate, consistent with SWRCB precedential orders, that dilution credits and mixing zones must be considered on a site-specific basis, such that if the proposed effluent limitation (without dilution) would have no discernible impact on mercury concentrations in receiving waters or in fish, dilution must be allowed.

5. The fish tissue objectives proposed to protect wildlife are likely to be overly conservative and should be revised to address this limitation.

The fish tissue objectives proposed for wildlife protection are generally in the range of values commonly used by United States Fish and Wildlife Service (USFWS) and are generally based on peer-reviewed literature. However, in many instances the information for key species is generated using surrogates of mammals or avian species with numerous assumptions. For example, the wildlife value is based on a mallard duck reference dose of 0.021 mg/kg/day, and assumptions regarding the life histories of other avian species, body weight, etc., are used to extrapolate to a wildlife value for all other birds (presented in Appendix K Table K-1).[34] It appears a similar treatment is applied to mammals, using a reference dose of 0.018 mg/kg/day; however, the species used for the determination of this reference dose is not provided (a generic citation of USFWS 2003 appears in the text without any reference to a mammal species). We recommend the mammalian reference dose [p. K-4 and Table K-1] cite the source.

The avian reference dose derived from the mallard duck study by Heinz (1979)[35] appears to be superseded by a later study by the same author.[36] Heinz (1979) identified the lowest dosage of 0.5 mg/kg in diet as the lowest-observed-adverse-effect concentration (LOAEL), whereas a dietary toxicity threshold ranging from approximately 3 mg/kg to 9 mg/kg was found in more

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[33] Summary for Board water quality Order 2001–06, accessed February 9, 2017, at http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/wqo01.shtml.

[34] Staff Report, Appendix K. p. K-4.

[35] Heinz, G.H. 1979. Methyl mercury: Reproductive and behavioral effects on three generations of mallard ducks. J Wildl Manage 43:394–401.

[36] Heinz, G.H., D.J. Hoffman, J.D. Klimstra, and K.R. Stebbins. 2010. Reproduction in mallards exposed to dietary concentrations of methylmercury. Ecotoxicology 19:977–982.

QAID 1608830.000 - 3640

recent studies (Figure 4).[37] In addition, USFWS applied interspecies and NOAEL-to-LOAEL[38] uncertainty factors to derive the avian reference dose of 0.021 mg/kg/day.[39] A critical review paper by Fuchsman et al. suggests the reference dose of 0.021 mg/kg/day may be too conservative.[40] Based on the current literature, Fuchsman et al. identify/propose ranges of toxicity reference values suitable for risk assessment applications between 0.05 mg/kg/day to 0.5 mg/kg/day on a dose basis, which are a factor of 2–20 higher than the proposed reference dose. This overly conservative approach employing an artificially lower reference dose translates into a lower fish tissue concentration. While we understand this recently published information became available after the Staff Report was released for public review, SWRCB should consider the critical evaluation by Fuchsman et al. (2017) of avian threshold values in their evaluation and revise the reference dose and tissue objectives accordingly.

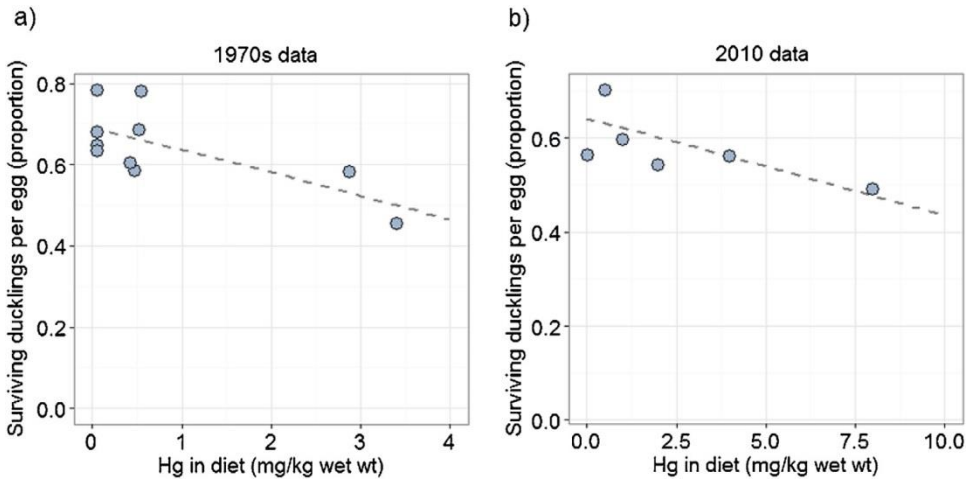

Figure 4. Dose–response relationships for mallards exposed to methylmercury dicyandiamide (1970s) or methylmercury chloride (2010). Dashed lines represent fitted regressions. Response variable calculated as % egg fertility % hatchability % duckling survival. (from Fuchsman et al. 2017)

[37] Fuchsman, P.C., L.E. Brown, M.H. Henning, M.J. Bock, and V.S. Magar. 2017. Toxicity reference values for methylmercury effects on avian reproduction: Critical review and analysis. Environ Toxicol Chem 36(2):294–319.

[38] NOAEL: No observed adverse effect concentration

[39] USFWS. 2003. Evaluation of the Clean Water Act Section 304(a) Human Health Criterion for Methylmercury: Protectiveness for Threatened and Endangered Wildlife in California. October. U.S Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Environmental Contaminants Division, Sacramento, CA.

[40] Fuchsman, P.C., L.E. Brown, M.H. Henning, M.J. Bock, and V.S. Magar. 2017. Toxicity reference values for methylmercury effects on avian reproduction: Critical review and analysis. Environ Toxicol Chem 36(2):294–319.

QAID 1608830.000 - 3640

Trophic level (TL) values were used in the Staff Report to protect wildlife that consumes prey from more than one trophic level. Clarification on 'statewide' TL values is needed. The 'statewide' values for some species were derived from site-specific data from only one region (i.e., Guadalupe River for Great blue heron and Forster's tern, Clear Lake for common loon; Table K-2, Table K-3, and text on pages K-9 through K-13), and this limitation needs to be consistently documented throughout the Staff Report.[41] Knowing 'statewide' data are derived from a data set that does not truly represent the whole state or given area would allow additional site-specific data to be used preferentially over the default value, when site-specific data become available.

The proposed water quality objective tissue concentrations for protection of wildlife—0.03 mg/kg in TL3 fish less than 50 mm, 0.05 mg/kg in TL3 fish less than 150 mm, and 0.2 mg/kg for TL4 fish 150–500 mm—are similar to or lower than background mercury concentrations in forage (TL3) and predatory fish (TL4). As presented in Figure H-1 of the Staff Report, mercury concentrations in largemouth bass, a common TL4 fish, are 0.4 mg/kg on average, equivalent to 2 times the wildlife value for the same TL, with concentrations that range up to approximately 0.73 mg/kg. For TL3 fish, average concentrations of mercury in rainbow trout and Chinook salmon are approximately 0.1 mg/kg, as shown Figure H-1 of the Staff Report, which are 2–3.3 times the fish concentration target calculated for this TL. A recent review by Fuchsman et al. (2016) indicated average naturally occurring Hg concentrations in forage (TL3) and predatory (TL4) fish are roughly 0.03–0.1 mg/kg and 0.1–0.3 mg/kg, respectively.[42] Given most of the mercury already in the system is from nonpoint sources, it is unlikely the proposed wildlife values of 0.03, 0.05, and 0.2 mg/kg could be attained.

The California least tern prey fish water quality objective should be applied only to water bodies where the species commonly forages. Table K-5 of Appendix K lists 8 counties where this objective is to be applied.[43] However, the map shown in the January 9, 2017 Staff presentation (Slide 20) includes Monterey County, which is not listed in Table K-5, and does not include Alameda or San Mateo County, which are listed in Table K-5. Because there have been very few historical regular breeding colonies between the City of Santa Barbara and Monterey Bay[44] the objective to protect the California least tern should not be applied in Monterey County. Also, as noted in Table K-5, the spatial application of the objective should be limited to areas within a reasonable foraging distance from known breeding colonies. However, slide 20 of the Staff presentation seems to indicate that application of the objective will be applied county-wide, without regard to distance from known breeding colonies. The Staff Report should be

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41 Staff Report, Appendix K. pp. K-9–K-13.

42 Fuchsman, P.C., M.H. Henning, M.T. Sorensen, L.E. Brown, M.J. Bock, C.D. Beals, J.L. Lyndall, and V.S. Magar. 2016. Critical perspective on mercury toxicity reference values for protection on fish. Environ Toxicol Chem, 35:529–549.

43 Staff Report, Appendix K, pp. K-32–K-34.

44 USFWS (U.S Fish and Wildlife Service). 1985. Recovery Plan for the California least tern, *Sterna antillarum browni*. Portland Oregon 112 p. http://ecos.fws.gov/docs/recovery_plan/850927_w%20signature.pdf.

QAID 1608830.000 - 3640

revised to clarify that objectives to protect the California least tern should be limited to areas within a reasonable foraging distance from known breeding colonies.

6. The water concentration targets derived from the proposed fish tissue water quality objectives are fundamentally flawed and should not be implemented at this time.

The Staff Report derives water column concentrations based on fish tissue bioaccumulation factors (BAF)[45] and translators.[46] Proposed targets of 12 ng/L and 4 ng/L are based on the Sport Fish WQO (0.2 mg/kg in TL4 fish, 150–500 mm; see Table 3). The Staff Report uses an EPA-derived national BAF for rivers and streams to derive a water column target concentration of 12 ng/L total mercury for flowing water bodies, including rivers, creeks, and streams. The target concentration of 4 ng/L total mercury for slow-moving water bodies, such as estuaries and bays, was derived from the combined national BAF for lakes and rivers. Water target concentrations of 4 ng/L and 1 ng/L were derived for flowing waters and slow-moving waters, respectively, based on the Tribal Subsistence mercury objective (0.06 mg/kg in TL4 fish)[47] and the same national BAFs.

Table 3. Water column concentrations based on water body type and beneficial use. From Staff Report. COMM: Commercial and Sport Fishing, T-SUB: Tribal Subsistence Fishing, SUB: Subsistence Fishing by other communities or individuals, CUL Tribal Tradition and Culture, WILD: Wildlife Habitat RARE: Rare, Threatened, or Endangered Species, MAR: Marine Habitat.

Beneficial Use of the Receiving Water	**COMM, CUL, WILD, MAR, RARE**	**COMM, CUL, WILD, MAR, RARE**	**COMM, CUL, WILD, MAR, RARE, T-SUB**	**T-SUB**	**T-SUB**	**SUB**
Water body type	Flowing water bodies (generally, rivers, creeks and streams)	Slow moving water bodies (generally, lagoons and marshes)	Lakes and reservoirs	Flowing water bodies (generally, rivers, creeks and streams)	Slow-moving water bodies (generally, lagoons and marshes)	Any
Value for "C"	12 ng/L total mercury	4 ng/L total mercury	Case-by-case	4 ng/L total mercury	1 ng/L total mercury	Case-by-case

[45] The bioaccumulation factor (BAF) is the ratio between the dissolved methylmercury concentration in water and the concentration of methylmercury in fish tissue.

[46] Staff Report, Appendix I. p. I-1.

[47] The default value is 0.04 mg/kg based on 30% TL4 and 70% TL3 diet, which is equivalent to 0.03 mg/kg in TL3 fish and 0.06 mg/kg TL4 fish (Staff Report, Appendix H, p. H-12). BAF and fish tissue targets in TL4 fish were used to derive water column targets (Staff Report, Appendix I, p. I-1).

QAID 1608830.000 - 3640

There are several problems with SWRCB's approach to calculating water concentration targets from the proposed fish tissue water quality objectives. First, and most importantly, application of two national BAFs to calculate mercury water concentration targets for every water body in California is inappropriate. National BAFs, California statewide BAFs, and translation factors for mercury are highly variable and uncertain.[48] National BAFs are calculated as the geometric mean of field-measured BAFs obtained from published literature.[49] As illustrated in Figure 5, national BAFs range over two to three orders of magnitude due to variability between the many different regions and water bodies reflected in the 90 percent confidence-interval range (i.e., between the 5th and 95th percentiles). The Staff Report also discusses the potential use of an available California-wide BAF, but because this value is based on a limited dataset, the Staff Report proposes to use the EPA national BAFs instead.[50] However, the use of nation-wide BAFs oversimplifies the very complex process of mercury bioaccumulation and ignores site-specific conditions. A BAF is a site-specific value and is affected by numerous physical, chemical, and biological factors including among others pH, dissolved organic carbon (DOC), salinity, water flow, temperature, redox potential, sulfide and sulfate, suspended solids, nutrient loading, fish size and age, and concentration-dependent demethylation.[51,52,53,54,55,56,57,58] There is potential for mercury methylation and bioaccumulation to vary significantly from location to location and over time (seasonally). Even within California, conditions vary considerably

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[48] Sandborn, J.R., and R.K. Brodberg. 2006: Evaluation of bioaccumulation factors and translators for methylmercury, SDMS DocID 466770.

[49] U.S. EPA. 2010. Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion. EPA 823-R-10-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

[50] Staff Report, Appendix I, p. I-2–I-3.

[51] Brumbaugh, W.G., D.P. Krabbenhoft, D.R. Helsel, J.G. Wiener, and K.R. Echols. 2001. A national pilot study of mercury contamination of aquatic ecosystems along multiple gradients: Bioaccumulation in fish. USGS/BRD/BSR-2001-0009. U.S. Geological Survey, Columbia, Missouri.

[52] Kamman, N.C., P.M. Lorey, C.T. Driscoll, R., Estabrook, A. Major, B. Pientka, and E. Glassford. 2004. Assessment of mercury in waters, sediments, and biota of New Hampshire and Vermont lakes, USA, sampled using a geographically randomized design. Environ. Toxicol. Chem. 23:1172–1186.

[53] Marvin-DiPasquale, M., J. Agee, C. McGowan, R.S. Oremland, M. Thomas, D. Krabbenhoft, and C.C. Gilmour. 2000. Methyl-mercury degradation pathways: A comparison among three mercury-impacted ecosystems. Environ. Sci. Technol. 34(23):4908–4916.

[54] Qian, S.S., W. Warren-Hicks, J. Keating, D.R.J. Moore, and R.S. Teed. 2001. A predictive model of mercury fish tissue concentrations for the southeastern United States. Environ. Sci. Technol. 35(5):941–947.

[55] Ullrich, S.M., T.W. Tanton, and S.A. Abdrashitova. 2001. Mercury in the aquatic environment: a review of factors affecting methylation. Crit. Rev. Environ. Sci. Technol. 31:241–293.

[56] Sonesten, L. 2003. Catchment area composition and water chemistry heavily affects mercury levels in peach (Perca fluviatilis L.) in circumneutral lakes. Water, Air, Soil Pollution 144:117–139.

[57] Rose, J., M.S. Hutcheson, C.R. West, O. Pancorbo, K. Hulme, A. Cooperman, G. DeCesare, R. Isaac, and A. Screpetis. 1999. Fish mercury distribution in Massachusetts, USA Lakes. Environ. Toxicol. Chem. 18(7):1370–1379.

[58] Watras, C.J., R.C. Back, S. Halvorsen, R.J.M. Hudson, K.A. Morrison, and S.P. Wente. 1998. Bioaccumulation of mercury in pelagic freshwater food webs. Sci. Tot. Environ. 219:183–208.

QAID 1608830.000 - 3640

between regions. As a result, national or statewide default values are likely to be inaccurate on a site-specific basis. As the Staff Report states, the water concentration targets based on national BAFs can be over- or under-protective in different water bodies.[59] Because of this likely possibility, EPA recommends the use of site-specific data over default national values such as those used in developing the mercury water concentration targets.[60,61] The use of site-specific data allows the development of BAFs that are more realistic.

Second, the Staff Report lacks clear guidance on the classification of the receiving water body type as either "flowing" or "slow-moving." The Report refers to "Table 1" for guidance, but there is no Table 1 in the document.[62] The Board expects individual permit writers at the Regional Boards to apply site specific information and "professional judgment" to determine which category fits best for a given water body. However, this approach seems highly subjective and open to arbitrary determinations, despite its importance given the significant difference between the two water concentration targets (12 ng/L versus 4 ng/L) and the potentially significant costs to NPDES dischargers that could result from this choice.

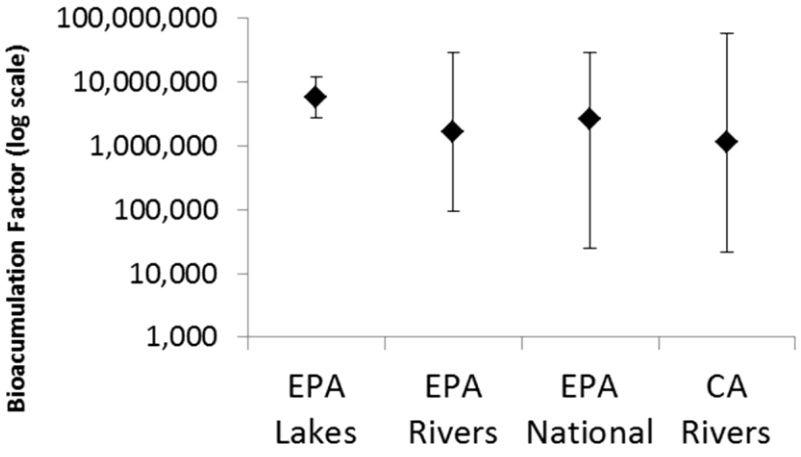

Figure 5. Comparison of National and California Bioaccumulation Factors. Data points (diamond symbols) are geometric means. Vertical bars extend from the 5th to the 95th percentile of the log-normal distribution. (From Staff Report, Appendix I. p. I-2, Figure I-1.)

Third, it is unclear whether estuaries should be understood as "slow-moving" water bodies, and thus whether a BAF applicable to lakes should be applied in calculating water concentration

[59] Staff Report, p. 91.

[60] U.S. EPA. 2010. Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion. EPA 823-R-10-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

[61] U.S. EPA. 2001. Water Quality Criteria for the Protection of Human Health: Methylmercury. EPA-823-R-01-001. January 2002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

[62] Staff Report, pp. 155.

QAID 1608830.000 - 3640

targets for estuaries. Unlike lakes, most estuaries are actively flowing water bodies containing a wide distribution of many different TL fishes. Our experience indicates that in some estuaries, waters are not "slow-moving"; for example, in Carquinez Strait in San Francisco Bay, water velocities routinely exceed the velocities measured in most rivers, such that it is wholly inappropriate to assume estuaries are "slow-moving."[63] The proposal should be revised to provide clear guidance for distinguishing the two types of water bodies.

Fourth, as noted above, the Staff Report uses a BAF for rivers and streams to derive a water column target concentration of 12 ng/L for flowing water bodies and a BAF for lakes and rivers to derive a water column target concentration of 4 ng/L for slow-moving water bodies, such as estuaries and bays. Thus, the BAFs used to calculate concentration targets for flowing water bodies and slow-flowing water bodies *both* rely on data from rivers. This double use suggests that one or both BAFs may be inappropriate to the flow categories they were used to represent.

Fifth, the method of calculating water concentration targets from BAFs is flawed. A recent study by Dutton and Fisher (2014) shows that methylmercury concentrations in fish are driven by food exposure and not by water column exposure.[64] The BAF approach does not address potentially wide variability in water concentrations and assumes all compartments (water, sediment, and biota) are in equilibrium with each other. In fact, in most cases the water compartment is *not* in equilibrium with the lower portions of the food chain—thus, one of the most basic assumptions behind the use of a BAF is violated.

Sixth, the use of translators adds to the already considerable degree of uncertainty associated with the water concentration targets. Different forms of mercury and methylmercury, such as dissolved/filtered and total/unfiltered, are measured in the water column. Translators are applied to convert dissolved methylmercury concentration (obtained via the BAF method) to total mercury and to total methylmercury concentrations, which are the forms in which mercury water concentration targets are typically expressed. The Staff Report proposes water column target concentrations expressed as total mercury concentrations. Underlying the use of any type of mercury translator is the assumption that mercury levels in fish tissue will respond in a linear manner to reductions in mercury loading. Evidence indicates this relationship between fish tissue levels and loadings is much more complex and influenced by a number of interacting biogeochemical factors that are highly variable in time and space.[65] In addition, relationships used to derive the translation factors are very weak (Figure 6). The translation factor between dissolved and total mercury in a given waterbody can be highly variable, changing spatially and temporally. The Staff Report should be revised to include a detailed discussion of the variability of the translators employed in their methodology.

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[63] During high flow periods of the tidal cycle, flow velocity in Carquinez Strait is routinely higher than three feet per second (fps). See Warner, J., D. Schoellhamer, J. Burau, G. Schladow. 2002. Effects of tidal current phase at the junction of two straits. Continental Shelf Res. 22:1629-1642. Figure 2, p. 1632.

[64] Dutton, J., and N.S. Fisher. 2014. Modeling metal bioaccumulation and tissue distribution in killifish (*Fundulus heterolitus*) in three contaminated estuaries. Environ Toxicol Chem. 33(1):89–101.

[65] See citations provided in prior footnotes.

QAID 1608830.000 - 3640

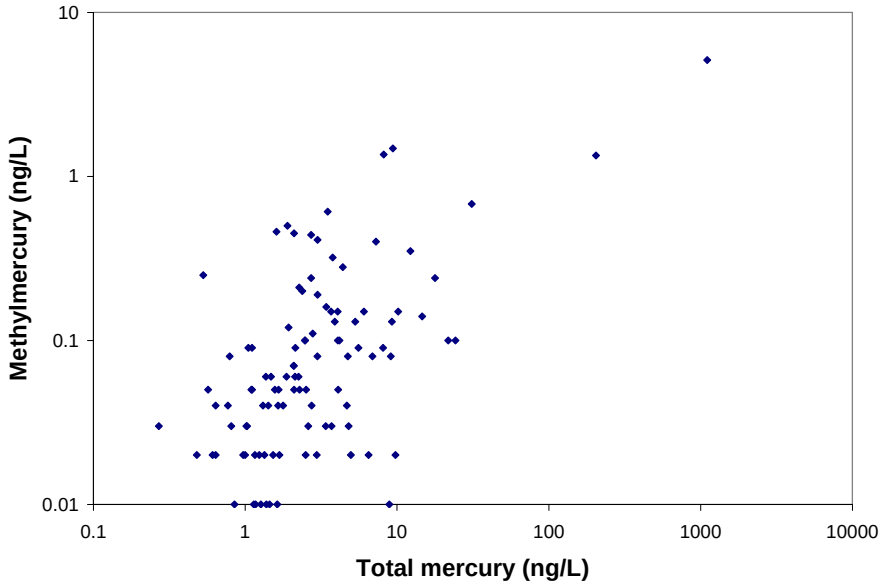

Figure 6. Total Mercury versus methylmercury in stream water samples collected throughout the U.S. as Part of the National Water-Quality Assessment Program (from Krabbenhoft et al. 1999)

In short, there are multiple problems with the Staff Report's approach to calculating water concentration targets in the Mercury Provisions. The use of national BAFs rather than local site-specific BAFs, and the use of mercury translators, introduces enormous uncertainty into the proposed values. In addition, given the lack of clarity about what constitutes "flowing" and "slow-moving waters," it is unclear whether the Staff Report used BAFs for the correct water body categories in calculating the concentration targets. Moreover, the use of BAFs is flawed given the faulty assumptions upon which the methodology is based, such as the assumption of equilibrium between the water, sediment, and biota compartments. Given these problems, and the potentially huge costs that NPDES dischargers would likely incur to comply with the water concentration targets if they are imposed as effluent limitations, SWRCB should revise the proposed targets and should not implement them at this time.

7. The proposed human health objectives may be too conservative.

We share the state's concern about protection of human health but would request that the Staff Report be revised to confirm that specific assumptions are appropriate. The Staff Report describes numerical fish tissue levels for two human health objectives: Commercial and Sport Fishing (COMM) and Tribal Subsistence (T-SUB) (Table 4).[66]

[66] Table 5.1, p. 80 of the Staff Report.

QAID 1608830.000 - 3640

Table 4. Summary of numerical mercury water quality objectives for human health in the Mercury Provisions

Human Health Objective	Beneficial Uses	Numerical Fish Tissue Level
Commercial and Sport Fishing (COMM)	Commercial and Sport Fishing; Wildlife Habitat[a]; Marine Habitat[a]	0.2 mg methylmercury/kg in Trophic level 4 fish
Tribal Subsistence (T-SUB)	Tribal subsistence fishing	0.04 mg methylmercury/kg in 70% Trophic Level 3 fish and 30% Trophic Level 4 fish

[a] According to the Mercury Provisions, the objectives supporting Wildlife Habitat and Marine Habitat may also be applied to Warm Freshwater Habitat, Cold Freshwater Habitat, Estuarine Habitat, and Inland Saline Water Habitat because each of those includes protection of wildlife habitat.

The proposed fish tissue concentration for COMM is 0.2 mg methylmercury/kg in highest TL fish (TL4, e.g., largemouth bass; fishes in this trophic level contain the highest concentrations of mercury). This value is similar to the Fish Contaminant Goal (FCG) of 0.22 mg methylmercury/kg developed by the Office of Environmental Health Hazard Assessment (OEHHA).[67] The difference between the two fish tissue concentrations (the proposed COMM and OEHHA FCG) arises from the use of a Relative Source Contribution value (see the next comment) in the proposed COMM fish tissue concentration but not in the OEHHA FCG. The OEHHA FCG of 0.22 mg/kg is non-enforceable but has been used since 2012 for water quality assessment purposes in the State, according to the Mercury Provisions.[68] EPA developed a national criterion for fish tissue of 0.3 mg methylmercury/kg in 2001,[69] but the Staff Report did not adopt that value.

Currently, the only enforceable concentration for mercury is for water as established in the California Toxics Rule (CTR) to protect people from consuming mercury from fish caught recreationally; the fish tissue concentration for mercury used to derive the CTR water criterion was 0.37 mg/kg.[70] There is no statewide criterion that addresses subsistence fishers.

The proposed fish tissue concentration for the T-SUB is 0.04 mg methylmercury/kg, assuming a diet comprised of 70% TL3 fish and 30% TL4 fish. This proposed concentration is similar to EPA's national criterion for subsistence fishing of 0.05 mg methylmercury/kg[71] and matches the

[67] Klasing, S., and R. Brodberg. 2008. Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene. June 2008. Office of Environmental Health Hazard Assessment. Sacramento, CA. http://oehha.ca.gov/media/downloads/fish/report/atlmhgandothers2008c.pdf. Accessed on February 2, 2017.

[68] Staff Report at p. 31.

[69] U.S. EPA. 2001. Water Quality Criterion for the Protection of Human Health: Methylmercury. Final. EPA-823-R-01-001. January 2001. Office of Science and Technology, Office of Water, U.S. Environmental Protection Agency, Washington DC.

[70] Table 3-1, p. 31 of the Staff Report.

[71] U.S. EPA. 2001.

QAID 1608830.000 - 3640

fish concentration of 0.04 mg methylmercury/kg developed for Oregon's Columbia River Tribes.[72] EPA has proposed even lower fish concentrations for subsistence fishing in Washington (0.033 mg methylmercury/kg)[73] and Maine (0.02 mg methylmercury/kg).[74] While EPA has promulgated a fish concentration of 0.03 mg methylmercury/kg for Washington,[75] the state of Maine is contesting EPA's proposal of 0.02 mg methylmercury/kg.

The Staff Report and appendices[76] describe the assumptions and values used in the calculations of the human health objectives (COMM and T-SUB), which are fish tissue concentrations. The equation used to calculate the proposed fish tissue concentrations for COMM and T-SUB is:

$$FTC = \frac{BW * (RfD - RSC)}{FI}$$

FTC = a fish tissue concentration in milligrams (mg) methylmercury per kilogram (kg wet weight) fish. The FTC value is the methylmercury WQO.

BW = average human body weight; a value of 70 kg was used.

RfD = reference dose of 0.0001 mg methylmercury/kg body weight/day was used. This value is EPA's Rfd for oral exposure of methylmercury.

RSC = relative source contribution, estimated at 2.7×10^{-5} mg methylmercury/kg body weight/day. This value is subtracted from the reference dose to account for other sources (e.g., store bought marine fish).

FI = fish intake rate or fish consumption rate (kg fish wet weight/day). A value of 0.032 kg/day (32 g/day) is used for COMM, and a value of 0.142 kg/day (142 g/day) is used for T-SUB.

While the assumptions and values used are EPA default values or specifically based on California data where available, there may be a compounding effect of conservatism, which may result in lower fish tissue concentrations for the objectives than necessary. In other words, the combined impact of the multiple conservative assumptions about exposure and toxicity may lead to the compounding of uncertainty factors only in one direction (i.e., toward worst case) and may result in target fish tissue concentrations that may not be representative of the actual dose and exposure and that may be lower than necessary . For instance,

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72 ODEQ. 2011. Human Health Criteria Issue Paper Toxics Rulemaking. May 24, 2011. Portland, OR. Oregon Department of Environmental Quality.

73 80 FR 55063, September 14, 2015.

74 81 FR 23239, April 20, 2016.

75 81 FR 85417, November 28, 2016.

76 Staff Report, Appendices G and H.

QAID 1608830.000 - 3640

- The RfD is EPA's maximum acceptable oral dose of a chemical; it is defined as "an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." While EPA's RfD of 0.0001 mg/kg/day for methylmercury is the standard toxicity value commonly used, EPA applied uncertainty factors to derive the value. While uncertainty factors are intended to provide protection in the face of uncertainty, the compounding of several or many uncertainty estimates can result in overprotective values. In this case, if the RfD is lower than necessary, the fish tissue concentration also will be lower than necessary.

- The RSC is the mean daily exposure estimate of methylmercury from other sources, in this case from store-bought marine fish; EPA developed a default value of 2.7×10^{-5} mg/kg/day in their 2001 water quality criteria for methylmercury.[77] Applying an RSC value of 2.7×10^{-5} mg/kg/day to the RfD drives down the RfD to 0.000073 mg/kg/day, which in turn lowers the calculated fish tissue concentration. While EPA's default RSC value for methylmercury was used by SWRCB to calculate fish tissue levels, other states such as Oregon have decided not to apply that value, acknowledging that their consumption rates already account for the other sources (e.g., store bought marine fish).

- The proposed fish tissue concentrations for COMM and T-SUB were derived using EPA's old default average body weight value (70 kg)[78] rather than the revised default average body weight (80 kg) used in a later document.[79] Using the previously reported lower body weight (70 kg) rather than the revised default weight (80 kg) also results in lower calculated fish tissue concentrations (e.g., the COMM fish tissue concentration would be 0.18 mg/kg instead of 0.16 mg/kg, before rounding). EPA has used the new default body weight (80 kg) to revise human health criteria for several chemicals[80] but not methylmercury.

- The fish consumption rates used in these calculations are 32 g wet weight/day (approximately one and half 5-oz. meals per week) for COMM and 142 g wet weight/day (approximately seven 5-oz. meals per week) for the T-SUB and are based on

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77 U.S. EPA. 2001.

78 U.S. EPA. 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health 2000. EPA-822-B-00-004. October 2000. Office of Water, Office of Science and Technology, U.S. Environmental Protection Agency, Washington DC.

79 U.S. EPA. 2015a. Fact Sheet: Human Health Ambient Water Quality Criteria: 2015 Update. U.S. Environmental Protection Agency, Washington DC. https://www.epa.gov/sites/production/files/2015-10/documents/human-health-2015-update-factsheet.pdf. Accessed February 8, 2017.

80 U.S. EPA. 2015b. Table Comparing EPA's Updated 2015 Final Human Health Criteria to Previous Criteria. U.S. Environmental Protection Agency, Washington DC. https://www.epa.gov/sites/production/files/2015-10/documents/comparison-of-epa-s-2015-final-updated-human-health-awqc-and-previous-awqc-june-2015.pdf. Accessed February 8, 2017.

QAID 1608830.000 - 3640

> California surveys.[81] EPA's default value for the general population, which was developed under the Clean Water Act, Section 304(a), is 17.5 g wet weight/day (approximately one 5-oz. meal per week).[82] While EPA updated the default fish consumption rate for the general population to 22 g/day (approximately one 6-oz. meal per week),[83] EPA has not updated its methylmercury criteria for human health to reflect this newer rate.

Although applying these assumptions and values may not individually drive down the proposed fish tissue concentrations by a substantial amount, applying them collectively may artificially lower the fish tissue concentrations. Therefore, we recommend the Board review the assumptions and values in the proposed human health objectives for COMM and T-SUB in the Mercury Provisions.

A further concern is that the proposed fish tissue concentrations for human health objectives (COMM and T-SUB) in the Mercury Provisions are likely unattainable. The mercury concentration in fish for T-SUB is 0.04 mg/kg, assuming a diet of 70% TL3 fish and 30% TL4 fish. As shown in Figure H-1 of the Mercury Provisions (reproduced below as Figure 7), mercury concentrations in largemouth bass, a common TL4 fish, are on average 0.4 mg/kg, ten times higher than the proposed objective, with concentrations up to approximately 0.73 mg/kg. Average concentrations of mercury in rainbow trout and Chinook salmon (TL 3 fish) are approximately 0.1 mg/kg (Figure H-1), which are approximately 2.5 times the fish concentration calculated for T-SUB.

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81 San Francisco Estuary Institute. 2000. San Francisco Bay Seafood Consumption Study. Richmond, CA. Shilling, F., A. Negrette, L. Biondini, and S. Cardenas. 2014. California Tribes Fish-Use: Final Report. A Report for the State Water Resources Control Board and the U.S. Environmental Protection Agency. Agreement # 11-146-250. July 2014.

82 U.S. EPA. 2000.

83 U.S. EPA. 2015a.

QAID 1608830.000 - 3640

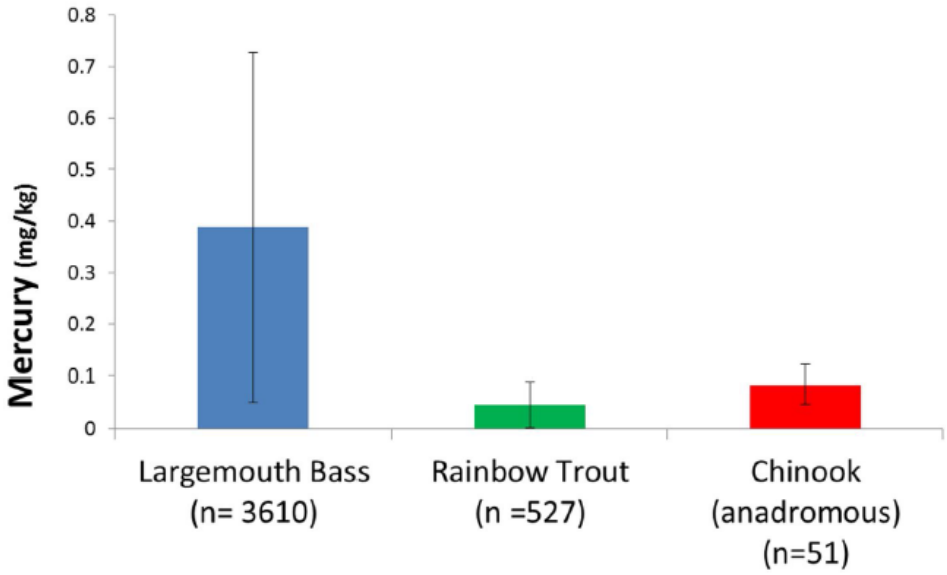

Figure H-1. Mercury concentrations in largemouth bass, rainbow trout, anadromous chinook salmon in California. Largemouth bass and trout were 150-500 mm. Chinook were 500-1000 mm. Data from ceden.org.

Figure 7. Figure H-1 from Appendix H (p. H-6) of the Mercury Provisions. Accessed February 9, 2017, at http://www.swrcb.ca.gov/water_issues/programs/mercury/docs/staff_report/hg_apndx_h.pdf.

Given most of the mercury already in the system is from nonpoint sources, it is unlikely the proposed human health-based values of 0.2 and 0.04 mg/kg for COMM and T-SUB, respectively, could be attained. In addition, salmon largely accumulate mercury during the long time spent in the ocean, not in inland waters and estuaries where the proposed objectives would be applied. In California, freshwater fisheries currently capable of sustaining subsistence fishing tend to be limited to anadromous species such as salmon, which are largely limited to rivers of coastal northern California and tributaries of the Sacramento River. As such, WQOs for other regions of California may be inappropriate.

Finally, alternative implementation measures to protect human health should be considered, particularly since reduction in environmental mercury concentrations is expected to take decades or longer. There are alternatives for lowering mercury exposure in populations of subsistence fishers other than reduction of mercury concentrations in the environment. Extensive experience has been gained in recent decades in balancing public health risks and mercury exposure in indigenous populations in the Canadian Arctic and the Brazilian Amazon that are dependent on fish consumption. This experience has led to several strategies to maintain fish consumption while reducing mercury exposure; these strategies can be implemented where it is impossible to reduce environmental mercury concentrations. These interventions through public health education include:

QAID 1608830.000 - 3640

- Guidance on mercury status of fish species to encourage consumption of less contaminated species
- Guidance on which waters contain higher mercury levels so that they can be avoided
- Encouraging greater fruit consumption, which may be protective against the bioaccumulation of mercury in human populations exposed via dietary intake of fish.[84]

This section of the Mercury Provisions also contains several significant typographical errors that require correction. On page H-9 of Appendix H (Section H.3.3), the report states "Two example trophic level specific objectives were derived that would protect consumption of one fish meal per week (0.016 mg/kg in fish tissue on average, from Table H-2A)." The value 0.016 mg/kg appears to be a typo. Based on Table H-2A, the value should be 0.16 mg/kg.

8. The proposed action to address dredging, wetlands, and nonpoint sources of mercury is vague and does not prescribe or prevent any specific actions.

The Mercury Provisions present three options to "control mercury discharges from dredging, wetlands and nonpoint source discharges (other than legacy mines… and current NPDES permitted discharges)"[85]:

Option 1. No Action.
Option 2. Emphasize that under existing law the Water Boards have discretion to address nonpoint source discharges of mercury and methylmercury production in wetlands and the Water Boards should consider such implementation measures in areas with elevated mercury concentrations.
Option 3. Establish new requirements for mercury and methylmercury and continue to use existing programs.

Of the three options presented to reduce mercury impact from wetlands, the Staff Report recommends Option 2, which allows for the use of existing law to implement mercury controls where warranted and seeks to emphasize their use in areas of "elevated" mercury. Specifically, the Staff Report identifies areas of "elevated" mercury as locations with mercury of 1 ppm or higher or areas with a history of mercury or gold mining.[86] However, this recommendation is vague and does not prescribe (or prevent) any specific action. It is unclear how this is different from Option 1, "No Action."

It is also unclear how Option 2 is intended to be implemented. In the discussion of wetlands management in Appendix Q, the Staff Report identifies several factors which may be used to minimize mercury transport or methylmercury production, but all of these are areas of active

[84] Passos, C.J.S., D. Mergler, M. Fillion, M. Lemire, F. Mertens, J.R.D. Guimarães, and A. Philibert. 2007. Epidemiologic confirmation that fruit consumption influences mercury exposure in riparian communities in the Brazilian Amazon. Environmental Research 105(2):183–193.

[85] Staff Report, p. 133-35.

[86] Staff Report, p. 133.

QAID 1608830.000 - 3640

research rather than established management procedures.[87] The science to determine which environmental factors are important in controlling the production of methylmercury in wetlands is still evolving, and the relative importance of the many factors which can influence mercury chemistry can vary from site to site.[88]

There are no established best management practices to reduce the production or transport of methylmercury in wetlands. The Staff Report acknowledges this in Appendix Q but describes wetland studies with "potential" methods to control mercury transport and methylation. Some of the potential management procedures described in Appendix Q are relatively untested, and their possible utility for mercury control on a wide scale is unknown, while others are more applicable and/or straightforward to implement.

For example, settling ponds to reduce sediment load (and potential mercury transport) to other water bodies is a reasonable approach, but care must be taken to minimize potential methylation and/or bioaccumulation in such a system, as the slow-moving conditions required for settling to occur may also be conducive to anoxic conditions that favor mercury methylation. Similarly, wetting/drying cycles, especially in areas with significant organic matter, have been shown to contribute to the production of methylmercury.[89] Managing water flow to minimize wetting/drying cycles caused by water level fluctuation is a reasonable management approach for agricultural or other managed wetlands, but it is not possible at this time to quantify the predicted effect that this would have in any specific system.[90]

In contrast, the recommended use of coagulants for mercury removal in settling ponds is based on a single paper, which used experimental coagulants to attempt to minimize methylmercury bioaccumulation and transport.[91] This study used a single environmental site and a limited time frame (approximately 1 year). The practicality of treating a large wetland or agricultural system using a similar approach is not discussed. There would likely be issues with mercury accumulation in the pond and with the potential to re-methylate mercury in new locations if the coagulated mercury is transported to locations with different chemistry. This is not addressed in either the Staff Report or the cited paper. Additionally, while both experimental treatments reduced the amount of methylmercury produced, only one of the two chemical coagulants

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87 Staff Report, Appendix Q.

88 Bigham, G. N., K. J. Murray, Y. Masue-Slowey, and E. A. Henry. 2016. Biogeochemical controls on methylmercury in soils and sediments: Implications for site management. Integr Environ Assess Manag. doi:10.1002/ieam.1822.

89 Feng, S., Z. Ai, S. Zheng, B. Gu, and Y. Li. 2014. Effects of dryout and inflow water quality on mercury methylation in a constructed wetland. Water, Air, & Soil Pollution, 225(4), p.1929.

90 Larson, J.H., R.P. Maki, B.C. Knights, and B.R. Gray. 2014. Can mercury in fish be reduced by water level management? Evaluating the effects of water level fluctuation on mercury accumulation in yellow perch (Perca flavescens). Ecotoxicology, 23(8), pp.1555–1563.

91 Ackerman, J.T., T.E. Kraus, J.A. Fleck, D.P. Krabbenhoft, W.R. Horwath, S.M. Bachand, M.P. Herzog, C.A. Hartman, and P.A. Bachand. 2015. Experimental dosing of wetlands with coagulants removes mercury from surface water and decreases mercury bioaccumulation in fish. Environ Sci & Technol 49(10):6304–6311.

QAID 1608830.000 - 3640

reduced the amount of methylmercury accumulated in biota, consistent with other publications reporting that the total mercury concentration is not always the controlling factor in mercury bioaccumulation.[92] The suggested use of coagulants as a management practice in California wetlands is premature.

[92] Driscoll, C.T., H.J. Han, C.Y. Chen, D.C. Evers, K.F. Lambert, T.M. Holsen, N.C. Kamman, and R.K. Munson. 2007. Mercury contamination in forest and freshwater ecosystems in the northeastern United States. BioScience 57(1):17–28.

QAID 1608830.000 - 3640