

STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION--DIVISION OF WATER QUALITY
MARCH 16, 2005

ITEM 8

SUBJECT

CONSIDERATION OF A RESOLUTION APPROVING ~~WITH PARTIAL DISAPPROVAL~~ AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY REGION TO INCORPORATE A TOTAL MAXIMUM DAILY LOAD (TMDL) FOR MERCURY IN SAN FRANCISCO BAY

DISCUSSION

The San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board) adopted the revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) under Resolution No. 95-76 on June 21, 1995. The revised Basin Plan was approved by the State Water Resources Control Board (State Water Board) on July 20, 1995 and by the Office of Administrative Law (OAL) on November 13, 1995.

The Basin Plan contains a basinwide narrative water quality objective for bioaccumulation and, for the portion of San Francisco Bay north of the Dumbarton Bridge, numeric water quality objectives for mercury. The numeric objective requires that marine waters shall not contain concentrations of mercury greater than 0.025 microgram per liter ($\mu\text{g/L}$) calculated on a four-day average. A footnote associated with the marine water four-day average 0.025 $\mu\text{g/L}$ objective states that the source of the objective is the 1984 U.S. Environmental Protection Agency (USEPA) Ambient Water Quality Criteria for Mercury. This criteria document states: "saltwater aquatic organisms and their uses should not be affected unacceptably if the four-day average concentration of mercury does not exceed 0.025 $\mu\text{g/L}$ more than once every three years on the average." It also says: "If the four-day average concentration exceeds 0.025 $\mu\text{g/L}$ more than once in a three-year period, the edible portion of consumed species should be analyzed to determine whether the concentration of methylmercury exceeds the FDA [Food and Drug Administration] action level."

In 1998, the San Francisco Bay Water Board placed San Francisco Bay on the Clean Water Act (CWA) section 303(d) list as impaired by mercury due to the exceedance of the narrative bioaccumulation water quality objective. It is not clear whether San Francisco Bay, north of the Dumbarton Bridge, exceeds the numeric mercury marine four-day average water quality objective (four-day average objective).

CWA section 303(d)(1)(C) requires states to establish TMDLs for the pollutants causing the impairments at levels necessary to protect the beneficial uses and attain applicable water quality objectives. A TMDL is a numerical calculation and allocation of the total loading capacity that a water body can assimilate, considering seasonal variations and a margin of safety, and still attain water quality standards. A TMDL includes one or more numerical targets that represent attainment of the standards.

On September 15, 2004, the San Francisco Bay Water Board adopted Resolution No. R2-2004-0082 ([Attachment 1](#)) to establish a TMDL for mercury in the San Francisco Bay. The proposed TMDL implements the bioaccumulation water quality objective by setting numeric targets for mercury in sediment, fish tissue, and in bird eggs. It is expected to result in compliance with the bioaccumulation objective by the end of the 120-year compliance period. The proposed TMDL does not set a mercury water column target to implement the four-day average objective; rather, it is only directed to the narrative bioaccumulation objective. San Francisco Bay Water Board staff argue that it was unnecessary for the TMDL to meet that numeric objective, because as noted in the footnote attached to the four-day average objective, the objective appears to be directed to ensuring that edible fish tissue is safe for consumption, and the fish tissue targets selected are in fact protective of fish tissue consumption.

The numeric targets included in the TMDL are:

- Fish tissue – 0.2 milligrams (mg) mercury per kilogram (kg) fish tissue. The target is based on the 95th percentile of the consumption rate of San Francisco Bay sport and subsistence fishers who consume their catch.
- Sediment – 0.2 mg mercury per kg dry sediment. The target is based on the calculated reduction needed to achieve the fish tissue target.
- Bird egg – less than 0.5 mg mercury per kg wet weight. As stated in the staff report supporting the TMDL, bird egg concentrations of 0.5 mg mercury per kg wet weight are associated with toxic effects, and an egg mercury concentration that does not cause adverse effects has not been determined. The San Francisco Bay Water Board therefore determined that the target should be “less than” 0.5 mg/kg.

Regional Board Resolution No. R2-2004-0082 authorized the Regional Board Executive Officer to make minor, non-substantive corrections to the language of the amendment, if needed, for clarity or consistency. SWRCB staff review of the proposed amendment identified an item in the amendment that required clarification. As a result of a typographic error, a portion of the bird egg target was inadvertently omitted. As reflected in the Regional Board’s staff report, the correct bird egg target should read: “The wildlife target is expressed as a bird egg mercury concentration less than 0.5 mg mercury per kg (wet weight) where no observable adverse effects occur.” By memorandum dated March __, 2005, the Regional Board Executive Officer made the above non-substantive correction to the amendment “Exhibit A Basin Plan Amendment” (Attachment 2).

~~It has been determined, however, that for feeding breeding mallards, 0.5 mg/kg mercury results in long-term reproductive effects. Based on this study, USEPA calculated a chronic No Observed Adverse Effects Level of 0.021 mg/kg body weight for avian wildlife. Mercury bioaccumulates and eggs are considered a sensitive life stage. Additional feeding studies of breeding pairs found that ring-necked pheasants and game chickens are more sensitive to mercury than mallards. Birds are exposed to mercury through food; however, it is difficult to raise and breed wild birds for similar types of feeding testing. CalFed addressed this difficulty by developing a protocol for determining the relative sensitivities of wild birds to mercury compared to pheasants, game chickens, and mallards. The result of that work was “Use of egg injections to rank the sensitivities of avian embryos to methylmercury” by the US Geologic Survey (USGS) Patuxent Wildlife Research Center, which was part of the “Assessment of Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed” project. USGS found the same relative ranking of sensitivity for injected egg studies of the three game farm species as for the feeding studies. USGS went forward with the assumption that the results of injected egg studies in wild bird species would give similar~~

~~interspecies relative ranking of sensitivity and therefore would provide a reasonable substitute for feeding studies. As indicated in the table below, the wild bird species studied had lower survival rates; that is, they were more sensitive to mercury than mallards or game chickens and pheasants. Snowy egrets were the most sensitive species tested.~~

~~Summary of results of the relative avian sensitivity to mercury testing:~~

	Control 1 % survival/ no. of deformities	Control 2 % survival/ no. of deformities	0.2 ppm Hg % survival/ no. of deformities	0.4 ppm Hg % survival/ no. of deformities	0.8 ppm Hg % survival/ no. of deformities
snowy egret	not used	90/0	25/1	10/1	20/1
royal tern*	not used	40/1	22/3	40/3	0/0
clapper rail	not used	79/0	40/1	47/3	8/0
herring gull	89/0	72/1	59/2	42/1	31/2
brown pelican	93/0	93/1	86/0	67/1	47/2
ring-necked pheasant	86/1	96/1	80/3	46/2	31/2
chicken	98/0	100/0	87/3	63/1	67/4
mallard	90/1	82/0	97/0	77/0	63/3

~~* Only tern tested. Royal tern is not a resident of the Bay area. Control survival was poor.~~

~~The proposed bird egg target, based upon mallards and not fully protective of mallards, would not be protective of more sensitive wild birds. Therefore, State Water Board staff recommends **disapproving** the bird egg wildlife target.~~

USEPA has expressed concern that the:

- TMDL does not establish the mercury four-day average objective as a target;
- TMDL may not result in compliance with the four-day average mercury water quality objective; and
- Method used to assign waste load allocations to point source dischargers could result in a relaxation of effluent limitations.

State and Regional Water Board staff have discussed these issues with USEPA. To address the third issue, San Francisco Bay Water Board staff will supplement the administrative record with information requested by USEPA.

With regard to the first two issues, USEPA has objected to the TMDL because the implementation plan may not cause the water body to attain the four-day average objective by the end of the 120-year implementation schedule. State Water Board staff agrees with USEPA that this numeric water quality objective is an objective that is applicable to ~~a part of~~ the San Francisco Bay north of the Dumbarton Bridge. However, staff disagrees that a single TMDL must be directed to all applicable objectives at once. While this TMDL, which is directed to the narrative bioaccumulation objective, constitutes an appropriate program of implementation under California Water Code section 13242, the San Francisco Bay Water Board should be directed to address ensure that the four-day average mercury objective, ~~which applies north of the Dumbarton Bridge, will also be addressed~~. Even if a Regional Water Quality Control Board believes that implementation of one objective (such as a narrative bioaccumulation objective) will be protective

of the human health ends of another objective (such as the numeric water column objective), it may not bypass that other applicable objective. If an objective is applicable, it must be implemented.

There is a question, however, given the footnote attached to the objective in the Basin Plan, and the USEPA criteria, about whether the mercury four-day average objective needs to be attained to ensure the protection of human health associated with fish consumption. There is also a question about whether this TMDL would actually attain the numeric objective, given that current monitoring activities are not frequent enough to calculate a four-day average. Finally, as reported by the Regional Board during the Workshop, there is a question about whether any additional measures could cause the Bay to actually reach the four-day average objective in any event. Given these questions, the San Francisco Bay Water Board may not need to adopt a program of implementation directed to the four-day average water column objective if either (a) the TMDL's targets are actually demonstrated to attain this objective, or (b) if the four-day average objective is modified through an appropriate standards action such that the existing targets would reflect full attainment. If neither (a) or (b) are appropriate, the San Francisco Bay Water Board should modify this TMDL or adopt a new TMDL directed to the four-day average objective to ensure that it will be attained.

Accordingly, the TMDL (which is directed to the narrative objective) and program of implementation should be approved, but the State Water Board should instruct the San Francisco Bay Water Board to take action ~~as soon as practicable~~, as described in the preceding paragraph to ensure that the four-day average objective is likewise addressed.

POLICY ISSUE

Should the State Water Board approve the amendment to the Basin Plan in accordance with the Staff Recommendation below?

FISCAL IMPACT

California Water Board staff work associated with or resulting from this action can be accomplished within budgeted resources.

REGIONAL WATER BOARD IMPACT

Yes, San Francisco Bay Water Board.

STAFF RECOMMENDATION

That the State Water Board:

1. Approves the amendment to the Basin Plan to incorporate a TMDL for mercury in San Francisco Bay adopted under San Francisco Bay Water Board Resolution No. R2-2004-0082, as corrected by the Executive Officer (Attachment 2). ~~except:~~

- a. ~~In the first paragraph under the “Numeric Targets” heading, the third and fourth sentences, and in the fifth sentence, the phrase “and bird egg;” and the “s” of “targets”;~~
 - b. ~~In the second paragraph under the “Numeric Targets” heading, the end of the first sentence, starting with the words “and the U.S. Fish and Wildlife”; and~~
 - c. ~~The heading “Wildlife Target” and following two paragraphs, which are **disapproved** remanded to the San Francisco Bay Water Board for further consideration (as indicated by double strike-through in **Attachment 2**);~~
2. Directs the San Francisco Bay Water Board to take appropriate action within nine months of the date of this Resolution to revise the as soon as practicable to ensure that marine waters mercury four-day average water quality objective. ~~will also be addressed.~~
 3. Authorizes the Executive Director or designee to submit the amendment and administrative record for this action to OAL and the TMDL to USEPA for approval.

Policy Review: _____

Fiscal Review: _____

Legal Review: _____

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2005 -

APPROVING ~~WITH PARTIAL DISAPPROVAL~~ AN
AMENDMENT TO THE WATER QUALITY CONTROL PLAN
FOR THE SAN FRANCISCO BAY REGION TO
INCORPORATE A TOTAL MAXIMUM DAILY LOAD
(TMDL) FOR MERCURY IN SAN FRANCISCO BAY

WHEREAS:

1. The San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board) adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on June 21, 1995, which was approved by the State Water Resources Control Board (State Water Board) on July 20, 1995 and by the Office of Administrative Law (OAL) on November 13, 1995.
2. On September 15, 2004, the San Francisco Bay Water Board adopted Resolution No. R2-2004-0082 (Attachment 1) amending the Basin Plan to incorporate a TMDL for mercury in the San Francisco Bay.
3. The State Water Board finds that the proposed TMDL for mercury is an adequate and acceptable program of implementation directed to the narrative bioaccumulation water quality objective in the Basin Plan, as required by Clean Water Act section 303(d)(1)(C) and California Water Code section 13242.
4. The State Water Boards find that it is not clear whether the TMDL also will cause attainment of the numeric water quality objective of 0.025 microgram per liter, calculated as a four-day average, which is an objective that is applicable to those portions of the San Francisco Bay that are north of the Dumbarton Bridge
5. ~~The State Water Board finds that the proposed bird egg target is not sufficiently protective of sensitive bird wildlife.~~
6. The San Francisco Bay Water Board staff prepared documents and followed procedures satisfying environmental documentation requirements in accordance with the California Environmental Quality Act and other State laws and regulations.
7. San Francisco Bay Water Board Resolution No. R2-2004-0082 delegated to the San Francisco Bay Water Board Executive Officer authority to make minor, non-substantive clarifications/corrections to the adopted amendment, if needed, for clarity or consistency. It appeared that the bird-egg target as reflected in the basin plan amendment was inconsistent with the intent stated in the Regional Board's supporting staff report. Regional Board staff indicated that the inconsistency was occasioned by a typographical error, where part of the target was inadvertently omitted from the regulatory language. By memorandum dated March xx, 2005, the Regional Board Executive Officer has made the necessary clarification/correction to the amendment (Attachment 2).
- 7.8. The State Water Board finds that the Basin Plan amendment is in conformance with Water Code section 13240, which specifies that Regional Water Quality Control Boards may revise Basin Plans, and section 13242, which requires a program of implementation of water quality objectives.

8.9. A Basin Plan amendment does not become effective until approved by State Water Board and until the regulatory provisions are approved by OAL. Additionally, the TMDL must be approved by the U.S. Environmental Protection Agency (USEPA).

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves the amendment to the Basin Plan to incorporate a TMDL for mercury in San Francisco Bay adopted under San Francisco Bay Water Board Resolution No. R2-2004-0082 as corrected by the Executive Officer (Attachment 2).
~~except:~~
 - a. ~~In the first paragraph under the "Numeric Targets" heading, the third and fourth sentences, and in the fifth sentence, the phrase "and bird egg;" and the "s" of "targets";~~
 - b. ~~In the second paragraph under the "Numeric Targets" heading, the end of the first sentence, starting with the words "and the U.S. Fish and Wildlife"; and~~
 - c. ~~The heading "Wildlife Target" and following two paragraphs, which are disapproved (as indicated by double strike-through in Attachment 2).~~
2. Directs the San Francisco Bay Water Board to take appropriate action within nine months of the date of this Resolution to revise the ~~as soon as practicable to ensure that the~~ marine waters mercury four-day average water quality objective. ~~is also addressed.~~
3. Authorizes the Executive Director or designee to submit the amendment and administrative record for this action to OAL and the TMDL to USEPA for approval.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on March 16, 2005.

Debbie Irvin
Clerk to the Board