

STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Petition of )  
)  
CITIZENS FOR A BETTER ENVIRONMENT )  
ENVIRONMENT (CBE), ET AL., UNITED )  
STATES FISH AND WILDLIFE SERVICE )  
(USFWS), AND CITY OF SAN JOSE )  
)  
For Review of Action and Inaction )  
of the California Regional Water )  
Quality Control Board, San Francisco )  
Bay Region. Our Files Nos. A-580, )  
A-606, and A-606(A). )  
\_\_\_\_\_ )

ORDER NO. WQ 90-5

BY THE BOARD:

On October 20, 1988, the State Water Resources Control Board (State Board or Board) received a petition from Citizens for a Better Environment and eleven other organizations (CBE et al.)<sup>1</sup>. The petition sought review of the failure of the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board), to take certain actions requested by CBE et al. to regulate the discharge of heavy metals from three municipal wastewater treatment plants into San Francisco Bay south of the Dumbarton Bridge (South Bay).

<sup>1</sup> These organizations include: Citizens Committee to Complete the Refuge; Fisherman's Wharf Association; Pacific Coast Federation of Fishermen's Association; Peninsula Conservation Center Foundation; Santa Clara Valley Audubon Society; Sierra Club - Bay Chapter; Standard Fisheries Company; San Francisco Boardsailing Association; Save San Francisco Bay Association; Sierra Club - Loma Prieta; and, United Anglers.

On December 21, 1988, the Regional Board reissued waste discharge requirements in Orders Nos. 88-176 (NPDES Permit No. CA0037621) and 88-175 (NPDES Permit No. CA0037834) to Sunnyvale and Palo Alto, respectively. These communities operate the Sunnyvale Water Pollution Control Plant (Sunnyvale Plant) and the Palo Alto Regional Water Quality Control Facility (Palo Alto Plant), two of the three municipal sewage treatment plants which discharge to the South Bay. The Regional Board revised the waste discharge requirements for the remaining discharger, the cities of San Jose and Santa Clara, on January 18, 1989, to regulate wastewater flows from the San Jose/Santa Clara Water Pollution Control Plant (San Jose/Santa Clara Plant) in Order No. 89-012 (NPDES Permit No. CA0037842). The Regional Board also adopted Cease and Desist Order No. 89-013, directing San Jose and Santa Clara to cease and desist discharging waste in violation of prohibitions contained in Order No. 89-012.

On February 17, 1989, CBE et al. filed a supplement to its earlier petition. The supplemental petition added two additional parties<sup>2</sup> and requested review of the three National Pollutant Discharge Elimination System (NPDES) permits<sup>3</sup> and of

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<sup>2</sup> The additional parties are Coalition for Effluent Action Now (CLEAN) and the National Audubon Society.

<sup>3</sup> The State of California is authorized to implement the NPDES permit program, established under Section 402 of the federal Clean Water Act, 33 U.S.C. Section 1251 et seq. 33 U.S.C. Section 1342. See California Water Code, Division 7, Chapter 5.5. Waste discharge requirements adopted by one of the California Regional Water Quality Control Boards (Regional Boards) pursuant to Chapter 5.5, Division 7 of the Water Code, are equivalent to NPDES permits under Section 402 of the Clean Water Act. Water Code Section 13374; Section 23 CCR Section 2235.2.

Cease and Desist Order No. 89-013. On the same date, the State Board received a petition, filed on behalf of San Jose, Santa Clara, and seven other public entities (San Jose/Santa Clara)<sup>4</sup>, seeking modification of the NPDES permit and cease and desist order issued for the San Jose/Santa Clara Plant. The United States Fish and Wildlife Service (the Service) also filed a petition on February 16, 1989, for review of the San Jose/Santa Clara permit and cease and desist order. By letter dated March 21, 1989, the petitioners were informed that their petitions would be consolidated for purposes of State Board review. See 23 CCR Section 2054.

In December 1989, State Board staff circulated a draft technical report on the petitions to the petitioners and other interested parties. All parties were offered the opportunity to comment on the draft report at a staff-level workshop held on January 12, 1990, and to submit written comments after the workshop until January 17, 1990. In addition, interested persons were given until January 17 to request augmentation of the administrative record with evidentiary materials not contained in the existing record. See *id.* Section 2066. In response, CBE et al., San Jose/Santa Clara, and Sunnyvale filed requests to augment the record, and these requests were granted.<sup>5</sup> A second

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<sup>4</sup> *These entities are the City of Milpitas, Cupertino Sanitary District, West Valley Sanitation District, County Sanitation Districts Nos. 2-3, Sunol Sanitary District and Burbank Sanitary District.*

<sup>5</sup> *See letters, dated January 23, 1990, to Mr. Alan Ramo, Mr. Les White, and Mr. Robert C. Thompson, respectively, from Sheila K. Vassey.*

staff-level workshop was held on January 30, 1990. This workshop was limited to a discussion of issues raised in the petitions regarding wetlands mitigation. The parties were subsequently informed, by letter dated February 20, 1990, that the State Board intended to take administrative notice of five studies relating to the issue of wetlands mitigation.<sup>6</sup> All parties were given the opportunity to comment on these studies.

After consideration of the comments received at the two workshops and review of the additional materials entered into the record, State Board staff prepared a final Staff Report on the petitions. The final report was sent to interested persons in May 1990.

Because of the complexity of the issues raised in the petitions and the time required to adequately address these issues, the State Board was unable to take formal action on the petitions within the 270-day period specified in the State Board's petition regulations. See 23 CCR Section 2052(d). The Board, therefore, takes this matter up on its own motion. See Water Code Section 13320(a).

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<sup>6</sup> These studies are: "Staff Report, Mitigation: An Analysis of Tideland Restoration Projects in San Francisco Bay", San Francisco Bay Conservation and Development Commission (March 1988); "Forum, Wetlands Restoration and Mitigation Policies: Comment", Harvey and Josselyn, *Environmental Management*, Vol. 10, No. 5 (1986); "Summary of Past Wetland Restoration Projects in California", Josselyn & Buchholz (1982); "Critique of Present Wetlands Mitigation Policies in the United States Based on an Analysis of Past Restoration Projects in San Francisco Bay", *Race, Environmental Management*, Vol. 9, No. 1 (1985); "California Clapper Rail Breeding Survey, South San Francisco Bay", Rigney, H. T. Harvey & Associates (September 12, 1989).

## I. BACKGROUND

### A. Treatment Plants

The San Jose/Santa Clara Plant began operation in 1956 as a 36 million gallon per day (mgd) primary treatment plant serving the city of San Jose. In 1959 the plant began treating flows from the city of Santa Clara, and the following year the plant was expanded to treat 51 mgd of flow. Secondary treatment facilities were added in 1964, and plant capacity was expanded to 94 mgd. Advanced treatment facilities were completed in 1979. The plant was recently expanded to a capacity of 167 mgd, average dry weather flow, and additional reliability improvements were added.

The San Jose/Santa Clara Plant is the largest of the three municipal wastewater treatment plants discharging to the South Bay. The facility is located in the city of San Jose, southeast of South Bay. The plant currently discharges approximately 120 mgd, average dry weather flow, to Artesian Slough, a dead-end slough draining into Coyote Creek, a tributary of the South Bay.

The two smaller facilities servicing the cities of Sunnyvale and Palo Alto discharge approximately 17 and 27 mgd, respectively, of tertiary treated effluent. Both facilities also discharge to dead-end sloughs. The Sunnyvale Plant has a capacity of 29.5 mgd, average dry weather flow. The facility discharges wastewater into Moffett Channel, which extends to Guadalupe Slough, a tributary of the South Bay. The Palo Alto

Plant was expanded in 1988 to an average dry weather flow capacity of 38 mgd, and reliability features were added. The plant discharges to an unnamed slough, tributary to the South Bay.

B. History of Adoption of South Bay Permits

1. Bays and Estuaries Policy

In May, 1974, the State Board adopted the "Water Quality Control Policy for the Enclosed Bays and Estuaries of California" (Bays and Estuaries Policy or Policy). The Policy contains a general prohibition against the discharge of municipal and industrial wastewater to enclosed bays and estuaries. Policy, Ch.I.A. Exceptions to this prohibition can be granted by a Regional Board only where the Regional Board finds that the wastewater will be consistently treated and discharged in a manner that would enhance the quality of the receiving waters above that which would occur in the absence of the discharge. Id.<sup>7</sup> The rationale for the Policy, as stated by the State Board in Order No. WQ 79-20, is that bays, with the exception of the San Francisco Bay-Delta system, are typically small isolated

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<sup>7</sup> *The State Board has interpreted the term "enhancement" to require:*

*". . . (1) full uninterrupted protection of all beneficial uses which could be made of the receiving water body in the absence of all point source waste discharge along with (2) a demonstration by the applicant that the discharge, through the creation of new beneficial area or a fuller realization, enhances water quality for those beneficial uses which could be made of the receiving water in the absence of all point source waste discharges." State Board Order No. WQ 79-20 at 9. See also Policy, p. 11, fn. 3.*

features with limited assimilative capacity, due to their generally shallow depths and restricted access to the freely moving, widely dispersed waters of the open ocean. P.7.

Enclosed bays and estuaries were given special protection in the Policy because "[t]hey have a very high resource value, providing critical habitat for a wide variety of fish and wildlife." Id.; accord, Order No. WQ 77-21 at 4.

The San Francisco Bay-Delta system north of the Dumbarton Bridge was excepted from the general discharge prohibition because of its high tidal exchange and the depth of its waters. Policy, Ch.I.B.la. By contrast, the discharge of wastewater to the South Bay was required to be eliminated at the earliest practicable date. Id. Ch.I.B.lb. This portion of the bay has limited wastewater dilution capability, and the State Board found that there was sufficient evidence to indicate that continued wastewater discharges in this location were an unacceptable condition. Id.

## 2. 1975 Basin Plan

The Regional Board initially adopted the Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) in 1975. The 1975 Basin Plan acknowledged that the Regional Board was required to comply with the provisions of the Bays and Estuaries Policy adopted by the State Board the previous year. 1975 Basin Plan at 4-11. The document also included several prohibitions, which are applicable to South Bay. In particular, the Basin Plan prohibited discharges of wastewater receiving a

minimum initial dilution of less than 10:1 and discharges into any non-tidal water or dead-end slough or similar confined areas. Exceptions to these prohibitions were allowed under the following circumstances:

"for certain wet weather discharges and other discharges having a high initial dilution where an inordinate burden would be placed on the discharger relative to beneficial uses protected and when an equivalent level of environmental protection can be achieved by alternate means. Exceptions will also be considered where a discharge is approved as part of a reclamation project or where it can be demonstrated that environmental benefits will be derived as a result of the discharge". Id. at 5-45.

In addition, the 1975 Basin Plan prohibited the discharge of wastewater into the South Bay. Id. at 5-47. Exceptions to this prohibition were allowed where the discharge was part of an approved reclamation project, or where it could be demonstrated that a net environmental benefit would be derived from the discharge. Id.

The 1975 Basin Plan did not have numerical water quality objectives for heavy metals in San Francisco Bay. The Basin Plan did, however, have a narrative toxicity objective, requiring that all waters be maintained free of toxic substances in toxic amounts. Id. at 4-17.

The 1975 Basin Plan also identified receiving water segments and classified these segments in accordance with their ability to assimilate wastes. Id. at 5-6 through 5-12. Segments were classified as "water quality limited" if water quality objectives would not be met within the segment after the



application of applicable effluent limitations. The South Bay was designated as water quality limited because bay waters did not consistently meet dissolved oxygen objectives. See id. at 5-9.

### 3. 1982 Basin Plan

The Basin Plan was amended in 1982, and the discharge prohibition section of the plan was revised. The amended version contained essentially the same prohibitions; however, all three prohibitions were now subject to the same exception criteria:

"a. an inordinate burden would be placed on the discharger relative to beneficial uses protected and an equivalent level of environmental protection can be achieved by alternate means, such as an alternative discharge site, a higher level of treatment, and/or improved treatment reliability; or

b. a discharge is approved as part of a reclamation project; or

c. It can be demonstrated that net environmental benefits will be derived as a result of the discharge." Basin Plan at IV-8 through IV-9.

The 1982 amendments also added specific numeric objectives, including objectives for heavy metals, for municipal and agricultural supply waters. See 1982 Basin Plan, Table 3-2. Effluent limitations to achieve the identified objectives were established in Chapter 4. See id. at Table 4-1. These limitations were applicable to all sewage treatment facilities discharging to inland surface waters, including bays and estuaries.

#### 4. Requests for Basin Plan Exceptions

In April, 1973, the cities of San Jose, Santa Clara, Sunnyvale, and Palo Alto formed the South Bay Dischargers Authority (the Authority), a joint powers agency. The Authority was created following the completion of a consultant's report in 1972, which recommended relocating the three existing municipal South Bay discharges to a location north of the Dumbarton Bridge. The Authority's principal function was to explore alternatives for the treatment and disposal of wastewater from its member communities.

In 1980 the Environmental Protection Agency (EPA) and the Authority published an Environmental Impact Report and Environmental Impact Statement (EIR/EIS), evaluating several effluent disposal alternatives for the South Bay dischargers. The EIR/EIS recommended the "no project" alternative, which entailed continued discharge at the present locations and implementation of a monitoring program to assess the impacts of continued discharge. The principal reasons for this recommendation were the high costs associated with relocating the discharge and the lack of available data to support the relocation alternative.

In September 1980 the Authority submitted a petition to the Regional Board requesting an exception to the Basin Plan prohibitions against discharges receiving less than 10:1 minimum initial dilution, discharges to dead-end sloughs, and discharges to the South Bay. Alternatively, the Authority requested a five-

year deferral from implementation of the prohibitions. The Authority proposed that a water quality study be conducted during the deferral period to assess the impacts of continued discharges on the South Bay environment.

In February 1981 the Regional Board adopted Orders Nos. 81-11, 81-12 and 81-13, finding that deferral was reasonable provided that the dischargers resolved a number of issues. In particular, the study was required to address whether the continued discharge of tertiary effluent would enhance the water quality of and provide a net environmental benefit to the South Bay. The study was to be completed by September 1, 1987. The Regional Board would consider the results of this study, as well as the conclusions of studies on the reliability of the three treatment plants, in determining whether exceptions to the prohibitions should be granted.

#### 5. 1986 Basin Plan

On December 17, 1986, the Regional Board adopted significant amendments to the Basin Plan. In particular, the amendments added a new table of toxic pollutant objectives for surface waters downstream of the Carquinez Straits. Basin Plan, Table III-2A at III-7. The objectives corresponded to EPA water quality criteria, which were current in 1986. A copper objective, however, was omitted due to the need for a site-specific objective. *Id.* fn. c. The objectives in Table III-2A were implemented through effluent limitations contained in Table IV-1 of the Basin Plan. *Id.* at IV-3.

Chapter 4 of the Basin Plan, however, also allowed a discharger to propose alternate limits for the toxic pollutants specified in Table IV-1. Two methods for the development of alternate limits were authorized. The first method required a demonstration of adequate source control for the toxic pollutants in question, an assessment of the impact of the alternate limit on beneficial uses, and a cost-benefit analysis. The second option allowed a discharger to propose an alternate limit based on a site-specific water quality objective.<sup>8</sup>

While discharges to other parts of San Francisco Bay had to meet the receiving water objectives in Table III-2a and the effluent limitations in Table IV-1 of the Basin Plan, discharges to the South Bay were specifically exempted from these requirements. *Id.* at III-5 and IV-3. Rather, the South Bay

<sup>8</sup> Specifically, the Basin Plan stated that the Regional Board would consider proposals for alternate toxic pollutant limitations for the pollutants specified in Table VI-1 where the discharger:

"1a. demonstrates that all sources of the toxic pollutant are being controlled through application of all reasonable treatment and source control measures. Such proposals must include an assessment of the impact of the alternate effluent limit on the beneficial uses of the receiving water, and must include a demonstration that the costs of additional measures do not bear a reasonable relationship to the level of beneficial uses protected by such additional measures, or

1b. proposes an alternate effluent limit based on a site-specific water quality objective for that location, addressing three specific aspects of uncertainty: site-specific water chemistry and constituent speciation, background concentration(s) in receiving waters, and differences in sensitivity between local species and species used to develop EPA criteria,

and

2. participates in a program to identify and develop control strategies for nonpoint sources of pollution (urban runoff, agricultural drainage, etc.) within or upstream from that discharger's receiving water segment to reduce uncertainty regarding the discharger's contribution to the total pollutant load." *Id.* at IV-3.

dischargers were required to perform detailed work to develop site-specific water quality objectives, effluent limitations, and other control measures. Id. at IV-3.

Two reasons were cited for the exemption. The Regional Board concluded that site-specific water quality objectives were absolutely necessary because of the "unique hydrodynamic environment" of the South Bay and the need to implement "potentially costly nonpoint source pollution control measures" in order to attain objectives. Id. at III-5. The objectives in Table III-2A were, therefore, to be considered guidance only. The Basin Plan specified that the methods described in Chapter 4 would be used to develop site-specific objectives. Id. In the meantime, "ambient conditions shall be maintained". Id.

The 1986 Basin Plan amendments also revised the classifications of receiving water segments. Classification of segments in the 1975 and 1982 Basin Plans had focused on the effects of conventional pollutants, such as dissolved oxygen. In the 1986 Basin Plan the Regional Board reevaluated the classifications based upon the potential effects of toxic pollutants on beneficial uses. The South Bay was again listed as water quality limited. See id. Table IV-3 at IV-13.

The State Board approved the 1986 amendments on May 21, 1987, in Resolution No. 87-49. The provisions of the 1986 Basin Plan are, essentially, still current.

## 6. Five-Year Study

The five-year monitoring program conducted by the Authority covered the period from December 1981 to November 1986. It culminated in a Final Technical Report, Final Monitoring Report and Appendices, South San Francisco Bay Avian Botulism Study, and Reliability Report. In August 1987, the dischargers submitted petitions to the Regional Board, requesting exceptions from the three applicable discharge prohibitions contained in the Basin Plan. The reports were provided to the Regional Board in support of the petitions.

## 7. Adoption of Revised Permits and Cease and Desist Order

In December 1988, the Regional Board adopted revised NPDES permits for Sunnyvale and Palo Alto in Orders Nos. 88-176 and 88-175. In these orders the Regional Board found that the discharges from the Sunnyvale and Palo Alto Plants would provide a net environmental benefit and water quality enhancement. Order No. 88-176, Finding 13; Order No. 88-175, Finding 12. Specifically, the Regional Board concluded that the discharges enhance dissolved oxygen levels and improve flushing in the South Bay, resulting in enhancement of the beneficial uses of non-contact recreation, estuarine habitat, and commercial and sport fishing. *Id.* The Regional Board further concluded that the effects of the discharges on heavy metals and toxicity in the South Bay were unresolved but that these issues would be addressed in studies mandated by the Regional Board. *Id.*

The Regional Board granted Sunnyvale and Palo Alto exceptions to the prohibitions, provided that the dischargers conduct several studies. Order No. 88-176, Finding 17 and Discharge Prohibitions A.1.-A.3 and fn.; Order No. 88-175, Finding 16 and Discharge Prohibitions A.1.-A.3 and fn. The studies address salt marsh conversion, development of site-specific water quality objectives and effluent limitations for heavy metals, and ammonia removal. See Order No. 88-176, Provisions E.3.-E.6.; Order No. 88-175, Provisions E.3.-E.5. Sunnyvale was required to conduct an additional study on avian botulism control. See Order No. 88-176, Provision E.4.

In January 1989 the Regional Board addressed the petition submitted by San Jose/Santa Clara. The Regional Board adopted an NPDES permit, Order No. 89-012, for the San Jose/Santa Clara Plant discharge, which concluded that the evidence before the Regional Board did not support a finding of net environmental benefit and water quality enhancement. Order No. 89-012, Finding 13. The Regional Board found that the existing discharge had converted salt marsh to brackish or freshwater marsh, adversely impacting the habitat of two rare and endangered species. Id. Preservation of rare and endangered species is a designated beneficial use for the South Bay. Id., Finding 5. The Regional Board determined, however, that a finding of net environmental benefit could be made if the discharger committed to implement measures, consistent with the provisions of Cease and Desist Order No. 89-013, to mitigate for the loss of salt marsh habitat.

Id., Finding 14. If these impacts were mitigated, the Regional Board concluded that a conditional exception, like that granted Sunnyvale and Palo Alto, would be appropriate. Id., Finding 18.

Concurrently with the adoption of Order No. 89-012, the Regional Board adopted Cease and Desist Order No. 89-013. This order directed San Jose/Santa Clara to cease and desist discharging waste in violation of the Basin Plan prohibitions against discharges to dead-end sloughs, discharges receiving less than 10:1 minimum initial dilution, and discharges to the South Bay. The order established a time schedule for compliance with these prohibitions, which required San Jose/Santa Clara to submit a proposal, by September 1, 1989, to either comply with the Basin Plan prohibitions or to mitigate for the loss of endangered species habitat.

The NPDES permits issued to Sunnyvale, Palo Alto, and San Jose/Santa Clara also established a three-step process to develop site-specific objectives and effluent limits for toxic pollutants, consisting primarily of heavy metals. To cover the interim period until site-specific objectives and limits were established, the permits contained effluent limits for some toxic pollutants. The Regional Board included interim limits for toxic pollutants because of the absence of objectives and effluent limits for these substances and because of the limited assimilative capacity of the South Bay. See, e.g., Order No. 88-176, Finding 15. The initial limits were derived primarily from objectives contained in the 1982 Basin Plan, which were adopted



to protect the beneficial uses of municipal and agricultural supply. See *id.*, Effluent Limitations B.4.a. These limits are substantially above the levels specified in Table IV-1 of the current Basin Plan for toxic pollutant discharges to other areas of the Bay.

After one year, the effluent limits were to be replaced with interim limits for toxic pollutants based upon performance. See, e.g., *id.*, Effluent Limitations B.4.b. These performance-based limits were to be established using the 95 percent upper confidence limit of the dischargers' self-monitoring data to reflect currently achievable effluent concentrations. *Id.* Thirdly, the permits specified that the toxic pollutant effluent limitations contained in Table IV-1 of the Basin Plan, which are applicable to the rest of San Francisco Bay, would become effective on December 21, 1991, unless alternate limits were established by that date, based upon the mandated site-specific studies. See, e.g., *id.*, Effluent Limitations B.5.

In addition, the revised permits included limitations on the mass emission of heavy metals. The permits included limits, expressed in pounds per year, on the mass loading of heavy metals, which were based on the current effluent limitations and the maximum permitted discharge rates. See, e.g., *id.*, Effluent Limitations B.6.a. When the permits were revised to include performance-based limits for toxic pollutants, the mass emission limits would be similarly revised. See, e.g., *id.*, Effluent Limitations B.6.b. Finally, the latter limits were

to be ultimately revised upon permit reissuance, based upon a wasteload allocation for toxic pollutants. See, e.g., Effluent Limitations B.6.c.

C. Water Quality Act of 1987

The federal Clean Water Act was amended by the Water Quality Act of 1987, Pub. L. 100-4, to place new emphasis on the regulation of toxic pollutant discharges to surface waters. Two of these amendments bear on the issues raised by petitioners.

1. Section 303(c)(2)(B)

The Water Quality Act of 1987 added Section 303(c)(2)(B), addressing the adoption by states of water quality standards for toxic pollutants.<sup>9</sup> 33 U.S.C. Section 1313(c)(2)(B). Section 303(c)(2)(B) requires that whenever a state revises or adopts new water quality standards<sup>10</sup>, the state must adopt criteria for all toxic pollutants listed pursuant to

9 Section 303(c)(2)(B) states, in pertinent part:

*"Whenever a State revises water quality standards pursuant to paragraph (1) of this subsection, or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria for all toxic pollutants listed under section 304(a), the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State, as necessary to support such designated uses. Such criteria shall be specific numerical criteria for such toxic pollutants. Where such numerical criteria are not available, whenever a State reviews water quality standards pursuant to paragraph (1), or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria based on biological monitoring or assessment methods consistent with information published pursuant to section 304(a)(8)."*

*10 Section 303 of the Clean Water Act, 33 U.S.C. Section 1313, requires the States to adopt water quality standards for surface waters. These standards consist of the designated uses of waters of the United States and water quality criteria for those uses. Section 1313(c)(2)(A). In California, water quality standards are set through the basin planning process. In the basin plans the Regional Boards designate the beneficial uses to be protected and establish water quality objectives to ensure protection of the designated uses. See Water Code Sections 13050(j), 13170, 13240 et seq.*

Section 307(a)(1) of the Clean Water Act<sup>11</sup> for which criteria have been published under Section 304(a)<sup>12</sup> of the Act, if the discharge or presence of the toxic pollutant can reasonably be expected to interfere with the designated beneficial uses of the water body. See *id.* Sections 1317(a)(1) and 1314(a). The EPA has interpreted this section to require that the states adopt numeric criteria for toxic pollutants by February 4, 1990.<sup>13</sup>

In order to comply with Section 303(c)(2)(B), the State Board is considering promulgating statewide water quality objectives for toxic pollutants. Draft Water Quality Control Plans for the Inland Surface Waters of California and Enclosed Bays and Estuaries of California (Draft Inland Plan and Draft Bays and Estuaries Plan) have been prepared, circulated for public comment, and discussed at two public hearings. The State

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*11 Section 307(a)(1) requires EPA to publish and revise, if appropriate, a list of toxic pollutants. This list is codified in 40 CFR Section 401.15. The Section 307(a)(1) list contains 65 compounds and families of compounds. EPA has interpreted the list to include 126 "priority" toxic pollutants. In general, references to the Section 307(a)(1) list encompass the 126 priority toxic pollutants.*

*12 Section 304(a) directs EPA to publish water quality criteria, reflecting the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare, on the concentration and dispersal of pollutants through various processes, and on the effects of pollutants on biological community diversity, productivity, and stability.*

*13 See, e.g., 55 Federal Register 14350-14356 (April 17, 1990). February 4, 1990, is three years after the date of adoption of Section 303(c)(2)(B). Section 303(c)(1), 33 U.S.C. Section 1313(c)(1), requires the States to review water quality standards at least once every three years. EPA guidance, dated December 12, 1988, on implementation of Section 303(c)(2)(B) states that EPA expects the States to comply with the requirements of Section 303(c)(2)(B) in any triennial review of the water quality standards initiated after enactment of the Water Quality Act of 1987 (February 4, 1987). February 4, 1990, reflects the latest date by which all of the States would have to conduct a triennial review after enactment of the Water Quality Act of 1987.*

Board anticipates taking final action on the draft plans in December 1990.

## 2. Section 304(1)

The Water Quality Act of 1987 also added Section 304(1) to the Clean Water Act.<sup>14</sup> See *id.* Section 1314(1). This

<sup>14</sup> Section 304(1) provides, in part:

"(1) State List of Navigable Waters and Development of Strategies. -- Not later than 2 years after the date of the enactment of this subsection, each State shall submit to the Administrator for review, approval, and implementation under this subsection --

(A) a list of those waters within the State which after the application of effluent limitations required under section 301(b)(2) of this Act cannot reasonably be anticipated to attain or maintain (i) water quality standards for such waters reviewed, revised, or adopted in accordance with section 303(c)(2)(B), due to toxic pollutants, or (ii) that water quality which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water;

(B) a list of all navigable waters in such State for which the State does not expect the applicable standard under section 303 of this Act will be achieved after the requirements of sections 301(b), 306, and 307(b) are met, due entirely or substantially to discharges from point sources of any toxic pollutants listed pursuant to section 307(a);

(C) for each segment of the navigable waters included on such lists, a determination of the specific point sources discharging any such toxic pollutant which is believed to be preventing or impairing such water quality and the amount of each such toxic pollutant discharged by each such source; and

(D) for each such segment, an individual control strategy which the State determines will produce a reduction in the discharge of toxic pollutants from point sources identified by the State under this paragraph through the establishment of effluent limitations under section 402 of this Act and water quality standards under section 303(c)(2)(B) of this Act, which reduction is sufficient, in combination with existing controls on point and nonpoint sources of pollution, to achieve the applicable water quality standard as soon as possible, but not later than 3 years after the date of the establishment of such strategy.

(2) Approval or Disapproval. -- Not later than 120 days after the last day of the 2-year period referred to in paragraph (1), the Administrator shall approve or disapprove the control strategies submitted under paragraph (1) by any State.

(3) Administrator's Action. -- If a State fails to submit control strategies in accordance with paragraph (1) or the Administrator does not approve the control strategies submitted by such State in accordance with paragraph (1), then, not later than 1 year after the last day of the period referred to in paragraph (2), the Administrator, in cooperation with such State and after notice and opportunity for public comment, shall implement the requirements of paragraph (1) in such State."

section requires the states to adopt lists of impaired waterbodies, including a list of surface waters which do not meet applicable water quality standards due entirely or substantially to point source<sup>15</sup> discharges of toxic pollutants. Id. Section 1314(1)(1)(B). For waters identified on this list, known as the Section 304(1) "short list", the state must identify certain point sources and amounts of pollutants causing a toxic impact, and develop individual control strategies for each point source. Id. Section 1314(1)(1)(C) and (D). The deadline for compliance with these tasks was February 4, 1989. See id. Section 1314(1)(1).

Section 304(1) provides that the individual control strategy must produce a reduction in the discharge of toxics from the identified point sources through the establishment of effluent limitations under Section 402<sup>16</sup> and water quality standards under Section 303(c)(2)(B) of the Act. See id. 1314(1)(1)(D), 1342, 1313(c)(2)(B). The reduction must be sufficient, in combination with existing controls on point and nonpoint sources of pollution, to achieve the applicable water quality standard not later than three years after the date of

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<sup>15</sup> The term "point source" means "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." Clean Water Act, Section 502(14); accord, 40 CFR Section 122.2.

<sup>16</sup> In general, NPDES permits issued pursuant to Section 402 of the Clean Water Act must ensure compliance with any applicable technology-based effluent limitations and standards promulgated under Section 301 of the Act or established on a case-by-case basis and with any more stringent effluent limits, including those necessary to meet water quality standards under state or federal law. 33 U.S.C. Section 1342.

establishment of the strategy. Id. The EPA has interpreted the term "individual control strategy" to mean "a final NPDES permit with supporting documentation showing that effluent limits are consistent with an approved wasteload allocation, or other documentation which shows that applicable water quality standards will be met not later than three years after the individual control strategy is established". 54 Federal Register 23868, 23896 (1989) [to be codified at 40 CFR Section 123.46(c)].

On February 3, 1989, the State Board transmitted to the EPA its lists of impaired waterbodies. South Bay was included on the short list for violation of the narrative receiving water objective included in the Basin Plan for toxicity. See Basin Plan at III-3. Specifically, South Bay was listed due to water quality impacts associated with seven pollutants: cadmium, copper, lead, mercury, nickel, selenium, and silver. San Jose/Santa Clara, Palo Alto, and Sunnyvale were identified as contributing point sources. On the same date, the Regional Board transmitted the NPDES permits for the three dischargers to EPA as individual control strategies.

On June 5, 1989, EPA approved the State Board's inclusion of South Bay on the short list and the identification of the three South Bay dischargers as contributing point sources.<sup>17</sup> In addition, EPA conditionally approved the reissued NPDES permits as individual control strategies. The conditions required the state to adopt numerical water quality objectives

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<sup>17</sup> See 54 Federal Register 24748 (June 9, 1989).

for the seven metals for the South Bay by February 4, 1990, and to modify the NPDES permit effluent limitations accordingly.

The state did not meet the February 4, 1990, deadline for the adoption of numerical objectives for the South Bay. Because of this, in June 1990, EPA and the Regional Board issued a joint public notice stating that EPA must, in cooperation with the state, modify the NPDES permits to establish numerical limits for the seven constituents. The proposed revisions would revise the default provision in the existing permits which specifies that the Table IV-1 toxic pollutant effluent limits will become effective on December 21, 1991, unless the Regional Board has already established site-specific limits. Rather than imposing the Table IV-1 effluent limits, the revised draft permits provide for the default imposition of effluent limits based upon current EPA criteria. The proposed limits would be the more stringent of two values: (1) the EPA freshwater criteria, and (2) a limit to assure that the EPA saltwater criteria are met after dilution to estuarine salinities. No action has been taken to date on the revised draft permits.

D. Regional Board Actions Subsequent to Adoption of South Bay Permits

As provided in the permits, the Regional Board amended Orders Nos. 88-175, 88-176, and 89-012 on February 21, 1990, to include performance-based limits for toxic pollutants. See Orders Nos. 90-034, 90-035, and 90-033, respectively. On May 16, 1990, the permits were again amended, by Orders Nos. 90-069, 90-70, and 90-068, respectively, to add a provision requiring

the dischargers to implement additional source control measures over metals entering the treatment plants, including pretreatment program improvements and a pilot waste minimization program.

The Regional Board has also adopted several amendments to Cease and Desist Order No. 89-013. On August 16, 1989, the Regional Board adopted Order No. 89-140, amending Order No. 89-013 to extend the date for submission of a mitigation proposal from September 1 to December 1, 1989. On December 13, 1989, the Regional Board amended Order No. 89-013, by extending the December 1, 1989, date to 30 days after the State Board takes final action on these petitions. See Order No. 89-188. On April 18, 1990, the order was again amended to change the acreage required for wetland mitigation from 240 acres to 275 acres of saltmarsh. See Order No. 90-054.

## II. CONTENTIONS AND FINDINGS

The petitions raise three main issues. The petitions question the propriety of: (1) the Regional Board's decision to grant conditional Basin Plan exceptions to Sunnyvale and Palo Alto and to deny an exception for San Jose/Santa Clara; (2) the manner in which the permits regulate toxic pollutants; and (3) the Regional Board's actions regarding mitigation for the loss of saltmarsh habitat. The following discussion addresses each of these issues, as well as related issues.<sup>18</sup>

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<sup>18</sup> All additional issues raised by petitioners are dismissed for failure to raise substantial issues appropriate for review. 23 CCR Section 2052(a)(1).



A. Basin Plan Exceptions

Contentions: CBE et al. contend that the Regional Board erred in conditionally granting exceptions to Sunnyvale and Palo Alto and in finding that an exception could be granted to San Jose/Santa Clara if the discharger implemented appropriate measures to mitigate for the loss of saltmarsh habitat. CBE et al. maintain that the South Bay dischargers failed to meet their burden of demonstrating that a net environmental benefit results from their discharges. To support their contentions, petitioners cite the impacts of discharging toxic pollutants and, with respect to San Jose/Santa Clara, the loss of endangered species habitat.

Petitioners, San Jose/Santa Clara, on the other hand, argue that the record supports a finding that there is a net improvement in water quality as a result of their discharge. They contend that beneficial impacts outweigh adverse impacts for all beneficial uses, except endangered species habitat, and that the Authority's five-year study correctly concluded, by applying a weighting factor, that the overall net impact of their discharge on beneficial uses is positive.

Findings: We agree with petitioners, CBE et al., that the South Bay dischargers have failed to demonstrate that an exception to the Basin Plan prohibition against discharges to the

South Bay based on net environmental benefit is appropriate. Our review of the record indicates that beneficial uses in the South Bay are threatened or have been impaired due to elevated concentrations and loadings of metals, as well as by the conversion of salt marsh to freshwater marsh. Further, we do not believe that additional studies to demonstrate net environmental benefit would be productive or are warranted. Rather, we conclude that a Basin Plan exception to the applicable prohibitions could be granted to the South Bay dischargers on the basis of "equivalent protection" if certain conditions are met. These conditions are explained later in this Order. Additionally, we strongly encourage the South Bay dischargers to vigorously pursue reclamation, as an additional means of obtaining an exception to the Basin Plan prohibitions.

1. Review of Record

The Regional Board included findings in all three NPDES permits for the South Bay dischargers that Basin Plan exceptions could be considered "where the discharger can demonstrate net environmental benefit and water quality enhancement, both measured as a result of the existing discharge and as compared to the discharge area in the absence of the discharge". Orders Nos. 88-175, 88-176, and 89-012, Finding 8. This interpretation harmonized the exception criteria in the Bays and Estuaries Policy with that in the Basin Plan. For purposes of this Order,

we conclude that a showing of net environmental benefit also constitutes a showing of enhancement.<sup>19</sup>

At a minimum, discharges of wastewater to the South Bay must ensure reasonable protection of existing beneficial uses of the receiving waters. See Water Code Sections 13263, 13241. The Authority and the Regional Board employed different processes in analyzing the impacts of the South Bay dischargers on the beneficial uses of the South Bay.

The Final Technical Report submitted by the Authority to the Regional Board, at the culmination of the five-year study, assigned numerical weighting factors to each of the eleven beneficial uses<sup>20</sup> of the South Bay in order to assess the net impact of the South Bay discharges on beneficial uses. See generally Final Technical Report (December 1981 - November 1986), Ch. 6. Using this methodology, the Authority concluded that the discharges have a net benefit on beneficial uses, despite adverse impacts related to salt marsh conversion, avian botulism, and potential short-term water quality and biological effects of major treatment plant upsets. Id. at 6-6.

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*19 We also note that this Board intends to make revisions to the Policy in the near future. At that time, the prohibition language of the Basin Plan and the Policy will be fully harmonized.*

*20 The beneficial uses of the South Bay and contiguous water bodies are water contact recreation, non-contact water recreation, wildlife habitat, preservation of rare and endangered species, estuarine habitat, fish migration, fish spawning, industrial service and process supply, shellfish harvesting, navigation, and commercial and sport fishing.*

The Regional Board used a qualitative, rather than a quantitative, approach in assessing the issue of net environmental benefit. See Internal Memo, dated December 1, 1988, from Stephen Hill and Lynn Suer, Environmental Specialists, to Steven R. Ritchie, Executive Officer (Internal Memo). The Regional Board examined the effects of the discharge on seven water quality issues and the eleven beneficial uses. The Regional Board concluded that the discharges enhance dissolved oxygen levels and improve flushing in the South Bay. See id.; Order No. 88-175, Finding 12, Order No. 88-176, Finding 13, Order No. 89-012, Finding 14. The data was insufficient, however, to determine the effects of the discharges on heavy metal concentrations and chronic toxicity in the South Bay, and these issues remained unresolved. See id. The impacts of the discharges on the remaining four water quality issues, ultimate oxygen demand, nutrient loadings, coliform concentrations, and avian botulism, were found to be neutral.

With respect to beneficial uses, the Regional Board concluded that the South Bay discharges have a positive impact on non-contact water recreation, estuarine habitat, and commercial and sport fishing. See id. For the San Jose/Santa Clara discharge, these positive impacts were outweighed by the adverse impact on rare and endangered species, caused by the conversion of salt marsh habitat to freshwater marsh habitat. See Internal Memo; Order No. 89-012, Finding 13. The impacts of the three South Bay discharges on the remaining beneficial uses were found

to be neutral provided that the dischargers implemented programs to further assess the impacts of the discharges on toxicity and the accumulation of heavy metals and that San Jose/Santa Clara and Sunnyvale continued programs to control avian botulism. The Regional Board, therefore, concluded that a finding of net environmental benefit could be made for the Sunnyvale and Palo Alto discharges, conditioned upon implementation of the required programs. In addition, the finding could be made for the San Jose/Santa Clara if the discharger committed to implement wetland mitigation measures, in addition to the other programs.

We agree with the Regional Board's conclusion that the South Bay discharges introduce highly oxygenated waters into the South Bay, raising the dissolved oxygen levels of bay waters. Based upon our review of the record, however, we reach different conclusions with respect to several of the other water quality issues addressed by the Regional Board, including nutrient loading, avian botulism, and heavy metals. In addition, we differ with the Regional Board's findings regarding impacts on beneficial uses, with respect to avian botulism and heavy metals. For these reasons and considering the impacts of the San Jose/Santa Clara Plant on rare and endangered species, the Board concludes that the South Bay dischargers have failed to demonstrate that their discharges provide a net environmental benefit to or enhance the water quality of the South Bay.

a. Nutrient Loading

The nutrients of primary concern in the South Bay discharges include phosphorus compounds and nitrogen constituents, such as ammonia, nitrite, and nitrate. See generally Final Technical Report, pp. 3-44 through 3-46, 5-32 through 5-33; Staff Report, Division of Water Quality, State Water Resources Control Board, on the South Bay petitions (Staff Report), pp. III-7 through III-8; Internal Memo at 5-6. The discharge of these substances has the potential to accelerate eutrophic conditions, that is, to stimulate the production of algae. Eutrophication can result in a lowering of dissolved oxygen levels in the water column, as algae die and decompose. Eutrophic waters are generally aesthetically unpleasing and adversely impact the habitat of a variety of aquatic species.

The Regional Board found, based upon modeling results, that the concentrations of nitrate and phosphorus in the South Bay discharges and in the South Bay itself are sufficient for eutrophication to occur. Internal Memo at 6. The Regional Board determined, however, that the discharge of nutrients does not apparently contribute to eutrophic conditions because light extinction, resulting from the relatively high turbidities in the shallow South Bay, limits excessive algal growth. Id.

The California Department of Fish and Game (Department), on the other hand, concluded that the dynamics between nutrient loadings, algal growth, dissolved oxygen, and pH were not adequately addressed in the five-year study. See

memorandum, dated January 29, 1988, from the Department to the Regional Board (Dept. Memo). We concur. Our review of the record indicates that there is insufficient evidence to assess the impacts of nutrient loadings on the beneficial uses of the South Bay.

The five-year study conducted by the Authority included a study of the effect of South Bay effluents on the growth rate of the red algae, Polysiphonia. Final Technical Report, pp. 3-44 through 3-46. The latter study compared ambient nutrient levels in the South Bay to the magnitude of Polysiphonia blooms and concluded that the South Bay discharges "do not have a controlling influence on these blooms". Id. at 3-46. The study did not address nutrient loading by the South Bay dischargers or nutrient uptake by the algae. The study results are, therefore, inconclusive.

Researchers from the United States Geological Survey have studied phytoplankton density in the South Bay.<sup>21</sup> These studies indicate that, although the South Bay is nutrient-enriched, phytoplankton biomass is usually low. Both phytoplankton growth rates and the biomass of benthic invertebrates, including suspension-feeding bivalve mollusks, are high in comparison to those of northern San Francisco Bay. The

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<sup>21</sup> See Cloern, Cole, Wong, & Alpine, "Temporal Dynamics of Estuarine Phytoplankton: A Case Study of San Francisco Bay", Hydrobiologia 129:153-176 (1985); Cloern, "Does the Benthos Control Phytoplankton Biomass in South San Francisco Bay?", Mar. Ecol. Prog. Ser. 9:191-202 (1982) [Cloern (1982)].

studies suggest that the phytoplankton biomass is controlled by benthic grazing. According to one of the studies:

"Although circumstantial in nature, available evidence is consistent with the hypothesis that benthos control phytoplankton biomass in South San Francisco Bay. If this is true, then the South Bay behaves like a large aquaculture system (citation omitted) where sewage-derived wastes are converted to algal biomass and then molluscan biomass. The stability of this ecosystem is unknown, and it is important to recognize the potential for algal blooms in South Bay if the benthic community is selectively perturbed."<sup>22</sup>

Evidence in the record, therefore, does not support the conclusion that algal productivity in the South Bay is light limited. While the evidence does not indicate that the South Bay discharges have caused algal blooms, the evidence does suggest that high nutrient loadings enhance the productivity of both algae and benthic organisms in the bay. The overall impacts of this increased productivity are unclear.

b. Avian Botulism

Avian botulism is a disease affecting birds which have ingested the toxin of the anaerobic bacterium, Clostridium botulinum. See generally South San Francisco Bay Avian Botulism Study (Avian Botulism Study); Final Technical Report, pp. 3-31 through 3-35; Staff Report at III-8; Internal Memo at 6-7; Dept. Memo, Att. A, pp. 8-9. Major prerequisites for the development of avian botulism include warm temperatures, shallow stagnant water, low dissolved oxygen levels, and high nutrients. Studies by the Department, the Service, and the Regional Board have indicated that the disease has been prevalent in the Artesian

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<sup>22</sup> Cloern (1982) at 200.



Slough area, which receives a constant supply of treated wastewater from the San Jose/Santa Clara Plant.

The five-year study concluded that conditions in Artesian Slough, Coyote Creek, Guadalupe Slough, Alviso Slough, and the oxidation ponds at the Sunnyvale Plant are suitable for outbreaks of avian botulism. Avian Botulism Study at 78. The study recommended increased monitoring and corrective measures to limit the magnitude of outbreaks of the disease. Id. at 78-81. Suggested actions included frequent, seasonal collection of sick and dead birds in the affected areas. The Regional Board concluded that these measures were adequate to mitigate the impacts of avian botulism.

The exact mechanisms for the outbreak and transmission of avian botulism are unclear although the discharge of wastewater into the South Bay must be considered a contributing factor. The discharges raise the temperature and reduce the salinity of the receiving waters, fostering conditions which are conducive to avian botulism, that is, warm, shallow, nutrient-enriched freshwater in an area that supports significant numbers of waterfowl. If the discharges were discontinued, it is likely that the incidence of avian botulism would be reduced. Because the discharge of wastewater contributes to the outbreaks of the disease, we conclude that the discharge of wastewater into the South Bay has an adverse impact on the beneficial uses of wildlife and estuarine habitat as a result.

c. Heavy Metals

(1) Water Column, Effluent, and Sediment

Concentrations

The five-year study included quarterly sampling and analysis of the water column, sediments, and shrimp tissues for heavy metal concentrations at four locations in the South Bay. Final Technical Report, pp. 2-73 through 2-85. See generally *id.*; Final Monitoring Report and Appendices; Internal Memo at 7-13; Final Staff Report, pp. III-8 through III-9, IV-15 through IV-41; Dept. Memo, Att. A, p. 4. Two of the sampling sites were located in sloughs, one in Coyote Creek near the San Jose/Santa Clara Plant and one in Guadalupe Slough near the Sunnyvale Plant. The two remaining locations were open water sites in the South Bay.

The Regional Board reviewed the results of this effort and of a review conducted by the San Francisco Bay-Delta Aquatic Habitat Institute and concluded that the impacts of heavy metals loadings on the water quality of the South Bay were unresolved. The Regional Board determined that the data was inadequate to assess the impact of heavy metals on aquatic life and that the relative contribution of metals from nonpoint sources had not been adequately characterized.

We agree with the Regional Board that the relative contribution of heavy metals from nonpoint sources to the South Bay has not been definitively established. Nevertheless, based upon our review of the record, we conclude that discharges of

heavy metals from the South Bay treatment plants contribute significantly to exceedances of EPA criteria for the protection of aquatic life. In addition, although much of the evidence regarding impacts of heavy metals on beneficial uses is inconclusive, there is some evidence of impairment.

Results of receiving water sampling conducted during the five-year study indicated that ambient concentrations of cadmium, chromium, copper, silver, nickel, mercury, lead, and zinc exceeded EPA criteria for the protection of aquatic life on at least one sampling date. In general, the copper criterion was consistently exceeded. Ambient mercury and nickel levels exceeded EPA criteria in half of the samples. Levels of cadmium, silver, and lead exceeded the EPA criteria from 10 to 20 percent of the time.

More recent receiving water studies in the South Bay indicate that primarily copper and nickel are found in South Bay waters in concentrations exceeding EPA criteria. The Regional Board conducted bay-wide receiving water monitoring for heavy metals in April, August, and December 1989. Two sites, one in the extreme South Bay and one at the Dumbarton Bridge, were sampled. This study used rigorous quality assurance and quality control techniques, and the data may, therefore, be more reliable than that generated in the five-year study.

In addition, the five-year study indicated that annual average concentration of heavy metals in effluent from the South Bay treatment plants exceeded the effluent limits contained in

Table IV-1 of the Basin Plan, which are applicable to shallow bay waters other than the South Bay, at all of the plants. Evidence in the record indicates that the annual average concentration of lead and nickel in effluent from the San Jose/Santa Clara Plant exceeded the Table IV-1 limits every year for a seven-year period from 1981 to 1987. The copper limit was exceeded from 1982 through 1984, and the limit for zinc was exceeded in 1985. The Sunnyvale Plant also discharged nickel at concentrations above the Table IV-1 effluent limit every year. Copper and lead discharges were above the effluent limits in five and four of the seven years, respectively. The annual average silver concentration was slightly above the Table IV-1 limit in 1987. The Palo Alto Plant discharged copper, nickel, and lead at levels greater than Table IV-1 limits in all seven years. Silver was twice as high as the effluent limit in six of the seven years. Zinc and chromium exceedances were also evident.

The present performance of the three South Bay treatment plants can be surmised by comparing the interim, performance-based effluent limits included in the revised permits adopted by the Regional Board in February 1990 to the effluent limits contained in Table IV-1 of the Basin Plan. The Regional Board determined current performance based on the results of weekly sampling from April through October 1989. The performance-based limits were calculated as the 95 percentile of the sample distribution. The performance-based limits in the Sunnyvale permit were higher than the Table IV-1 limits for copper, lead,

mercury, nickel, silver, and zinc; in the San Jose/Santa Clara permit for nickel, silver, and zinc; and in the Palo Alto permit for cadmium, copper, lead, nickel, silver, and zinc. All of the treatment plants could meet the EPA saltwater criteria for selenium. None of the plants could meet the EPA saltwater criteria for copper.

The low solubility of most metals and their tendency to adsorb to particles and settle out in the sediments result in sediment enrichment. Metals concentrations in sediments are reviewed below.

Results of the five-year study revealed that annual mean copper concentrations in the sediments at the four sites ranged from 17 to 39 parts per million (ppm), with no significant difference in concentration among the stations. These concentrations are typical of the rest of San Francisco Bay and other west coast bays. Copper concentrations in the sediment at all four stations generally increased over the last four years of the Authority's study. Other studies have noted localized elevated levels of copper, 5 to 27 times higher than background, in sediments near the Palo Alto Plant. One study noted that concentrations in the sediment declined with distance from the Palo Alto Plant's outfall.

Silver enrichment of South Bay sediments showed a similar pattern. Background silver concentrations in coastal sediments range from 0.1 to 0.5 ppm, dry weight. Annual mean concentrations of silver in sediment samples from the four

stations included in the five-year study ranged from less than detection, or 0.1, to 1.3 ppm, dry weight. These data suggest slight enrichment when compared to background levels. High levels of silver, ranging from 2.5 to 4 ppm, dry weight, in sediments have been measured off the Palo Alto outfall. Like the copper concentrations, levels of silver at this location declined with distance from the outfall. High values of zinc have also been documented off the Palo Alto outfall. The high values have been associated with the Palo Alto Plant and San Francisquito Creek.

The quarterly sediment sampling conducted during the five-year study also revealed elevated levels of mercury during the first two years of the study. These high values were not associated with elevated effluent concentrations. These data indicate that South Bay sediments are high in mercury when compared to the rest of San Francisco Bay or other west coast bays. Sediment enrichment by chromium, cadmium, and nickel was not evident.

Lead enrichment of sediment is common in nearshore locations, such as harbors and creeks throughout San Francisco Bay. Particularly high levels have been detected in Guadalupe Slough in the past. Levels detected during the five-year study, however, were typical of bay-wide values, which are only slightly elevated above background.

Values of zinc in sediment collected during the five-year study were similar to the bay-wide average. However,

localized enrichment off the Palo Alto outfall has been documented.

In summary, sediment studies conducted in the South Bay have identified elevated levels of copper, silver, and zinc off the Palo Alto outfall. The elevated mercury concentrations detected during the five-year study also warrant concern. Studies conducted by the United States Geological Survey (USGS) near the Palo Alto Plant strongly suggest that discharges from the Palo Alto Plant have created the locally elevated levels of copper, silver, and zinc in sediments. The sampling design of the five-year study did not include transects away from the South Bay treatment plants and from other point sources. The study design, which included two slough stations and two open water stations, was probably inadequate to assess whether contamination is localized near the San Jose/Santa Clara and Sunnyvale Plants.

#### (2) Impacts on Biota

Metals enrichment of South Bay waters and sediments is of concern because benthic organisms may be exposed to these metals through particle feeding, filter feeding, and water diffusion. It is, therefore, important to analyze whether metals enrichment in the South Bay has adversely impacted the biota.

Petitioners, CBE et al., compared metal concentrations in South Bay sediments to Apparent Effects Thresholds (AETs) developed for Puget Sound off the coast of Washington state. The AETs are chemical-specific sediment concentrations above which adverse biological effects were always observed in the Sound. Based upon this comparison, CBE concluded that concentrations of

cadmium, chromium, silver, nickel, and mercury in sediments in the extreme South Bay reach levels which may impair beneficial uses.

The Regional Board concluded that the AETs developed for Puget Sound are not appropriate for San Francisco Bay. We agree. The database used to develop an AET for a chemical is region-specific. Therefore, AETs developed for Puget Sound may not be applicable to the South Bay. The Board does concur, however, that the sediment enrichment which has been detected in the South Bay warrants concern.

Although copper enrichment of South Bay sediments is variable, the tissue burdens in South Bay mussels and clams are particularly high. We note that copper concentrations in ambient water and effluent discharged from the South Bay treatment plants consistently exceed the EPA criterion for the protection of aquatic life and the Table IV-1 effluent limit, respectively.

Metal concentrations in the Baltic clam Macoma balthica have been measured by USGS since 1975 near the Palo Alto Plant. Concentrations of copper in the Macoma population exceeded any values reported in surveys of 37 European estuaries characterized by a variety of pollutant inputs. Silver in Macoma tissues was also detected at very high levels, and zinc concentrations were elevated. The Macoma population has developed a tolerance to high concentrations of silver and copper. According to one USGS researcher, this is an indication that the population has been adversely affected through the elimination of more sensitive



individuals. In addition, genetic differences have been detected in this population. One study found increased partitioning of metals in the low molecular weight fraction of clams off the Palo Alto Plant. This is an indication of metals-induced stress. Research conducted by USGS has found fairly consistent agreement in the long-term trends of copper and silver concentrations in the sediments, the clam population and effluent from the Palo Alto Plant.

Data from the State Mussel Watch Program has revealed elevated levels of silver in both transplanted and resident mussels in the South Bay. Elevated levels of silver are not limited to the Palo Alto site. Ambient silver concentrations in South Bay waters infrequently exceed the EPA criterion for the protection of aquatic life. Only the Palo Alto Plant routinely exceeds the Table IV-1 effluent limits for silver.

Consistently elevated levels of mercury in mussels have also been documented in the South Bay. Mercury levels in fish from the Coyote Creek watershed have consistently exceeded standards for the protection of human health. Fish from the South Bay have not been analyzed for mercury contamination. Mercury has been detected in the livers of the South Bay diving ducks, scaup and surf scoter, at levels that reduced reproductive success and altered behavior in other waterfowl, although there is no evidence of reproductive impairment in South Bay waterfowl. Ambient concentrations of mercury frequently exceed the EPA criterion.

Cadmium levels in South Bay mussels are consistently elevated. Elevated concentrations occur throughout San Francisco Bay. Additionally, the ambient cadmium concentration of South Bay waters during 1984, a high runoff year, may be associated with the high incidence of shell necrosis in the commercial bay shrimp, Crangon franciscorum.

Sampling of selenium levels in sediment and shellfish in the South Bay has been limited. Selenium was not analyzed in the five-year study. Results from the few sampling efforts which have been conducted have revealed levels of selenium, exceeding the DHS health advisory, in mollusc tissues. Selenium has been measured in the livers of scaup and scoter at concentrations associated with embryonic abnormalities and mortalities in other species. Adverse biological impacts have not been observed, however, in South Bay diving ducks.

There is no evidence of elevated nickel levels in sediments, and only limited biological sampling has been conducted. One State Mussel Watch sample of South Bay mussels had higher nickel concentrations than other San Francisco Bay stations. Nickel concentrations in ambient water and effluent from all three South Bay treatment plants consistently exceeded the EPA criterion and the Table IV-1 effluent limit.

Elevated concentrations of lead in tissue have not been evident. Lead exceedances of the EPA criterion in ambient water occurred in from 20 to 40 percent of the samples taken during the five-year study. Effluent from the San Jose/Santa Clara and Palo

Alto Plants exceeded the Table IV-1 limits every sampling year. Effluent from the Sunnyvale Plant exceeded the limit in four of the seven years.

In sum, the record indicates that, in the area surrounding the Palo Alto outfall, elevated levels of copper, silver and zinc have impacted the local clam population. In addition, ambient concentrations of copper and nickel in the South Bay generally exceed EPA criteria for the protection of aquatic life, and concentrations of lead, silver, mercury, and cadmium intermittently exceed EPA criteria. Selenium and mercury have bioaccumulated in waterfowl to levels that threaten human health and warrant concern for wildlife. Levels of cadmium and selenium in shellfish warrant concern for the protection of human health. Therefore, we conclude that copper, cadmium, nickel, lead, silver, mercury, zinc, and selenium are found in the South Bay at levels that adversely affect or threaten to affect the attainment of designated beneficial uses. Based upon the annual mass loadings and exceedances of Table IV-1 effluent limits, we also conclude that the three South Bay treatment plants contribute significantly to impaired water quality conditions in the South Bay.

d. Beneficial Uses

For the reasons previously stated, the Board concludes that the discharge of effluent from the South Bay plants is a contributing factor in the outbreak of avian botulism in the bay, adversely impacting the beneficial uses of wildlife and estuarine

habitat. In addition, we conclude that the discharge of heavy metals has adversely affected or threatens to affect these beneficial uses. In particular, the Board has found evidence of frequent exceedances of EPA criteria for the protection of aquatic life in the receiving waters of the South Bay, together with exceedances of the Table IV-1 effluent limits by the South Bay dischargers. The evidence also indicates a tie between discharges from the Palo Alto Plant and the bioaccumulation of copper, silver, and zinc in clams off Palo Alto.

In addition, the Board concurs in the Regional Board's finding that the discharge from the San Jose/Santa Clara Plant has had a major negative impact on the beneficial use of preservation of rare and endangered species through the conversion of salt marsh habitat. This is discussed in more detail in Part II.C, *infra*, of this Order.

## 2. Conclusion

Based upon our review of the evidence in the record, the State Board finds that the South Bay dischargers have failed to demonstrate that they should be granted an exception from the Basin Plan prohibition against discharges to the South Bay on the basis of net environmental benefit. Specifically, the Board concludes that the impacts of nutrient loading remain unresolved, that avian botulism negatively impacts wildlife and estuarine habitat, and that the discharge of heavy metals contributes or threatens to contribute to impairment of these beneficial uses. In addition, the discharge from the San Jose/Santa Clara Plant

has a substantial adverse impact on rare and endangered species. Therefore, exceptions to the discharge prohibitions in the Basin Plan on the basis of net environmental benefit are not appropriate at this time. In addition to concluding that the present data base does not support a Basin Plan exception on the basis of net environmental benefit, we are dubious that any additional studies can show that an exemption on this ground is appropriate.

We note, however, that there seems to be general agreement among the parties to this proceeding that relocation of the discharges to a site north of the Dumbarton Bridge may not be the most economically or environmentally sound solution to the problems associated with the South Bay discharges. We also note that the Basin Plan authorizes exceptions to the applicable discharge prohibitions for reclamation projects and that a concerted effort to reclaim wastewater on the part of the South Bay dischargers might significantly reduce future discharges to the bay. The Regional Board has encouraged the Authority to explore the feasibility of reclamation in the past. We strongly encourage the Authority to pursue this alternative and are prepared to support the Authority as needed to develop and implement reclamation projects.<sup>23</sup>

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<sup>23</sup> Such support would include appropriate use of this Board's waste and unreasonable use power to develop markets for reclaimed water. See California Constitution, Article X, Section 2; Water Code Sections 275, 13550.

Wastewater reclamation is favored by the legislature and is particularly appropriate now given current drought conditions. The legislature has declared, for example, that "(a)dequately treated reclaimed water should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone". Water Code Section 13142.5. Similarly, state Water Reclamation Law provides that "the people of the state have a primary interest in the development of facilities to reclaim water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state" and that "(i)t is the intention of the Legislature that the state undertake all possible steps to encourage development of water reclamation facilities. . . ." Id. Sections 13510, 13512.

Additionally, we conclude that a Basin Plan exception can be granted to the South Bay dischargers on the basis of "equivalent protection", provided that certain conditions are met. In reaching this conclusion, the Board wishes to stress that no additional studies are needed in order to make the determination of equivalent environmental protection. The existing record, coupled with the studies required by the Regional Board, provides ample data upon which to make the necessary ecological determination.

As discussed previously, the Basin Plan authorizes exceptions to the three applicable prohibitions on the ground

that an inordinate burden would be placed on the discharger relative to beneficial uses protected and an equivalent level of environmental protection can be achieved by alternate means, i.e., means other than relocating the discharges to a point north of the Dumbarton Bridge. If the South Bay dischargers were, in fact, discharging wastewater north of the Dumbarton Bridge, they would be required to comply with the toxic pollutant objectives and effluent limitations contained in Tables III-2A and IV-1 of the current Basin Plan.

In order to demonstrate that discharges to the South Bay provide environmental protection equivalent to discharges north of the Dumbarton Bridge, the State Board, therefore, concludes that the NPDES permits for the South Bay dischargers must include water quality-based effluent limits for toxic pollutants. These limits are discussed further in Section II.B.3, *infra*, of this Order. Water quality-based effluent limits are necessary in order to provide protection equivalent to that provided by discharges north of the Dumbarton Bridge, as well as to ensure reasonable protection of the existing beneficial uses of the South Bay. See Water Code Sections 13241, 13263, and 13377.

In addition, in order to address avian botulism, the South Bay dischargers must, as required by the Regional Board, continue their efforts to control this disease. Finally, the dischargers must ensure that the beneficial uses of preservation of rare and endangered species is protected. In particular, as

discussed in Section III of this Order, San Jose/Santa Clara must undertake appropriate measures to mitigate the effects of their discharge on this beneficial use.

B. Regulation of Toxic Pollutants

The petitions raise issues regarding the propriety of the Regional Board's approach to the development of water quality objectives for toxic pollutants for the South Bay and of the effluent and mass emission limitations for toxics included in the South Bay permits.

Petitioners' contentions are addressed in the following discussion. We note that some of the issues have become moot as a result of intervening events.

1. Water Quality Objectives

Contention: One of the principal contentions raised by petitioners, CBE et al., is that numeric, water quality-based objectives for toxic pollutants must be adopted for the South Bay in order to protect aquatic life, wildlife habitat, and human health in the South Bay and to comply with applicable state and federal law. Petitioners request that the State Board order the Regional Board to amend its Basin Plan to adopt objectives for toxic pollutants, based upon the toxic materials objectives contained in the State Board's Water Quality Control Plan, Ocean Waters of California (1988) (Ocean Plan), for the South Bay. Petitioners further request that the State Board implement these objectives through a waste load allocation and appropriate effluent limits in the three South Bay NPDES permits. CBE et al.



contend that the effluent limitations should be calculated with no factor for dilution.

The Regional Board agrees that water quality-based objectives are needed for the South Bay. However, the Regional Board has taken the position that the water quality objectives in Table III-2A of the Basin Plan are not appropriate for the South Bay and that the process specified in the Basin Plan for the development of site-specific objectives for this area is the most expedient and rational approach to toxics control.

Finding: We conclude that the rationale for exempting the South Bay from the objectives contained in Table III-2A of the Basin Plan is invalid. In addition, we conclude that numeric, water quality-based objectives are required for the South Bay. Further, while the Board supports the current process for development of site-specific objectives for this area, the Board concludes that water quality-based objectives are needed for the interim period until site-specific objectives are developed. We reach these conclusions after examining the rationale for the Basin Plan exclusion for the South Bay and reviewing the applicable legal requirements for the development of water quality objectives for toxics.

a. Rationale for Exclusion

Two rationale were given for not imposing numeric objectives on the South Bay until site-specific objectives could be adopted:

"First, its unique hydrodynamic environment dramatically affects the environmental fate of pollutants. Second, potentially costly nonpoint source pollution control measures must be implemented to attain any objectives for this area." Basin Plan at III-5.

CBE et al. has challenged this rationale. They argue that the hydrodynamics and water chemistry of the South Bay result in the accumulation of pollutants in the bay, making the adoption of specific numerical objectives all the more important. In addition, they contend that the bioavailable nonpoint source loadings of metals are insignificant compared to the point source loadings and that, therefore, costly nonpoint source pollution control measures are not necessary to attain objectives.

In addressing this issue, we are cognizant of the fact that this Board approved the 1986 amendments to the Regional Board's Basin Plan. We reconsider this issue in light of new information which was not considered in 1987.

(1) Hydrodynamics and Environmental Fate

The circulation and mixing of San Francisco Bay is determined by riverine inflow, tides, wind, and the physical dimensions of the basins. See generally Staff Report, pp. IV-12 through IV-14. The relative importance of these factors differs for the northern reaches, consisting of Suisun Bay and San Pablo Bay, the Central Bay and the southern basin, consisting of the Lower Bay and South Bay. Delta discharges strongly influence net circulation in the northern reaches, causing a gravitational circulation which is landward at the bay bottom and seaward at

the surface. Tides and winds affect the horizontal circulation in the northern basin.

The southern basin is only characterized by gravitational circulation in extreme wet years when runoff from Guadalupe River and Coyote Creek is high. Similarly, Delta discharges only affect the circulation pattern in the southern basin when discharges are high. At these times, surface salinities in the Central Bay are reduced, causing net movement of freshwater southward and saline water northward. This pattern is reversed when Delta discharge declines. During low Delta discharge, the southern basin's circulation pattern is influenced primarily by tides and winds. Thus, the hydrodynamic processes that govern the South Bay occur in the Lower Bay as well.

Circulation in the southern basin is generally more sluggish than in the northern and central reaches. Residence time in the southern basin is from two to three weeks during high Delta discharges, compared to a residence time of less than a week in the northern reach. At low Delta discharge, the southern reach's residence time has been estimated at from one to five months and the residence time for the northern reach at approximately one month. While the longer residence time in the southern basin might support the need for site-specific objectives, it would also argue in favor of the need for more stringent objectives than those applicable to the northern basin.

The physical characteristics of the basins also affect water movement. The important features in the southern basin are

the San Bruno shoal and the constriction at the San Mateo Bridge. These features may give rise to three distinct mixing zones: (1) waters north of the San Bruno shoal, located in the Lower Bay; (2) waters between the San Bruno shoal and the San Mateo Bridge, also located in the Lower Bay; and (3) waters south of the San Mateo Bridge, located in both the Lower Bay and South Bay. If these are the only mixing zones in the southern basin, then the waters of the South Bay mix with the waters of the Lower Bay. This is a further indication that the hydrodynamic processes governing the Lower Bay occur in the South Bay.

Hydrodynamic processes are also important in transporting particulates, which can affect the bioavailability of metals. Particulate organic carbon and suspended particulates are higher in both the northern extreme of Suisun Bay and the southern extreme of the South Bay, where riverine or wastewater inflows are important. In both areas, an important source of suspended particles is the substrate, which is distributed by wind and tidal-induced currents. In the South Bay, an additional source of particulate matter is wastewater. The seasonality of hydrodynamic processes may influence seasonal changes in metal bioavailability. For example, seasonal variations in sediment characteristics result from changes in wind velocity. High winds can resuspend finer-grained material in the summer. Freshwater inputs return fine particulates to Bay sediment. These seasonal processes will affect metal bioavailability throughout the Bay depending on the relative magnitude of the processes.

The fate of trace metals in the estuarine environment is a complex issue. Several studies conducted in the South Bay provide evidence that environmental factors in the South Bay may affect the bioavailability of metals. A primary factor may be the amount of dissolved organic carbon in the water column. These factors are not, however, unique to the South Bay, but rather are likely to occur in other parts of the Bay which are subject to freshwater inflows.

In sum, the Board concludes that site-specific factors may affect the bioavailability of metals in the South Bay; however, these factors are generally applicable to San Francisco Bay as a whole. The nature of the available evidence concerning site-specific toxicity does not support the exclusion of the South Bay from compliance with the water quality objectives in Table III-2A or other appropriate water quality-based objectives.

(2) Relative Contribution of Point and Nonpoint Sources

Petitioners, CBE et al., contend that the three South Bay plants discharge more bioavailable cadmium, chromium, copper, lead, nickel, silver, and zinc to the South Bay than is discharged in urban runoff. In addition, they assert that, even without considering bioavailability, the treatment plants are the source of more heavy metals than are nonpoint sources.

The Authority's five-year study included an estimate of metals loadings from both point and nonpoint sources. CBE et al. reviewed this data and derived alternate estimates of urban

runoff. The Regional Board determined that neither the Authority's nor CBE et al.'s estimates were conclusive and that, in addition, the issue of bioavailability of metals from the two sources was unresolved. We concur with the Regional Board. See generally Staff Report, pp. IV-34 through IV-36. More data are needed to estimate loadings from urban runoff and their impact on biota. To address these issues, the Regional Board has required the evaluation of nonpoint source pollution south of Dumbarton Bridge by Santa Clara County. In response, the county has now completed a draft report, entitled "Santa Clara Valley Nonpoint Source Study".

The draft report estimates that, on an average basis, the South Bay discharges account for roughly 40 percent of the total loading of copper, lead, nickel and zinc, and 20 percent of the total loading of chromium. The remaining loadings come from nonpoint sources. CBE et al. have criticized the draft report on the grounds that pollutant concentrations measured in a dry year were used to estimate loads in normal and wet years. CBE et al.'s criticism is valid. At a minimum, the report should estimate and report the error involved in making the assumption that pollutant concentrations vary little over wide ranges of flow conditions. Nevertheless, the report is important because it indicates that both point and nonpoint discharges are important sources of metals to the South Bay, and neither can be ignored.

Our review of the data, therefore, concerning the relative metals loadings from point and nonpoint sources indicates that impairments of water quality in the South Bay cannot be attributed to one or the other category of source. Rather, any regulatory strategy to improve the water quality and protect beneficial uses in the South Bay must take both categories of sources into account. The Regional Board's approach to the regulation of metals pollution in the South Bay is consistent with this conclusion. The Regional Board has embarked on a program to determine the relative metals loadings from point and nonpoint sources and to develop wasteload allocations for point and nonpoint source discharges to the South Bay. The Regional Board has made a commitment to EPA to develop wasteload allocations for the South Bay discharges by December 1991. We support this effort.

In sum, as stated previously, the Board has found that discharges from the South Bay treatment plants of effluent above the Table IV-1 limits contribute to ambient water concentrations above the Table III-2A objectives. While it is no doubt true that potentially costly nonpoint source control measures may be necessary in order to attain heavy metals objectives in the South Bay, this is not an adequate justification for exempting South Bay from water quality-based objectives for metals during the interim until site-specific objectives can be adopted.

b. Legal Requirements

The Board will first address the requirements, governing the adoption of water quality objectives for toxic

pollutants, which were applicable to the State and Regional Boards in 1986, when the Basin Plan amendments were adopted. The Board will then discuss later developments in the law.

State law governing the adoption of water quality standards is quite general. It requires that "(e)ach regional board . . . establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance. . . ." Id. Section 13241.

The water quality standard regulations adopted by EPA contain more specific guidance on the adoption of standards for surface waters. The regulations specify that water quality criteria must protect the designated use. 40 CFR Section 131.11(a). Further, "such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use." Id. For waters with several designated uses, the criteria must support the most sensitive use. Id.

Since 1983, EPA has had specific requirements for the regulation of toxic pollutants. In particular, Section 131.11 of the standards regulations states:

"Toxic pollutants. States must review water quality data and information on discharges to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated water use or where the levels of toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use. Where a State adopts narrative criteria for



toxic pollutants to protect designated uses, the State must provide information identifying the method by which the State intends to regulate point source discharges of toxic pollutants on water quality limited segments based on such narrative criteria. . . ." Id. Section 131.11(a)(2).

The regulations also describe the form of the criteria. In general, the criteria should be numeric values. Id.(b)(1). Narrative criteria or criteria based upon biomonitoring methods are allowed "where numerical criteria cannot be established or to supplement numerical criteria". Id.(b)(2).

The Regional Board was required to comply with these regulations when the Regional Board adopted its Basin Plan amendments in 1986. The 1986 amendments added numeric objectives for heavy metals for surface waters, including San Francisco Bay, but excluding the South Bay, in Table III-2A. The Basin Plan amendments also continued the listing of South Bay as water quality limited and indicated that the area was suspected to be water quality limited due to toxic pollutants but more data was needed. As a result of the 1986 amendments to the Basin Plan, dischargers to the South Bay had to comply with the existing narrative toxicity objective in the Basin Plan, which was applicable to all surface water discharges, but did not have to comply with Table III-2A. The narrative objective prohibits the discharge of toxic substances "in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms", and compliance is determined by bioassays. Basin Plan at III-3.

Our review of evidence in the record indicates that the South Bay treatment plants were discharging toxic pollutants in levels to warrant concern. Further, the narrative toxicity criteria does not appear to comply with the provisions of Section 131.11 because numeric criteria could be adopted, and, in fact, were adopted for other portions of San Francisco Bay. Our review, based upon new information, of the rationale for exempting South Bay from the Table III-2A objectives indicates that the rationale was inappropriate. Therefore, the failure to adopt objectives for the toxic pollutants of concern appears to be inconsistent with then applicable EPA regulations.

Subsequent to adoption of the 1986 Basin Plan amendments, Congress enacted the Water Quality Act of 1987, amending the Clean Water Act. These amendments, as explained previously, added Section 303(c)(2)(B) to the Clean Water Act. This section requires the states to adopt, by February 1990, criteria for all priority pollutants for which EPA has adopted criteria, where the discharge or presence of these pollutants could reasonably be expected to interfere with designated beneficial uses. See fn. 9, *infra*.

On December 12, 1988, EPA transmitted guidance to the States, describing three acceptable options for achieving compliance with Section 303(c)(2)(B). See "Guidance for State Implementation of Water Quality Standards for CWA Section 303(c)(2)(B)" (December 1988) (Guidance Document). The three options are as follows:

(1) adopt statewide numeric water quality criteria for all Section 307(a) toxic pollutants for which EPA has issued Section 304(a) criteria;

(2) adopt specific numeric water quality criteria for Section 307(a) toxic pollutants for which EPA has issued Section 304(a) guidance, as necessary to support designated uses where such pollutants could reasonably be expected to interfere with designated uses; and

(3) adopt a procedure to be applied to a narrative water quality criterion, which shall be used in calculating derived numeric criteria. Id. at 1.

Further, the document provides the following guidance to the States on making the determination whether the discharge or presence of a toxic pollutant is interfering or is likely to interfere with the attainment of designated beneficial uses:

"Presence of facilities that manufacture or use the section 307(a) toxic pollutants or other information indicating that such pollutants are discharged or will be discharged strongly suggests that such pollutants could be interfering with attaining designated uses." Id. at 3.

The three South Bay treatment plants are discharging significant amounts of cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc into the South Bay. These are priority pollutants, for which EPA has published criteria under Section 304(a). These constituents can clearly interfere with attaining the designated beneficial uses of the South Bay. Consequently, criteria meeting the requirements of Section 303(c)(2)(B) were

required by February 1990. The existing narrative toxicity objective in the Regional Board's Basin Plan does not comply with Section 303(c)(2)(B), as interpreted in the EPA Guidance Document.

c. Conclusion

In conclusion, the Board has determined that 40 CFR Section 131.11 and Section 303(c)(2)(B) of the Clean Water Act require the adoption of numeric water quality-based objectives for copper, chromium, cadmium, lead, silver, nickel, zinc, and mercury for the South Bay. Exemption of the South Bay from the water quality objectives contained in Table III-2A, which are applicable to the rest of San Francisco Bay was inappropriate.

The Regional Board has established a process under which the dischargers must submit recommendations for site-specific water quality objectives and effluent limits for toxics by August 1, 1991. By December 1991 their permits will be revised to include either effluent limits based upon these site-specific objectives or effluent limits based upon Table IV-1, which generally implements the objectives contained in Table III-2A of the Basin Plan. Because Section 303(c)(2)(B) requires the adoption of numeric water quality objectives for toxic pollutants by February 1990 the Board concludes that the delay in adopting objectives for South Bay is unjustified. We further conclude that appropriate water quality-based objectives should be adopted by February 1991.

The Regional Board has several options to comply with this directive. This Board anticipates taking final action on

the Draft Bays and Estuaries Plan in December 1990. Once this plan is adopted, the objectives contained in the plan will be applicable to the South Bay, and no further action will be necessary in order to comply with Section 303(c)(2)(B).

The Draft Bays and Estuaries Plan currently includes proposed water quality objectives for cadmium, chromium, copper, lead, mercury, silver, selenium and zinc. If the draft plan is adopted as proposed, these objectives will apply to the waters of the South Bay. The draft plan also, however, includes provisions for the adoption of site-specific water quality objectives by a Regional Board, subsequent to adoption of the Draft Bays and Estuaries Plan. Such site-specific objectives, when adopted in accordance with the provisions of the Draft Bays and Estuaries Plan, supersede the objectives in the draft plan for the same substances and waters to the extent of any conflict. Therefore, if the Regional Board adopts site-specific objectives for the South Bay in December 1991, these objectives would supersede any applicable objectives contained in the Bays and Estuaries Plan, if the Draft Bays and Estuaries Plan is adopted in its current form.

Alternatively, the Regional Board could consider amending its existing Basin Plan, under the procedures specified in Article 3, Chapter 4, Division 7 of the Water Code, to delete the language exempting the South Bay from compliance with Table III-2A. If the Regional Board chooses this option, the Regional Board will also have to adopt objectives for selenium and copper,

since these substances are not included in Table III-2A.

Objectives for these substances could be based upon site-specific data, Ocean Plan objectives, EPA criteria, or other appropriate numbers. These objectives could also, of course, be revised if site-specific objectives are adopted in December 1991.

Petitioners, CBE et al., have proposed that the toxic materials objectives included in the Ocean Plan be adopted for the South Bay. Use of the Ocean Plan methodology for the development of water quality objectives which are protective of aquatic life is an additional option available to the Regional Board. While this Board concludes that water quality objectives for the toxic pollutants in question must be adopted for the South Bay, it is inappropriate for the Board to specify which numbers should be adopted by the Regional Board.

Finally, the Board notes that the Regional Board has required the South Bay dischargers to conduct a variety of studies which will serve to clarify the status of beneficial uses in the South Bay, the biological impacts of the ambient toxic pollutant concentrations in the bay, and the relative importance of point and nonpoint sources in causing such impacts. These studies will provide the information needed to develop site-specific objectives. The South Bay is a water quality limited segment where the attainment of protective water quality standards may be costly and complicated. Further, there are indications that the South Bay may have a high retention rate for pollutants. For these reasons, we agree that site-specific conditions should be investigated further to ensure that the

objectives to be implemented over the long term are, in fact, the pollutant levels necessary to protect beneficial uses.<sup>24</sup>

<sup>24</sup> Petitioners, CBE et al., contend that the NPDES permits illegally authorize the Regional Board to adopt site-specific objectives for selected metals based on cost. See, e.g., Order No. 88-176, Provision E.5.e. The permits allow the dischargers to submit recommendations for site-specific objectives and effluent limits based on (1) cost|effectiveness of additional point and non-point source control measures, and (2) expected impacts on beneficial uses. See id.

We do not agree with CBE's interpretation of these permit provisions. And, we have complete confidence that the Regional Board will comply with applicable state law in the adoption of any site-specific objectives for the South Bay.

The cited provisions allow for consideration of both cost and impacts on beneficial uses in the development of objectives and effluent limits. This language cannot be interpreted, however, to allow the adoption of objectives and effluent which fail to ensure reasonable protection of beneficial uses. See Water Code Section 13241.

State law governing the adoption of water quality objectives requires a Regional Board to adopt objectives which will ensure reasonable protection of beneficial uses, taking into account a variety of factors including economics. Id. State law does not provide that the boards may tradeoff water quality against economic impacts.

Further, CBE et al.'s interpretation is inconsistent with express provisions of the Water Code which declare a legislative intent to satisfy federal requirements in order to avoid direct regulation by EPA. See id. Sections 13170, 13370(c). The EPA water quality standards regulations specify circumstances where economic impacts may override water quality impacts, and preclude such tradeoffs in other circumstances. For example, if a beneficial use is not an existing use, the State may decide not to designate the use for protection if the control measures necessary to attain the use would have widespread economic impacts. 40 CFR Section 131.10(g)(6). Where a beneficial use is an existing use, however, the State may not cite economic impacts as a basis for failure to protect that use. Id. Section 131.10(h)(1). Similarly, the federal antidegradation policy specifies circumstances where the State can and cannot allow a reduction in water quality in order to accomodate economic development. Id. Section 131.12(a).

Petitioners San Jose|Santa Clara, on the other hand, contend that the Board has misinterpreted the EPA water quality standards regulations because beneficial uses for the South Bay have not been designated through a use attainability analysis. Petitioners are mistaken. The EPA regulations require a use attainability analysis only if instream beneficial uses are not designated for protection, or if the State proposes to remove designation of an instream beneficial use. Id. Section 131.10(j). The Basin Plan, in this case, already includes several designated instream beneficial uses for the South Bay, and no use attainability analysis is, therefore, required for these uses. See fn. 20, supra.

## 2. Section 304(1) Listing

Contention: CBE et al. requested that the South Bay be listed as water quality limited, due to the impacts of heavy metals, and that a formal wasteload allocation process be initiated pursuant to Section 304(1) of the Clean Water Act.

Finding: As explained above, the State Board has already placed the South Bay on the Section 304(1) short list for violation of the narrative toxicity objective in the Regional Board's Basin Plan. The short list includes all surface waters which the State does not expect to meet applicable water quality standards, after application of technology-based effluent limits, due entirely or substantially to point source discharges of priority pollutants. See 33 U.S.C. Section 1314(1)(1)(B); 40 CFR Section 130.10(d)(2). The short list also includes waters which have been impaired due to in-place sediments which have been substantially contaminated by priority pollutant loadings from point sources regulated under an NPDES permit. 54 Federal Register 23882 (June 2, 1989).

For the purposes of listing waters on the short list, "applicable standard" includes a State's narrative toxicity criteria. 40 CFR Section 130.10(d)(4). EPA regulations provide that the narrative criteria can be interpreted, on a chemical-by-chemical basis, by applying a proposed state numeric criterion, an explicit state policy or regulation for interpreting the narrative criterion, or an EPA water quality criterion, supplemented by other relevant information. Id. In the absence



of the former two interpretations, EPA national water quality criteria, supplemented with other relevant information, must be used for interpreting the state's narrative water quality criteria. See id.: 54 Federal Register 23881 (June 2, 1989).

As discussed previously, ambient water concentrations in the South Bay for several heavy metals exceed EPA water quality criteria. In addition, there is evidence in the record that concentrations of copper, silver, and zinc in sediments at the Palo Alto outfall have impaired the local clam population. These factors are an indication that the narrative toxicity objective has not been achieved in the South Bay. Inclusion of the South Bay on the short list was, therefore, appropriate.

Finally, as noted previously, the Regional Board has made a commitment to develop total maximum daily loads for heavy metals discharged to the South Bay and wasteload allocations for point and nonpoint sources of pollution. This effort is being funded as part of the State Board's Bay Protection and Toxic Cleanup Program.

### 3. Effluent Limitations

Contentions: Petitioners, CBE et al., contend that the effluent limits for toxic pollutants included in the South Bay permits cannot assure protection of existing beneficial uses in the bay, in violation of Resolution No. 68-16, the federal antidegradation policy, and Section 304(1) of the Clean Water Act. Petitioners, San Jose/Santa Clara, object to their permit on the grounds that the mass emission limits, interim effluent

limits, and default imposition of Table IV-1 limits for toxics violate the Basin Plan and Water Code Section 13241. In addition, petitioners contend that these limits are not scientifically based and may not be achievable.

Findings: As explained previously, the South Bay permits established a three-step process for the control of heavy metal discharges. Initially, the dischargers were required to comply with effluent limitations for heavy metals, based upon the limits listed in Table 4-1 of the 1982 Basin Plan. The permits also included a total mass loading limit for heavy metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. Flow data used in calculating the mass limit was a mean of flows from 1985 through 1988. The metals cap was effective until the permits were revised with mass loading limits for the individual metals.

In February 1990 both the initial effluent limits and the mass loading limits were revised. The new effluent limits for heavy metals are the greater of the 95th percentile value of 1989 monitoring data or twice the detection limit. The latter was used only if nondetected values represented more than 50 percent of the data. Individual mass loading limits were calculated for arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc, cyanide, phenols, polynuclear aromatic hydrocarbons, and selenium. The limits were calculated using the same flow data as previously used. For each constituent, a mass limit was derived by multiplying the average flow by a figure

representing the midpoint between the mean annual 1989 concentration and the new effluent concentration limit. These performance-based loading limits will remain in effect until total maximum daily loads and wasteload allocations are developed for the pollutants.

a. Initial Limits

The effluent limits and the total metals loading limits included in the initial South Bay permits have been replaced by the new limits adopted by the Regional Board in February 1990. Hence, the validity of the earlier effluent and mass loading limits has become a moot point.

b. Interim, Performance-Based Effluent and Mass Loading Limits

(1) Validity of Effluent Limits

Under the current permits, the performance-based effluent limits for toxics will remain in effect until December 1991. On December 21, 1991, either the Table IV-1 limits or alternative site-specific limits will become effective. Petitioners, CBE et al., contend that the interim limits will not assure protection of beneficial uses because the limits are based upon performance, rather than protection of water quality. The question before this Board, therefore, is whether water quality-based effluent limits for toxics must be adopted prior to December 1991.

For the reasons which will be explained, the Board concludes that water quality-based effluent limitations for

toxics were required to implement the Basin Plan's existing narrative toxicity objective when the South Bay permits were adopted. We further conclude that numeric, water-quality based limits must be adopted for the South Bay dischargers no later than April 1991.

Under Section 301(b)(1)(C) of the Clean Water Act, point source dischargers are required to comply with applicable state water quality standards by July 1, 1977. 33 U.S.C. Section 1311(b)(1)(C). Permits issued to point source dischargers under Section 402 of the Clean Water Act must include effluent limits to ensure compliance with applicable state standards. *Id.* Section 1342(a)(1); see 40 CFR Section 122.44; Water Code Section 13377. See also Trustees for Alaska v. Environmental Protection Agency, 749 F.2d 549 (9th Cir. 1984), holding that EPA violated Section 301(b)(1)(C) of the Clean Water Act by failing to include an effluent limitation in an NPDES permit to implement a state water quality standard. Applicable state standards include standards which are narrative. See 40 CFR Section 131.3(b) and (i). Hence, when the South Bay permits were adopted, the permits were required to include effluent limitations to implement the Basin Plan's narrative objective for toxicity. Existing EPA regulations did not, however, describe the procedures for developing water quality-based effluent limitations, particularly limits implementing narrative objectives.

Subsequent to adoption of the initial South Bay permits, in June 1989 EPA revised its surface water toxics

control program to provide detailed guidance on procedures for the development of water quality-based effluent limits. See 40 CFR Section 122.44(d). The regulations clarify that effluent limits are required in order to achieve any state narrative, as well as numeric, criteria. Water quality-based limits must be included in permits when the pollutant may be discharged "at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard". Id.(1). For excursions above narrative criteria, the regulations specify that the permit must contain effluent limits for whole effluent toxicity. Id.(1)(v).

Where a specific chemical pollutant has the potential to cause an excursion above a narrative criterion, the permit must include effluent limits derived by one or more of three options. Id.(1)(vi). These are: (1) establish limits using a calculated numeric water quality criterion which will attain and maintain applicable water quality standards;

(2) establish effluent limits on a case-by-case basis, using EPA's water quality criteria supplemented with other relevant information; and (3) establish limits on an indicator parameter for the pollutant of concern, provided that certain conditions are met. Id.

By including the South Bay on the Section 304(1) short list, the State Board has already determined that the discharge of heavy metals from the three South Bay treatment plants has the potential to cause or contribute to excursions above the

narrative toxicity objective in the Basin Plan. Therefore, current EPA regulations mandate that the South Bay NPDES permits include water quality-based effluent limitations for cadmium, copper, nickel, lead, mercury, silver, and selenium in order to implement the narrative toxicity objective.

The Board has previously concluded, in Section II.B.1. of this Order, that the Regional Board must adopt numeric water quality objectives for toxic pollutants for the South Bay no later than February 1991. Once these objectives are adopted, the permits must be revised to incorporate numeric water quality-based effluent limits implementing these objectives. See 33 U.S.C. Sections 1311(b)(1)(C), 1313(c)(2)(B), 1342(a)(1); 40 CFR 122.44(d); Water Code Sections 13377, 13263; 23 CCR Sections 2235.1 and 2235.2. Because the South Bay permits must be revised within the near future to incorporate effluent limits implementing the numeric water quality objectives for toxics, the Board concludes that the Regional Board's resources would be best utilized by focusing on this effort. The Board, therefore, concludes that the South Bay permits must be revised, no later than April 1991, to include numeric, water-quality based effluent limits for toxics. These limits must be based upon any applicable numeric, toxic pollutant objectives, or, in the absence of such numeric objectives, upon the existing narrative toxicity objective included in the Basin Plan. In the succeeding subsection of this Order, the Board will discuss effluent limits which would be appropriate to implement the narrative objective.

(2) State Board Resolution No. 68-16 and Federal Antidegradation Policy

Petitioners, CBE et al., object to the interim effluent and mass loading limits for toxics in the South Bay permits on the ground that they violate the federal antidegradation policy and State Board Resolution No. 68-16. Petitioners argue, in addition, that the South Bay is entitled to special protection under the federal antidegradation policy because most of the bay is included in the San Francisco Bay National Wildlife Refuge, a high quality water constituting an outstanding national resource.

We conclude that the federal antidegradation policy and State Board Resolution No. 68-16 apply to the South Bay permits. The Board further concludes that the interim performance-based effluent limits and mass loading limits are inconsistent with these policies.

The water quality standards regulations adopted by EPA require that the States adopt, as part of their water quality standards regulations, a statewide antidegradation policy, which is consistent with the principles set forth in 40 CFR Section

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131.12 (federal antidegradation policy).<sup>25</sup> See 33 U.S.C. Section 1313(d)(4)(B). The federal antidegradation policy emphasizes protection of instream beneficial uses. In general, where instream uses will not be impaired and no outstanding national resources waters will be affected, the federal antidegradation policy allows reductions in water quality. The reductions must be justified, however, as necessary to accommodate important social and economic development. See *id.*(a)(2). Further, the federal antidegradation policy only applies to reductions in water quality which occur on or after November 28, 1975, the date of adoption of the policy.

In 1968 the State Board adopted Resolution No. 68-16, the "Statement of Policy with Respect to Maintaining High Quality of Waters in California", as a part of state policy for water quality control. See California Water Code Section 13140 et seq. Resolution No. 68-16 has been adopted, as a general water quality objective, in all of the Regional Boards' basin plans.

Resolution No. 68-16 satisfies the federal requirement for a statewide antidegradation policy. In order to ensure consistency with federal Clean Water Act requirements, the State

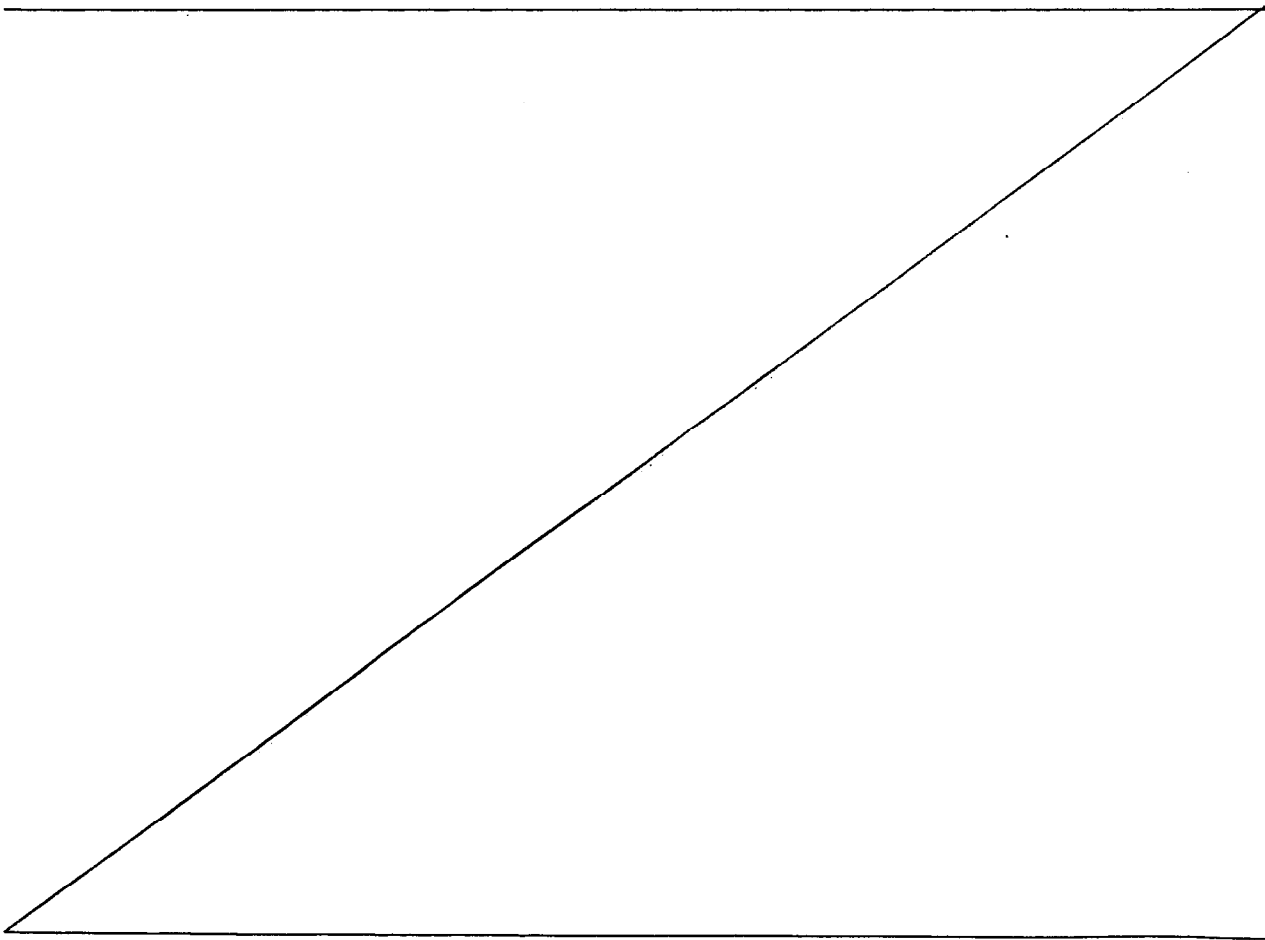
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<sup>25</sup> The federal antidegradation policy establishes a three-part test for determining when increases in pollutant loadings or other adverse changes in surface water quality may be permitted. At its base, all existing uses and the level of water quality necessary to protect those uses must be maintained and protected. 40 CFR Section 131.12(a)(1). This provision establishes the absolute floor of water quality in all surface waters. The second level provides protection of actual water quality in areas where the quality of the waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (fishable/swimmable). *Id.*(a)(2). In this case, some limited water quality degradation is allowed, as long as the water quality remains adequate to be fishable/swimmable. The third tier provides special protection to waters, denoted "outstanding National resource waters". *Id.*(a)(3). The water quality of these waters must be maintained and protected. *Id.*



Board has interpreted State Board Resolution No. 68-16 to incorporate the federal antidegradation policy in cases where the federal policy is applicable. See State Board Order No. WQ 86-17 at 17-18.

The South Bay permits allow both an increase in the volume of the discharges, as well as an increase in the mass emissions of toxic pollutants over current levels. To illustrate, the actual 1989 mass emissions from the three treatment plants was 47,600 pounds per year (lb/yr). Allowable mass emissions under the revised mass emission limits total 67,968 lb/yr. Thus, the permits allow a lowering of surface water quality below the highest levels achieved since 1975, and



the federal test must be applied.<sup>26</sup> Likewise, State Board Resolution No. 68-16 is applicable.<sup>27</sup>

Because the interim limits for toxics included in the South Bay permits are based upon performance, the limits do not necessarily ensure protection of existing instream beneficial

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*26 While the policy applies, we disagree that the South Bay is entitled to the extraordinary protection afforded to high quality waters which constitute an outstanding national resource. The South Bay has not been designated as an outstanding national resource. Its lower water quality would seem to preclude such a designation.*

*27 The South Bay permits do not include findings reflecting consideration of the state and federal policies. However, the fact sheets accompanying the three permits and the Regional Board's "Responses to Comments", dated December 20, 1988, on the draft permits indicate that the Regional Board had determined that the permits met the requirements of the federal antidegradation policy. The fact sheets stated:*

*"The re-issuance of the discharger's NPDES permit must conform to the federal anti-degradation policy, because the subject discharge is to receiving water classified as water quality limited in the Regional Board Basin Plan. The Basin Plan notes that South Bay would likely remain water quality limited, even with relocation of SBDA discharges to a deepwater outfall north of the Dumbarton Bridge, because of the natural factors limiting full attainment for all objectives.*

*The re-issued permit meets the requirements of the antidegradation policy. The permit stipulates that there shall be no increase in mass loadings of metals over current levels. This program will insure that increased flows do not result in increases in mass loading of metals....*

*In addition, the special studies to be performed by the discharger to develop site-specific water quality objectives and effluent limits are necessary prior to establishment of applicable water quality objectives. These site-specific studies, and the Santa Clara Valley Non-point Source Study satisfy the antidegradation policy requirements, regarding intergovernmental coordination and consideration of important economic and social development in the area of the discharger."*

*In the "Responses to Comments", the Regional Board addressed comments that the permits allowed increases in metals loadings in violation of the federal antidegradation policy. The response indicated that metals loadings from the three plants had dropped about 50 percent since 1975, and the interim metals cap was expected to prevent statistically significant increases during the life of the permits. Responses to Comments at 8.*

uses. Thus, the limits do not meet the first part of the federal antidegradation test. In particular, we note that several of the performance-based effluent limits are higher than the limits contained in Table IV-1 of the Basin Plan or more current EPA water quality criteria.<sup>28</sup>

The Board has concluded in the preceding subsection that the interim, performance-based limits in the South Bay permits are inconsistent with applicable law, and that the permits must be revised by April 1991 to incorporate numeric, water quality-based limits for toxic pollutants. The Board provides the following guidance to the Regional Board on the adoption of effluent limits which conform to the requirements of State Board Resolution No. 68-16 and the federal antidegradation policy.

In general, where existing water quality is better than objectives, State Board Resolution No. 68-16 and the federal antidegradation policy allow a lowering of water quality only where instream uses are protected, and the reduction in water quality is justified as necessary to accommodate important social

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<sup>28</sup> We note that the performance-based limits and the Table IV-1 limits are not directly comparable. The former refers to the 95th percentile of the 52 samples collected weekly over a one-year period, while the Table IV-1 limits are daily averages, which would have to be met for each weekly sample. For example, assume that the value of both limits is equivalent. To comply with the annual 95th percentile, 49 of the weekly samples would have to equal or be less than Table IV-1; and three samples would be equal or greater than Table IV-1. However, all weekly samples would have to be lower than Table IV-1's daily maximums for compliance. If Table IV-1 limits are lower than the performance-based limits, then Table IV-1 limits are more protective since all samples must fall at or below this value. If Table IV-1 limits are higher, then the performance-based limits are more protective.

and economic development. See Resolution No. 68-16; 40 CFR Section 131.12(a)(2); State Board Order No. WQ 86-17 at 21-23. See also 33 U.S.C. Section 1342(o); 40 CFR Section 122.44(1). For this reason, in order to ensure consistency with State Board Resolution No. 68-16 and the federal antidegradation policy, the Board recommends that the Regional Board retain the existing performance-based effluent limits in the South Bay permits, when the Regional Board revises the permits as directed in this Order, where the performance-based limits are lower than limits implementing applicable objectives.<sup>29</sup> Where the performance-based effluent limits are greater than effluent limits implementing applicable objectives, the Board recommends that the Regional Board adopt the latter limits. If the performance-based limits are retained, they should be enforced weekly, rather than annually, as currently provided in the South Bay permits.

The dischargers have indicated that they may have difficulty in meeting water quality-based effluent limits for some toxic pollutants. This position has some support in the record. Evidence in the record also indicates that the South Bay dischargers have made commendable efforts to implement vigorous source control programs in order to reduce the loadings of metals

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<sup>29</sup> In the absence of numeric objectives, effluent limits implementing the narrative toxicity objective in the Basin Plan should be the lesser of the performance-based effluent limits or the Table IV-1 limits, current EPA water quality criteria, or other appropriate water-quality based number. In addition, the permits should include an effluent limit for whole effluent toxicity. We recommend an effluent limit of 1.0 chronic toxicity unit. We note that the limit for copper in Table IV-1 is not water-quality based. The limit for copper should, therefore, be the lesser of an appropriate water quality-based limit or the performance-based limit.

into their plants. Under the circumstances, the Board recommends that the Regional Board consider, concurrently with the adoption of revised effluent limits, adoption of an appropriate enforcement order, containing a time schedule to give the dischargers an opportunity to come into compliance with the new limits.<sup>30</sup> The time schedule could be phased to take into account the possible adoption of site-specific objectives in December 1991 or later.

As explained above, the interim mass loading limits<sup>31</sup> allow for an increase in the total loading of metals. While the new total limits are from 33 to 80 percent higher than actual loadings, it is unlikely that the dischargers could increase their loadings by that much. Because the interim loading limits allow loading higher than the mean loading, they are less protective than the interim effluent limits. Therefore, the dischargers could not actually increase their mass loadings up to the loading limits without significant noncompliance with the effluent limits. Further, the Regional Board is requiring the dischargers to use lower detection limits. This will result in

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<sup>30</sup> While a schedule of compliance cannot be included in the permits in this case, an appropriate time schedule can be included in an enforcement order, such as a cease and desist order. See 33 U.S.C. Section 1311(b)(1)(C); 40 CFR Section 122.47(a)(1); In re Star-Kist Caribe, Inc., NPDES Appeal No. 88-5 (April 17, 1990).

<sup>31</sup> Petitioners, San Jose/Santa Clara, contend that mass emission limits cannot be included in their NPDES permit unless specifically addressed in the program of implementation in the Basin Plan. This argument is inconsistent with state law. State law requires that NPDES permits be issued and administered in accordance with applicable federal requirements. See Water Code Section 13377; 23 CCR Section 2235.2. Applicable federal regulations require the inclusion of mass emission limits in NPDES permits for all pollutants which are limited in the permit. See 40 CFR Section 122.45(f).

lower calculated mass loadings since samples at "non-detect" levels are assumed to be at the detection limit.

In order to comply with the federal antidegradation policy, the mass loading limits should also be revised, based on mean loading, concurrently with adoption of revised effluent limits. The limits should be calculated by multiplying the 1989 annual mean effluent concentration by the 1985-1988 annual average flow. Because the dischargers will be using lower detection limits, they should be able to comply with mass loading limits, based on mean loading. Further, when evaluating compliance with these mass emissions, the Regional Board should consider variability due to wet and dry weather.

Revision of the effluent and mass loading limits for heavy metals and selenium in the South Bay permits will not, however, address the impacts of increased freshwater flows from the San Jose/Santa Clara Plant on rare and endangered species. This issue is addressed in Section II.C. of this Order.

(3) Objections of San Jose/Santa Clara et al.

Petitioners, San Jose/Santa Clara et al., object to the interim effluent limits on the grounds that they violate the Basin Plan and Water Code Section 13241, that they are scientifically indefensible, and that they may not be achievable.

For the reasons explained in the preceding section, the Board concludes that these limits must be revised. Nevertheless, the Board will briefly address petitioners' contentions.

Evidence in the record indicates that the limits were technically based and are achievable. The technical basis for the interim performance-based limits was well documented by the Regional Board. The basis was current performance. By definition, current performance is achievable.

The interim limits are also consistent with the Basin Plan. The Basin Plan specifically provides that "(a)mbient conditions shall be maintained until site specific objectives are developed". Basin Plan at III-5. Limiting discharge concentrations of heavy metals based upon current performance maintains the status quo until water quality-based effluent limitations are adopted.

Further, the Board finds that Water Code Section 13241 is not applicable to the interim limits adopted by the Regional Board.<sup>32</sup> This section specifies the factors which a Regional Board must consider in establishing water quality objectives. "Water quality objectives" are the limits or levels of water quality constituents or characteristics established for the reasonable protection of beneficial uses of water. Water Code

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*32 Several of the parties to this proceeding also contend that the adoption of water quality-based effluent limitations implementing the narrative toxicity objective violates Water Code Section 13241. This contention must be rejected. State law requires that NPDES permits implement applicable water quality standards, including narrative standards. See Water Code Section 13377, 13263, 13050(h) and (j). In addition, state law requires that NPDES permits be issued and administered in accordance with applicable NPDES permit regulations adopted by EPA. 23 CCR Section 2235.2; see Water Code Section 13377. The NPDES regulations, as discussed above, require the inclusion of numeric effluent limits implementing narrative objectives under certain circumstances. See 40 CFR Section 122.44. The adoption of numeric effluent limitations implementing the Basin Plan's narrative toxicity objective would, therefore, be entirely consistent with state law.*

Section 13050(h). "Water quality" refers to the properties or characteristics of water which affect its use. Id.(g). The Regional Board did not establish water quality objectives in this case. Rather, the Regional Board adopted technology-based effluent limitations to regulate the discharges prior to the adoption of water quality-based limitations. See 40 CFR Section 122.2. This action was entirely consistent with state and federal law. See 33 U.S.C. Section 1342; Water Code Sections 13377; 40 CFR Section 122.44.

c. Default Limits

Petitioners, San Jose/Santa Clara et al., object to the automatic imposition of the Table IV-1 limits if alternate site-specific objectives have not been adopted by that time.

Petitioners contend that the default limits, like the interim limits, are scientifically indefensible, not achievable, and in violation of the Basin Plan and Water Code Section 13241.

This Order directs the Regional Board to adopt numeric water quality objectives applicable to the South Bay for toxic by February 1991 and to adopt numeric water quality-based effluent



limits for toxics by April 1991. The question of the propriety of the default limitations will, therefore, become a moot point.<sup>33</sup>

Nevertheless, we conclude that imposition of the default limits is consistent with applicable law.<sup>34</sup> The federal regulations, authorize imposition of effluent limits for pollutants that contribute to excursions above narrative standards, in cases where the state has not established numeric water quality standards for the pollutants. See 40 CFR Section 122.44(d)(1). Three options are provided for establishing effluent limits under these circumstance, including using EPA water quality criteria, supplemented where necessary by other relevant information. *Id.* The use of EPA water quality criteria, in the absence of site-specific objectives, as the basis for water quality-based effluent limits is consistent with applicable NPDES permit regulations. Further, generally speaking, use of the EPA criteria should ensure protection of both human health and aquatic life.

C. Salt Marsh Mitigation

Petitioners, CBE et al., contend that Cease and Desist Order No. 89-013 violates the California Endangered Species Act,

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<sup>33</sup> *The issue may also become moot if EPA revises the South Bay permits. EPA and the Regional Board published a joint public notice in June of this year of proposed modifications to the South Bay permits. See 33 U.S.C. Section 1314 (1)(3). The proposed modifications would substitute new default limits for those contained in Table IV-1 of the Basin Plan. The proposed default limits are based upon current EPA freshwater or saltwater criteria. The effluent limits contained in Table IV-1 of the Basin Plan were generally based upon EPA water quality criteria current in 1986, some of which have been revised.*

<sup>34</sup> *See discussion in fn. 32, supra.*

Fish and Game Code Section 2050 et seq. (State Endangered Species Act), the federal Endangered Species Act, 16 U.S.C. Section 1531 et seq., and the Basin Plan by failing to require sufficient acreage for wetlands mitigation. In addition, petitioners contend that no increases in flow volume should be permitted until wetland mitigation measures have been established and have been demonstrated to be successful. Petitioner, the Service, raises similar issues. In particular, the Service argues that the Regional Board erred in not requiring wetland mitigation to compensate for salt marsh habitat which has been degraded but has not yet been converted to brackish conditions.

Petitioners, San Jose/Santa Clara et al., counter that the adoption of Order No. 89-013 was improper because the order violates Water Code Section 13360, and the Regional Board lacked authority to require retroactive mitigation. Petitioners also maintain that the mitigation acreage is excessive.

For the reasons explained below, the Board concludes that the Regional Board's adoption of Order No. 89-013 was consistent with applicable state and federal law, including Water Code Section 13360. The Board further concludes that, if San Jose/Santa Clara chooses to comply with Order No. 89-013 by submitting a mitigation proposal for the creation or enhancement of saltmarsh, the proposal must provide for the creation or enhancement of 380 acres of saltmarsh or equivalent habitat. Finally, the Board has determined that a condition must be included in the San Jose/Santa Clara NPDES permit or enforcement order prohibiting increases in flow to the South Bay which adversely impact rare and endangered species.

## 1. Introduction

As of 1984 only about nine percent of California's historic wetlands remained in existence. See generally Staff Report, pp. V-1 through V-19, App. I and Tables. Like other areas of the state, San Francisco Bay has experienced a significant loss of wetlands. Of the original tidal marshes, only 5 to 25 percent remain.

Historically, salt marsh was the predominant marsh type in the Lower and South San Francisco Bay. Total acreage is estimated at approximately 5,000 acres. Salt marsh is a highly valued resource due to its limited extent along the California coastline, the high productivity of vegetation in this ecosystem, and its importance to a number of rare and endangered species. Typical vegetation types in tidal salt marsh habitat include cordgrass and common pickleweed.

In the vicinity of the South Bay discharges, freshwater and brackish marsh habitat predominates in areas that would otherwise provide salt marsh habitat. Freshwater marsh areas exist, for example, at the upstream ends of Artesian Slough, Moffett Channel and the Palo Alto discharge channel. The vegetation in these areas is dominated by California bulrush and cattails. Brackish marsh areas exist near the South Bay discharge points as a transition between the freshwater marshes and the salt marshes. Brackish marsh vegetation is typified by alkali bulrush, gum plant, and fat hen.

The salt marsh provides habitat for two species, the salt marsh harvest mouse (Reithrodontomys raviventris) and the California clapper rail (Rallus longirostris obsoletus), which have been listed by both the state and federal governments as endangered. Salt marsh is also the preferred habitat for the salt marsh wandering shrew (Sorex vagrans), a candidate for listing on the federal list, and the Alameda salt marsh song sparrow, which is expected to be submitted for listing as a federal candidate species. Primary concern has focused on the two listed species.

The populations of both species have declined significantly over the past 20 years. The estuarine marshes of San Francisco Bay have historically supported the largest populations of California clapper rails. The present breeding distribution of this species is now apparently confined to the greater San Francisco Bay area. Over 75 percent of the clapper rail population occurs in lower San Francisco Bay, south of the San Mateo Bridge. Of that population, 75 percent is found in the South Bay. The numbers of rail have apparently declined from an estimated several thousand in the early 1970's to a current population of approximately 500 or less. According to the Service, 11 rail species have become extinct on a world-wide basis since the year 1600. This level of extinction exceeds that of any other family of birds.

The decline in the California clapper rail population is not entirely attributable to loss or degradation of habitat.

Other factors, such as predation by Norway rats and red foxes, may also contribute to the decline. Nevertheless, the Service considers the conversion of salt marsh in the South Bay to be the single largest habitat loss for the salt marsh harvest mouse and the clapper rail since these species were listed as endangered by the state and federal governments.

The record contains scant information on the abundance of the South Bay population of the salt marsh harvest mouse. The Service has cited research conducted in Triangle Marsh, indicating that harvest mice were abundant in the mid-1960's when the marsh was predominantly salt marsh. In contrast, consistently low numbers of harvest mice were trapped in the marsh in the 1980's when alkali bulrush was the predominant vegetation. The Service has taken the position that the extensive elimination of salt marsh has contributed to the further endangerment of the salt marsh harvest mouse.

## 2. Impact of San Jose/Santa Clara Discharge on Salt Marsh

Petitioners, San Jose/Santa Clara, dispute the conclusion that the discharge of effluent from their treatment plant has caused salt marsh conversion. This position is not supported by evidence in the record.

In 1970 the San Jose/Santa Clara Plant discharged approximately 75 mgd; their present discharge is about 120 mgd. There is a highly significant correlation between this increase in freshwater flows and the reduction in salt marsh. Conversely,

there is no correlation between other freshwater inflows to the South Bay, specifically, streamflows from Coyote Creek or Guadalupe River, and salt marsh conversion. Historically, salt marsh has been lost because tidal marshes were diked and converted to salt ponds, farm land, or filled land for development. All diking in the affected area was completed prior to 1960, however; therefore, diking cannot be considered the cause of habitat loss subsequent to that time. We conclude that the conversion of salt marsh to brackish marsh can be attributed to the discharge of effluent from the San Jose/Santa Clara Plant.

### 3. Water Code Section 13360

Petitioners, San Jose/Santa Clara, contend that Cease and Desist Order No. 89-013 violates Water Code Section 13360 because it impermissibly specifies the manner in which the discharger must comply with the order. This contention must be rejected.

Cease and Desist Order No. 89-013 does not mandate that San Jose/Santa Clara implement wetland mitigation. Rather, the order directs the dischargers to cease and desist from discharging waste contrary to the Basin Plan prohibitions against discharges to the South Bay, discharges to dead-end sloughs, and discharges receiving less than 10:1 minimum initial dilution. Order No. 89-013 specifies permissible alternatives for achieving compliance with this directive, including: (1) wetland mitigation; (2) submission of a schedule for constructing a deep-water outfall north of the Dumbarton Bridge; and (3) submission

of a schedule for otherwise complying with the discharge prohibitions. The order further provides that acceptable mitigation projects can consist of: (1) creation or enhancement of saltmarsh; (2) reclamation that reduces annual average treatment plant flows to 1970 levels; (3) relocation of the discharge that results in a projected net increase in salt marsh habitat of 240 acres; or (4) any combination of these options that results in a projected net increase in saltmarsh habitat of 240 acres.

Order No. 89-013, therefore, is consistent with Water Code Section 13360. This section prohibits a Regional Board from specifying "the design, location, type of construction, or particular manner in which compliance may be had with" an order issued by the Regional Board. Order No. 89-013 does not dictate the manner of compliance with applicable Basin Plan prohibitions, but rather the order allows the dischargers to select the manner of compliance.

#### 4. "Retroactive Mitigation"

Petitioners, San Jose/Santa Clara, also argue that the Regional Board lacked authority to require retroactive mitigation, that is, mitigation for salt marsh conversion occurring prior to adoption of Order No. 89-012, their reissued NPDES permit. Rather, they contend that the Regional Board can only require mitigation for the loss of salt marsh, approximately 40 acres, which they project to occur during the present NPDES permit term.

It should again be stressed that Order No. 89-013 does not mandate wetland mitigation. Instead, the order directs San Jose/Santa Clara to cease discharging waste in violation of applicable discharge prohibitions contained in the Basin Plan and implemented through Order No. 89-012. This directive is, unquestionably, within the legal authority of the Regional Board, which must adopt waste discharge requirements implementing the Basin Plan. See Water Code Sections 13263 and 13377.

Petitioners' specific argument appears to be that the Regional Board erred by directing the dischargers, if they chose to comply with Order No. 89-013 by seeking an exception to the prohibitions on the basis of net environmental benefit, to mitigate for adverse impacts on rare and endangered species habitat which occurred prior to issuance of Order No. 89-012.

The Regional Board found, in Order No. 89-013, that the discharge of effluent from the San Jose/Santa Clara Plant had resulted in the conversion of 220 acres of salt marsh to fresh or brackish marsh between 1970 and 1985, causing a commensurate loss of habitat for rare and endangered species. The preservation of rare and endangered species is an existing designated beneficial use of South Bay waters. The order found that, if San Jose/Santa Clara wished to obtain an exception to the Basin Plan prohibitions on the basis of net environmental benefit, at least 240 acres of salt marsh would have to be created or enhanced to mitigate for the loss of endangered species habitat. The Regional Board derived the larger acreage amount using a



multiplication factor of 1.1., which took into account the relative habitat values of the original salt marsh, the converted marsh, and the mitigation site for the endangered species. Order No. 89-013 also allowed the discharger to submit additional information on the subject of salt marsh conversion and provided that the Regional Board would consider revising its marsh conversion estimates based upon this new information.

The discharger subsequently did submit new information, and the Regional Board, at its April 1990 meeting, determined that an actual loss of 250 acres of salt marsh had occurred since 1970, requiring the creation of 275 acres of mitigation acreage. The Regional Board did not require mitigation for salt marsh acreage which was degraded but not vegetatively converted.

The Regional Board evaluated the conversion of salt marsh from the period from 1970 to 1985. The Regional Board used 1970 as a baseline for essentially two reasons. The clapper rail and harvest mouse species were first federally listed as endangered species in 1970. Additionally, aerial infra-red photos needed to identify marsh types were not generally available prior to the early 1970's.

We conclude that the Regional Board had the authority to require the dischargers, if they chose to pursue a Basin Plan exception on the basis of net environmental benefit, to mitigate for losses of endangered species habitat occurring prior to issuance of Order No. 89-012. The Regional Board properly determined that, if San Jose/Santa Clara wished to continue

discharging to the South Bay, the dischargers would have to comply with applicable water quality standards.

As discussed previously, state water quality standards applicable to the South Bay include State Board Resolution No. 68-16 and the federal antidegradation policy where applicable. See State Board Order No. WQ 86-17 at 16-18; Basin Plan at III-2. The federal antidegradation policy requires, at its core, that existing instream beneficial uses be maintained and protected. See 40 CFR Section 131.12(a)(1). This part of the federal antidegradation policy is intended to establish an "absolute requirement that uses attained must be maintained". 48 Federal Register 51409 (November 8, 1983). The federal policy allows a lowering of water quality only if existing instream uses are fully protected. 40 CFR Section 131.12(a)(2). Existing instream uses include those uses in existence as of November 28, 1975, the date of adoption of the policy. See *id.* Section 131.3(e).

Under the federal policy, the South Bay dischargers were required, at a minimum, to protect and maintain instream uses and the level of water quality necessary to protect those uses in existence as of November 28, 1975. Further, because the policy is an existing state water quality standard, the dischargers were required to meet the standard by no later than July 1, 1977. See 33 U.S.C. Section 1311(b)(1)(C). Because they are not meeting the standard, a cease and desist order could have been issued to require the dischargers to both cease discharging

waste in violation of the standard and to comply with the standard. See Water Code Section 13301; Order No. 89-012, C.3. In other words, San Jose/Santa Clara could have been required, under Water Code Section 13301, to achieve that level of water quality necessary to protect the beneficial use of preservation of rare and endangered species, as the use existed in 1975.

State Board Resolution No. 68-16 has broader applicability. It applies to changes in water quality occurring after its adoption in 1968. This policy prohibits changes in water quality which unreasonably affect both present and potential beneficial uses of water. See also Water Code Sections 13263 and 13241. Because this is an existing state water quality standard, it could also be enforced under Water Code Section 13301. See Water Code Section 13301; Order No. 89-012. C.3. Thus, the dischargers could have been required, in order to implement Resolution No. 68-16, to achieve that level of water quality necessary to protect the beneficial use of preservation of rare and endangered species, as the use existed in 1968.

Petitioners, San Jose/Santa Clara, contend that Water Code Section 13301 does not allow "retroactive mitigation". Retroactive mitigation, in this context, is a misnomer. Water Code Section 13301 clearly authorizes a Regional Board to require compliance with waste discharge requirements and with discharge prohibitions. Thus, Order No. 89-013 was properly adopted by the Regional Board on the basis of San Jose/Santa Clara's failure to comply with the three applicable Basin Plan prohibitions. The

order gave the dischargers several options to comply with the prohibitions. One of these options was to obtain a Basin Plan exception based upon net environmental benefit. Order No. 89-013 specified the parameters for obtaining an exception on this basis. The Regional Board did not abuse its discretion in determining that, in order to grant an exception on the basis of net environmental benefit, San Jose/Santa Clara would have to demonstrate that a continuing discharge to South San Francisco Bay would meet applicable water quality standards. Applicable standards include State Board Resolution No. 68-16 and the federal antidegradation policy. For the reasons explained previously, these standards can be interpreted to require San Jose/Santa Clara to achieve that level of water quality necessary to protect the beneficial use of preservation of rare and endangered species, as the use existed in 1968.

In addition, we conclude that use of the year 1970 as a baseline, rather than 1968, was appropriate. The Regional Board's obligation to ensure that the beneficial use of preservation of rare and endangered species was protected would logically derive from the date of listing of these species, which was 1970. In addition, the information necessary to make a reasoned determination of marsh conversion was only available from the early 1970's.

The provisions of Order No. 89-013 also conform with the mandate of the State Endangered Species Act. This act establishes state policy to conserve, protect, restore, and

enhance endangered species and their habitat. Fish and Game Code Section 2052. The act further provides that state agencies should not approve projects which would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available which would prevent jeopardy. Id. Section 2053. If specific economic, social, or other conditions make such alternatives infeasible, projects may be approved if appropriate mitigation and enhancement measures are provided. Id. Section 2054. All state agencies must seek to conserve endangered species and must use their authority in furtherance of the purposes of the act. Id. Section 2055. Thus, the provisions of Order No. 89-013 directing San Jose/Santa Clara to comply with the Basin Plan, by implementing wetland mitigation, moving their discharge location, or other appropriate means, foster the purposes of the State Endangered Species Act.

Additionally, Order No. 89-013 is consistent with the federal Endangered Species Act. The federal act requires formal consultation between a federal agency and the Secretary of the Department of the Interior on any agency action which is likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of such species. 16 U.S.C. Section 1536(a)(4). This is referred to as the "Section 7" consultation process. Following consultation, the Secretary must provide an opinion

detailing how the federal agency action will affect the species or its habitat. Where jeopardy is found, the Secretary must propose reasonable alternatives to minimize the impacts and set forth terms and conditions which the federal agency or permit applicant must comply with to implement these alternatives. See *id.* Section 1536(b).

The Regional Board's action in adopting Orders Nos. 89-012 and 89-013 was a state, rather than a federal, action and, hence, was not directly subject to Section 7 of the federal Endangered Species Act. EPA, however, has the general authority to object to issuance of NPDES permits by the States, and the Service, apparently on that basis, has taken the position that Section 7 is applicable in this particular case. By letter dated December 22, 1988, the Service informed EPA that formal consultation under Section 7 may be necessary if the endangered species issues cannot be resolved at the state level.

The Service has also taken the position that Section 9 of the federal Endangered Species Act is applicable. See *id.* Section 1538. The Service, by letter dated December 22, 1988, advised the Regional Board that the degradation and loss of endangered species habitat caused by the San Jose/Santa Clara discharge could constitute a "take" of the endangered species, in violation of Section 9.

The mandate of Order No. 89-013 that San Jose/Santa Clara comply with the Basin Plan prohibition against discharge to

the South Bay is consistent with Section 9 of the federal Act. It ensures that the discharger either ceases discharge to the South Bay or implements appropriate measures to mitigate the effects of its discharge on endangered species.

Thus, this Board concludes that the Regional Board was authorized to adopt Order No. 89-013 and to use 1970 as a baseline for wetland mitigation, if San Jose/Santa Clara chooses to comply with the Basin Plan prohibitions by this means. We also find that the Regional Board's actions in this matter are consistent with prior actions taken by the Regional Board, which we have upheld, to protect wetland habitat by offsite mitigation. In Order No. WQ 83-6, for example, we affirmed the Regional Board's determination that a solid waste disposal site included wetlands, and that mitigation measures, including the purchase of offsite wetlands, were necessary in order to address the adverse impacts of filling the wetlands. In addition, the Board determined that the amount of wetlands should be determined as of 1972, the year of passage of the Clean Water Act. Similarly, in Order No. WQ 84-9 the Board affirmed adoption of an order by the

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Regional Board, requiring development of offsite wetlands as mitigation for expansion of a landfill into wetlands.<sup>35</sup>

#### 5. Amount of Mitigation Acreage

The petitioners disagree with the Regional Board's estimate of salt marsh loss. The City of San Jose argues that the specified mitigation acreage is excessive. The Service and CBE et al. contend that the mitigation acreage is inadequate. They specifically contend that the discharger should be required to mitigate for the reduction in habitat value resulting from salt marsh acreage which has been degraded but not vegetatively converted.

The Regional Board's latest figure for mitigation acreage was 275 acres, based upon a calculated actual loss of saltmarsh of 250 acres. This Board has recalculated the amount of saltmarsh acreage which was converted by San Jose/Santa Clara.

Based upon new information introduced into the record subsequent to the adoption of Order No. 89-013, we have

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*35 If San Jose/Santa Clara elects to implement wetland mitigation, the Regional Board may wish to consider issuance of a cleanup and abatement order under Water Code Section 13304 to regulate the dischargers' activities. Water Code Section 13304 gives a Regional Board the authority to issue an enforcement order against any person "who has discharged" waste in violation of waste discharge requirements or discharge prohibitions or "who has caused or permitted" waste to be discharged into waters of the state and has created or threatens to create a condition of pollution. An order issued under this section can order the discharger to cleanup the waste, abate the effects, or, in the case of a threatened pollution, take other remedial action. Water Code Section 13304 expressly allows a Regional Board to address the impacts of past waste dischargers.*

*A cleanup and abatement order could be issued to San Jose/Santa Clara, in this case, for violation of the terms of its permit and of applicable Basin Plan prohibitions. See Order No. 89-012, A.1, A.2., A.3., C.3; Basin Plan IV-8. In addition, an order could be issued to abate conditions of pollution created by the discharge. See Water Code Section 13050(1).*



recalculated the amount of saltmarsh acreage which was converted as a result of the San Jose/Santa Clara discharge. The evidence indicates that 273 acres of salt marsh in the affected area were converted to brackish marsh during the study period, from 1970 to 1985.<sup>36</sup> This figure includes 20 acres in Albrae Slough.<sup>37</sup> In

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*36 Black and white stereoscopic photograph pairs taken during the study period were examined to estimate conversion. Revised conversion estimates were based on observed increases in alkali bulrush, Scirpus robustus. Bulrush can be distinguished from pickleweed, the dominant salt marsh species, by the darker color and taller height of the bulrush. Based upon this evaluation, the Board finds that 253 acres of salt marsh, excluding Albrae Slough, have been converted since 1970. The acreage amount is 273 acres, including Albrae Slough. Thus, of the 381 acres of salt marsh present in 1970 in the area affected by the San Jose/Santa Clara Plant discharge, 108 acres remained in 1985. These figures indicate that 72 percent of clapper rail and salt marsh harvest mouse habitat within the study area has disappeared over the last 15 years. Salt marshes south of the Dumbarton Bridge, a larger area than the study area, support the majority of the populations of the clapper rail and the southern subspecies of the harvest mouse. Thus, the discharge of effluent from the San Jose/Santa Clara Plant has caused a substantial loss of salt marsh habitat.*

*37 The new evidence also indicates that the discharge has resulted in the conversion of 20 additional acres in Albrae Slough. The cause of salt marsh conversion in Albrae Slough has been the subject of some dispute among the parties to this proceeding. The Board reviewed a time series of photographs of Albrae Slough, not previously available to the Regional Board. Our review indicates that the pattern of vegetative conversion in the slough is no different than patterns observed in other marshes. Therefore, we conclude that the discharge of effluent has affected the vegetative composition of this marsh.*

addition, the evidence indicates that the remaining 108 acres of salt marsh have a lower habitat value to endangered species than the acreage had in its original condition.<sup>38</sup>

The Regional Board derived its wetland mitigation figure of 275 acres, using an habitat evaluation procedure (HEP). The HEP is a methodology developed by the Service to evaluate the effects of a proposed action on wildlife and to develop mitigation proposals. The HEP is used to determine the value of habitat, specifically the quality and quantity of habitat, to selected wildlife species. Mitigation is considered adequate when the habitat value lost, due to a project, is fully compensated by habitat created or acquired in mitigation.

The Regional Board used the HEP to compare the habitat value of South Bay wetlands in 1970 to the value of the wetlands after mitigation. The purpose of the HEP was to offset the loss of habitat for the two endangered species, the clapper rail and harvest mouse, through the gain of an equal amount of habitat for

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*38 The Service estimates that an additional 320 acres of salt marsh have been degraded but not vegetatively converted. This estimate is substantially higher than the 108 acres of salt marsh which the Board has calculated as remaining in the project area post-1970. The Service contends that the value of the remaining habitat has been reduced due to metals contamination from the South Bay treatment plants. In addition, the Service has suggested that reduced salinity may alter prey availability, thereby adversely impacting the rail population. There is no data in the record to substantiate the latter contention. With respect to metals contamination, studies have shown high metals concentrations in South Bay diving ducks. However, deleterious impacts on waterfowl have not been noted.*

*Nevertheless, the evidence indicates that the remaining 108 acres of salt marsh are of lower value to both rails and mice. The remaining marsh areas appear to have lower habitat suitability due to their reduced size, fragmentation, isolation and strip-like configuration. These factors may decrease or eliminate continuity with upland peripheral areas, which are an important tidal refuge for harvest mice and clapper rails.*

these species. The procedure took into account several factors, including the time necessary for restoration, the suitability of different marsh types to endangered species, the rate of salt marsh loss and gain, and the study period.

Petitioners, San Jose/Santa Clara, argue that the Regional Board should reconsider the HEP. They contend that the Regional Board's estimate of salt marsh acreage is flawed because clapper rails utilize transitional marshes, containing both salt marsh and brackish marsh vegetation. If this contention is true, the Regional Board would have overestimated the acreage necessary to offset the loss of pure salt marsh.

The Board has reevaluated the HEP used by the Regional Board. Our conclusions can be briefly summarized. Salt marsh harvest mice are more sensitive to salt marsh loss than clapper rails; therefore, the mitigation habitat derived from the HEP should be based upon the habitat value to mice. In general, brackish marsh is relatively unsuitable for both harvest mice and rails. The ratio of habitat lost to habitat gained via mitigation would depend on the actual mitigation site, if one is selected by Jose/Santa Clara. There are two likely scenarios. The first would be restoration of a low-level marsh by natural sedimentation and natural recolonization. In order to protect the harvest mouse, full recovery of this site would take 27 years. In the second scenario, a diked area, such as a salt pond, would be properly graded, inundated, and revegetated. This site would take considerably less time, 11 years, to recover.

The ratios of habitat lost to habitat gained under these two scenarios would be 1.56 and 1.01, respectively. The total affected acreage is 381 acres, of which 273 acres have been converted and 108 acres have reduced habitat values. The mitigation acreage necessary to compensate for endangered species habitat loss would depend on the mitigation approach selected by the dischargers, and would be 380 acres.

We, thus, conclude that full replacement of lost habitat value in this case would require the creation of 380 acres of saltmarsh, with a habitat suitability index for salt marsh harvest mice of approximately 0.9 by the year 2004, or equivalent habitat. If San Jose/Santa Clara submits a mitigation proposal involving the creation or enhancement of wetlands, the proposal must be consistent with this requirement. We recognize, however, that the specific characteristics of any actual restoration site selected by San Jose/Santa Clara may require a reevaluation of the habitat suitability index or the time required for full restoration. Any necessary modifications to the required mitigation acreage should be made utilizing the best information and expertise available and the HEP.

#### 6. Flow Limits

Petitioners, CBE et al. and the Service, have requested that Order No. 89-012 include a flow limitation to prevent the future conversion and degradation of endangered species habitat. In support of their request, the Service argues that if future

habitat losses are allowed to occur before the feasibility and success of compensating for past losses are determined, past and future impacts may never be fully offset. We concur.

Order No. 89-012 allows flows up to the design capacity of the San Jose/Santa Clara Plant, which is 167 mgd, to be discharged into the South Bay. Present average flow is approximately 120 mgd. Order No. 89-012, thus, allows an increase in the amount of wastewater discharged to the South Bay of 47 mgd. This increase approximates the actual increase in flow occurring during the period from 1970 to 1985, the time period in which the Regional Board estimated that 220 acres of salt marsh were lost.

The Regional Board has taken the position that future habitat losses are too difficult to predict. Therefore, the Regional Board has not required San Jose/Santa Clara to take measures to prevent future habitat conversion. Rather, the Regional Board has required the discharger to document habitat conversion that occurs during the life of Order No. 89-012. If conversion occurs, mitigation would be mandated in future waste discharge requirements.

The petitioners raise valid concerns regarding the efficacy of mitigation and the likelihood of continued loss of endangered species habitat in the South Bay. The feasibility of restoring or creating wetlands is a matter of some dispute. The debate has been fueled by inadequate monitoring of wetland restoration projects. A review of available literature indicates that wetland restoration projects, in general, have only limited

success. Their success depends on a number of factors, including: a sufficiently detailed mitigation plan; identification and acquisition of a suitable site; accurate topographic and hydrologic data; compliance monitoring during all stages of mitigation; and, performance standards by which to gage and reevaluate project success.

As discussed previously, state and federal law require that existing beneficial uses be protected. See 33 U.S.C. Sections 1311(b)(1)(C), 1311(d)(4)(B), 1342(a)(1); Water Code Sections 13241, 13263, 13377; 40 CFR Sections 131.11(a)(1), 131.12(a), 23 CCR Section 2235.2. Existing instream beneficial uses are accorded special protection under the federal antidegradation policy. The policy allows a lowering of water quality only if existing instream beneficial uses are fully protected. See 40 CFR Section 131.12(a)(2). We have previously concluded that the discharge of effluent from the San Jose/Santa Clara Plant has resulted in the conversion of salt marsh to brackish marsh, thereby adversely impacting the habitat of two endangered species. It is inevitable that additional increases in the flow discharged to the South Bay, possibly up to a maximum of 47 mgd, will further impact the habitat of these species.

The past discharge of effluent from the San Jose/Santa Clara Plant has already adversely impacted the habitat of the clapper rail and harvest mouse. It is, therefore, appropriate to require that the discharger implement measures, such as relocation of the discharge, reclamation, wetland mitigation, or

other alternatives, to address the effects of waste discharges which have already occurred. These measures are necessary to ensure that the beneficial use of preservation of rare and endangered species is adequately protected.

It is not appropriate, however, to allow increases in flow to the South Bay in the face of evidence that such freshwater inputs in the affected area adversely impact the beneficial use of preservation of rare and endangered species. Because of the limited success of restoration projects, mitigation to address adverse impacts which have already occurred should not be used in lieu of alternatives which would prevent the adverse impacts from occurring in the first place. The Board, therefore, concludes that a condition should be included in the San Jose/Santa Clara permit or enforcement order, preventing increases in flow which adversely impact rare and endangered species habitat. This condition will not preclude San Jose/Santa Clara from utilizing the full design capacity of its treatment plant, nor will it prevent development in the San Jose area. The condition will mean only that San Jose/Santa Clara will have to find alternatives to increasing the discharge of wastewater to the South Bay. The most obvious alternative is vigorous reclamation, which we highly endorse.<sup>39</sup>

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*39 This order directs the Regional Board to revise the permits of the South Bay dischargers and to consider adoption of certain enforcement orders. Unless a specific deadline is specified in this Order or is otherwise applicable, the Regional Board has discretion with regard to the timing of actions directed by this order. The Regional Board may also wish to combine its various regulatory proceedings on the South Bay permits.*

### III. Conclusions

After review of the record and consideration of the contentions of the petitioners, and for the reasons discussed above, we conclude:

1. The evidence in the record does not support a finding that the discharge of effluent from the South Bay treatment plants has provided a net environmental benefit.

2. The Palo Alto and Sunnyvale permits should be revised to reflect that evidence does not support a finding of net environmental benefit. Additionally, cease and desist orders should be issued, if necessary, to these dischargers to require compliance with the Basin Plan prohibition against discharges to the South Bay.

3. The existing evidence in the record, together with the studies required by the Regional Board of the South Bay dischargers, provide sufficient information on the ecological impacts of the discharges to make a determination regarding "equivalent protection".

4. The Regional Board can grant the South Bay dischargers exceptions on the basis of equivalent protection if the following conditions are met: (1) the NPDES permits include numeric, water quality-based effluent limits for toxic pollutants; (2) the dischargers continue efforts, as required by the Regional Board, to control avian botulism; (3) the dischargers ensure that the beneficial use of preservation of rare and endangered species is protected.



5. The failure of the Regional Board to adopt water quality objectives for toxic pollutants for the South Bay was inappropriate.

6. The Regional Board must take steps to ensure that appropriate interim water quality objectives for toxics are adopted for the South Bay by February 1991.

7. The process established by the Regional Board for the development of site-specific water quality-based objectives for toxic pollutants is reasonable and, when completed, should provide the basis for revising the interim objectives, as appropriate.

8. The interim, performance-based limits in the South Bay permits for heavy metals and selenium are inconsistent with applicable federal regulations.

9. The South Bay permits must be amended by April 1991 to include interim numeric water quality-based effluent limits for toxic pollutants.

10. In order to comply with State Board Resolution No. 68-16 and the federal antidegradation policy, the mass loading limits for heavy metals must be revised, based on mean loading.

11. The Regional Board should consider adoption of an appropriate enforcement order with a time schedule to enable the South Bay dischargers to come into compliance with numeric, water-quality based effluent limits.

12. Cease and Desist Order No. 89-013 complies with Water Code Section 13360 and applicable state and federal law.

13. Use of the year 1970 as a baseline for evaluating salt marsh conversion was appropriate.

14. If San Jose/Santa Clara elects to submit a mitigation proposal involving the creation or enhancement of saltmarsh, the proposal must provide for the creation or restoration of 380 acres of wetlands, or equivalent habitat, as provided in this order.

15. A condition should be included in the San Jose/Santa Clara permit or enforcement order, preventing flow increases to the South Bay which adversely impact rare and endangered species habitat.

#### IV. ORDER

IT IS HEREBY ORDERED that the Regional Board shall take appropriate action by February 1991 to ensure that numeric water quality objectives for toxic pollutants are adopted for the South Bay.

IT IS FURTHER ORDERED that the Regional Board shall take appropriate action by April 1991 to amend the South Bay permits to include numeric water quality-based effluent limits for toxic pollutants, as provided in this Order.

IT IS FURTHER ORDERED that the Regional Board shall amend the mass loading limits for toxic pollutants included in the South Bay permits, as provided in this Order.

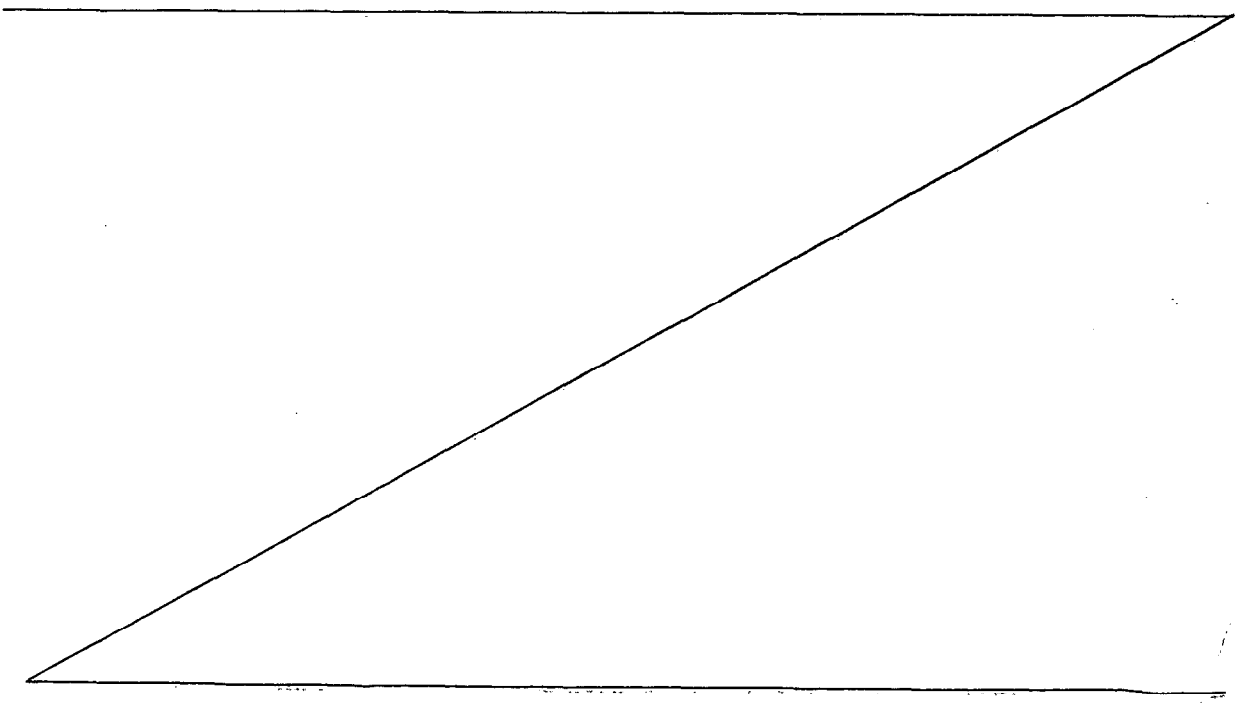
IT IS FURTHER ORDERED that the Regional Board shall amend the San Jose/Santa Clara permit or enforcement order to

include condition, limiting the flows discharged to the South Bay to not more than 120 mgd, average dry weather flow, or to those flows which would not further adversely impact rare and endangered species.

IT IS FURTHER ORDERED that the Regional Board shall amend the Palo Alto and Sunnyvale permits to include a finding of a lack of net environmental benefit.

IT IS FURTHER ORDERED that a cease and desist order be issued to Palo Alto and Sunnyvale, if necessary, to require appropriate compliance with the Basin Plan prohibition against discharges to the South Bay.

IT IS FURTHER ORDERED that, if San Jose/Santa Clara submits a mitigation proposal involving the creation or enhancement of saltmarsh, the proposal must provide for the creation or restoration of 380 acres of wetlands, or equivalent habitat, as provided in this order.



IT IS FURTHER ORDERED that the petitions filed in this matter are otherwise denied.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on October 4, 1990.

AYE:               W. Don Maughan  
                      Darlene E. Ruiz  
                      Edwin H. Finster  
                      John Caffrey

NO:                 None

ABSENT:           Eliseo M. Samaniego

ABSTAIN:          None

  
Maureen Marché  
Administrative Assistant to the Board