

12-1986

# Water Quality Control Plan. San Francisco Bay Basin (Region 2)

California Regional Water Quality Control Board

Follow this and additional works at: [http://digitalcommons.law.ggu.edu/caldocs\\_agencies](http://digitalcommons.law.ggu.edu/caldocs_agencies)



Part of the [Environmental Law Commons](#), and the [Water Law Commons](#)

---

## Recommended Citation

California Regional Water Quality Control Board, "Water Quality Control Plan. San Francisco Bay Basin (Region 2)" (1986).  
*California Agencies*. Paper 393.  
[http://digitalcommons.law.ggu.edu/caldocs\\_agencies/393](http://digitalcommons.law.ggu.edu/caldocs_agencies/393)

This Cal State Document is brought to you for free and open access by the California Documents at GGU Law Digital Commons. It has been accepted for inclusion in California Agencies by an authorized administrator of GGU Law Digital Commons. For more information, please contact [jfischer@ggu.edu](mailto:jfischer@ggu.edu).

# **WATER QUALITY CONTROL PLAN**



**SAN FRANCISCO BAY BASIN  
REGION 2**

**WATER QUALITY  
CONTROL PLAN**

**SAN FRANCISCO BAY BASIN  
REGION (2)**

**DECEMBER 1986**

---

**STATE OF CALIFORNIA  
GEORGE DEUKMEJIAN  
GOVERNOR**

**JANANNE SHARPLESS  
SECRETARY OF ENVIRONMENTAL AFFAIRS**

---

Cover photo by:

MICHAEL DRENNAN, Senior Water Resources Engineer  
San Francisco Bay Region

STATE OF CALIFORNIA

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

**DONALD E. ANDERSON, CHAIRMAN**  
**PETER W. SNYDER, VICE CHAIRMAN\***  
**FRED KLATTE\***  
**JANICE E. MONDAVI**  
**MARION OTSEA\***  
**KENNETH R. MERCER**  
**JEPHTHA WADE**  
**PHILIP WENTE**

---

\*Basin Plan Committee

STATE OF CALIFORNIA

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

**This report was prepared under the direction of**

Roger B. James ..... Executive Officer  
Lawrence P. Kolb ..... Assistant Executive Officer  
Richard H. Whitsel ..... Chief, Division of Planning

**by**

Steven R. Ritchie ..... Senior Water Resource Control Engineer  
Susan Anderson Ph.D ..... Environmental Specialist III  
Daniel S. Tempelis ..... Water Resource Control Engineer  
Michael P. Carlin ..... Environmental Specialist III  
Karen Garrison ..... Graduate Student Assistant

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**RESOLUTION NO. 86-14**

**ADOPTING AMENDMENTS TO THE WATER QUALITY CONTROL PLAN  
AND REQUESTING APPROVAL FROM  
THE STATE WATER RESOURCES CONTROL BOARD**

Whereas, on October 21, 1982, the State Water Resources Control Board (State Board) approved amendments revising the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan);

Whereas, the Regional Board has developed new proposed amendments to the Basin Plan in accordance with Section 13240 et. seq. of the California Water Code;

Whereas, the Regional Board circulated three draft sets of proposed amendments dated April 11, 1986, August 29, 1986, and November 14, 1986;

Whereas, a committee of the Regional Board held public workshops on April 30, 1986 and May 19, 1986, and the Regional Board held public hearings on September 19, 1986 and December 17, 1986 on the proposed Basin Plan amendments in accordance with Section 13244 of the California Water Code;

Whereas, the Basin Plan amendments must be approved by the State Board as provided in Sections 13245 and 13246 of the California Water Code before becoming effective;

Whereas, the Continuing Planning section of the Basin Plan identifies and prioritizes specific areas of the Basin Plan which the Board intends to investigate for the purpose of future Basin Plan amendment proposals;

Whereas, the Regional Board reaffirms those sections of the Basin Plan identified for future investigations until such time that amendments are considered;

Whereas, some proposed effluent limits in Table 4-1 of the amendments are slightly less stringent than those in Table 4-1 of the 1982 Basin Plan, the Regional Board finds that the new limits, which are based on specific water quality objectives, when applied with other proposed programs in the amendments will provide improved protection for beneficial uses and are consistent with State Board Resolution No. 68-16;

Whereas, the Regional Board prepared an environmental assessment evaluating significant environmental impacts and alternatives in compliance with Public Resources Code Section 21000 et. seq. (CEQA) and found that no significant adverse environmental impacts would result from implementation of the proposed Basin Plan amendments; and

Whereas, the proposed Basin Plan amendments are consistent with the requirements of the Clean Water Act, as amended;

Therefore, be it resolved that:

1. The Regional Board adopts the Final Draft proposed Basin Plan amendments, dated November 14, 1986, as modified at the public hearing held on December 17, 1986.
2. The State Board is requested to approve the proposed Basin Plan amendments in accordance with Sections 13245 and 13246 of the California Water Code.

3. Upon approval, the State Board is requested to transmit the Basin Plan amendments to the U.S. Environmental Protection Agency for approval.

I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on December 17, 1986.

ORIGINAL SIGNED BY

ROGER B. JAMES  
Executive Officer



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**RESOLUTION NO. 87-106**

**ADOPTING AMENDMENTS TO THE WATER QUALITY CONTROL PLAN  
AND REQUESTING APPROVAL FROM  
THE STATE WATER RESOURCES CONTROL BOARD**

WHEREAS, on December 17, 1986, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board), adopted amendments to the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) and requested that the State Water Resources Control Board (State Board) approve those amendments;

WHEREAS, on May 21, 1987, the State Board adopted Resolution No. 87-49, approving portions of those amendments to the Basin Plan but remanding other portions to the Regional Board for further consideration;

WHEREAS, the Regional Board has developed new proposed amendments to the Basin Plan in accordance with Section 13240 et. seq. of the California Water Code;

WHEREAS, a committee of the Regional Board held a public hearing on August 17, 1987, and the Regional Board held a public hearing on August 19, 1987 on the proposed Basin Plan amendments in accordance with Section 13244 of the California Water Code;

WHEREAS, the Basin Plan amendments must be approved by the State Board as provided in Sections 13245 and 13246 of the California Water Code before becoming effective;

WHEREAS, the Regional Board prepared an environmental assessment evaluating significant environmental impacts and alternatives in compliance with Public Resources Code Section 21000 et. seq. (CEQA) and found that no significant adverse environmental impacts would result from implementation of the proposed Basin Plan amendments, and that environmental assessment applies to these proposed amendments; and

WHEREAS, the proposed Basin Plan amendments are consistent with the requirements of the Clean Water Act, as amended;

THEREFORE, BE IT RESOLVED THAT:

A. The Regional Board adopts the following Basin Plan amendments:

1. Reference to Class III surface impoundments contained in the Wet Weather Overflows section of Chapter 4 should be deleted.
2. The second and third sentences of Guideline No. 4 listed under the Erosion and Sediment Control Section of Chapter 4 which state as follows should be deleted:

"In addition, the Regional Board may find that any water quality problems caused by erosion and sedimentation for such a project were due to the negligent lack of an adequate erosion control ordinance and enforcement program by the local permitting agency. Such a finding of negligence could subject a permitting agency to liability for indemnification to a developer if civil monetary remedies are recovered by the State."

3. The discussion of wastewater treatment requirements for the City and County of San Francisco contained in the Municipal Facilities Section of Chapter 4 which states in part "A full compliance deadline beyond July 1, 1988 must be part of a consent decree or other court-ordered time schedule," should be revised to state "A full compliance deadline beyond July 1, 1988 must be part of an enforceable time schedule."
4. All references in the Basin Plan to anti- and nondegradation policy should be replaced with references to State Board Resolution No. 68-16.

5. The last two paragraphs of the discussion of the Central Valley agricultural drainage problem in Chapter 4 should be deleted and replaced with:

“The State Board has taken an active role in the remediation of the selenium problem at Kesterson. The San Joaquin Valley Drainage Program, another State and Federal inter-agency program, has begun to further investigate the problems associated with the drainage of agricultural lands to develop solutions to those problems.”

6. The discussion of wetlands contained in the proposed amendments to Chapter 2 should be deleted and replaced with:

“Wetlands are waters of the State and the United States. Wetlands are defined in 40 CFR 122.2 as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and riparian areas. Because of the seasonality of rainfall in the Region, some wetlands may not be easy to identify by simple means. Therefore, in identifying wetlands the Board will rely on such indicators as hydrology, hydrophytic plants and/or hydric soils and implementation guidelines to be adopted by the Board.

There are many actual and potential beneficial uses of wetlands, with wildlife habitat being the most significant of them. Other uses are identified in the following sections which describe two of the most important types of wetland habitat in the Region, marshes and mudflats. In addition, wetlands that are adjacent to the Bay and its tributaries contribute to the enhancement of the Bay’s beneficial uses by acting as filtering agents for many pollutants, including solids and nutrients, as well as acting as habitat that serve as a transitional zone between open water and upland areas.”

7. The prohibition of discharge of solid wastes or earthen materials to wetlands contained in Chapter 4 should be deleted. The following new section should be added to Chapter 4 immediately after the prohibitions:

#### “WETLAND FILL

The beneficial uses of wetlands are mainly affected by diking and filling. Pursuant to Section 404 of the Clean Water Act, discharge of fill material to waters of the United States must be performed in conformance with a permit obtained from the Army Corps of Engineers prior to commencement of the fill activity. However, in addition, under Section 401 of the Clean Water Act, the State must certify that any permit issued by the Corps pursuant to Section 404 will comply with water quality standards established by the State (i.e. the Basin Plans), or the State can waive such certification. If the State does not waive certification, the State Board’s Executive Director, acting on the recommendation of the Regional Board, can grant or deny State certification. In the event of a conflict between the State and the Corps, or, in those rare instances where the Corps may not have jurisdiction, the Regional Board has independent authority under the State Water Code to regulate discharges to wetlands through waste discharge requirements or other orders.

The Regional Board will use Senate Concurrent Resolution No. 28 and California Water Code Section 13142.5 as guidance for action on wetlands. Senate Concurrent Resolution No. 28 states that, ‘It is the intent of the legislature to preserve, protect, restore and enhance California’s wet lands and the multiple resources which depend on them for the benefit of the people of the state.’ California Water Code Section 13142.5 states ‘Highest priority shall be given to improving or eliminating discharges that adversely affect . . . Wetlands, estuaries, and other biologically sensitive sites.’

The Regional Board will require that any application for proposed fill activity within its regulatory jurisdiction include mitigation located within the same section of the Region, wherever possible, so that there will be no net loss of wetland acreage and no net loss of wetland value when the project and mitigation lands are evaluated together. In addition,

the Regional Board will utilize EPA's Section 404(b) (1) Guidelines for Specification of Disposal Sites for Dredge or Fill Material in determining the circumstances under which wetlands filling may be permitted."

- B. The State Board is requested to approve the proposed Basin Plan amendments in accordance with Sections 13245 and 13246 of the California Water Code.
- C. Upon approval, the State Board is requested to transmit the Basin Plan amendments to the U.S. Environmental Protection Agency for approval.

I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on August 19, 1987.

ORIGINAL SIGNED BY

ROGER B. JAMES  
Executive Officer

## STATE WATER RESOURCES CONTROL BOARD

### RESOLUTION NO. 87-49

#### APPROVAL OF AMENDMENTS TO THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY BASIN

##### WHEREAS:

1. The California Regional Water Quality Control Board, San Francisco Bay Region ( San Francisco Bay Regional Board), revised the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on October 21, 1982.
2. Division 7 of the California Water Code states that Basin plans shall be periodically reviewed and, if appropriate, revised.
3. The San Francisco Bay Regional Board developed new proposed amendments to the Basin Plan which were considered at public workshops held on April 30, 1986 and May 19, 1986 and public hearings held on September 19, 1986 and December 17, 1986.
4. The amendments revise Beneficial Uses (Chapter 2), Water Quality Objectives (Chapter 3), Implementation Plan (Chapter 4), and Plans and Policies (Chapter 5).
5. Proposed changes to Chapter 5 will be considered at a later date to allow adequate review of guidance documents incorporated. Approval of changes to Chapters 2, 3, and 4 does not constitute approval of any of the proposed amendments to Chapter 5 adopted by San Francisco Bay Regional Board Resolution No. 86-14 on December 17, 1986.
6. As a result of the review process, the San Francisco Bay Regional Board identified and prioritized specific areas of the Basin Plan which the San Francisco Bay Regional Board intends to further study and evaluate for the purpose of future amendment proposals.
7. Some proposed water quality objectives and effluent limits contained in the amendments are less stringent than those established in the 1982 Basin Plan. The San Francisco Bay Regional Board determined that the new objectives when applied with other proposed programs in the amendments will provide improved protection for beneficial uses and are consistent with State Board Resolution 68-16.
8. State Board finds that the proposed water quality objectives as well as the effluent limitations are to be used in the interim until site specific objectives and limitations are developed and adopted.
9. State Board finds that the proposed amendments allow specific exceptions from toxic substance water quality objectives, effluent limits, and toxicity bioassay testing compliance.
10. The proposed amendments make numerous incorrect references to State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California", as either the Non- or Anti-degradation Policy.
11. New language has been incorporated into the Basin Plan with regard to the problems associated with agricultural drainage in the Central Valley. This language has been incorporated for purposes of providing information only.
12. The proposed amendment would establish a new definition for wetlands, and would establish a prohibition against discharge of solid wastes or earthen materials to wetlands. The State Board finds that further review and evaluation of these proposed amendments, including consideration of alternatives, is necessary to determine if the proposed amendments are appropriate.
13. The State Board finds that the discussion of the July 1, 1988 deadline with regard to the wastewater treatment compliance by the County and City of San Francisco should indicate

that a cease and desist order may be issued and that a consent decree or other court-ordered time schedule is optional if a cease and desist order is issued.

14. State Board finds that the proposed amendments make reference to Subchapter 15, Title 23, CAC Regulation. There are no Class III surface impoundments as per current Subchapter 15 standards.
15. State Board finds that the second and third sentences of proposed Guideline No. 4 listed under the Erosion and Sediment Control section of Chapter 4 are legally incorrect.
16. The proposed Basin Plan amendments are consistent with the requirements of Public Resources Code Section 21000 et seq (California Environmental Quality Act.)
17. Basin Plan amendments do not become effective until approved by the State Board.

THEREFORE BE IT RESOLVED:

1. That any exception adopted by the San Francisco Bay Regional Board with regard to compliance with toxic substances water quality objectives, effluent limits or toxicity bioassay testing be adopted according to the same procedures established for basin plan amendments. These procedures are set forth a memorandum and attachments from the Office of Chief Counsel to the Regional Board Executive Officers dated July 15, 1983 regarding "Basin Plan Amendment Procedures" as well as EPA standards and public participation regulations. That such exception will not be effective until approval by the State Board and EPA (if necessary) and that any Waste Discharge Requirements or NPDES permit implementing such an exception shall not be adopted until after such needed approval.
2. That the amendments to the Basin Plan for Chapters 2, 3, and 4 as described by the San Francisco Bay Regional Board Resolution No. 86-14 adopted December 17, 1986 be approved with the exception of the following items:
  - a. That the Class III surface impoundment reference as stated in the Subchapter 15, Title 23, CAC requirements be remanded to the San Francisco Bay Regional Board as inappropriate.
  - b. That the second and third sentences of Guideline No. 4 listed under the Erosion and Sediment Control Section of Chapter 4 be remanded to the San Francisco Bay Regional Board as inappropriate.
  - c. That the discussion of the need for a court-ordered time schedule for failure to comply with the July 1, 1988 deadline for compliance, with regard to the wastewater treatment requirements by the County and City of San Francisco, be remanded as inappropriate.
  - d. That all references to anti- and non-degradation policy be remanded to the San Francisco Bay Regional Board as inappropriate. That such language should be replaced with the appropriate reference to State Board Resolution No. 68-16 "Statement of Policy With Respect to Maintaining High Quality of Waters in California".
  - e. That the statement regarding the agriculture drainage problem in the Central Valley be remanded to the San Francisco Bay Regional Board for updating.
  - f. That the discussion of wetlands in Chapter 2 and the prohibition against discharge of solid wastes or earthen materials (Discharge Prohibition No. 18) in Chapter 4 be remanded for further review and evaluation. The State Board Executive Director will compile and forward to the San Francisco Bay Regional Board a list of issues to be considered during such review and evaluation. The list will include issues received by the State Board in writing from interested persons by June 1, 1987.
3. That the following matters be addressed by the San Francisco Bay Regional Board to the extent feasible given existing resources:
  - a. Toxicity objectives should be revised to ensure protection of all beneficial uses.
  - b. Site-specific toxicity objectives should be established where appropriate.

- c. A use-attainability analysis should be performed on the South Bay.
- d. Effluent limits established in individual permits must be consistent with the Clean Water Act.
- e. Toxicity requirements should be revised as chronic test procedures are developed.
- f. Testing for compliance with bioassay requirements should be refined to include plant and invertebrate species.
- g. The exception to the bioassay requirements for deep-water discharges should be refined to include consideration of additive effects of chemical constituents.

#### CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and current copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on May 21, 1987.

ORIGINAL SIGNED BY

Maureen Marché  
Administrative Assistant to the Board

## STATE WATER RESOURCES CONTROL BOARD

### RESOLUTION NO. 87-82

#### APPROVAL OF AMENDMENTS TO CHAPTER 5 OF THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY BASIN

WHEREAS:

1. The California Regional Water Quality Control Board, San Francisco Bay Region ( San Francisco Bay Regional Board), revised the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on October 21, 1982.
2. Division 7 of the California Water Code states that basin plans shall be periodically reviewed and, if appropriate, revised.
3. The San Francisco Bay Regional Board developed new proposed amendments to the Basin Plan which were considered at public workshops held on April 30, 1986 and May 19, 1986 and public hearings held on September 19, 1986 and December 17, 1986.
4. The amendments revise Beneficial Uses (Chapter 2), Water Quality Objectives (Chapter 3), Implementation Plan (Chapter 4), and Plans and Policies (Chapter 5).
5. The amendments to Chapters 2 through 4 were considered and acted upon through State Board Resolution No. 87-49 adopted May 21, 1987.
6. Proposed changes to Chapter 5 were to be considered as a later date to allow adequate review of guidance documents referenced.
7. The Chapter 5 references to three guidance documents do not constitute actual incorporation into the Basin Plan.
8. The referenced guidelines were reviewed pursuant to Section 13245.5 of the California Water Code.
9. The guidelines entitled "Discharge of Polluted Ground Water to Surface Water: Guidance Document" is inconsistent with Clean Water Act requirements.
10. The guideline entitled "Enforcement Guidelines for POTW Chlorine Residual Violations" is appropriate, but may allow for impacts to aquatic organisms and may not reflect the implementation of the best available technology.
11. The guideline entitled "Guidance For Addressing Fuel Leaks" is inappropriate because it duplicates and overlaps guidance provided by the Leaking Underground Fuel Tank (LUFT) statewide field manual.
12. Deletion of reference to the Resources Agency "Policy for Preservation of Wetlands in Perpetuity" is appropriate since the Regional Board is developing a comprehensive protection plan for the Region's wetlands.
13. The proposed amendments make numerous incorrect references to State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," as either the Non- or Anti-degradation Policy.
14. The deletion of on-site disposal county waivers Nos. 583 and 598 and the addition of Regional Board Resolution Nos. 83-1, 83-2, and 83-12 are appropriate.
15. The addition of the reference to the policy statement, Regional Board Resolution No. 83-10, with respect to the results of the San Francisco Bay Shellfish Program approved by State Board through Resolution No. 84-23, March 15, 1984, is not appropriate.
16. The proposed Basin Plan amendments are consistent with the requirements of Public Resources Code Section 21000 et seq (California Environmental Quality Act).
17. Basin Plan amendments do not become effective until approved by the State Board.

THEREFORE BE IT RESOLVED:

1. Reference in Chapter 5 to the guideline entitled "Enforcement Guidelines for POTW Chlorine Residual Violations" is approved. This guideline is conditionally approved pursuant to Water Code Section 13245.5. The conditions are:
  - a. The Regional Board should reconsider the performance thresholds to prevent receiving water impacts and to implement best available technology.
  - b. The Regional Board should consider development of an annual frequency threshold to limit the maximum number of days that violations can occur on an annual basis.
  - c. That any discharger which fails to meet the performance threshold be required to consider corrective actions and system upgrades to reflect best available technology and operational performance. State Board staff will assist Regional Board staff in review of de-chlorination system adequacy.
2. That the other amendments to Chapter 5 of the Basin Plan as adopted in the San Francisco Bay Regional Board Resolution No. 86-14 adopted on December 17, 1986 be approved with the exception of the following:
  - a. That all references to anti- and non-degradation policy are remanded to the San Francisco Bay Regional Board as inappropriate. That such language should be replaced with the appropriate reference to State Board Resolution No. 68-16 "Statement of Policy With Respect to Maintaining High Quality of Waters in California."
  - b. Reference to the guidance document "Discharge of Polluted Ground Water to Surface Waters" is not approved. This guideline is also not approved pursuant to Water Code Section 13245.5.
  - c. Reference to the guidance document "Guidelines for Addressing Fuel Tanks" is not approved. This guideline is also not approved pursuant to Water Code Section 13245.5
  - d. Incorporation of the reference to the policy statement (Regional Board Resolution No. 83-10) concerning the results of the San Francisco Bay Shellfish Program is also not approved.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on August 20, 1987.

ORIGINAL SIGNED BY

Maureen Marché  
Administrative Assistant to the Board



## **STATE WATER RESOURCES CONTROL BOARD**

### **RESOLUTION NO. 87-92**

#### **APPROVAL OF AMENDMENTS TO CHAPTERS 2, 3, AND 4 OF THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY BASIN**

##### WHEREAS:

1. The California Regional Water Quality Control Board, San Francisco Bay Region (San Francisco Bay Regional Board), revised the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986.
2. On May 21, 1987, the State Water Resources Control Board (State Board) adopted Resolution No. 87-49 approving portions of these amendments to the Basin Plan remanding other portions to the San Francisco Bay Regional Board for further consideration.
3. The San Francisco Bay Regional Board adopted Resolution No. 87-106 on August 19, 1987 revising the items remanded by State Board Resolution No. 87-49.
4. The proposed revised amendments to the Basin Plan include wetland protection provisions. These amendments define wetlands in accordance with the definition established by the Environmental Protection Agency's regulations implementing the Clean Water Act.
5. The proposed revised amendments to Chapters 2, 3, and 4 of the Basin Plan as included in San Francisco Bay Regional Board Resolution No. 87-106 are appropriate in accordance with State Board Resolution No. 87-49.
6. The proposed Basin Plan amendments are consistent with the requirements of Public Resources Code Section 21000 et seq. (California Environmental Quality Act).
7. Basin Plan amendments do not become effective until approved by the State Board.
8. The wetlands protection provisions in the proposed revision to the Basin Plan call for implementation guidelines for wetlands identification. The State Board finds that implementation guidelines for determining wetlands' value would also be desirable. Regional Board guidelines do not take effect until they are approved by the State Board.

##### THEREFORE BE IT RESOLVED:

1. That the State Board approves the revised Basin Plan amendments as described in San Francisco Bay Regional Board Resolution 87-106 adopted on August 19, 1987.
2. That approval is with the understanding that since the Environmental Protection Agency's definition is used, and the proposed revised amendments do not define "riparian," the statement in the revised amendments that wetlands include "riparian areas" refers only to those areas along watercourses that are inundated saturated at sufficient frequency and duration that they meet the Environmental Protection Agency's definition of wetlands.
3. That approval is with the understanding that since the proposed revised amendments are based upon the Environmental Protection Agency's definition of wetlands, the San Francisco Bay Regional Board will give great deference to the Environmental Protection Agency's administrative interpretation of that definition.
4. That the State Board directs the San Francisco Bay Regional Board to adopt implementation guidelines for determining wetlands value, and submit them to the State Board for approval no later than April 1, 1988.

5. That the State Board directs the San Francisco Bay Regional Board to include in its implementation guidelines a method for addressing general certification or a waiver of certification of Corps of Engineer Permits pursuant to Section 401 of the Federal Clean Water Act for solar salt making and maintenance activities associated with solar salt making.

#### CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on August 20, 1987.

ORIGINAL SIGNED BY

Maureen Marché  
Administrative Assistant to the Board

## TABLE OF CONTENTS

	<i>PAGE</i>
<b>I. INTRODUCTION</b>	
Introduction .....	I-1
The San Francisco Bay Region .....	I-2
The Regional Board .....	I-3
The Water Quality Control Plan .....	I-3
<b>II. BENEFICIAL USES</b>	
Introduction .....	II-1
Definitions of Beneficial Uses .....	II-1
Municipal and Domestic Supply .....	II-1
Agricultural Supply .....	II-1
Industrial Process Supply .....	II-2
Industrial Service Supply .....	II-2
Ground Water Recharge .....	II-2
Fresh Water Replenishment .....	II-2
Navigation .....	II-2
Water Contact Recreation .....	II-2
Non-Contact Water Recreation .....	II-3
Ocean Commercial and Sport Fishing .....	II-3
Warm Fresh Water Habitat .....	II-3
Cold Fresh Water Habitat .....	II-3
Preservation of Areas of Special Biological Significance .....	II-3
Wildlife Habitat .....	II-3
Preservation of Rare and Endangered Species .....	II-3
Marine Habitat .....	II-4
Fish Migration .....	II-4
Fish Spawning .....	II-4
Shellfish Harvesting .....	II-4
Estuarine Habitat .....	II-4
Present and Potential Beneficial Uses .....	II-4
Surface Waters .....	II-4
Ground Waters .....	II-5
Wetlands .....	II-5
Marshes .....	II-5
Mud Flats .....	II-6
<b>III. WATER QUALITY OBJECTIVES</b>	
Introduction .....	III-1
State Board Resolution 68-16 .....	III-2
Objectives for Ocean Waters .....	III-2
Objectives for Inland Surface Waters .....	III-2
Color .....	III-2
Tastes and Odors .....	III-2
Floating Material .....	III-2
Suspended Material .....	III-2
Settleable Material .....	III-2
Oil and Grease .....	III-2
Biostimulatory Substances .....	III-2
Sediment .....	III-3
Turbidity .....	III-3
pH .....	III-3

## TABLE OF CONTENTS (CONTINUED)

	<i>PAGE</i>
Dissolved Oxygen.....	III-3
Bacteria.....	III-3
Temperature .....	III-3
Salinity .....	III-3
Toxicity .....	III-3
Un-ionized Ammonia .....	III-5
Sulfide.....	III-5
Constituents of Concern for Municipal and Agricultural Water Supplies.	III-7
Radioactivity .....	III-7
Delta and Suisun Marsh .....	III-7
Alameda Creek Watershed .....	III-8
Objectives for Ground Waters.....	III-8
 <b>IV. IMPLEMENTATION PLAN</b>	
Introduction.....	IV-1
Research .....	IV-1
Investigation and Monitoring.....	IV-1
Control.....	IV-1
Point Source Control Measures .....	IV-2
Effluent Limitations.....	IV-2
Effluent Toxicity Control Program.....	IV-7
Effluent Characterization .....	IV-7
Development of Water Quality Objectives .....	IV-7
System Modeling and Waste Load Allocation .....	IV-8
Effluent Limit Derivation.....	IV-8
Discharge Prohibitions .....	IV-8
Wetland Fill .....	IV-10
Load Allocation to Receiving Water Segments.....	IV-11
Segment Identification and Classification.....	IV-11
Assimilative Capacity and Load Allocation .....	IV-11
South Bay .....	IV-14
Napa and Petaluma Rivers .....	IV-14
Sonoma Creek and Suisun Marsh .....	IV-14
Alameda Creek.....	IV-14
Richardson and Tomales Bay .....	IV-14
Ranking of Segments.....	IV-14
Municipal Facilities .....	IV-15
City and County of San Francisco.....	IV-16
Fairfield-Suisun Sewer District.....	IV-16
South Bay Dischargers Authority.....	IV-18
Livermore-Amador Valley.....	IV-20
East Bay Municipal Utility District and Local Agencies .....	IV-25
Pretreatment.....	IV-25
Industrial Wastes Discharges .....	IV-26
San Luis Drain .....	IV-26
Solid and Hazardous Waste Disposal.....	IV-27
Municipal Wastewater Sludge Management .....	IV-30
Leaking Underground Tanks and Abandoned Sites.....	IV-30

**TABLE OF CONTENTS (CONTINUED)**

	<i>PAGE</i>
Wet Weather Overflows .....	IV-31
Conceptual Approach.....	IV-31
Industrial Facilities.....	IV-31
Subchapter 15 Ponds.....	IV-33
Nonpoint Source Control Measures .....	IV-33
Agricultural Wastewater Management.....	IV-33
Animal Confinement Operations .....	IV-33
Irrigation Operations.....	IV-34
On-Site Wastewater Treatment and Disposal Systems.....	IV-34
Policy on Discrete Sewerage Facilities .....	IV-34
Individual System Guidelines .....	IV-35
Dredging and Disposal of Dredge Spoils .....	IV-35
Erosion and Sediment Control .....	IV-37
Goal.....	IV-37
Program.....	IV-37
Urban Runoff Management.....	IV-39
Basic Information from Local Agencies .....	IV-40
Basic Information from Flood Control Agencies.....	IV-40
San Francisco Bay South of the Dumbarton Bridge .....	IV-40
East Bay Shoreline from the Dumbarton Bridge to Richmond .....	IV-41
Vessel Wastes.....	IV-41
Oil Spills.....	IV-42
Wastewater Reclamation .....	IV-42
Regional Water Reuse Study .....	IV-42
Reclamation/Conservation Advisory Committee.....	IV-42
Estuarine Management.....	IV-46
Continuing Planning .....	IV-46
Regional Board Resource Allocation.....	IV-46
Recommendations for Action by the State Board.....	IV-49
Recommendations for Action by the EPA.....	IV-49
Recommendations for Action by the Aquatic Habitat Institute.....	IV-49
<b>V. PLANS AND POLICIES</b>	
Introduction.....	V-1
Statewide Plans and Policies.....	V-1
State Water Resources Control Board.....	V-1
Resolution 68-16 .....	V-1
Thermal Plan .....	V-1
Water Quality Control Policy.....	V-1
Ocean Plan.....	V-1
Bays and Estuaries Policy.....	V-3
Powerplant Cooling Policy .....	V-3
Delta Plan .....	V-3
Regional Board Plans and Policies.....	V-3
Aquatic Habitat Programs.....	V-3
Cooperative Agreements.....	V-3
Dairy Wastes.....	V-4
Delta Planning.....	V-4
Dredging .....	V-4

## TABLE OF CONTENTS (CONTINUED)

	<i>PAGE</i>
Erosion and Surface Runoff .....	V-4
Marshlands.....	V-5
On-Site Disposal.....	V-5
Reclamation .....	V-6
Shellfish.....	V-6
Technical Reports .....	V-6
Vessel Wastes.....	V-6
Regional Board Guidance Documents .....	V-6
Enforcement Guideline for P.O.T.W. Chlorine Residual Violations.....	V-6
 <b>VI. SURVEILLANCE AND MONITORING</b>	
Introduction.....	VI-1
State Surveillance and Monitoring Program .....	VI-1
Primary Network.....	VI-2
Toxic Substances Monitoring .....	VI-2
State Mussel Watch .....	VI-5
Ground Water Network .....	VI-5
Compliance Monitoring .....	VI-7
Complaint Investigation .....	VI-7
Intensive Surveys .....	VI-7
Aquatic Habitat Program .....	VI-7
Aerial Surveillance .....	VI-7
Lake Surveillance .....	VI-7
Biennial Water Quality Inventory .....	VI-8
Local Monitoring Programs.....	VI-8
 <b>APPENDICES (Available Upon Request)</b>	
A. Statewide Plans and Policies	
B. Un-ionized Ammonia Calculation	
C. Solid Waste Disposal Sites	
D. Municipal Facilities	
E. Regional Board Policies	

## LIST OF FIGURES

<i>NUMBER</i>	<i>TITLE</i>	<i>PAGE</i>
I-1	San Francisco Bay Basin.....	I-2
II-1	Principal Surface Waters of Basin 2.....	II-13
II-2	Location of Groundwater Basins.....	II-14
II-3	Location of Marshes.....	II-15
IV-1	Delineation of Receiving Water Segments.....	IV-12
IV-2	Municipal Facilities.....	IV-17
IV-3	South Bay Dischargers Authority.....	IV-19
IV-4	Livermore-Amador Valley.....	IV-21
IV-5	Location of Industrial Discharges.....	IV-28
IV-6	Overflow Control Criteria for Wastewater Collection Systems.	IV-32
IV-7	Oil Spilled During Transfer Operations in San Francisco Bay Area, 1975-1980 .....	IV-43
V-1	Areas of Special Biological Significance.....	V-2
VI-1	Monitoring Network .....	VI-4

## LIST OF TABLES

<i>NUMBER</i>	<i>TITLE</i>	<i>PAGE</i>
II-1	Existing and Potential Beneficial Uses of Surface Waters.....	II-7
II-2	Significant Tributaries to Major Streams, Creeks and Reservoirs.....	II-11
II-3	Beneficial Uses of Marshes.....	II-12
III-1	Water Quality Objectives for Coliform Bacteria .....	III-4
III-1A	EPA Bacteriological Criteria for Water Contact Recreation .....	III-4
III-2	Water Quality Objectives for Municipal and Agricultural Supply Waters .....	III-6
III-2A	Water Quality Objectives for Toxic Pollutants for Surface Waters Downstream of Carquinez Strait.....	III-7
III-2B	Water Quality Objectives for Toxic Pollutants for Surface Waters Upstream of San Pablo Bay.....	III-8
III-3	Water Quality Objectives for the Alameda Creek Watershed above Niles.....	III-9
IV-1	Effluent Limitations for Selected Toxic Pollutants for Discharge to Surface Waters .....	IV-3
IV-2	Schedule for Performing Effluent Characterization Studies.....	IV-6
IV-3	Receiving Water Segments.....	IV-13
IV-4	Treatment Levels.....	IV-13
IV-5	Receiving Water Segment Ranking Chart.....	IV-15
IV-6	Segment Ranking.....	IV-16
IV-7	Livermore-Amador Valley Incremental Salt Load.....	IV-20
IV-8	Major Industrial Dischargers.....	IV-27
IV-9	Erosion and Sediment Control Regulatory Programs Needing Revision.....	IV-38
IV-10	Reclaimed Wastewater Projects.....	IV-44
VI-1	Monitoring Stations .....	VI-3
VI-2	Synthetic Organic Compounds Analyzed in the TSM and SMW Programs.....	VI-6



# I. INTRODUCTION

---

## INTRODUCTION

The State Water Resources Control Board and the nine Regional Water Quality Control Boards were created to solve California's water quality problems. Operating under the provisions of the California Water Code, their unique relationship provides state level coordination and regional familiarity with local needs and conditions. Their joint actions constitute a comprehensive program for managing water quality in California, as well as effective State administration of the Federal water pollution control laws.

The State Board gives general direction to the water quality control program through the policies and decisions it makes. The physical characteristics of the San Francisco Bay Region and the Regional Board's role are discussed below.

## THE SAN FRANCISCO BAY REGION

The San Francisco Bay Region is endowed with a unique natural setting. Located on the central coast of California as shown in Figure I-1, it functions as the only drainage outlet for waters of the Central Valley and also marks a natural topographic separation between the northern and southern coast ranges. All or major portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties are included within the region.

The San Francisco Bay system is the dominant feature of the Region. The system is the most extensive and significant estuary remaining on the California coast. Its deepwater channels, tidelands, marshlands, freshwater streams, and rivers provide a variety of habitats which have become more critical to the preservation of several species as other estuaries have been reduced in size or lost to development. Myriads of fish and wildlife species utilize these habitats for feeding and nursery grounds. The Bay sys-

tem also provides a migratory pathway for anadromous fish and is a key stopping point for migratory birds on the Pacific Coast Flyway.

The unusual physical characteristics of the Bay system contribute to the diversity of habitat within it. Deepwater areas exist within each segment of the Bay adjacent to large expanses of very shallow water. A wide salinity range from hypersaline to freshwater is nearly always present, and wide ranges of water temperature are also encountered. This situation greatly increases the number of species which can live in the Bay and therefore enhances its biological stability.

The Sacramento and San Joaquin Rivers at the eastern boundary of the basin enter the Bay system through the Delta at the eastern end of Suisun Bay. These major rivers contribute almost all of the fresh water inflow to the Bay.

There are numerous small streams and rivers within the basin. Streamflow in the Region is highly seasonal with more than 90 percent of the annual runoff occurring during the winter period between November and April. Many streams often go dry during the middle or late summer. The Napa River, which is the least affected by upstream regulation, clearly shows the seasonality of runoff; only 4½ percent of the average annual runoff occurs during the summer months.

Because of its unique characteristics, the waters of the San Francisco Bay Region, particularly the San Francisco Bay estuarine system, merit special protection. The adverse effects of waste discharges must be controlled, and extensive upstream water diversions must be limited and their effects mitigated. The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board), was created by the California legislature to protect and enhance the quality of all waters in the San Francisco Bay Region.



## THE REGIONAL BOARD

The Regional Board consists of nine members appointed by the Governor for four-year terms. Members must reside or maintain a place of business within the Region and must be associated with or have special knowledge of specific activities related to the control of water quality. Members of the Board serve without pay and conduct their business at regular meetings and frequent public hearings at which public participation is encouraged.

All duties and responsibilities of the Regional Board are directed at providing reasonable protection and enhancement of the quality of all waters in the Region, both surface and underground. The programs by which these duties and responsibilities are carried out include:

- Preparing new or revised policies addressing Region-wide water quality concerns;
- Adopting, monitoring compliance with, and enforcing waste discharge requirements and NPDES permits;
- Providing recommendations to the State Board on financial assistance programs, proposals for water diversion, budget development, and other state-wide programs and policies;
- Coordinating with other public agencies which are concerned with water quality control; and
- Informing and involving the public on water quality issues.

## THE WATER QUALITY CONTROL PLAN

The Regional Board is required by law to develop, adopt (after public hearing), and implement a Water Quality Control Plan for the entire region. The principal elements of this plan are:

- Statement of beneficial water uses which the Board will protect;
- Water quality objectives needed to protect the designated beneficial water uses; and
- Strategies and time schedules for achieving the water quality objectives.

The original Water Quality Control Plan, San Francisco Bay Basin (Basin Plan) was adopted by the Regional Board and approved by the State Board in April 1975. The basic purpose of the basin planning effort is to provide future direction of water quality

control management for protection of California's waters. The Plan satisfies the following needs:

- The Plan is a requirement of the U. S. Environmental Protection Agency (EPA) for the allocation of federal grants to cities and districts for construction of wastewater treatment facilities.
- The Plan fulfills requirements of the Porter-Cologne Act that call for water quality control plans in California.
- The Plan provides a basis for establishing priorities in the disbursement of both state and federal grants for construction and upgrading of wastewater treatment facilities.
- The Plan, by delineating water quality objectives to be achieved and maintained, provides a basis for establishment or revision of waste discharge requirements by the Regional Board and the establishment or revision of water rights permits by the State Board.
- The Plan establishes conditions (discharge prohibitions) which must be met at all times.

The Basin Plan is intended to provide a definitive program of actions designed to preserve and enhance water quality, and to protect beneficial uses in a manner which will result in maximum benefit to the people of the State. The Basin Plan is a melding of state and federal requirements with the unique physical, economic, and social conditions of the Region to yield the best practicable water quality management scheme presently attainable.

The Basin Plan consists of two major parts. Part I, which is herein presented, contains all the necessary elements of a water quality control plan in accordance with state and federal requirements. It consists of the identified beneficial water uses, water quality objectives, implementation program for meeting these objectives, and a surveillance program to monitor the effectiveness of the plan. A separately bound Part II consists of planning information supportive to the control plan.

Although the intent of this comprehensive planning effort has been to provide positive and firm direction for future water quality control, adequate provision must be made for changing conditions and technology. Thus, a major premise in the development of the Basin Plan has been that it will be maintained current. Reviews will be performed at least triennially. Unlike traditional plans which often become obsolete within a few years after their preparation, the Basin Plan will be updated as deemed necessary to maintain pace with technological, political, and physical changes in the Region.



## II. BENEFICIAL USES

---

### INTRODUCTION

State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Therefore, all water resources must be protected from the pollution and nuisance that may occur as a result of waste discharges. Beneficial uses of surface waters, ground waters, marshes, and mud flats presented here serve as a basis for establishing water quality standards and discharge prohibitions to attain this goal.

### DEFINITIONS OF BENEFICIAL USES

The following definitions for beneficial uses are applicable throughout the entire state. A brief description of the most important water quality requirements for each beneficial use follows the definition.

**Municipal and Domestic Supply**—Includes usual uses in community or military water systems and domestic use from individual water systems.

The principal issues involving municipal water supply quality are (1) protection of the public health, (2) aesthetic acceptability of the water, and (3) the economic impacts associated with treatment or quality-related damages. The health aspects broadly relate to direct disease transmission, toxic effects and increased susceptibility to disease. Examples include the possibility of contracting typhoid fever and cholera from ingestion of contaminated water, links between nitrate and methemoglobinemia (blue babies), and possible relationship between sodium and heart disease or between halogenated organic compounds and cancer.

Aesthetic acceptance varies widely depending on the nature of the supply source to which people have become accustomed; however, parameters of general concern are excessive hardness, unpleasant odor or taste, turbidity and color. In each case it is

possible to improve acceptability by treatment. The cost of doing so may not be economically justified when alternative water supply sources of suitable quality are available.

There are published water quality objectives that give limits for known health-related constituents and most properties affecting public acceptance. These objectives for drinking water include the U. S. Environmental Protection Agency Drinking Water Standards and the California State Department of Health Services criteria.

**Agricultural Supply**—Includes crops, orchards and pasture irrigation, stock watering, support of vegetation for range grazing and all uses in support of farming and ranching operations.

Farmstead uses are best protected by adherence to criteria previously discussed under municipal and domestic water supply. The quality of livestock water supply requires consideration of the relationship of water to the total diet including water freely drunk and moisture content of feed, and interactions between irrigation water quality and the quality of feed. The University of California Cooperative Extension developed threshold and limiting concentrations for livestock and irrigation water.

Continued irrigation often leads to one or more of four types of hazards related to water quality and the nature of soils and crops. These hazards are (1) soluble salt accumulations, (2) chemical changes in the soil, (3) toxicity to crops, and (4) potential disease transmission to man. Irrigation water classification systems, arable soil classification systems, and public health criteria related to reuse of wastewater have been developed with consideration given to these hazards.

**Industrial Process Supply**—Includes process water supply and all uses related to the manufacturing of products.

Water quality requirements differ widely for the many industrial processes in use today. So many specific industrial processes exist with differing water quality requirements that no meaningful criteria can be established generally for quality of raw water supplies. Fortunately, this is not a serious shortcoming, since current water treatment technology can create desired product waters tailored for specific uses. The National Technical Advisory Committee (NTAC) 1968 report summarized raw water quality characteristics used for various industrial categories and suggested criteria at the point of use for certain industrial uses.

**Industrial Service Supply**—Includes uses that do not depend primarily on water quality such as mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

Most industrial service supplies, such as water used in mining, gravel washing, fire protection or hydraulic conveyance, have essentially no water quality limitations except gross constraints such as freedom from unusual debris. Cooling water requirements were developed by the NTAC.

**Ground Water Recharge**—Natural or artificial recharge of ground water for protection of beneficial uses and to maintain salt balance or to halt salt water intrusion into fresh water aquifers.

The requirements for ground water recharge operations generally reflect the future use to be made of the water stored underground. In some cases recharge operations may be conducted to prevent seawater intrusion; in these cases the quality of recharged waters may not directly affect quality at the well-field being protected. Recharge operations are often limited by excessive suspended sediment or turbidity that can clog the surface of recharge pits, basins or wells.

Under the State's policy with respect to maintaining the high quality of water resources (Resolution 68-16), the quality of some of the waters of the State are higher than established by adopted policies. It is the intent of this policy that existing higher quality be maintained to the maximum extent possible.

Requirements for ground water recharge, therefore, shall impose the Best Available Technology (BAT) or Best Management Practices (BMP) for control of the discharge as necessary to assure the highest quality consistent with maximum benefit to the peo-

ple of the State. Additionally, it must be recognized that ground water recharge occurs naturally in many areas from streams and reservoirs. This recharge may have little impact on the quality of ground waters under normal circumstances, but it may act to transport pollutants from the recharging water body to the ground water. Therefore, it is a factor which must be considered when requirements are established.

**Fresh Water Replenishment**—Provides a source of freshwater for replenishment of inland lakes and streams of varying salinities.

**Navigation**—Includes commercial and naval shipping.

**Water Contact Recreation**—Includes all recreational uses involving actual body contact with water, such as swimming, wading, water-skiing, skin-diving, surfing, sport fishing, uses in therapeutic spas, and other uses where ingestion of water is reasonably possible.

Water contact implies a risk of water-borne disease transmission and involves human health; accordingly, criteria required to protect this use are more stringent than those for more casual water-oriented recreation. Criteria for recreation areas have been described in the NTAC report.

Many studies have been made of water quality in recreation areas; however, very few have demonstrated a direct correlation between recreational water use and disease transmission. The NTAC report cites three U.S. Public Health Service epidemiological studies that were used as the basis for setting the committee's criteria. Though they were not definitive studies, the committee felt that detectable health effects may occur at a fecal coliform level of about 400 per 100 ml. A pH criterion was included to prevent or minimize eye irritation.

Excessive algal growth has reduced the value of shoreline recreation areas in some cases, particularly for swimming. Where algal growths exist in nuisance proportions, particularly blue-green algae, all recreational water uses including fishing tend to suffer.

Nuisance from algal growths is related to social acceptability and public opinion. Conditions in the San Francisco Bay system indicate that nutrients are not the growth limiting factor.

Presently, it is believed that light penetration which is related to turbidity is a leading limiting factor, but in some cases other factors such as nutrients and temperature may be important. One of the many criteria to protect the aesthetic quality of waters used for recreation is based on chlorophyll *a*; concentra-

tions of chlorophyll **a** not to exceed 50 micrograms per liter have been proposed for clear waters.

**Non-Contact Water Recreation**—Recreational uses that involve the presence of water but do not require contact with water, such as picnicking, sun bathing, hiking, beachcombing, camping, pleasure boating, tide-pool and marine life study, hunting and aesthetic enjoyment in conjunction with the above activities as well as sightseeing.

Water quality considerations relevant to noncontact water recreation such as hiking, camping or boating and those activities related to tide pool or other nature studies require protection of habitats and aesthetic features. In some cases preservation of a natural wilderness condition is justified particularly when nature study is a major dedicated use.

**Ocean Commercial and Sport Fishing**—The commercial collection of various types of fish and shellfish, including those taken for bait purposes, and sport fishing in oceans, bays, estuaries and similar non-fresh water areas.

The maintenance of ocean fishing relies mostly on the protection of aquatic life habitats where fish reproduce and seek their food. Protection of habitats is discussed in the succeeding sections.

**Warm Fresh Water Habitat**—Provides a warm water habitat to sustain aquatic resources associated with a warm water environment.

The warm fresh water habitats supporting bass, bluegill, perch and other panfish are generally lakes and reservoirs, although some minor streams will serve this purpose where stream flow is sufficient to sustain the fishery. The habitat is also important to a variety of non-fishes such as frogs, crayfish, and insects which provide food for fish and small mammals. This habitat is less sensitive to environmental changes but more diverse than the cold fresh water habitat, and natural fluctuations in temperature, dissolved oxygen, pH and turbidity are usually greater. Criteria considered relevant to warm water biota and their habitats have been described by NTAC.

**Cold Fresh Water Habitat**—Provides a cold water habitat to sustain aquatic resources associated with a cold water environment.

Cold fresh water habitats generally support trout, and may support the anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well oxygenated. Life within these waters is relatively intolerant to environmental stresses. Often the cold water habitats are fed by soft waters; the

lack of buffering capacity of these waters renders fish more susceptible to toxic metals such as copper. Criteria have been recommended by NTAC for cold water habitats.

**Preservation of Areas of Special Biological Significance**—Areas of Special Biological Significance are those areas designated by the State Water Resources Control Board as requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable.

**Wildlife Habitat**—Provides a water supply and vegetation habitat for the maintenance of wildlife.

The two most important types of wildlife habitat are riparian and wetland habitats. These habitats can be threatened by development and erosion and sedimentation as well as poor water quality.

The water quality requirements of wildlife pertain to the water directly used for ingestion, the aquatic habitat itself, and the effect of water quality on the production of food materials. Waterfowl habitat is particularly sensitive to changes in water quality. Some of the quality characteristics of particular importance in waterfowl habitat are dissolved oxygen, pH, alkalinity, salinity, turbidity, settleable matter, oil, toxicants and specific disease organisms.

Dissolved oxygen is needed in waterfowl habitats to suppress development of botulism organisms; botulism has killed millions of waterfowl. Maintenance of adequate circulation and aerobic conditions are particularly important in shallow fringe areas of ponds or reservoirs where botulism has caused problems. Recommendations have been made by NTAC for the water quality of wildlife habitats.

**Preservation of Rare and Endangered Species**—Provides an aquatic habitat necessary, at least in part, for the survival of certain species established as being rare and endangered species.

Water quality criteria to be achieved to encourage development and protection of rare and endangered species should be the same as those for protection of fish and wildlife habitats generally. However, where rare or endangered species exist, special control requirements may be necessary to assure attainment and maintenance of particular quality criteria, which may vary slightly with the environmental needs of each particular species. Criteria for species using areas of special biological significance should likewise be derived from the general criteria for habitat types involved, with special management diligence given where required.

**Marine Habitat**—Provides for the preservation of the marine ecosystem including the propagation and sustenance of fish, shellfish, marine mammals, waterfowl and vegetation such as kelp.

The protection of marine habitat in many cases will be accomplished by measures to protect wildlife habitat generally, but criteria may be necessary for waterfowl marshes and other habitats such as those for shellfish and marine fishes. Some marine habitats, such as important intertidal zones and kelp beds, may require special protection. Water quality requirements for some individual marine species are admittedly not well known.

**Fish Migration**—Provides a migration route and temporary aquatic environment for anadromous or other fish species.

Anadromous fish protection is generally assured by provisions of water quality acceptable to cold water fishes; however, particular attention must be given to maintenance of zones of passage. Any barrier to migration or free movement of migratory fish is harmful. Natural tidal movement in estuaries and unimpeded river flows are necessary for sustenance of migratory fishes and their offspring. A water quality barrier, whether thermal, physical, or chemical, can destroy the integrity of the migration route and lead to rapid decline of dependent fisheries.

Water quality may vary through a zone of passage as a result of natural or man-induced activities. Fresh water entering estuaries may float on the surface of the denser salt water or hug one shore as a result of density differences related to water temperature, salinity or suspended matter. The NTAC report has suggested that acceptable water quality migration zones should include at least 75 percent of the cross-sectional area of the waterway.

**Fish Spawning**—Provides a high quality aquatic habitat especially suitable for fish spawning.

Dissolved oxygen levels in spawning areas should ideally approach saturation levels. Free movement of water is essential to maintain well oxygenated conditions around eggs deposited in sediments. Water temperature, size distribution and organic content of sediments, water depth, and current velocity are also important determinants of adequacy of spawning areas.

**Shellfish Harvesting**—The collection of shellfish such as clams, oysters, abalone, shrimp, crab and lobster for either commercial or sport purposes.

Shellfish harvesting areas require protection and management for continuation of the resource and protection of public health. Transmission of disease

and direct poisoning of humans are of considerable concern in shellfish regulation. Bacteriological criteria for the open ocean, bays, and estuarine waters utilized for shellfish cultivation and harvesting should conform with the standards described in the National Shellfish Sanitation Program, Manual of Operation.

Build-up of toxic metals occurs in shellfish. Mercury and cadmium are two metals known to have caused extremely disabling effects in humans consuming shellfish which concentrated these elements from industrial waste discharges. Other elements, radioactive isotopes and certain toxins produced by particular plankton species also concentrate in shellfish tissue. Documented cases of paralytic shellfish poisoning are not uncommon in California.

**Estuarine Habitat**—Provides an essential and unique habitat that serves to acclimate anadromous fishes (salmon, striped bass) migrating into fresh or marine water conditions. This habitat also provides for the propagation and sustenance of a variety of fish and shellfish, numerous waterfowl and shore birds, and marine mammals.

The protection of the estuarine habitat is contingent upon (1) the maintenance of adequate Delta outflow to provide mixing and salinity control, and (2) provisions to protect wildlife habitat associated with marshlands and the Bay periphery (i.e. prevention of fill activities). This habitat is generally associated with moderate seasonal fluctuations in dissolved oxygen, pH and temperature and with a wide range in turbidity.

## PRESENT AND POTENTIAL BENEFICIAL USES

### SURFACE WATERS

Surface waters in the region consist of fresh water rivers and streams, coastal waters, and estuarine waters. Estuarine waters are comprised of the Bay system from the Golden Gate to the regional boundary near Pittsburg and the lower portions of streams flowing into the Bay such as the Napa and Petaluma Rivers in the North and Coyote and San Francisquito Creeks in the South.

The beneficial uses associated with inland surface waters are varied. In general, each body of surface water possesses the potential to accommodate most of the designated beneficial uses. The specific beneficial uses for inland streams include: municipal and domestic supply, agricultural supply, industrial process supply, ground water recharge, water contact recreation, non-contact water recreation, wildlife



habitat, cold fresh water habitat, warm fresh water habitat, fish migration and fish spawning. The remaining surface waters of the Bay include all of the above except fresh water habitat as a beneficial use and in addition incorporate estuarine habitat, industrial service supply (cooling water), and navigation as beneficial uses.

Beneficial uses of coastal waters include water contact recreation, non-contact water recreation, industrial service supply, navigation, marine habitat, shellfish harvesting, ocean, commercial and sport fishing, areas of special biological significance, and preservation of rare and endangered species. Also, the California coastline within the San Francisco Bay Basin is endowed with exceptional scenic beauty contributing significantly to the natural environment.

The water bodies for which beneficial uses are specified are shown in Figure II-1 as keyed to Table II-1. Significant tributaries to these water bodies are identified in Table II-2. The beneficial uses of any specifically identified water body generally apply to all its tributaries. In some cases a beneficial use may not be applicable to the entire body of water such as navigation in Calabazas Creek or shellfish harvesting in the Pacific Ocean. In these cases the Board's judgment will be applied.

It should be noted that it is important to list every surface water body in the Region. For unidentified water bodies, the beneficial uses will be evaluated on a case-by-case basis.

## **GROUND WATERS**

Present and potential beneficial uses applicable to the main ground water basins in the Region are municipal supply, industrial process water supply, industrial service supply, and agricultural supply. Figure II-2 shows the main ground water basins. Usable water underlies many parts of the Region, in some cases beneath saline surface water or brackish shallow aquifers. However, a significant portion of the ground water is not usable due to limited yield or the economics of ground water extraction. Data collected by local agencies and/or dischargers regarding the quality and use of waters in their vicinity represent the best information on beneficial uses.

In some areas, ground water overdraft has been common but through current efforts ground water reservoirs are being recharged with local and/or imported surface water. With this practice ground water basins become, in effect, subterranean reservoirs for the surface water system, the water in them being stored in transit to the surface distribution system. Water quality in the ground water basins is directly affected by water quality management

practices. The need for coordination between water supply and wastewater disposal functions is clear if the fullest beneficial uses of these resources is to be realized.

## **WETLANDS**

Wetlands are waters of the State and the United States. Wetlands are defined in 40 CFR 122.2 as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and riparian areas. Because of the seasonality of rainfall in the Region, some wetlands may not be easy to identify by simple means. Therefore, in identifying wetlands the Board will rely on such indicators as hydrology, hydrophytic plants and/or hydric soils and implementation guidelines to be adopted by the Board.

There are many actual and potential beneficial uses of wetlands, with wildlife habitat being the most significant of them. Other uses are identified in the following sections which describe two of the most important types of wetland habitat in the Region, marshes and mudflats. In addition, wetlands that are adjacent to the Bay and its tributaries contribute to the enhancement of the Bay's beneficial uses by acting as filtering agents for many pollutants, including solids and nutrients, as well as acting as habitat that serve as a transitional zone between open water and upland areas.

## **MARSHES**

One of the main characteristics of San Francisco Bay is the scattering of fresh, brackish and salt water marshes that occupy its margins. These highly complex communities are vital components of the ecology of the Bay system. The beneficial uses provided by marshes include the following: water contact recreation, non-contact water recreation, ocean commercial and sport fishing, wildlife habitat, preservation of rare and endangered species, marine habitat, fish migration, fish spawning, and estuarine habitat. Many marshes around the Bay have been destroyed through filling and development. The protection and preservation of the remaining marsh communities is essential for maintaining the ecological integrity of San Francisco Bay.

Table II-3 identifies 34 significant marshes within the Region, most of which are salt water marshes. The

beneficial uses of each are specified. Also, the locations of the marshes are shown in Figure II-3.

## **MUD FLATS**

One of the largest and most important San Francisco Bay habitats is made up of mud flats. Snails, clams, worms and other animals convert the rich organic matter in the mud bottom to food for fishes, crabs, and birds. The beneficial uses provided by mud flats

are generally the same as for marshes plus shellfish harvesting. The full value of the mud flats to the health and productivity of the Bay has not been assessed, but is undoubtedly considerable. Many species of fish rely heavily on the mud flats during at least a part of their life cycle. Additionally, San Francisco Bay mud flats are one of the most important habitats on the coast of California for millions of migrating shorebirds.

**TABLE II-1  
EXISTING AND POTENTIAL BENEFICIAL USES OF SURFACE WATERS**

	MUN	AGR	IND	PROC	GWR	FRSH	NAV	REC-1	REC-2	COMM	WARM	COLD	ASBS	WILD	RARE	MAR	MIGR	SPWN	SHELL	EST
001 Pacific Ocean			X				X	X	X	X			X	X	X	X	X	X	X	
002 South Bay			X				X	X	X	X			X	X	X	X	X	O	X	X
003 Lower Bay			X				X	X	X	X			X	X	X	X	X	O	X	X
004 Central Bay			X	X			X	X	X	X			X	X	X	X	X	X	X	X
005 Richardson Bay			X				X	X	X	X			X	X	X	X	X	X	X	X
006 San Pablo Bay			X				X	X	X	X			X	X	X	X	X	X	X	X
007 Carquinez Strait			X				X	X	X	X			X	X	X	X	X	X	X	X
008 Suisun Bay			X				X	X	X	X			X	X	X	X	X	X	X	X
009 Delta	X	X	X	X	X		X	X	X	X			X	X	X	X	X	X	X	X
<b>Alameda County</b>																				
101 Alameda Creek		X			X			X	X		X	X		X			X	X		
102 Alameda Creek Quarry Ponds					X			X	X		X	X								
103 Aquatic Park (Berkeley)								X	X					X			X	O		X
104 Arroyo De La Laguna					X			X	X		O	O		X			X	X		
105 Arroyo Del Valle	X				X			O	O			X		X			O	X		
106 Calaveras Res- ervoir	X							b	X		X	X		X				X		
107 Cull Canyon Reservoir								X	X		X	X		X				X		
108 Del Valle Reser- voir	X							a	X		X	X		X				X		
109 Don Castro Res- ervoir									X	X		X	X		X				X	
110 Elizabeth Lake									X		X	X		X				X		
111 Lake Chabot	X							a	X	X		X	X		X				X	X
112 Lake Merritt								X	X				X		X			X		X
113 Lake Temescal								X	X		X	X		X				X		
114 San Antonio Reservoir	X							b	X		X	X		X				X		
115 San Leandro Creek								X		O	O		O	X		X			O	O
116 Upper San Le- andro Reservoir	X							b	O		X	X		X				X		
117 San Lorenzo Creek	X				X	X		X	X		X	X		X			X	X		
118 Shadow Cliffs Reservoir								X	X		X	X		X				X		
<b>Contra Costa County</b>																				
201 Anza Lake								X	X		X	X		X						
202 Briones Reser- voir	X							b	O		X	X		X				X		
203 Jewel Lake								X	X		X	X		X						
204 Lafayette Reser- voir	X							a	X		X	X		X				X		
205 Mallard Reser- voir	X	X	X	X				b	O		X			X				X		
206 Mt. Diablo Creek								X	X		X	X		X				X	X	
207 Pine Creek								X	X		X	X		X				X	X	
208 Pinole Creek								O	O		X	X		X				X	X	
209 Rodeo Creek								O	X		X			X				X		
210 San Pablo Creek									X		X			X				X	X	
211 San Pablo Res- ervoir	X							a	X		X	X		X				X		
212 Walnut Creek								O	O		X	X		X				X	X	
213 Wildcat Creek									X		X			X				X	X	
<b>Marin County</b>																				
301 Abbots Lagoon								X	X					X		X				
302 Alamere Creek								O	X			X		X		X				

**TABLE II-1  
EXISTING AND POTENTIAL BENEFICIAL USES OF SURFACE WATERS—Continued**

	MUN	AGR	IND	PROC	GWR	FRSH	NAV	REC-1	REC-2	COMM	WARM	COLD	ASBS	WILD	RARE	MAR	MIGR	SPWN	SHELL	EST
303	Alpine Lake	X						a	X		X	X		X				X		
304	Arroyo Corte Madera Del Presido							O	X		X			X				X	X	
305	Bolinas Lagoon							X	X	X				X	X	X	X	X	X	
306	Bon Tempe Lake	X						a	X		X	X		X				X		
307	Coast Creek							X	X		X			X				X		X
308	Corte Madera Creek							O	X		X	X		X	X		O	O		
309	Coyote Creek								X		X			X						
310	Crystal Lake							O	O		X			X				X		
311	Drakes Estero							X	X	X				X	X	X		X		X
312	First Valley Creek							O	X					X				X		
313	Fish Hatchery Creek							O	X		X	X		X						X
314	Gallinas Creek								X		X	X		X	X					
315	Kent Lake	X						a	X		X	X		X				X		
316	Lagunitas Creek		X					X	X		X	X		X	X		X	X		
317	Lake Lagunitas	X						a	X		X	X		X				X		
318	Limantour Estero								X	X	X			X	X	X		X		X
319	Miller Creek							X	X		X	X		X	X		X	X		
320	Nicasio Creek	X				X		X	X			X		X			X	X		
321	Nicasio Reservoir					X		a	X		X	O		X				X		
322	Novato Creek	X						O	O		O	O		X	X		O	O		
323	Olema Creek							X	X		X	X		X			X	X		
324	Pacheco Pond								O		X	X		X				O		
325	Phoenix Lake	X						a	X		X	X		X				X		
326	Pine Gulch Creek	X							X		X	X		X			X	X		
327	Redwood Creek	X	X			X		X	X		X	X		X				X		X
328	Rodeo Creek							X	X		X			X	X	X		X		
329	San Antonio Creek							O	O		X	X		X			O	O		
330	San Rafael Creek						X		X		X	X		X						
331	Soulajoule Reservoir					X		a	X		X			X				X		
332	Stafford Lake	X						a	X		X	X		X				X		
333	Tomales Bay							X	X	X				X	X	X	X	X		X
334	Walker Creek							O	O		X	X		X	X		X	X		
<b>Napa County</b>																				
401	Chiles Creek	X				X		O	O		X	X		X				X		
402	Conn Creek	X				X		X	X		X	X		X			X	X		
403	Dry Creek	X	X					X	X		X	X		X			X	X		
404	Kimball Reservoir	X						a	X		X			X						
405	Lake Curry	X						a	X		X			X				X		
406	Lake Hennessey	X						a	X		X	X		X				X		
407	Lake Marie			O				X	X		O	O		X				X		
408	Milliken Reservoir								b	O	X	X		X				X		
409	Napa River	X	X				X	X	X		X	X		X	X		X	X		
410	Rector Reservoir	X							b		X	X		X				X		
411	Sage Creek	X				X		O	O		X	X		X			X	X		
412	York Creek						O	O			X			X		X	X			
<b>San Francisco County</b>																				
501	Golden Gate Park Lakes							X		X				X						

**TABLE II-1  
EXISTING AND POTENTIAL BENEFICIAL USES OF SURFACE WATERS—Continued**

	MUN	AGR	IND	PROC	GWR	FRSH	NAV	REC-1	REC-2	COMM	WARM	COLD	ASBS	WILD	RARE	MAR	MIGR	SPWN	SHELL	EST
502 Lake Merced	O							a	X		X	X		X					X	
<b>San Mateo County</b>																				
601 Crystal Springs Lakes	X								X		X	X		X	X				X	
602 Denniston Creek	X	X						X	X		X	X		X	X		X	X		
603 Felt Lake		X						X	X		X	X		X	X		X	X		
604 Frenchmans Creek		X						X	X		X	X		X	X		X	X		
605 Lobitas Creek		X						X	X		X	X		X	X		X	X		
606 Pescadero Creek	X	X						X	X		X	X		X	X		X	X		
607 Pilarcitos Creek	X	X						O	O		X	X		X	X		X	X		
608 Pilarcitos Lake	X							b	X		X	X		X	X				X	
609 Pomponio Creek		X						O	X		X	X		X	X		X	X		
610 Purisima Creek		X						X	X		X	X		X	X		X	X		
611 San Andreas Lake	X							b	X		X	X		X	X				X	
612 San Francisco Creek							O	O		X	X		X			X	X			
613 San Gregorio Creek		X						X	X		X	X		X	X		X	X		
614 San Mateo Creek					X		O	O			O		X	X			X			
615 San Pedro Creek	X								X		X	X		X			X	X		
616 San Vicente Creek	X	X						O	O			X		X	X		X	X		
617 Searsville Lake		X						X	X		X	X		X	X		X	X		
618 Tunitas Creek		X						O	O		X	X		X	X		X	X		
<b>Santa Clara County</b>																				
701 Almaden Reservoir	X				X			a	X		X	X		X					X	
702 Anderson Reservoir	X				X			a	X		X	X		X					X	
703 Arroyo Hondo	x					X		X	X		X	X		X					X	
704 Calabazas Creek		X			X		X	X	X		X	X		X						
705 Calero Reservoir	X				X			X	X		X			X					X	
706 Campbell Percolation Pond				X			X	X		X	X		X				X			
707 Cherry Flat Reservoir	X	X						b	X		X			X					X	
708 Cotton Wood Lake							X	X		X	X		X	X			X	X		
709 Coyote Creek				X			O	X		X	X		X	X		X	X			
710 Coyote Reservoir	X	X						X	X		X	X		X					X	
711 Guadalupe Reservoir	X				X			a	X		X	X		X					X	
712 Guadalupe River							O	X		X	X		X			O	O			
713 Halls Valley Reservoir							X	X		X			X				X			
714 Lake Elsmar	X											X		X						
715 LeXington Reservoir	X											X		X						
716 Los Gatos Creek	X				X	X		X	X	O	X	X		X					X	O
717 Matadero Creek							X	X		X	X		X			X				
718 Permanente Creek							X	X			X		X				X			

**TABLE II-1  
EXISTING AND POTENTIAL BENEFICIAL USES OF SURFACE WATERS—Continued**

	MUN	AGR	IND	PROC	GWR	FRSH	NAV	REC-1	REC-2	COMM	WARM	COLD	ASBS	WILD	RARE	MAR	MIGR	SPWN	SHELL	EST
719 Sandy Wool Lake								X		X	X		X				X			
720 San Felipe Creek							O	O		X	O		X				O			
721 Saratoga Creek		X			X	X		X	X		X	X		X						
722 Stevens Creek					X		X	X		X	X		X			X	O			
723 Stevens Creek Reservoir	X				X				X		X	X		X			X	X		
724 Vasona Reservoir				X			X	X		X	X		X				X			
<b>Solano County</b>																				
801 Green Valley Creek					X		X	X		X	X		X				X			
802 Lake Chabot	O	X						a	X		X	X		X					X	
803 Lake Frey	X								O		X	X		X					X	
804 Lake Herman	O		X					a	X		X	X		X					X	
805 Lake Madigan	X	X							O		X	X		X					X	
806 Laurel Creek					X		X	X		X	X		X			X	X			
807 Ledgewood Creek					X		X	X		X	X		X			X	X			
808 Montezuma Slough						X	X	X		X			X	X				X		
809 Suisun Creek					X		O	O		X	X		X			X	X			
810 Suisun Slough						X	X	X		X			X				X			
<b>Sonoma County</b>																				
901 Petaluma River						X	X	X		X	X		X	X	X	X	X			
902 Sonoma Creek							X	X		X	X		X	X		X	X			

X = existing beneficial use  
 O = potential beneficial use  
 a = fishing from shore or boat allowed; no other recreational use permitted  
 b = beneficial use prohibited by local regulation

**Key for Table II-1**

Municipal and Domestic Supply.....	MUN
Agricultural Supply.....	AGR
Industrial Process Supply.....	PROC
Industrial Service Supply.....	IND
Ground Water Recharge.....	GWR
Fresh Water Replenishment.....	FRSH
Navigation.....	NAV
Water Contact Recreation.....	REC-1
Non-Contact Water Recreation.....	REC-2
Ocean Commercial and Sport Fishing.....	COMM
Warm Fresh Water Habitat.....	WARM
Cold Fresh Water Habitat.....	COLD
Preservation of Areas of Special Biological Significance.....	ASBS
Wildlife Habitat.....	WILD
Preservation of Rare and Endangered Species.....	RARE
Marine Habitat.....	MAR
Fish Migration.....	MIGR
Fish Spawning.....	SPWN
Shellfish Harvesting.....	SHELL
Estuarine Habitat.....	EST

**TABLE II-2  
SIGNIFICANT TRIBUTARIES TO MAJOR  
STREAMS, CREEKS AND RESERVOIRS**

**Alameda County**

104 *Arroyo De La Laguna*  
Arroyo Mocho  
Arroyo De Las Positas  
Alamo Canal  
Tassajara Creek

106 *Calaveras Reservoir*  
Isabel Creek  
Smith Creek  
Sulpher Creek

114 *San Antonio Reservoir*  
LaCosta Creek  
San Antonio Creek

116 *San Leandro Reservoir*  
Kaiser Creek  
Moraga Valley Creek  
Redwood Creek

117 *San Lorenzo Creek*  
Crow Creek  
Palomares Creek

**Contra Costa County**

202 *Briones Reservoir*  
Bear Creek

212 *Walnut Creek*  
San Ramon Creek  
Tice Creek

**Marin County**

305 *Bolinas Lagoon*  
Easkoot Creek  
McKenna Gulch Creek  
Morses Gulch Creek  
Pike County Gulch Creek  
Pine Gulch Creek

308 *Corte Madera Creek*  
Cascade Creek  
Ross Creek  
San Anselmo Creek  
Sleepy Hollow Creek

315 *Kent Lake*  
Big Carson Creek

316 *Lagunitas Creek*  
Bear Valley Creek  
Devils Gulch Creek  
Haggerty Gulch Creek  
San Geronimo Creek

321 *Nicasio Reservoir*  
Halleck Creek

325 *Phoenix Lake*  
Bell Williams Creek  
Phoenix Creek

327 *Redwood Creek*  
Bootjack Creek  
Pine Gulch Creek

334 *Walker Creek*  
Arroyo Sausal Creek  
Frink Canyon Creek  
Salmon Creek  
Verde Canyon Creek

**Napa County**

409 *Napa River*  
Bear Canyon Creek  
Bell Canyon Creek  
Brown's Valley Creek  
Carneros Creek  
Cyrus Creek  
Garnett Creek  
Hopper Creek  
Huichin Creek  
Jericho Canyon Creek  
Milliken Creek  
Napa Creek  
Pickle Creek  
Rector Creek  
Redwood Creek  
Ritchie Creek  
Sarco Creek  
Soda Creek  
Sulphur Creek  
Suscol Creek  
Tulocay Creek

**San Francisco County**  
None

**San Mateo County**

606 *Pescadero Creek*  
Boges Creek  
Fall Creek  
Hoffman Creek  
Honsinger Creek  
Jones Gulch Creek  
Lambert Creek  
Little Boulder Creek  
McCormack Creek  
Oil Creek

Peters Creek  
Slate Creek  
Tarwater Creek  
Waterman Creek  
Woodruff Creek

607 *Pilarcitos Creek*  
Arroyo Leon Creek  
Mills Creek

612 *San Francisquito Creek*  
Bear Creek  
Los Trancos Creek  
West Union Creek

613 *San Gregorio Creek*  
Alpine Creek  
Clear Creek  
El Corte De Madera Creek  
Harrington Creek  
La Honda Creek  
Mindego Creek

**Santa Clara County**

709 *Coyote Creek*  
Arroyo Aquegia Creek  
Berryessa Creek  
Otis Canyon Creek  
Penitencia Creek  
Silver Creek  
Soda Cprings Canyon Creek

712 *Guadalupe River*  
Barrett Canyon Creek  
Herbert Creek

**Solano County**

809 *Suisun Creek*  
Wooden Valley Creek

**Sonoma County**

901 *Petaluma River*  
Adobe Creek  
Willow Creek

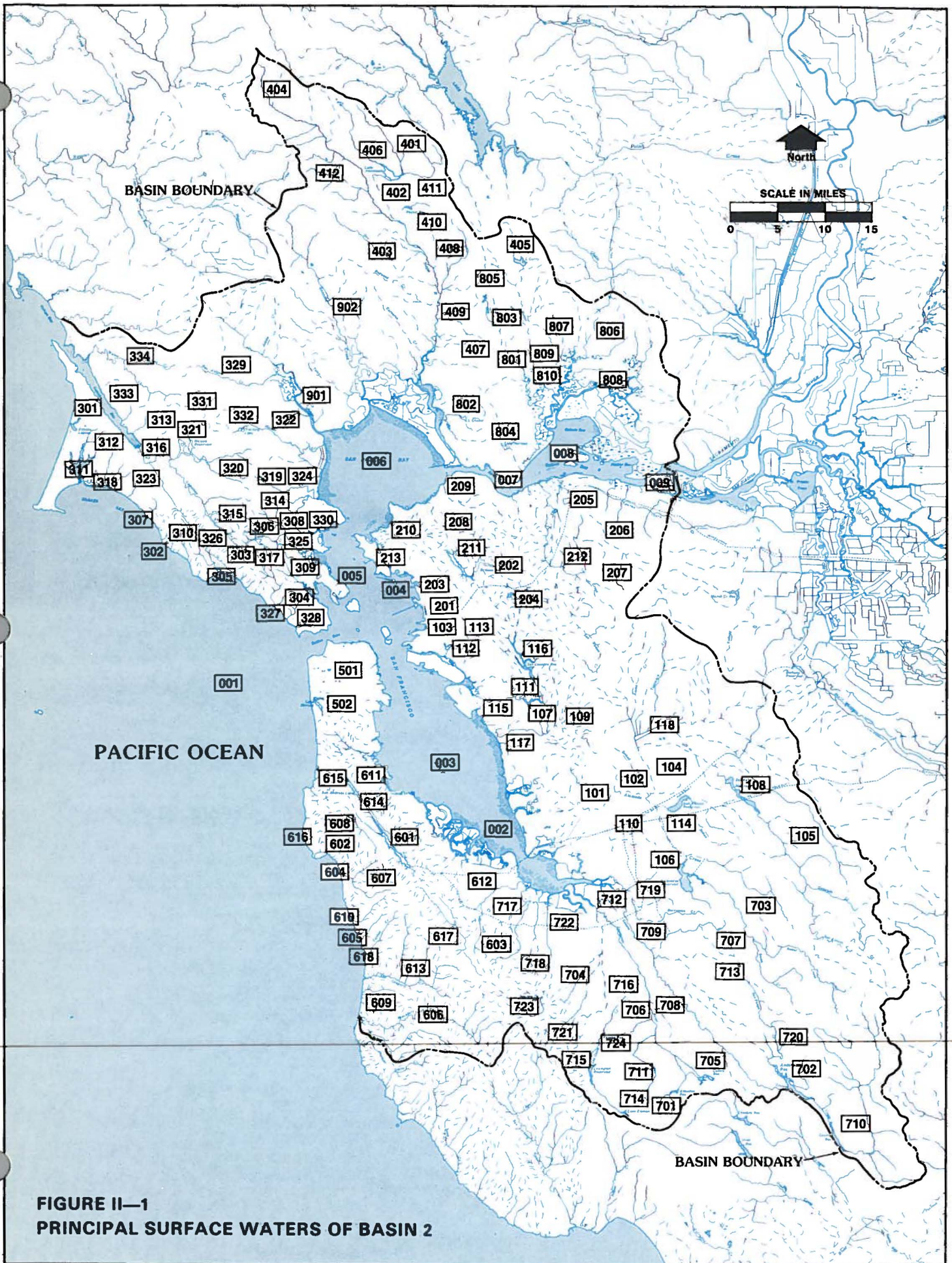
902 *Sonoma Creek*  
Agua Caliente Creek  
Arroyo Seco Creek  
Bear Creek  
Calabazas Creek  
Carriger Creek  
Fowler Creek  
Graham Creek  
Nathansen Creek  
Yulupa Creek

**TABLE II-3  
BENEFICIAL USES OF MARSHES**

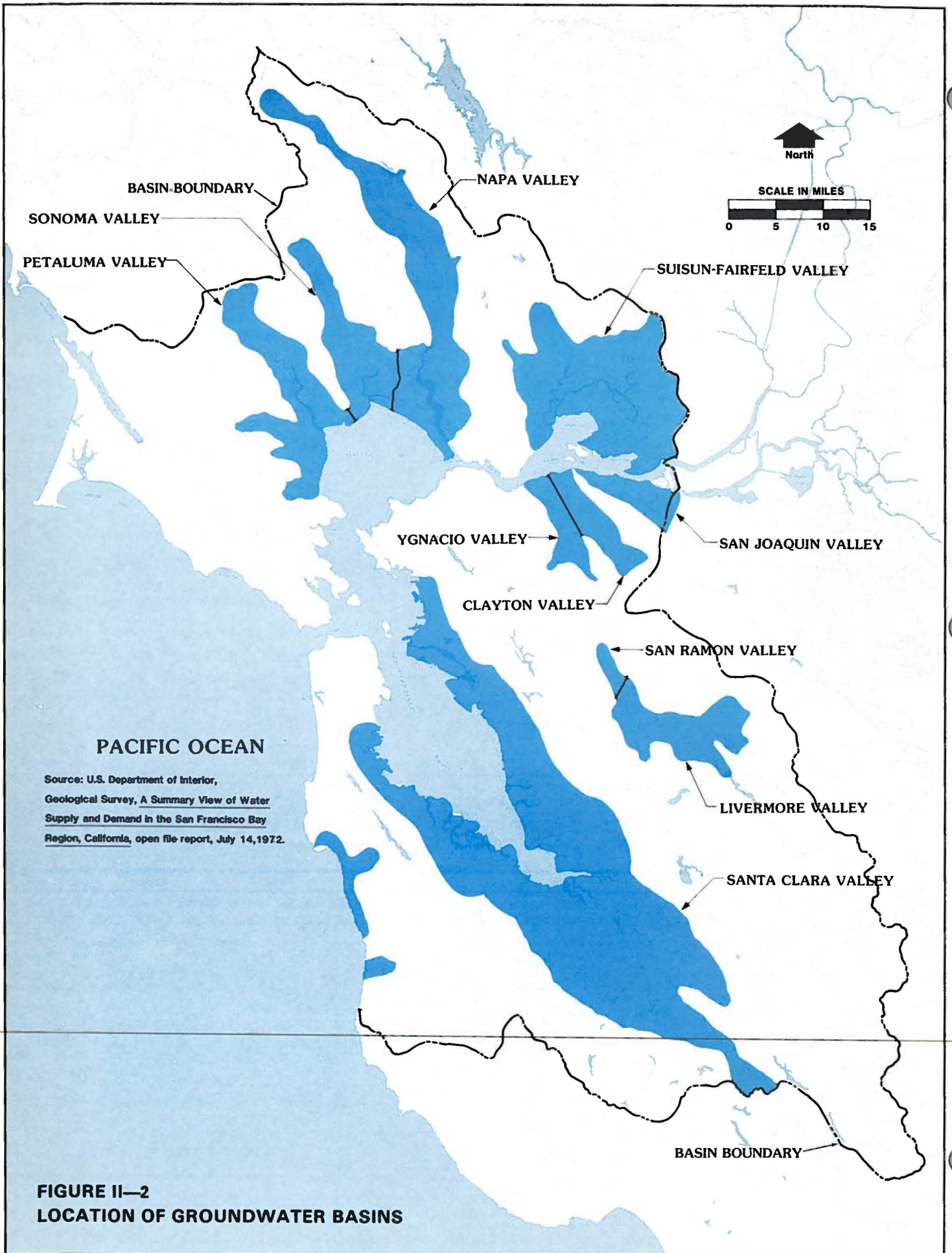
	REC 1	REC 2	COMM	WILD	RARE	EST	MIGR	SPWN	MAR	FRESH	BRACK- ISH	SALT
<b>ALAMEDA COUNTY</b>												
101	X	X		X	X	X		X				X
102	X	X		X	X	X		X				X
103												
104	X	X		X	X	X		X				X
104	X	X		X	X	X		X				X
<b>CONTRA COSTA COUNTY</b>												
201	X	X		X	X	X		X			X	X
202		X		X	X	X		X			X	
203	X	X		X	X	X		X				X
204	X	X		X	X	X		X				
<b>MARIN COUNTY</b>												
301	X	X		X					X			X
302	X	X		X					X			X
303	X	X		X	X	X		X				X
304	X	X		X				X				X
305	X	X		X	X	X		X			X	X
306	X	X		X					X			X
307	X	X		X		X						X
308	X	X			X	X	X	X			X	X
309	X	X		X	X	X		X				X
310	X	X		X					X			X
311	X	X	X	X	X	X		X			X	X
312	X	X		X	X	X					X	X
313	X	X		X			X	X	X			X
<b>NAPA COUNTY</b>												
401		X		X		X						X
402	X	X	X	X	X	X	X	X			X	
403	X	X	X	X	X	X	X	X				X
<b>SAN MATEO COUNTY</b>												
601	X	X		X	X	X						X
602	X	X		X	X	X		X				X
603	X	X		X	X		X	X	X			X
604	X	X		X						X	X	X
605	X	X		X	X	X						
<b>SANTA CLARA COUNTY</b>												
701	X	X	X	X	X	X	X	X				X
<b>SOLANO COUNTY</b>												
801	X	X		X	X	X		X				X
802	X	X		X	X	X	X	X		X	X	
803	X	X		X	X	X	X	X				X
<b>SONOMA COUNTY</b>												
901	X	X	X	X	X	X	X	X			X	

A—SOURCE: U. S. FISH AND WILDLIFE SERVICE AND CALIFORNIA DEPARTMENT OF FISH AND GAME. *PROTECTION & RESTORATION OF SAN FRANCISCO BAY FISH AND WILDLIFE HABITAT, VOLUME II - HABITAT DESCRIPTION, USE AND DELINEATION.* AUGUST 15, 1979.

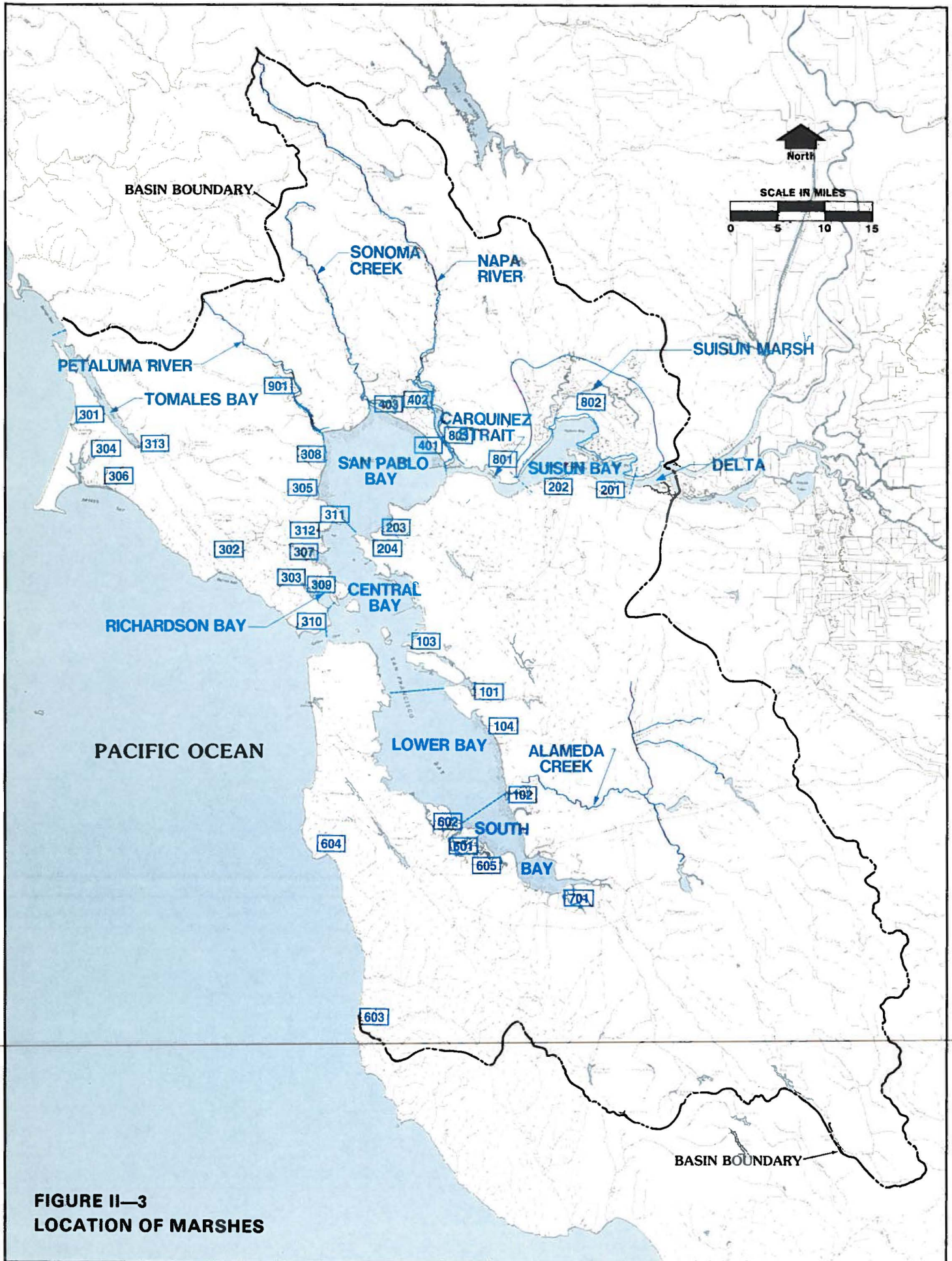




**FIGURE II—1  
PRINCIPAL SURFACE WATERS OF BASIN 2**



**FIGURE II—2  
LOCATION OF GROUNDWATER BASINS**



**FIGURE II—3  
LOCATION OF MARSHES**



# III. WATER QUALITY OBJECTIVES

---

## INTRODUCTION

For each beneficial water use, water quality objectives have been determined. Such objectives describe the level of water quality which should exist. In establishing relevant objectives, consideration was given to the expected water uses, any adverse effects of not attaining the established objectives, the capability of controlling water quality to permit all expected uses, and the administrative and institutional aspects of water quality control. Water quality resulting from attainment of the established objectives should be sufficiently high to insure protection for all designated current and potential beneficial uses. The Board recognizes that too little information exists in some cases to establish definitive objectives, but the Board believes its conservative approach to setting objectives has been proper.

Water quality shall conform to the objectives contained herein. When uncontrollable water quality factors result in the degradation of water quality beyond the levels or limits established herein as water quality objectives, a case-by-case analysis will be made of the benefits and costs of preventing further degradation. In cases where this analysis indicates that beneficial uses will be adversely impacted by allowing further degradation, then controllable water quality factors shall not cause any further degradation of water quality. Controllable water quality factors are those actions, conditions, or circumstances resulting from man's activities that may influence the quality of the waters of the State and that may be reasonably controlled.

These water quality objectives are considered to be necessary to protect present and potential beneficial uses enumerated in Chapter II of this plan and to protect existing high quality waters of the State. These objectives will be achieved primarily through the establishment and enforcement of waste discharge re-

quirements and through the implementation of this water quality control plan.

In setting waste discharge requirements the Regional Board will consider, among other things, the potential impact on beneficial uses within the area of influence of the discharge, the existing quality of receiving waters, and the appropriate water quality objectives. The Regional Board will make a finding as to the beneficial uses to be protected within the area of influence of the discharge and establish waste discharge requirements at levels necessary to meet water quality objectives in order to protect those uses.

In general, the objectives are intended to govern the concentration of pollutant constituents in the main water mass. The same objectives cannot be applied at or immediately adjacent to submerged effluent discharge structures. Zones of initial dilution within which higher concentrations can be tolerated will be allowed for such discharges.

For a submerged buoyant discharge, characteristic of most municipal and industrial wastes that are released from submerged outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

For shallow water submerged discharges, surface discharges, and nonbuoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the waste, or the diluting plume reaches a fixed distance from the discharge to be specified by the Board, whichever results in the lower estimate for initial dilution.

Compliance with water quality objectives may be prohibitively expensive or technically impossible in some cases. The Regional Board will consider modification of specific water quality objectives as long as the discharger can demonstrate that existing beneficial uses will be protected and that such a modification will otherwise be consistent with the State's Policy with Respect to Maintaining High Quality of Waters in California. This exception clause properly indicates that the Board will conservatively compare benefits and costs in these cases because of the difficulty in quantifying beneficial uses. This approach is also discussed in Chapter IV under the section titled "Wet Weather Overflow".

The remainder of this chapter is divided into four sections: State Board Resolution 68-16, which applies to all waters of the Basin; Objectives for Ocean Waters; Objectives for Inland Surface Waters; and Objectives for Ground Water. Many of the objectives given below simply identify parameters of concern and state that these shall not be allowed in concentrations that cause nuisance conditions to exist or impair beneficial uses. For those parameters for which numerical objectives are specified, a rationale is provided.

### STATE BOARD RESOLUTION 68-16

Whenever the existing quality of water is better than the quality of water established herein as objectives, such existing quality shall be maintained unless otherwise provided by State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," including any revisions thereto. (A copy of this policy is included in Appendix A). It is commonly called Resolution 68-16 and applies to all waters of the Basin.

### OBJECTIVES FOR OCEAN WATERS

The provisions of the State Board's "Water Quality Control Plan for Ocean Waters of California" (Ocean Plan), and "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan) and any revision thereto shall apply to ocean waters. (Copies of these plans are included in Appendix A). The Ocean Plan objectives are similar if not identical to many of the objectives for inland surface waters.

## OBJECTIVES FOR INLAND SURFACE WATERS

The following objectives apply to all inland surface waters, including enclosed bays and estuaries of the Region. This includes all surface waters of the Region except the Pacific Ocean.

### Color

Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.

### Tastes and Odors

Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.

### Floating Material

Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

### Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

### Settleable Material

Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.

### Oil and Grease

Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.

### Biostimulatory Substances

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Chlorophyll *a* concentration in excess of 50 ug/l (microgram per liter) upstream from Carquinez Bridge and 25 ug/l in San

Pablo Bay and in Central and Lower San Francisco Bay will indicate a need for the investigation of the cause of those concentrations. Such investigations will not be necessary if the conditions are (1) of a limited areal extent, (2) associated with the entrapment zone, or (3) not adversely affecting beneficial uses. Lower concentrations of chlorophyll **a** may indicate a need for investigation depending on the affected receiving water and the beneficial uses thereof.

### **Sediment**

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

### **Turbidity**

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas of 10 Jackson Turbidity Units (JTU) or more.

### **pH**

The pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the Basin. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

### **Dissolved Oxygen**

For all tidal waters, the following objectives shall apply:

In the Bay downstream of Carquinez Bridge	5.0 mg/l minimum
Upstream of Carquinez Bridge	7.0 mg/l minimum

For nontidal waters, the following objectives shall apply:

Waters designated as cold water habitat	7.0 mg/l minimum
Waters designated as warm water habitat	5.0 mg/l minimum

The median dissolved oxygen concentration for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation.

Dissolved oxygen is a general index of the state of the health of receiving waters. Although minimum

concentrations of 5 mg/l and 7 mg/l are frequently used as objectives to protect fish life, higher concentrations are generally desirable to protect sensitive aquatic forms. In areas unaffected by waste discharges a level of about 85 percent of oxygen saturation exists. A three-month median objective of 80 percent of oxygen saturation allows for some degradation from this level, but still requires a consistently high oxygen content in the receiving water.

### **Bacteria**

Table III-1 provides a summary of the bacterial water quality objectives and identifies the sources of those objectives.

### **Temperature**

Temperature objectives for Enclosed Bays and Estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California" including any revisions thereto. (A copy of this plan is included in Appendix A).

In addition, the following temperature objectives apply to surface waters:

The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.

The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature.

### **Salinity**

Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the State so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.

### **Toxicity**

All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species and/or significant alterations in population or community ecology or receiving water biota. Other relevant biological measures will be considered by the Regional Board in evaluating compliance with this objective. Additionally, effects on human health due to bioconcentration will be considered. As a minimum, compliance will be evaluated using the bioassay requirements contained in Chapter IV.

**TABLE III-1  
WATER QUALITY OBJECTIVES FOR COLIFORM BACTERIA <sup>a</sup>**

<b>Beneficial Use</b>	<b>Fecal Coliform MPN/100 ml</b>	<b>Total Coliform MPN/100 ml</b>
Water Contact Recreation	log mean < 200 90 percentile < 400	median < 240 no sample > 10,000
Shellfish Harvesting <sup>c</sup>	median ≤ 14 90 percentile ≤ 43	median ≤ 70 90 percentile ≤ 230 <sup>b</sup>
Non-Contact Water Recreation <sup>d</sup>	mean < 2000 90 percentile ≤ 4000	— —
Municipal Supply surface water <sup>e</sup> groundwater	log mean < 20 —	log mean < 100 median < 2.2 <sup>f</sup>

**Notes:**

- <sup>a</sup> Based on a minimum of five consecutive samples equally spaced over a 30-day period.
- <sup>b</sup> Based on a five-tube decimal dilution test or 300 MPN/100 ml when a three tube decimal dilution test is used.
- <sup>c</sup> Source: National Shellfish Sanitation Program.
- <sup>d</sup> Source: Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, 1968.
- <sup>e</sup> Source: DOHS recommendation.
- <sup>f</sup> Based on a seven-day median.

**TABLE III-1A  
EPA BACTERIOLOGICAL CRITERIA FOR WATER CONTACT RECREATION <sup>1,2</sup>  
(in colonies per 100 ml)**

	<b>Fresh Water</b>		<b>Salt Water</b>
	<b>enterococci</b>	<b>E. coli</b>	<b>enterococci</b>
Steady State (all areas)	33	126	35
Maximum (designed beach)	61	235	104
(moderately used area)	89	298	124
(lightly used area)	108	406	276
(infrequently used area)	151	576	500

**Notes:**

- <sup>1</sup> The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012-8016. The Criteria are based on: Cabelli, V.J. 1983. Health Effects Criteria for Marine Recreational Waters. U.S. Environmental Protection Agency, EPA 600/1-80-031, Cincinnati, Ohio.  
Dufour, A.P. 1984. Health Effects Criteria for Fresh Recreational Waters. U.S. Environmental Protection Agency, EPA 600/1-84-004, Cincinnati, Ohio.
- <sup>2</sup> The EPA criteria apply to water contact recreation only. The criteria provide for a level of protection based on the frequency of usage of a given water contact recreation area. The criteria may be employed in special studies within this Region to differentiate between pollution sources or to supplement the current coliform objectives for water contact recreation.



The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors. Also, controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Objectives for some toxic pollutants in municipal and agricultural supply waters are given in Table III-2. Water quality objectives for selected toxic pollutants in surface waters are given in Tables III-2A and III-2B. Derivation of site-specific objectives for segments of the Bay-Delta estuarine system is desirable in some cases and should be performed using general methods described in *The Water Quality Standards Handbook*, U.S. EPA, 1983 and specific Regional Board guidance.

The South Bay below the Dumbarton Bridge is a unique, water quality limited, hydrodynamic and biological environment which merits continued special attention by the Board. Site specific water quality objectives are absolutely necessary in this area for two reasons. 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. The costs of those measures must be factored into economic impact considerations by the Board in adopting any objectives for this area. Nowhere else in the Region will nonpoint source economic considerations have such an impact on the attainability of objectives. Therefore, for this area, the objectives contained in Tables III-2A and III-2B will be considered guidance only, and should be used as part of the basis for site specific objectives. Programs described in Chapter IV will be used to develop site specific objectives for it. Ambient conditions shall be maintained until site specific objectives are developed.

Based on the concerns raised in the Cooperative Striped Bass Study and other studies, water quality objectives for aromatic hydrocarbons are also needed. Regarding lighter aromatic hydrocarbons (monocyclic aromatic hydrocarbons or MAHs), the 1980 EPA water quality criteria documents for benzene, ethylbenzene, and toluene define the need for chronic toxicity data for these chemicals. In the Continuing Planning section of Chapter IV, the Board recommends that EPA determine an acute-to-chronic ratio for MAHs for application to acute toxicity data for resident species. Regarding heavier

aromatic hydrocarbons (polynuclear aromatic hydrocarbons or PAHs), a water quality objective is included in Table III-2A. It is based on the 1980 EPA Water Quality Criteria Document.

## Un-ionized Ammonia

The discharge of wastes shall not cause receiving waters to contain concentrations of un-ionized ammonia in excess of the following limits:

0.025 mg/l as N	Annual Median
0.16 mg/l as N Maximum (Central Bay and upstream)	
0.4 mg/l as N Maximum (Lower Bay and South Bay)	

A method for determining the un-ionized ammonia concentration is included in Appendix B.

The intent of this objective is to protect against the chronic toxic effects of ammonia in the receiving waters. An ammonia objective is needed for the following reasons:

1. Ammonia (specifically un-ionized ammonia) is a demonstrated toxicant. Ammonia is generally accepted as one of the principal toxicants in municipal waste discharges. Some industries also discharge significant quantities of ammonia.
2. Exceptions to the effluent toxicity limitations in Chapter IV of the Plan allow for the discharge of ammonia in toxic amounts. In most instances, ammonia will be diluted or degraded to a non-toxic state fairly rapidly. However, this does not occur in all cases, the South Bay being a notable example. The ammonia limit is recommended in order to preclude any build up of ammonia in the receiving water.
3. A more stringent maximum objective is desirable for the northern reach of the Bay for the protection of the migratory corridor running through Central Bay, San Pablo Bay, and upstream reaches.

## Sulfide

All water shall be free from dissolved sulfide concentrations above natural background levels. Sulfide occurs in Bay muds as a result of bacterial action on organic matter in an anaerobic environment.

Concentrations of only a few hundredths of a milligram per liter can cause a noticeable odor or be toxic to aquatic life. Violation of the sulfide objective will reflect violation of dissolved oxygen objectives as sulfides cannot exist to a significant degree in an oxygenated environment.

**TABLE III-2  
WATER QUALITY OBJECTIVES FOR MUNICIPAL OR AGRICULTURAL SUPPLY WATERS <sup>a</sup>**

PARAMETER	MUN	AGR	PARAMETER	MUN	AGR
<b>Physical</b>			<b>Inorganic constituents</b>		
Color (units)	15	-	Silver	0.05	-
Odor (number)	3	-	Sodium adsorption ratio (adjusted) <sup>e</sup>	-	3.0/9.0
			Sulfate	250/500	-
Turbidity (NTU)	1/5	-	TDS	500/1000	(10,000)-
			EC (mmhos/cm)	0.9/1.6	0.2-3.0
<b>Inorganic constituents</b>					
Aluminum	-	(5) 5/20	Vanadium	-	(0.1) 0.10/1.0
Arsenic	0.05	(0.2) 0.1/2.0	Zinc	5.0	(25) 2.0/10.0
			<i>Organic constituents</i>		
Barium	1.0	-	MBAS	0.5	-
Beryllium	-	0.1/0.5	Oil and grease	none	-
Boron	-	(5.0) 0.5/2	Phenols	0.001	-
Chloride	250/500	142/355	Trihalomethanes	0.1	-
Cadmium	0.010	(0.05) 0.01/.05	Endrin	0.0002	-
Chromium	0.05	(1.0) 0.10/1.0	Lindane	0.004	-
Cobalt	-	(1.0) 0.05/5.0	Methoxychlor	0.1	-
Copper	1.0	(0.5) 0.2/5.0	Toxaphene	0.005	-
Cyanide	0.01/0.2	-	2,4-D	0.1	-
			2,4,4-TP Silvex	0.01	-
Fluoride	0.8-1.7 <sup>h</sup>	(2.0) 1.0/15.0	<i>Bacteriological properties</i> <sup>f</sup>		
Iron	0.3	5.0/20.0	Total coliform	-	-
Lead	0.05	(0.1) 5.0/10.0	<i>Radioactivity</i>		
Lithium	-	2.5 <sup>b</sup>	Combined Radium-226 and Radium-228 (pCi/l)	5	-
Manganese	0.05	0.2/10.0	Gross Alpha Particle Activity (pCi/l)	15 <sup>g</sup>	-
Mercury	0.002	-	Tritium (pCi/l)	20,000	-
Molybdenum	-	(0.5) 0.01/0.05	Strontium - 90 (pCi/l)	8	-
Nickel	-	0.2/2.0	Gross Beta Particle Activity (pCi/l)	50	-
NO <sub>3</sub> + NO <sub>2</sub> (as N)	10 <sup>c</sup>	(100) 5/30 <sup>d</sup>			
pH (units)	6.0-8.5	5.5-8.3/ 4.5-9.0			
Selenium	0.01	(0.05) 0.02			

<sup>a</sup> Where two values appear (e.g., a/b), the first number represents a threshold concentration (where effects are noticeable) and the second represents a limiting concentration (where effects are undesirable). All single numbers represent limiting concentrations. All values in mg/l except as noted. Numbers in parentheses are allowable concentrations for livestock watering.

<sup>b</sup> For citrus irrigation, maximum 0.075 mg/l.

<sup>c</sup> 20 mg/l is allowable where specific criteria are met, including that the water is used in a non-community system and that no one under 6 months of age consumes it.

<sup>d</sup> For sensitive crops. Values are actually for NO<sub>3</sub>-N + NH<sub>4</sub>-N.

<sup>e</sup> adj-SAR = [Na/ (Ca+Mg) 1/2] [1 + (8.4 - pHc)] where pHc is a calculated value based on total cations, 2 Ca+Mg+CO<sub>3</sub>+HCO<sub>3</sub>, in me/l. Exact calculations of pHc can be found in "Guidelines for Interpretation of Water Quality for Agriculture" prepared by the Univ. of California Cooperative Extension, Committee of Consultants.

<sup>f</sup> For nontidal waters, mean of < 100 MPN/100 ml. For ground water, median of < 2.2 MPN/100 al.

<sup>g</sup> Includes Radium - 226 but excludes Radon and Uranium.

<sup>h</sup> Allowable concentration varies with annual average of maximum daily air temperature.

MUN—All values taken from Title 22, California Administrative Code except for cyanide and phenols which were from the 1962 USPHS standards and pH which was from McKee and Wolf, "Water Quality Criteria."

AGR—All values developed by University of California Cooperative Extension, Committee of Consultants except pH which was taken from McKee & Wolf, "Water Quality Criteria."

## Constituents of Concern for Municipal and Agricultural Water Supplies

Waters designated for use as domestic or municipal supply and agricultural supply shall not contain concentrations of constituents in excess of the limits specified in Table III-2.

### Radioactivity

Waters designated for use as domestic or municipal supply shall not contain concentrations of radionuclides in excess of the limits specified in Table III-2. All other inland surface waters shall not exceed the

limits specified in Section 30269 of the California Administrative Code. Radionuclides shall not be present in concentrations that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

### Delta and Suisun Marsh

The objectives contained in the State Board's "Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh" and any revisions thereto shall apply to the waters of the Sacramento-San Joaquin Delta and Suisun Marsh.

**TABLE III-2A  
WATER QUALITY OBJECTIVES FOR TOXIC POLLUTANTS  
FOR SURFACE WATERS DOWNSTREAM OF CARQUINEZ STRAIT  
(all values in ug/l)**

	4-day avg <sup>a</sup>	1-hr avg <sup>a</sup>	24-hr avg <sup>b</sup>	Inst. max <sup>b</sup>
Arsenic.....	36	69	-	-
Cadmium.....	9.3	43	-	-
Chromium (VI) .....	50	1100	-	-
Copper.....	-	<sup>c</sup>	-	-
Cyanide .....	-	5.0 <sup>g</sup>	-	-
Lead.....	5.6	140	-	-
Mercury.....	0.025	2.1	-	-
Nickel.....	-	-	7.1	140
Selenium <sup>d</sup> .....	-	-	-	-
Silver.....	-	-	-	2.3
Tributyltin <sup>e</sup> .....	-	-	-	-
Zinc.....	-	-	58	170
PAHs.....	-	-	15 <sup>f</sup>	-

<sup>a</sup> U.S. EPA 1984 Ambient Water Quality Criteria for saltwater. EPA freshwater criteria can be applied seasonally, where appropriate.

<sup>b</sup> U.S. EPA 1980 Ambient Water Quality Criteria for saltwater. EPA freshwater criteria can be applied seasonally, where appropriate.

<sup>c</sup> The criterion recommended by EPA is 2.9 ug/l. However, copper toxicity varies with the complexing capacity of specific receiving waters, and background concentrations in the Bay typically vary from 1 to 4 ug/l. A site-specific criterion for copper is urgently needed.

<sup>d</sup> EPA is expected to promulgate final selenium criteria in February, 1987. The Board will accept those criteria as an initial basis for controlling selenium in the Region. However, the Board recommends that the State Board develop criteria for the Bay/Delta estuary that account for bioaccumulation.

<sup>e</sup> Tributyltin is a compound that is used as an anti-fouling ingredient in marine paints and is toxic to aquatic life in low concentrations (< 1 ppb). It is anticipated that the SWRCB will issue both water quality objectives and control strategies for tributyltin by January, 1987.

<sup>f</sup> The U.S. EPA Water Quality Criteria Document indicates acute toxicity concentrations for salt water at or below 300 ug/l. An acute to chronic ratio of 20 yields an objective of 15 ug/l. PAHs are those compounds identified by EPA Method 610.

<sup>g</sup> The U.S. EPA Water Quality Criteria for Cyanide is 1.0 ug/l which is below the detection level of 5 ug/l. The objective of 1.0 is desirable, but attainment can only be determined at the level of detection.

## Alameda Creek Watershed

The water quality objectives contained in Table III-3 apply to the surface and ground waters of the Alameda Creek watershed above Niles.

Wastewater discharges that cause the surface water limits in Table III-3 to be exceeded may be allowed if they are part of an overall water-wastewater resource operational program developed by those agencies affected and approved by the Regional Board.

### OBJECTIVES FOR GROUND WATERS

All ground water basins shown in Figure II-2 are designated for use as domestic or municipal supply, in-

dustrial process supply, industrial service supply, and agricultural supply. Local ground water quality conditions may vary significantly, due to natural factors, making some ground water supplies unsuitable for the uses indicated.

Ground waters shall not contain concentrations of taste and odors, chemicals, and radioactivity in excess of the limits specified in Table III-2, and bacteria in excess of the limits specified in Table III-1 except where other numerical objectives are established for specific ground waters (such as the Alameda Creek watershed above Niles in Table III-3). In any case the quality of ground water shall be maintained unless otherwise provided by State Water Resources Control Board Resolution No. 68-16.

**TABLE III-2B**  
**WATER QUALITY OBJECTIVES FOR TOXIC POLLUTANTS**  
**FOR SURFACE WATERS UPSTREAM OF SAN PABLO BAY**  
(all values in ug/l)

	4-day avg <sup>a</sup>	1-hr avg <sup>a</sup>	24-hr avg <sup>b</sup>	Inst. max <sup>b</sup>
Arsenic.....	190	360	—	—
Cadmium.....	<sup>c</sup>	<sup>d</sup>	—	—
Chromium (VI).....	11	16	—	—
Copper.....	6.5	9.2	—	—
Cyanide.....	5.2	22 <sup>f</sup>	—	—
Lead.....	<sup>e</sup>	<sup>f</sup>	—	—
Mercury.....	0.025 <sup>j</sup>	2.4	—	—
Nickel.....	—	—	56	1100
Selenium <sup>g</sup> .....	—	—	—	—
Silver.....	—	—	-1.2	—
Tributyltin <sup>h</sup> .....	—	—	—	—
Zinc.....	—	—	58	170
PAHs.....	—	<sup>i</sup>	—	—

<sup>a</sup> U.S. EPA 1984 Ambient Water Quality Criteria for freshwater.

<sup>b</sup> U.S. EPA 1980 Ambient Water Quality Criteria for freshwater.

<sup>c</sup> The four-day average EPA freshwater criteria for cadmium is  $e(0.7852 [\ln (\text{hardness})] - 3.490)$ . This is 1.1 ug/l at a hardness of 100 mg/l as CaCO<sub>3</sub>.

<sup>d</sup> The one-hour average EPA freshwater criteria for cadmium is  $e(1.128 [\ln (\text{hardness})] - 3.828)$ . This is 3.9 ug/l at a hardness of 100 mg/l as CaCO<sub>3</sub>.

<sup>e</sup> The four-day average EPA freshwater criteria for lead is  $e(1.266 [\ln (\text{hardness})] - 4.661)$ . This is 3.2 ug/l at a hardness of 100 mg/l as CaCO<sub>3</sub>.

<sup>f</sup> The one-hour average EPA freshwater criteria for lead is  $e(1.266 [\ln (\text{hardness})] - 1.416)$ . This is 83 ug/l at a hardness of 100 mg/l as CaCO<sub>3</sub>.

<sup>g</sup> EPA is expected to promulgate final selenium criteria in February, 1987. The Board will accept those criteria as an initial basis for controlling selenium in the Region. However, the Board recommends that the State Board develop criteria for the Bay/Delta estuary that account for bioaccumulation.

<sup>h</sup> Tributyltin is a compound that is used as an anti-fouling ingredient in marine paints and is toxic to aquatic life in low concentrations (< 1 ppb). It is anticipated that the SWRCB will issue both water quality objectives and control strategies for tributyltin by January, 1987.

<sup>i</sup> The U.S. EPA Water Quality Criteria Document indicates there are too few data to develop a criteria. However, a saltwater objective of 15 ug/l has been identified.

<sup>j</sup> The U.S. EPA Water Quality Criterion Document for mercury is 0.012 ug/l which is below the level of detection of 0.025 ug/l. An objective of 0.012 is desirable, but attainment can only be determined at the level of detection.

**TABLE III-3  
WATER QUALITY OBJECTIVES FOR THE  
ALAMEDA CREEK WATERSHED ABOVE NILES**

**SURFACE WATER QUALITY OBJECTIVES  
(ALAMEDA CREEK AND TRIBUTARIES)**

TDS:	250 mg/l 90 day—arithmetic mean 360 mg/l 90 day—90th percentile 500 mg/l-daily maximum
CHLORIDES:	60 mg/l 90 day—arithmetic mean 100 mg/l 90 day—90th percentile 250 mg/l-daily maximum

**GROUND WATER QUALITY OBJECTIVES  
(BASIN AREAS SHOWN IN FIGURE IV-4 - CONCENTRATION NOT  
TO BE EXCEEDED MORE THAN 10% OF THE TIME DURING ONE YEAR)**

**Central Basin**

TDS:	Ambient or 500 mg/l, whichever is lower
Nitrate (NO):	45 mg/l

**Fringe Subbasins**

TDS:	Ambient or 1000 mg/l, whichever is lower
Nitrate (NO):	45 mg/l

**Upland and Highland Areas**

California domestic water quality standards set forth in California Administrative Code, Title 22, and current county standards.

Ambient water quality conditions at a proposed project area will be determined by Zone 7 of the Alameda County Flood Control and Water Conservation District at the time the project is proposed, with the cost borne by the project proponents. Ambient conditions apply to the water bearing zone with the highest quality water.

Waters designated for use as domestic or municipal water supply shall not contain concentrations of chemicals in excess of natural concentrations or the limits specified in California Administrative Code, Title 22, Chapter 15, particularly Tables 2, 3, 6 and 7.



# IV. IMPLEMENTATION PLAN

---

## INTRODUCTION

The actions intended to protect the beneficial uses and water quality of the San Francisco Bay Basin are presented in this chapter under four categories: (1) point source control measures, (2) nonpoint source control measures, (3) estuarine management, and (4) continuing planning. The sum of these actions is a comprehensive water quality control program which is strong, yet flexible.

The description of specific actions to be taken by local public entities and industries to comply with the policies and objectives of the Plan are intended for the guidance of local officials. The Regional Board will consider any proposed alternative actions which are consistent with and achieve the policies and objectives of the plan.

Toxic pollutants are of great concern in the San Francisco Bay-Delta estuarine system. The quantity of toxic pollutants in the system is the result of various factors including point source contributions, nonpoint source contributions, and Delta outflow, both for pollutant contribution and flushing. The complex relationship of these factors and their effect on the health of the Bay-Delta system demands that the Board maintain a comprehensive program to investigate the distribution and effects of toxic pollutants and properly regulate pollutant sources. The Board's toxic pollutant control program includes:

## RESEARCH

- Supporting research through the Aquatic Habitat Program and other necessary programs to determine the distribution and effects of toxic pollutants;
- Implementing a long-term program to develop effluent requirements for chronic toxicity, acute toxicity, and specific toxic pollutants based on waste load allocations for each water quality limited receiving water segment.

## INVESTIGATION AND MONITORING

- Identifying specific areas of toxic pollution based on State Mussel Watch information and other sources (Identified areas of concern include Castro Cove, Pt. Isabel, Coyote Creek, Richmond Inner Harbor, Redwood Creek, Santa Fe Channel, and Oakland Inner Harbor. Suspected areas of concern include Islais Creek and Lauritzen Canal);
- Requiring toxicity reduction evaluations (TREs) in cases of documented toxic pollution to determine the sources of toxic pollutants and the most cost effective means of reducing the amount discharged;
- Requiring the investigation of urban runoff pollution by industries and local agencies;
- Requiring the use of more sensitive acute toxicity bioassay test organisms and methods;
- Requiring flow-through bioassays where appropriate.

## CONTROL

- Regulating the acute toxicity of all point source discharges through existing NPDES permit requirements;
- Establishing water quality objectives for selected toxicants;
- Including effluent limitations for selected toxicants in NPDES permits as they are reissued (TREs may result in additional, more stringent effluent limitations);
- Requiring remedial action in cases of documented toxic pollution through the issuance of waste discharge requirements or Cleanup and Abatement Orders;
- Requiring the implementation of POTW pretreatment programs;

- Requiring the development and implementation of urban runoff pollution control strategies where appropriate;
- Making recommendations to the State Board during the State Board's review of Water Rights Decision 1485.

The establishment of toxic pollutant controls requires judgment on the part of the Board in dealing with uncertainty regarding many of the factors identified above. The least understood of these are the magnitude and effects of nonpoint sources of pollution, mainly urban and agricultural runoff. The Board intends to minimize this uncertainty by obtaining information over the next three years on these issues.

An effective way for this to occur is for point source dischargers in each segment of the Region to cooperate with nonpoint source dischargers in that segment (flood control agencies, municipalities, industries) in investigating the loads and effects of toxic pollutants. This would allow the investigations to proceed with the benefit of the resources and expertise of the point source dischargers who in turn would benefit by providing the Board with vital information in determining if additional point source controls are necessary.

The collection of data in each segment could be overseen by a local advisory committee which would consist of representatives from point source dischargers, local industries, local communities, the Board and EPA. The data collected should be directed to the Aquatic Habitat Institute in its coordination and data evaluation role. As the data collection proceeds, the same local advisory committees can begin developing and evaluating different nonpoint source control strategies for toxic pollutants.

Ultimately, the Board with input from all interested parties, will determine which controls should be implemented. This may result in requirements for best management practices to control urban runoff, requests to the Central Valley Regional Board to control agricultural drainage more effectively, more stringent effluent requirements for point source discharges, requests to the State Board to modify Delta outflow requirements, or a combination of all four. In any event, much of the uncertainty will be eliminated, and the Board will then make the best possible decisions.

## POINT SOURCE CONTROL MEASURES

Waste loads from point sources are those that are generally associated with pollutant discharges from an identifiable location to a specific receiving water body.

Acceptable control measures must ensure compliance with the effluent limitations and discharge prohibitions as provided on the following pages. In addition, control measures must satisfy water quality objectives set forth in the Plan unless the Board judges that related economic, environmental, or social considerations merit a modification. Control measures employed must be sufficiently flexible to accommodate future changes in technology, population growth, land development, and legal requirements.

Issues given major consideration in preparing a management plan for point sources include those associated with consolidation of discrete wastewater sources, methods for the ultimate disposal of both liquid effluent and residual solids, compliance with specified effluent limitations, load allocations for receiving water segments, source reduction changes in waste flow projections and characteristics, and potential markets for the use of reclaimed water.

## EFFLUENT LIMITATIONS

The effluent limitations described below have been established to help achieve the water quality objectives identified in Chapter III. The Board will consider establishing more stringent limitations for other constituents as necessary to meet water quality objectives and protect beneficial uses in particularly sensitive areas. Similarly, the Board will consider establishing less stringent limitations, consistent with other State and Federal laws, for any discharge where it can be conclusively demonstrated through a comprehensive program approved by the Board that such limitations will not result in unacceptable adverse impacts on the beneficial uses of the receiving water. Such a comprehensive program must evaluate the impact of other, nearby discharges as well as the discharge itself.

1. Effluent discharges to inland surface waters shall not contain toxic pollutants above concentrations which can be achieved through application of all reasonable treatment and control measures or which will lead to non-attainment of the relevant



numerical or narrative water quality objectives contained in Chapter III relating to acute toxicity, chronic toxicity, or bioaccumulation.

Six months after the effective date of these Basin Plan amendments, the Board will add the limits in Table IV-1 to NPDES permits at the earliest practicable time. However, dischargers have the option to indicate within those six months that they will choose to propose alternate effluent limits for any of the pollutants in Table IV-1 and at the same time must propose a schedule for submitting such proposals. For those dischargers, the Board will add the limits in Table IV-1 or acceptable alternate limits to their NPDES permits at the earliest practicable time.

The Board will consider proposals consistent with the State Board's Resolution No. 68-16 for alternate limits for each of the pollutants in Table IV-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.

The Board may adopt additional numerical standards for conservative constituents documented in discharges and/or documented to be of concern in receiving waters.

**Table IV-1  
Effluent Limitations for Selected Toxic  
Pollutants for Discharge to  
Surface Waters <sup>a,b</sup>  
(all values in ug/l)**

	<i>Daily Average</i>	
	<i>Shallow Water</i>	<i>Deep Water</i>
Arsenic	20	200
Cadmium	10	30
Chromium (VI) <sup>c</sup>	11	110
Copper	20	200
Cyanide <sup>d</sup>	25	25
Lead	5.6	56
Mercury	1	1
Nickel	7.1	71
Silver	2.3	23
Zinc	58	580
Phenols	500	500
PAHs <sup>e</sup>	15	150

Notes:

- <sup>a</sup> These limits are based on a combination of fresh and salt water quality objectives, technological achievability, limits of detection, and limited allowance for dilution. They are intended to be achieved through a combination of Best Available Technology and source control.
- <sup>b</sup> These limits apply to effluent discharges from POTW's and process water discharges from industrial facilities. The Board may apply them to discharges of cooling water and runoff on a case-by-case basis, but other programs as identified in Continuing Planning and Urban Runoff Management are intended to address those discharges.
- <sup>c</sup> Dischargers may at their option meet this limit as total chromium.
- <sup>d</sup> Cyanide may not persist in the environment in the same manner as the heavy metals. The Board will consider information on the persistence of cyanide in evaluating alternate limit proposals.
- <sup>e</sup> As identified by EPA Method 610. If a discharge exceeds the limit for PAHs, concentrations of individual constituents should be reported.

**SAN FRANCISCO BAY SOUTH OF THE  
DUMBARTON BRIDGE**

Discharges to the South Bay south of the Dumbarton Bridge are not obligated to comply with the effluent limits contained in Table IV-1 because of their unique situations as described in Chapter III. However, they are obligated to perform specific, detailed work identified in the Municipal Facilities section of this chapter which will result in the development of site-specific water quality objectives, effluent limits, and other control measures.

The Board will adopt schedules for developing site-specific water quality objectives and for possibly revising effluent limits when it considers the requests of the members of the South Bay Dischargers Authority for exemptions from the discharge prohibitions for their current discharge locations.

### ***Toxic Pollutant Accumulation***

The program described above will provide for reduced discharge of specific toxic pollutants. However, uncertainty remains regarding retention of these and other toxic pollutants in the estuary either in sediment or biota (sediment accumulation or bioaccumulation).

The Board is considering the merits of a sediment and bioaccumulation monitoring program. A likely approach would consist of identification of additional toxic pollutants of concern followed by voluntary or mandatory monitoring of sediment and bioaccumulation at or near the site of major discharges. This approach would be most useful if such local effects monitoring is supported by a network of regional monitoring stations. It is preferable that Federal, State, or other outside support for this network be committed before the Board commences the program.

The primary objective of such a program is to identify the fate of pollutants in the estuary. Such a program may also help to determine 1) the rates and sources of addition of toxic pollutants to the estuary; 2) the biological effects of documented exposures to resident biota and human health; and 3) methods of extrapolating between sediment quality and concentrations and effects in biota. It is anticipated that the EPA Bay/Delta program will provide a forum to review existing information on concentrations of toxic pollutants in biota and sediments. The Board will collaborate with the EPA in determining the best process to fill gaps in existing knowledge. The AHI will be requested to participate in coordination, study design, and quality assurance should any program be pursued.

1. All discharges to ocean waters must comply with the applicable quality requirements for waste discharges specified in the Ocean Plan and the Thermal Plan.
2. The following effluent limitations apply to all sewage treatment facilities which discharge to inland surface waters. The Board may also apply some of these limitations selectively to certain other non-sewage discharges, but they will not be used to

pre-empt Effluent Guideline Limitations established pursuant to Sections 301, 302, 304 or 306 of the Federal Water Pollution Control Act, as amended. (Such Effluent Guideline Limitations are included in National Pollutant Discharge Elimination System permits for particular industries).

- a. Biochemical oxygen demand (5-day) shall not exceed 30 mg/l as a monthly average nor 45 mg/l as a weekly average.
- b. Suspended solids shall not exceed 30 mg/l as a monthly average nor 45 mg/l as a weekly average.
- c. The arithmetic mean of the biochemical oxygen demand (5-day, 20°C) and suspended solids values, by weight, for effluent samples collected in any month shall not exceed 15 percent of the arithmetic mean of the respective values, by weight, for influent samples collected approximately the same times during the same period (85 percent removal).

(Federal Water Pollution Control Act amendments allow the use of such biological treatment facilities as oxidation ponds, lagoons, and ditches and trickling filters to comply with secondary treatment. Such units may not achieve the levels specified in a, b, and c but will be acceptable secondary treatment. Guidance will be forthcoming from EPA regarding acceptable design criteria for such facilities).

- d. For total coliform organisms, discharges which 1) do not receive an initial dilution of at least 10:1 with generally much greater dilution and which are in areas where significant public contact with the receiving water occurs, or 2) are in the immediate vicinity of shellfish harvesting areas, shall not exceed a seven sample median of 2.2 MPN/100 ml nor a maximum of 240 MPN/100 ml. Exceptions to these requirements may be granted by the Board where it is demonstrated that beneficial uses will not be compromised by such an exception. Discharges receiving such exceptions shall not exceed a five sample median of 23 MPN/100 ml nor a maximum of 240 MPN/100 ml during dry weather. All other discharges shall not exceed a five sample median or 240 MPN/100 ml nor a maximum of 10,000 MPN/100 ml. The Board may consider establishing less stringent requirements for any discharges during wet weather.

3. The following effluent limitations shall apply to all treatment facilities which discharge to inland surface waters:

- a. The pH shall not be less than 6.0 nor greater than 9.0. If the discharge does not receive a minimum initial dilution of 10:1 with generally much greater dilution, the pH shall not be less than 6.5 nor greater than 8.5.
- b. Deep Water Discharges

The survival of test fishes acceptable to the Board in 96-hour bioassays of the effluent shall be a 90 percentile value of not less than 50 percent survival if the discharge receives a minimum initial dilution of 10:1 and generally much greater dilution.

Exceptions to this limitation may be granted and revised toxicity requirements may be established if the following conditions are met:

- 1) The waste is discharged through a deepwater outfall which achieves rapid and high initial dilution; and
- 2) The toxicants are nonconservative constituents which rapidly decay in the receiving water, or they are conservative constituents for which water quality objectives have been established. Effluent mass emission rates may be established for such nonconservative constituents; and
- 3) A thorough investigation has determined that such an exception will not adversely affect resident and/or migratory fish or other aquatic life. Biological effects to be considered for investigation are: a) mortality, growth rate and reproductive success of resident or indicator species and b) alterations in population or community ecology of receiving water biota.

**Shallow Water Discharges**

If the discharge does not receive a minimum initial dilution of 10:1 with generally much greater dilution, the survival of test fishes acceptable to the Board in 96-hour bioassays of the effluent shall be a median of 90 percent survival and a 90 percentile value of not less than 70 percent survival.

**All Discharges**

Beginning in July 1987, compliance bioassays shall be performed using two test fish species in

parallel tests. One shall be three-spine stickleback, and the other shall be either rainbow trout or fathead minnow. If non-compliance is determined for either species, the

Board will consider appropriate enforcement action to include requiring a toxicity reduction evaluation and requiring an effluent characterization study in advance of the schedule shown in Table IV-2. If toxicity in excess of the effluent limit is determined for either species and the cause of the toxicity is demonstrated by the discharger to be un-ionized ammonia, the Board will not consider such toxicity to be a violation of requirements.

Within the following schedule, all dischargers shall determine compliance with the toxicity requirements using flow-through effluent bioassays and the species identified above except for those that discharge intermittently and discharge less than 1.0 mgd (average dry weather flow). Such small intermittent dischargers will be required to perform static renewal bioassays using the species identified above.

Flow	Implementation Date
Greater than 20 mgd and all major industries .....	July 1, 1987
Between 5 and 20 mgd .....	January 1, 1988
Less than 5 mgd .....	January 1, 1989

The flow-through test will be used for determining compliance three months after the above dates. The Board will consider extending these compliance dates for dischargers who can demonstrate that they are making satisfactory progress in constructing appropriate facilities to perform flow-through bioassays. The Board may modify the flow-through bioassay requirements and the specific test species requirements on a case-by-case basis for discharges of once-through cooling water or excessively saline wastes which make the implementation of these test requirements impractical. Such changes are not intended as a reduction in the standard, but rather to account for the technical difficulties of performing the tests.

- c. Residual chlorine (free chlorine plus chloramines) shall not exceed 0.0 mg/l.
- d. Settleable matter shall not exceed a monthly average of 0.1 ml/1-hr nor a daily maximum of 0.2 ml/1-hr. Discharges from sedimentation and

similar cases should generally not contain more than 1.0 ml/1-hr of settleable matter. Design and maintenance of erosion and sediment control structures shall comply with accepted engineering practices as identified in the Association of Bay Area Government's (ABAG's) "Manual of Standards for Erosion and Sediment Control Measures".

e. Oil and grease shall not exceed a monthly average of 10 mg/l nor a daily maximum of 20 mg/l.

f. Any other requirements as specified in other appropriate plans and policies of the State or Regional Boards (see Chapter V).

The limits identified in 3. and 4., above, have been and will be applied on a gross rather than a net basis except for certain industrial waste discharges which will be evaluated on a case-by-case basis.

**TABLE IV-2  
SCHEDULE FOR PERFORMING EFFLUENT CHARACTERIZATION STUDIES**

<b>Studies to commence no later than</b>	<b>Dischargers</b>
6 months after Board guidance adopted .....	3 major industries: Shell Oil Stauffer-Martinez U.S. Steel 3 POTWs: San Francisco EBMUD San Jose/Santa Clara 2 groundwater discharges: IBM Fairchild-San Jose
12 months after Board guidance adopted .....	9 major industries: Chevron USA PG&E-Pittsburg PG&E-Potrero Allied-Bay Point Merck Exxon Pacific Refining Dow Chemical Tosco 6 POTWs: Sunnyvale CCCSD EBDA Palo Alto Fairfield-Suisun S.D. South S.F./San Bruno 2 groundwater discharges: Texaco-Fremont National Semiconductor

Note: If other polluted groundwater dischargers acceptable to the Board are willing to perform the initial effluent characterization studies, the Board will not require the polluted groundwater dischargers listed in this table to perform those initial studies.

## **EFFLUENT TOXICITY CONTROL PROGRAM**

The goal of the effluent toxicity control program is to produce water quality objectives for each receiving water segment and effluent limits for toxicity and specific toxic pollutants based on waste load allocations for each discharger. Development of the ultimate water quality-based effluent limits will require many years of work and close coordination with the EPA, the State Board, and the Aquatic Habitat Institute. A phased approach to developing these limits is necessary because of the time and resources needed to accomplish the task. However, information gained in each phase of the program can lead to improved regulation before the ultimate water quality-based effluent limits are established for each discharge. As the program progresses, the Board may:

- modify existing effluent limits;
- specify different test organisms and methods for determining compliance with toxicity effluent limits;
- require a toxicity reduction evaluation (TRE) to determine the cost effectiveness of controlling toxicity or reducing concentrations of specific toxic pollutants.

It must be recognized that this program will be implemented within the framework of existing Board programs. Thus, any effluent limits developed herein which are less stringent than existing limits must be supported well enough to demonstrate that such "backsliding" will not result in degradation of water quality. Additionally, the Board may require dischargers to comply with technology-based effluent limits for certain pollutants pursuant to 40 CFR 122.44.

The overall program consists of four major steps. Each of those steps is critical to the development of water quality-based effluent limits for toxicity control. The major steps of the program are:

1. Effluent Characterization
2. Development of Water Quality Objectives
3. System Modeling and Waste Load Allocation
4. Effluent Limit Derivation

## **Effluent Characterization**

The purposes of effluent characterization are:

- to define effluent variability such that the most appropriate compliance monitoring program can be put in place for each discharge and such that adequate information can be developed to determine if treatment process or source control modifications are necessary to comply with effluent limits;
- define the sensitivity of different test species to the effluent such that adequate information can be developed to specify an appropriate acute toxicity effluent limit, and the most sensitive organism of a standard set can be used for compliance monitoring; and
- to define the chronic toxicity of the effluent to different test species such that the most sensitive organism of a standard set can be defined and either used for compliance monitoring or used for development of an application factor to be applied to the acute toxicity effluent limit and/or other specific toxicant effluent limits.

Selected dischargers will be required to perform effluent characterization studies commencing on dates identified in Table IV-2. The discharges selected for the initial characterization studies are intended to be representative of different types of discharges located in different segments of the estuary. The schedule for performing additional characterization studies will be determined as the initial studies progress. The effluent characterization studies will be based on explicit Board guidance to be developed in the near future. It is expected that each study will require from 12 to 18 months to complete.

Based on information developed during the effluent characterization process, the Board may revise the interim toxicity standard for deep water discharges. The shallow water discharge standard should remain unchanged because there should be no toxic effects in a discharge which receives no dilution.

## **Development of Water Quality Objectives**

To perform the ultimate waste load allocations under this program, water quality objectives specific to each segment of the Bay system must be developed. The water quality objectives for toxicity and specific toxic pollutants contained in Chapter III are reasonable for the purposes of interim regulation because they provide a minimum level of protection to the Bay system.

## System Modeling and Waste Load Allocation

Waste load allocations require the use of models to predict the exposure of organisms in the receiving water to toxic conditions. Using specific models and water quality objectives, the Board can allocate the allowable waste load for a particular receiving water segment.

The necessary modeling must be performed on two levels: near-field (close to each discharge) and system-wide. These modeling efforts must be supplemented by physical studies of each discharge, such as dye or tracer studies, to help identify dilution and dispersion of the wastewater. In particular instances, the Board should require coordinated studies to determine how discharges mix together.

Most outfalls were designed using near-field mathematical models. These can be updated and used in conjunction with physical studies and a system-wide model to provide meaningful information. Some attempts have been made to model the entire Bay system, but no comprehensive mathematical model exists at this time. As part of the Aquatic Habitat Program, a comprehensive model of the system is being developed.

## Effluent Limit Derivation

Given waste load allocations and detailed information regarding each effluent's quality, appropriate effluent limits for each discharge can be derived.

## DISCHARGE PROHIBITIONS

The discharge prohibitions identified below are intended to protect beneficial uses of all waters of the Region. No exceptions to these prohibitions will be allowed except where noted.

Prohibitions 1 through 5 refer to particular characteristics of concern to beneficial uses. This broad language has been and will be interpreted by the Board on a case-by-case basis. It should be noted that the Board will consider all discharges of treated sewage and other discharges where the treatment process is subject to upset to contain particular characteristics of concern unless the discharger can demonstrate that the discharge of inadequately treated waste will be reliably prevented.

It shall be prohibited to discharge:

1. *Any wastewater which has particular characteristics of concern to beneficial uses at any point at which the wastewater does not receive a minimum initial dilution of at least 10:1, or into any*

*nontidal water, dead-end slough, similar confined waters, or any immediate tributaries thereof.*

Waste discharges will contain some levels of pollutants regardless of treatment. This prohibition will require that these pollutants, when of concern to beneficial uses, be discharged away from areas of minimal assimilative capacity such as nontidal waters and dead-end sloughs. This prohibition will accomplish the following:

- a. Provide an added degree of protection from the continuous effects of waste discharge.
  - b. Provide a buffer against the effects of abnormal discharges caused by temporary plant upsets or malfunctions.
  - c. Minimize public contact with undiluted wastes.
  - d. Reduce the visual (aesthetic) impact of waste discharges.
2. *Any wastewater which has particular characteristics of concern to beneficial uses to San Francisco Bay south of the Dumbarton Bridge.*

This prohibition is consistent with the Bays & Estuaries Policy. This area is one which has experienced chronic water quality problems and has very limited assimilative capacity.

3. *Any wastewater which has particular characteristics of concern to beneficial uses to Suisun Marsh during the dry weather period of the year. Local irrigation return water is excepted in quantities and qualities consistent with good irrigation practices.*

The threat of high concentrations of toxicants, biostimulants, and oxygen demanding substances in Suisun Marsh, an area of low assimilative capacity, great ecological sensitivity and value, and poor dispersion by tidal or freshwater flushing, necessitates such protection for the Marsh for the critical portion of the year when freshwater flows are nonexistent.

Exceptions to Prohibition 1, 2, and 3 above will be considered for discharges where:

- 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.

Significant factors to be considered by the Regional Board in reviewing requests for exceptions will be the reliability of the discharger's system in preventing inadequately treated wastewater from being discharged to the receiving water and the environmental consequences of such discharges.

4. *Any wastewater which has particular characteristics of concern to beneficial uses to Alameda Creek when no natural flow occurs.*

The threat of dissolved solids, stable organics and other pollutant accumulation in the ground water of the basins recharged with waters of Alameda Creek is critical in the dry weather period when wastewater could account for much of the water percolating to the basin. This prohibition is intended to protect the ground waters of the Livermore-Amador Valley and Niles Cone. Chemical water quality objectives for the surface and ground waters of the Alameda Creek watershed above Niles are contained in Chapter III.

5. *Any wastewater which has particular characteristics of concern to beneficial uses to Tomales Bay, Drakes Estero, Limantour Estero, Bolinas Lagoon, or Richardson Bay (between Sausalito Point and Peninsula Point).*

Tomales Bay, Drakes Estero, and Limantour Estero are nearly pristine bodies of water. They are of great value for wildlife habitat and as recreational scientific study areas. The prohibition of discharge will help to assure the maintenance of existing high water quality.

Bolinas Lagoon and Richardson Bay both have poor dispersion capability and low assimilative capacity. They have experienced high coliform, nutrient and algal concentrations. This prohibition will provide protection for the intensive recreational beneficial uses of these water bodies.

6. *All conservative toxic and deleterious substances, above those levels which can be achieved by a program acceptable to the Board, to waters of the Basin.*

The intent of the prohibition is to minimize the discharge of persistent toxicants into waters, thus protecting aquatic life and public water supplies. The prohibition recognizes that these substances can be most economically reduced at their source.

7. *Rubbish, refuse, bark, sawdust, or other solid wastes into surface waters or at any place where they would contact or where they would be eventually transported to surface waters, including flood plain areas.*

The prohibition is intended primarily to protect recreational uses, including boating and navigation. Floating rubbish can also impair suitability of waters for industrial cooling and other diversions by endangering pumps. This prohibition is in conformance with the Bays and Estuaries Policy.

8. *Floating oil or other floating materials from any activity in quantities sufficient to cause deleterious bottom deposits, turbidity or discoloration in surface waters.*

The prohibition is intended to protect birds and other wildlife from the possible toxic effects of floating oil or oil deposits. Waterfowl and shorebirds in particular can be affected through coating of feathers and loss of thermal insulation. This prohibition is also intended to prevent visual nuisance that would be caused by floating oil or by its deposition on shore or on structures and to protect recreational uses which would be impaired by oil deposited on boats, other equipment, or persons.

9. *Silt, sand, clay, or other earthen materials from any activity in quantities sufficient to cause deleterious bottom deposits, turbidity or discoloration in surface waters or to unreasonably affect or threaten to affect beneficial uses.*

This is in conformance with the Bays and Estuaries Policy. The intent of this prohibition is to prevent damage to the aquatic biota by bottom deposits which can smother non-motile life forms, destroy spawning areas, and, if putrescible, can locally deplete dissolved oxygen and cause odors. The prohibition would also prevent discoloration and/or turbidity that can be caused by silt and earth. As one measure of compliance with this prohibition, design and maintenance of erosion and sediment control structures should comply with accepted engineering practices as identified in ABAG's "Manual of Standards for Erosion and Sediment Control Measures". Turbidity or discoloration caused by dredging is covered by the Board's policy on dredging (see Chapter V).

10. *Sludges of municipal or industrial waste origin and sludge digester supernatant, centrate, or filtrate directly to surface waters or to a waste stream that discharges to surface waters without adequate treatment in conformance with waste discharge requirements.*

The intent of this prohibition is to preclude a major potential source of bottom deposits, which could smother aquatic biota and cause localized dissolved oxygen depletion. Some sludges contain floatable material which would cause visual nuisance. Some industrial sludges contain persistent toxic matter. If discharged without adequate treatment, digester supernatant, centrate, and filtrate are generally septic and would cause odors, discoloration, and dissolved oxygen depletion.

11. *Biocides which have particular characteristics of concern to beneficial uses when applied where direct or indirect discharge to water is threatened except where net environmental benefit can be demonstrated to the satisfaction of the Board. A management plan for the use and control of biocides in these cases must be approved by the Board.*

It is the intent of this prohibition to prevent, as much as practicable, the entrance into the aquatic environment of persistent and/or cumulative biocides (pesticides, herbicides, copper, etc.). This is necessary to minimize the toxic effects of these substances on the aquatic biota.

12. *Radiological, chemical, or biological warfare agents or high level radioactive waste.*

The intent of the prohibition is to protect human and aquatic life from the adverse effects of these materials.

13. *Oil or any residuary product of petroleum to the waters of the State, except in accordance with waste discharge requirements or other provisions of Division 7, California Water Code.*

Discharge of soil or residuary products of petroleum is also prohibited under the Fish and Game Code.

14. *Sewage bearing wastewater to individual leaching or percolation systems in the Stinson Beach area of Marin County, the Glen Ellen area of Sonoma County, and the Emerald Lake Hills and Oak Knoll Manor areas of San Mateo County as specified in Resolution Nos. 73-13 (as amended), 73-14 and 76-7 of the California Regional Water Quality Control Board, San Francisco Bay Region.*

15. *Raw sewage or any waste failing to meet waste discharge requirements to any waters of the Basin.*

The intent of this prohibition is to protect the public and the aquatic environment from the effects of raw or inadequately treated waste discharges.

16. *Waste that is not a sufficient distance from areas designated as being of special biological significance to assure maintenance of natural water quality conditions in these areas.*
17. *Waste so as to alter the total dissolved solids or salinity of waters of the State to adversely affect beneficial uses, particularly fish migration and estuarine habitat.*

The intent of this prohibition is to prohibit the discharge of excessively salty water to streams and the Bay-Delta system.

## WETLAND FILL

The beneficial uses of wetland are mainly affected by diking and filling. Pursuant to Section 404 of the Clean Water Act, discharge of fill material to waters of the United States must be performed in conformance with a permit obtained from the Army Corps of Engineers prior to commencement of the fill activity. However, in addition, under Section 401 of the Clean Water Act, the State must certify that any permit issued by the Corps pursuant to Section 404 will comply with water quality standards established by the State (i.e. the Basin Plans), or the State can waive such certification. If the State does not waive certification, the State Board's Executive Director, acting on the recommendation of the Regional Board, can grant or deny State certification. In the event of a conflict between the State and the Corps, or, in those rare instances where the Corps may not have jurisdiction, the Regional Board has independent authority under the State Water Code to regulate discharges to wetlands through waste discharge requirements or other orders.

The Regional Board will use Senate Concurrent Resolution No. 28 and California Water Code Section 13142.5 as guidance for acting on wetlands. Senate Concurrent Resolution No. 28 states that, "It is the intent of the legislature to preserve, protect, restore, and enhance California's wetlands and the multiple resources which depend on them for the benefit of the people of the state." California Water Code Section 13142.5 states "Highest priority shall be given to improving or eliminating discharges that adversely affect...Wetlands, estuaries, and other biologically sensitive sites."



The Regional Board will require that any application for proposed fill activity within its regulatory jurisdiction include mitigation located within the same section of the Region, wherever possible, so that there will be no net loss of wetland acreage and no net loss of wetland value when the project and mitigation lands are evaluated together. In addition, the Regional Board will utilize EPA's Section 404(b) (1) Guidelines for Specification of Disposal Sites for Dredge or Fill Material in determining the circumstances under which wetlands filling may be permitted.

## **LOAD ALLOCATION TO RECEIVING WATER SEGMENTS**

For conformance with the planning requirements of the Federal Water Pollution Control Act Amendments of 1972, it is necessary to classify receiving waters according to severity of pollution. The waters of a basin need to be segmented, classified, and assessed as to their assimilative capacity prior to allocating waste loads to those which are found limited in water quality.

### **Segment Identification and Classification**

Fifteen principal receiving water segments have been identified and are illustrated in Figure IV-1. Their delineation is based on several major water quality factors including knowledge of existing water quality problems associated with portions of a water body presently receiving waste loads from either point or diffuse sources, as well as waters of comparable assimilative capability, dilution potential or sensitivity to environmental damage. The estuarine waters of San Francisco Bay and tributary surface water sources are thus segmented to better delineate specific water quality concerns related to future waste discharge operations.

Designated segments of the basin are classified as "effluent limited" if water quality objectives are met within the segment after the application of effluent limitations requiring best practicable treatment for industry and secondary treatment levels for municipal systems. Segments are classified as "water quality limited" if water quality objectives are not met within the segment after the application of those effluent limitations. The implementation plan for effluent limited segments need only employ elements

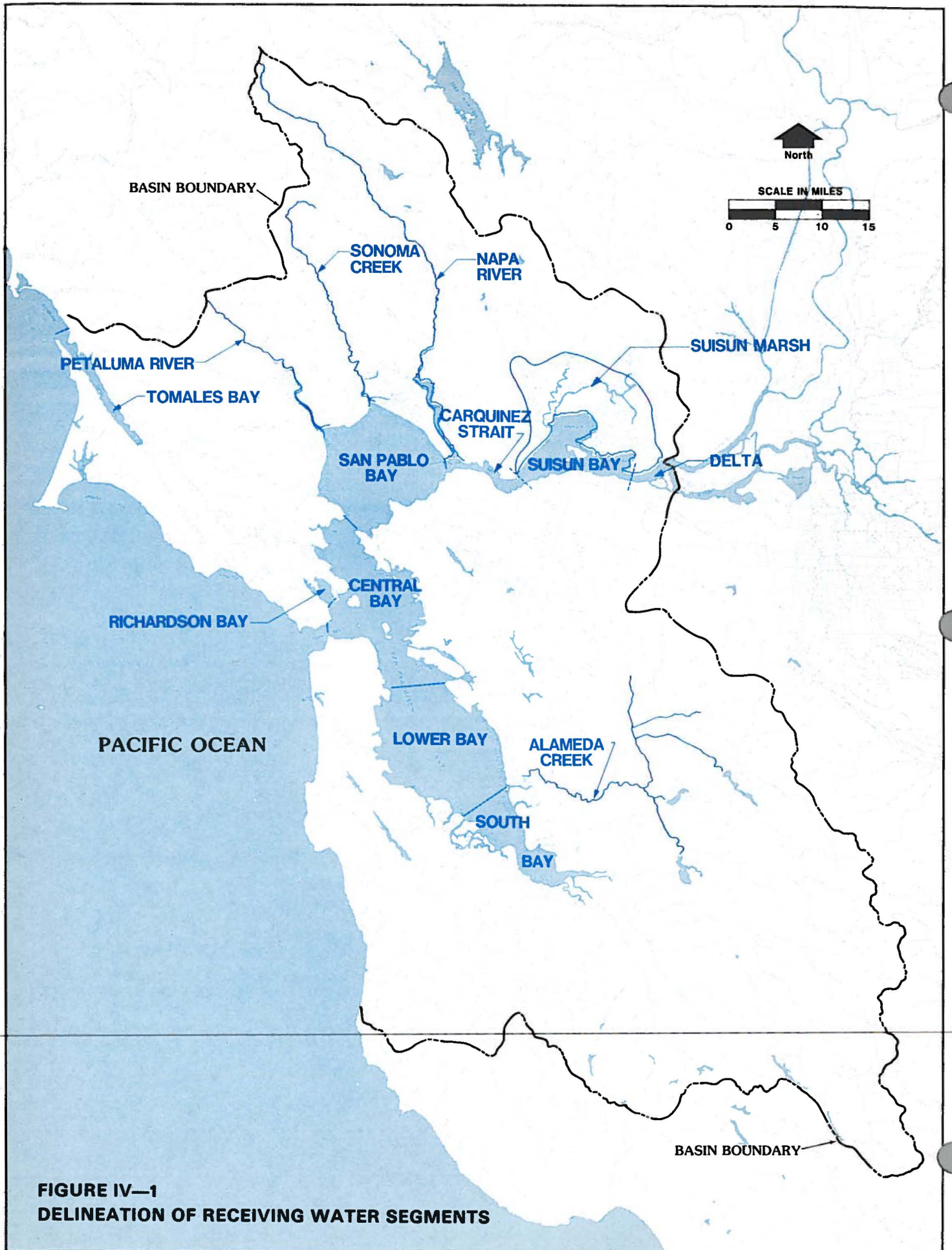
necessary to assure proper program management whereas in water quality limited segments, the plan needs to include such analysis as is necessary to assure that control actions taken will meet water quality objectives as well as the requirements of a sound program management.

There are portions of each segment which presently do not meet water quality objectives. In the 1975 and 1982 plans, segment classification was based on consideration of the effects of conventional pollutants. However, the potential effects of toxic pollutants on beneficial uses, particularly on fish migration, require that segment classification be re-evaluated. Specifically, Central San Francisco Bay, San Pablo Bay, Carquinez Strait, Suisun Bay, the Delta (within this Region), and Lower San Francisco Bay are all suspected to be water quality limited relative to toxic pollutants, but more data are necessary. These designations are given in Table IV-3. Table IV-4 specifies the initial treatment level necessary for discharge of municipal wastes to each segment, but additional treatment or other control measures may be necessary for any segment.

If coliform bacteria levels are considered during wet weather conditions, conformance with federal effluent limitations by municipal and industrial systems may still result in greater coliform counts during some storm periods than objectives stipulated for certain beneficial uses of San Francisco Bay. However, it is not felt that the entire Bay should be placed in a water quality limited classification because of potential coliform violations. Operational modifications, nonpoint source control regulations, and wet weather conveyance improvements will mitigate this problem. An approach to the control of stormwater overflows and suggestions for an improved planning approach are found later in this chapter.

### **Assimilative Capacity and Load Allocation**

The assimilative capacity of a water quality limited segment is an expression of the capability of a segment to accept waste loads which will not interfere with attainment of receiving water quality objectives. In order to determine the need for and extent of removal of specific waste constituents, an estimate of segment total assimilative capacity for the constituents in question needs to be performed.



**FIGURE IV—1  
DELINEATION OF RECEIVING WATER SEGMENTS**

**TABLE IV-3  
RECEIVING WATER SEGMENTS**

<b>Segment</b>	<b>Description</b>	<b>Classification</b>
1	Pacific Ocean	Effluent Limited
2	Central Bay	Water Quality Limited *
3	San Pablo Bay	Water Quality Limited *
4	Carquinez Strait	Water Quality Limited *
5	Suisun Bay	Water Quality Limited *
6	Delta	Water Quality Limited *
7	Lower Bay	Water Quality Limited **
8	South Bay	Water Quality Limited *
9	Suisun Marsh	Water Quality Limited *
10	Napa River	Water Quality Limited *
11	Petaluma River	Water Quality Limited
12	Sonoma Creek	Water Quality Limited *
13	Alameda Creek	Water Quality Limited
14	Richardson Bay	Water Quality Limited *
15	Tomaes Bay	Water Quality Limited
	Other Segments	Water Quality Limited

\* Suspected to be water quality limited, but more data are necessary

\*\* Particularly south of the Dumbarton Bridge

**TABLE IV-4  
TREATMENT LEVELS**

<b>Receiving Water Segment</b>	<b>Initial Treatment Level <sup>a</sup></b>
1 Pacific Ocean	Secondary
2 Central Bay	Secondary
3 San Pablo Bay	Secondary
4 Carquinez	Secondary
5 Suisun Bay	Secondary <sup>b</sup>
6 Delta	Secondary <sup>b</sup>
7 Lower Bay	Secondary
8 South Bay	Secondary with nitrification and filtration <sup>c</sup>
9 Suisun Marsh	Secondary with nitrification and filtration, no dry weather discharge
10 Napa River	Secondary with, no dry weather discharge
11 Petaluma River	Secondary with, no dry weather discharge
12 Sonoma Creek	Secondary with nitrification and filtration
13 Alameda Creek	Secondary with nutrient removal, Filtration and demineralization no dry weather discharge
14 Richardson Bay	No discharge
15 Tomales Bay	No discharge
other water segments	Variable

<sup>a</sup> The Board may modify effluent requirements as noted on page IV-1.

<sup>b</sup> Possible future nitrogen removal.

<sup>c</sup> Regional Board must grant waiver for continued discharge. Study of discharge effects to be completed in 1985.

## ***SOUTH BAY***

Previous modeling work conducted as part of the 1982 South Bay Subregional Study indicated that assimilative capacity of the South Bay varied with location and season. More recent modeling work conducted by the South Bay Dischargers Authority (SBDA) as part of their 1978 facilities planning effort confirmed the past findings and indicated that the Basin Plan dissolved oxygen objectives will be violated in Artesian and Guadalupe Sloughs whether the waste discharges are removed or not. The modeling results indicated that water quality in the sloughs was largely controlled by background (non-point source) loading.

Numerous concerns have been raised regarding the propriety of using the modeling results to establish the assimilative capacity of the South Bay and effluent standards for the SBDA dischargers. As will be discussed in the Municipal Facilities section, a five-year water quality study began in late 1981 to address these issues and a number of others related to continued discharge in the South Bay. Please refer to that section for a discussion of the five-year water quality study. It should be noted here that it is the intent of the Regional Board to develop and utilize assimilative capacity criteria when the South Bay water quality is better known and defined, possibly as a result of the five-year study.

## ***NAPA AND PETALUMA RIVERS***

Dissolved oxygen is presently found below objective values during portions of the year in both the Napa and Petaluma River segments. Available data do not allow precise determination of the source of oxygen demanding substances due to the unknown quantities of loads from agricultural sources and runoff occurring upriver from municipal discharges. Control actions for point source loadings from municipal facilities have been required by the Regional Board. Control actions for diffuse waste loads include development of watershed management plans. These actions have been recommended as part of the continuing planning process.

## ***SONOMA CREEK AND SUISUN MARSH***

Insufficient information is available on dissolved oxygen concentrations, loading conditions, and background levels to determine assimilative capacities for the Sonoma Creek and Suisun Marsh water quality limited segments. In addition, modeling capabilities in smaller tributaries and shallow extremities of the Bay system are much less accurate than for the deeper, open waters. The parameter of primary

concern is dissolved oxygen, but other constituents such as total nitrogen are also above critical levels such that advanced levels of treatment are necessary in these areas.

## ***ALAMEDA CREEK***

Alameda Creek (including tributaries) has been designated as water quality limited because of existing and long-range problems associated with wastewater discharges in the Livermore-Amador Valley and surrounding areas which may ultimately reach the Creek. Alameda Creek is used for recharge of the Livermore-Amador Valley ground water basin as well as a channel for conveyance of South Bay Aqueduct release water to the Niles Cone ground water basin for recharge. Anticipated problems are associated with the build-up of salts and stable organics that can occur as the amount of wastewater in the stream increases in proportion to the release waters. The nature of this problem, as opposed to concerns of oxygen depletion, does not lend itself to a determination of assimilative capacity. The watercourse acts as a transport medium to potentially affected ground water basins wherein the concern for mineral quality of future domestic supplies is paramount. During the dry summer months the flow in Alameda Creek is essentially limited to releases from the South Bay Aqueduct. If no dilution water is discounted, the system has almost no natural flow and no assimilative capacity for any waste load.

## ***RICHARDSON AND TOMALES BAY***

The key beneficial uses which have been established for Richardson and Tomales Bays include water contact recreation, shellfishing, and aesthetic enjoyment. High concentrations of coliform organisms found in receiving waters have dictated a designation of water quality limited for both bays. Waste loads associated with the problems in Richardson Bay are associated with both point and nonpoint sources and the problems in Tomales Bay are associated with nonpoint sources. Both areas show poor dispersion capability and low assimilative capacity which accentuate problems of coliform levels and biostimulation.

## **Ranking of Segment**

The relative severity of existing or future water quality problems can be considered from a multitude of standpoints including the estimated economic loss of a resource, the magnitude of required correction measures, social impact of the adversity of the mitigation measures, environmental consequences of no action, and the threat to either public health or well being. Such criteria are largely nonquantifiable and

can only be subjectively considered. The severity of water quality problems in this Region is rated using a set of conditions which were developed utilizing the State Board's "Annual State Strategy for Water Quality" and criteria found in Federal regulation 40 CFR 130.41.

The receiving water segment ranking chart is shown in Table IV-5. Further assessment and revision in priorities can be performed as surveillance and monitoring data become available on nonpoint waste loads, background quality conditions in specific areas, and reduced effluent waste loads.

Application of the above criteria to the Basin's water segments results in the group ranking shown in Table IV-6. Groups of segments are listed in order of potential problem severity from greatest to least taken within the context of the ranking chart described in Table IV-5. The segment groups listed at the top of the ranking order should receive priority in the allocation of financial and planning resources for water quality control. Modification of the ranking order may occur as revisions in criteria take place and greater sophistication in segment classification is developed.

Although the ranking system does enable some effluent limited segments to receive higher priority than some water quality limited segments which may exhibit less significant pollution problems, special concerns within any water segment are not well categorized by a set of ranking criteria. Diffuse source loads common to many segments, seasonal coliform violations, and localized water quality problems do not lend themselves to the segment classification approach. In many cases the solutions to basin problems are not separately identifiable or independent control measures which can necessarily be considered on a segment basis, but rather are part of the overall Basin Plan.

### MUNICIPAL FACILITIES

In the Basin Plan adopted in 1975, there was an extensive discussion by subregional area of proposed municipal facilities in the region. Such a discussion was appropriate then because many of facilities were still in the planning stage. At this time, most of these facilities have been constructed, and virtually all have received grant funding. In this section the final implementation plans will be identified, and brief discussions of the problems peculiar to the City and

**TABLE IV-5  
RECEIVING WATER SEGMENT RANKING CHART**

Ranking Factor <sup>1</sup>	Receiving Water Segment <sup>2</sup>													
	PO	CB	SPB	CS	D	LB	SB	SM	NR	PR	SC	AC	RB	TB
A	1							1	1	1	1		1	1
B							1	1	1	1	1			
C			1				1		1	1	1		1	
D							1							
E		-1		-1	-1	-1	-1					-1		
F	1													
G	1	1	1	1	1	1	1	NA	NA	NA	NA	NA	NA	NA
H	NA	NA	NA	NA	NA	NA	NA	1	1	1	1	1	1	1
I	NA	NA	NA	NA	NA	NA	NA	1	1	NA	1	1	1	1
J			1		1	1	1	NA	NA	NA	NA	NA	NA	NA
SUMMATION	3	0	3	1	1	1	5	4	4	5	5	0	4	2

<sup>1</sup> A = The segment exceeds bacteriological objectives for domestic water supply or water contact recreation.

B = The segment exceeds objectives established to maintain healthy aquatic and wildlife habitat.

C = The segment exceeds objectives to maintain aesthetic quality.

D = The segment indicated a threatened loss of a beneficial use.

E = The segment is presently meeting objectives.

F = The segment includes an Area of Special Biological Significance.

G = The segment is effluent limited where work toward abatement has been indicated.

H = The segment is water quality limited and indicates amenability to improvement through point source control.

I = The segment is effluent limited and threatens to become water quality limited in the near future unless additional control systems are implemented.

<sup>2</sup> PO = Pacific Ocean, CB = Central Bay, SPB = San Pablo Bay, CS = Carquinez Strait, SB = Suisun Bay, D = Delta, LB = Lower Bay, SB = South Bay, SM = Suisun Marsh, NR = Napa River, PR = Petaluma River, SC = Sonoma Creek, AC = Alameda Creek, RB = Richardson Bay, TB = Tomales Bay.

County of San Francisco, the Fairfield-Suisun Sewer District, the Livermore Amador Valley, and the South Bay Dischargers Authority will be presented.

In Appendix D the specific facilities built, being constructed, or proposed for each discharger are given along with the costs for building these facilities. Figure IV-2 shows where these facilities are located in the region.

**Table IV-6  
SEGMENT RANKING <sup>1</sup>**

I.	South Bay Petaluma River Sonoma Creek
II.	Suisun Marsh Napa River Richardson Bay
III.	Pacific Ocean San Pablo Bay
IV.	Tomales Bay
V.	Suisun Bay Delta Lower Bay
VI.	Central Bay Carquinez Strait Alameda Creek

<sup>1</sup> Additional water diversions in or upstream from the Delta would significantly alter the segment ranking. Diversion of water is addressed in the Estuarine Management section of this chapter.

### City and County of San Francisco

San Francisco is unique within the region because of its combined sewer system. Storm runoff and sewage enter the same collection system. The collection and treatment systems are frequently overloaded when it rains, resulting in overflow of untreated wastewater to the Bay and Ocean.

The Master Plan developed by the City and County of San Francisco to treat its wastewater has three basic elements. They are:

1. Collection of wastewater on the Bay side for treatment at the Southeast plant with interim disposal

to the Bay and interim treatment of some excess wet weather flow at the North Point plant;

2. Collection of wastewater on the Ocean side for treatment at the Southwest plant with disposal to the Ocean; and
3. Transport of wastewater from the Southeast plant to the Ocean outfall for disposal, and transport of excess wet weather flow to the Southwest plant for treatment and disposal.

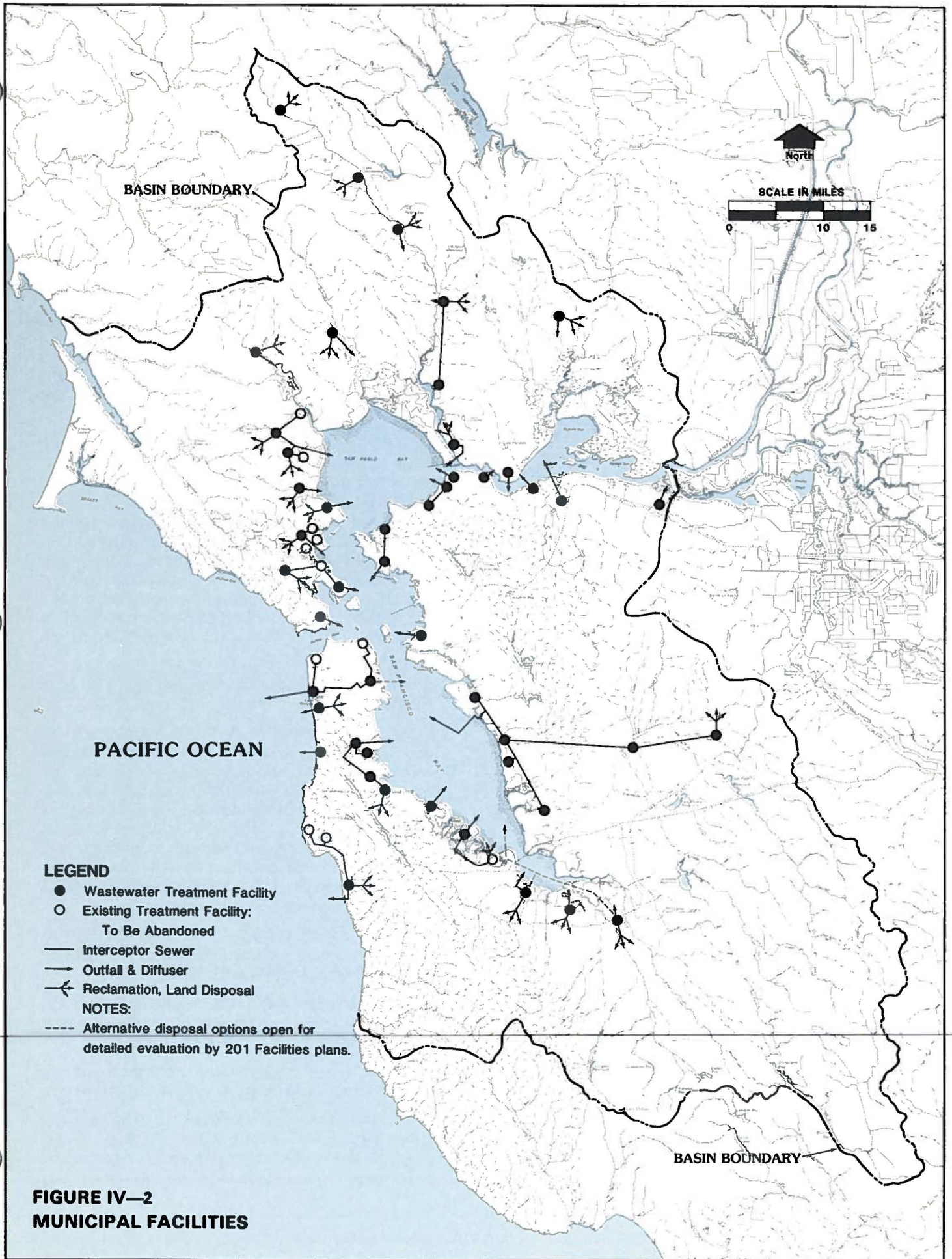
In accepting this Master Plan, the Regional Board applied the Wet Weather Overflow control strategy because the impairment of beneficial uses by such overflows was minimal compared to the exorbitant cost of total control of the overflows. The level of protection that was accepted is less than Maintenance Level C, but it was appropriately based on an analysis of the costs and benefits involved. Construction of wet weather facilities is underway. When complete, the number of overflows per year allowed by the Board will be eight on the Ocean side, ten in the Channel Basin area, four in the North Shore area, and one in the Yosemite Basin area. Board action in the future regarding San Francisco will continue to emphasize this cost effective approach to water quality protection.

However, San Francisco may not construct all of the project elements identified in its Master Plan if it can obtain a secondary treatment waiver for ocean discharge pursuant to Section 301 (h) of the Clean Water Act. Any significant change in the basic elements of the Master Plan will necessitate the preparation of a new Master Plan and EIR to be consistent with State and Federal grant regulations.

Pursuant to Board Resolution No. 84-11 and Federal law and regulations, San Francisco, like other municipalities, is required to comply with the Clean Water Act no later than July 1, 1988. A full compliance deadline beyond July 1, 1988 must be part of an enforceable time schedule.

### Fairfield-Suisun Sewer District

In order to comply with the Board's dry weather prohibition of discharge to Suisun Marsh, the District is implementing a reclamation project in cooperation with the Solano Irrigation District. However, that project is limited to about 6 mgd. To resolve this situation, the Fairfield-Suisun Sewer District is conducting a study to demonstrate that its discharge to Suisun Marsh results in a net environmental benefit.



## South Bay Dischargers Authority

The South Bay Dischargers Authority (SBDA) is a joint powers agency involving the communities served by the Palo Alto, Sunnyvale, and San Jose/Santa Clara sewage treatment facilities. The SBDA members, as shown in Figure IV-3, presently discharge effluent receiving advanced waste treatment (AWT) to shallow sloughs contiguous with the Bay. The discharges do not receive any initial dilution.

The Basin Plan prohibits the discharge of wastewater to South San Francisco Bay below the Dumbarton Bridge as well as prohibiting the following:

- discharge without initial dilution of at least 10 to 1,
- discharge into any . . . dead end slough, and
- discharge of conservative toxic and deleterious substances above the levels which can be achieved by a program acceptable to the Board.

On September 2, 1980, SBDA submitted a petition requesting a five year deferral in implementing the Basin Plan prohibitions on the grounds that the benefits of the prohibitions are outweighed by their high cost (approximately \$125 million) and lack of available data supporting them. SBDA proposed that during the five year deferral period a water quality study be performed to document the net environmental impact and water quality enhancement of the continued discharge of highly treated sewage effluent (AWT) into South San Francisco Bay.

The Regional Board on February 18, 1981 in Order Numbers 81-11, 81-12 and 81-13 recognized the SBDA concerns and found that deferral of implementation of the prohibitions was reasonable provided that the dischargers resolve the following issues:

- substantial maintenance and/or enhancement of beneficial uses
- demonstrate net environmental benefit
- implement or guarantee implementation of reclamation projects
- demonstrate consistent compliance with NPDES permit conditions for effluent and receiving waters
- provide operation, contingency and mitigation measures in case of treatment plant upsets.

On April 17, 1981 SBDA submitted a work program entitled "Water Quality and Biological Monitoring Program and Technical Report on Net Environmental Benefit and Enhancement of Receiving Water." The Regional Board Executive Officer approved this program, on behalf of the Board, on April 28, 1981.

The main objective of the five-year study is to demonstrate net environmental benefit and water quality

enhancement of the continued discharge of AWT to the shallow sloughs of the South Bay. A key task in this study is to identify and develop water quality criteria necessary to protect the beneficial uses found in the South Bay. As such, the study will focus on the unresolved issues of dissolved oxygen levels, ultimate oxygen demand (UOD), nutrients, chronic toxicity, heavy metals, coliform and avian botulism. The program and its results will be reviewed annually by SBDA and the Board.

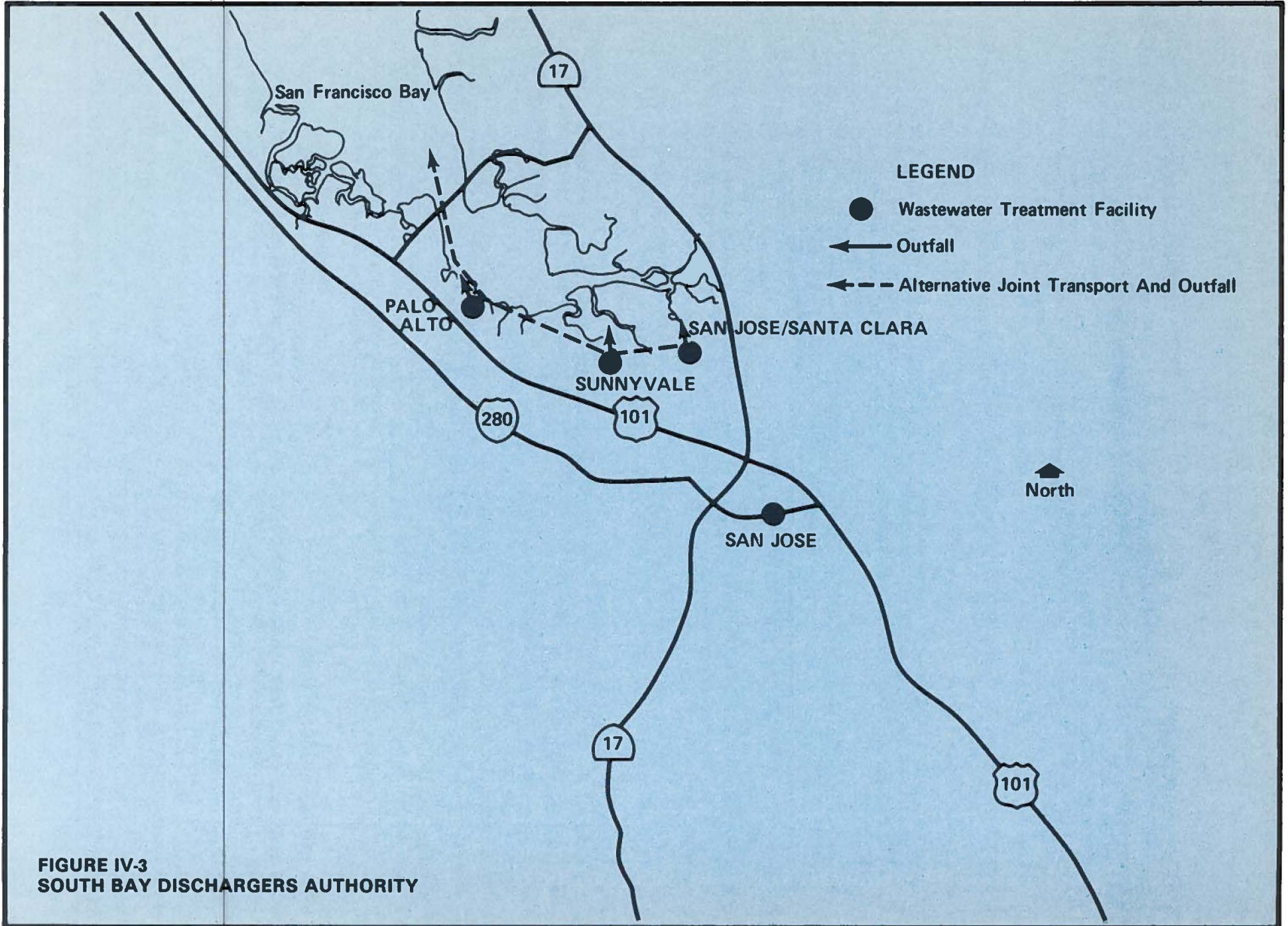
The Board will consider the results of the five-year study as well as reliability studies on each of the plants in determining if an exception to the discharge prohibitions is warranted. Until this study is complete, the Board does not intend to impose any more stringent waste discharge requirements on the South Bay Dischargers than those presently existing.

Pursuant to Board Order No. 85-123, the five-year study is to be complete no later than September 1, 1987. The Board acknowledges that site-specific objectives and effluent limits are necessary for the South Bay south of the Dumbarton Bridge. To provide for proper resolution of the issues in that reach of the Bay and to allow for waste load allocations, the Board will require public agencies in Santa Clara County south of the Dumbarton Bridge to complete the elements of the following program for which they have responsibility:

1. Submit the results of the five-year study by September 1, 1987.
2. Contribute a portion of the funding for outside review of the five-year study. The outside review will focus on (1) demonstration of net environmental benefits for exception from discharge prohibitions; (2) identification of relative contribution of pollutants from point and nonpoint sources; (3) identification of the most likely specific sources of pollutants; and (4) identification of further data needs for the development of site specific objectives and effluent limits.
3. Submit a detailed proposal by June 15, 1987 to evaluate nonpoint source pollution to commence no later than September 15, 1987:
  - a. in dry weather - evaluate discharges by industries (NPDES, "non-polluted", and spills) and dry weather runoff from residential areas
  - b. in wet weather - evaluate urban and agricultural runoff and sewage bypass/overflows

The proposal must contain specific monitoring locations and identified monitoring frequencies related to storm and discharge events. The proposal must contain a specific monitoring program for





**FIGURE IV-3  
SOUTH BAY DISCHARGERS AUTHORITY**

runoff from industrial facilities. The monitoring parameters must include some metals, ammonia, COD or BOD, PAHs, TSS, biological techniques (Microtox or some other), and flow. The proposal must provide for the evaluation of both concentrations of pollutants as well as total pollutant loadings and comparison with waste loads from point source discharges.

4. By June 15, 1987 identify existing nonpoint source pollution control measures and a program to evaluate their effectiveness.
5. Submit a program by September 15, 1987 to identify and evaluate the effectiveness of additional nonpoint source pollution control measures, including, but not limited to:
  - routing dry weather discharges to sanitary sewer
  - modifying street sweeping programs
  - installing oil/water separators on inlets to storm drains
  - routing storm water to retention basins
  - routing storm water through marshes (managed vs. unmanaged)
  - revising "litter" ordinances to stiffen penalties
  - requiring controls similar to above on new developments
  - altering land use planning to include buffer marshes
  - roofing of chemical storage areas
6. By December 15, 1989 complete the studies needed to supplement the five-year study as identified in Item 2.
7. Submit a program no later than June 15, 1989 for the implementation of additional nonpoint source controls and an ongoing monitoring program to evaluate their effectiveness.

Based on the progress, the Board may consider revisions of the time schedule stated above.

### Livermore-Amador Valley

Most wastewater generated in the Valley is exported via the Livermore-Amador Valley Wastewater Management Agency pipeline for discharge to the Bay in compliance with the dry weather discharge prohibition for Alameda Creek and the 250 mg/l mean TDS objective for the creek. Proposals for new discrete discharges to land in the Valley (package plants, septic systems, etc.) are being made, but the Board is discouraging such proposals until a water quality management plan is developed for the Valley. The Board is mainly concerned with nitrogen and salt

(TDS) loading from waste discharges in the Valley because it is a closed ground water basin.

For more than two decades the Board has been concerned over the need for a water quality management plan in the Valley. Zone 7 of the Alameda County Flood Control and Water Conservation District (Zone 7) has adopted a major portion of such a plan for unincorporated areas of the Valley. The plan consists of water quality objectives for the Valley, wastewater management policies designed to achieve those objectives, and recommendations regarding the implementing agencies.

The surface and ground water quality objectives for the Valley are given in Table III-3. The objectives for surface waters are identical to those adopted by the Board in 1975. The ground water quality objectives are adequate to protect the ground water supply in the Valley and are enforceable by the Board through inclusion in the Basin Plan.

The wastewater management policies consist of a general policy, community wastewater system policies, individual onsite wastewater system policies, and local area policies for specific problem areas. The general Zone 7 policy is:

The quality of ground water in the Central Ground Water Basin should not be allowed to be degraded by controllable factors. All wastewater treatment and disposal facilities shall be planned, located, scheduled for construction, and operated so as to maximize the export of salt, and to minimize salt and other pollutant loadings in the Central Basin.


The salt loading from further development in the area using discrete systems was evaluated. This evaluation indicated that a development level of one septic tank per 5 acres in the Valley floor rural residential areas and one per 100 acres in agricultural areas would result in the incremental salt loading given in Table IV-7 as keyed to the areas shown in Figure IV-4.

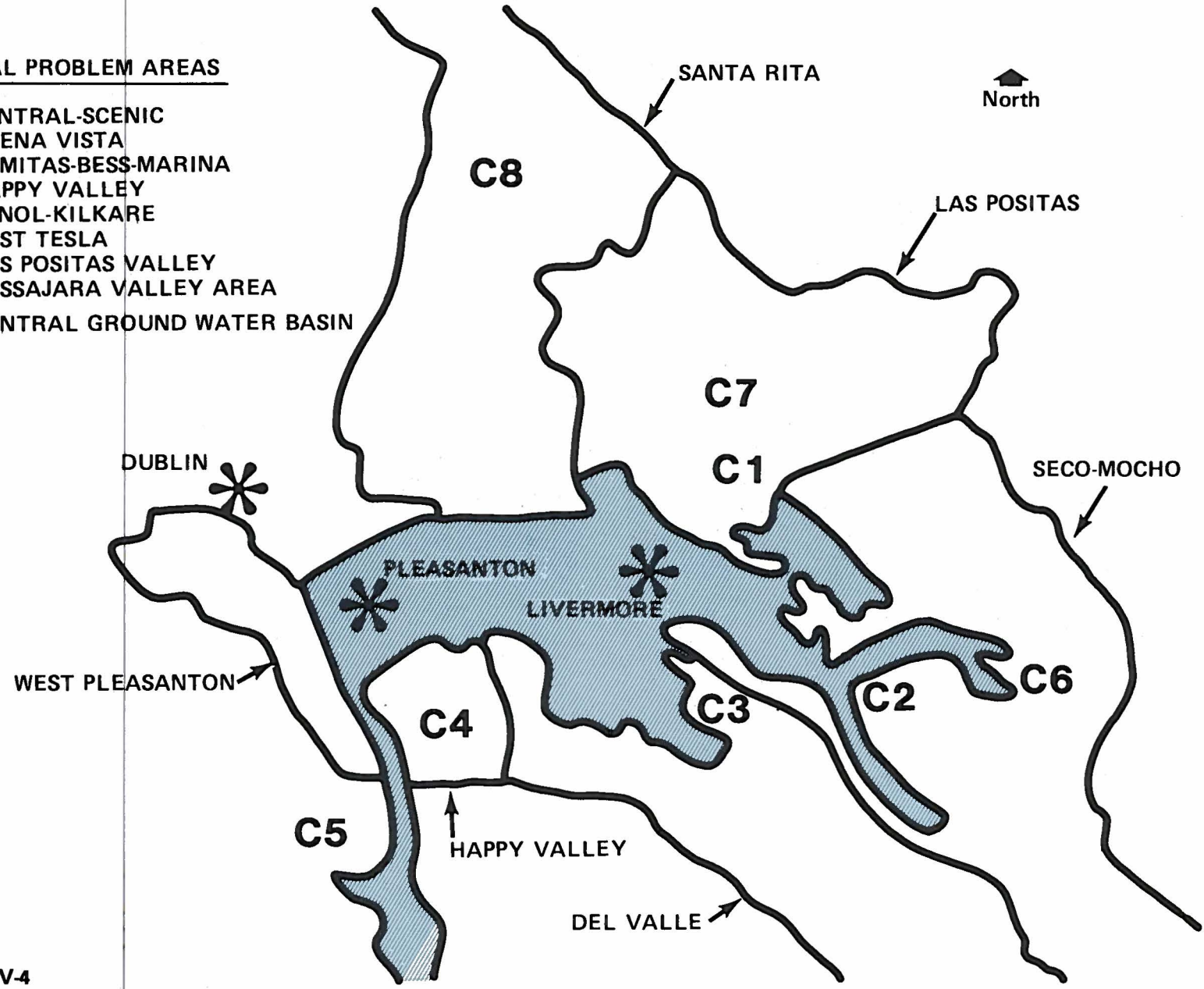
<sup>2</sup>This loading was shown to cause no noticeable increase in TDS concentrations in the Central Basin.

**TABLE IV-7  
LIVERMORE-AMADOR VALLEY  
INCREMENTAL SALT LOAD**

Area	TDS Load (Tons/Yr.)
Santa Rita	100
Los Positas	15
Seco-Mocho	88
Del Valle	5
Happy Valley	6
West Pleasanton	0

LOCAL PROBLEM AREAS

- C1. CENTRAL-SCENIC
  - C2. BUENA VISTA
  - C3. LOMITAS-BESS-MARINA
  - C4. HAPPY VALLEY
  - C5. SUNOL-KILKARE
  - C6. EAST TESLA
  - C7. LAS POSITAS VALLEY
  - C8. TASSAJARA VALLEY AREA
-  CENTRAL GROUND WATER BASIN



**FIGURE IV-4  
LIVERMORE—AMADOR VALLEY**

The following section repeats verbatim Zone 7's management policies for community wastewater systems. These policies are consistent with the Board's Policy on Discrete Sewerage Facilities. The Board supports these policies for the achievement of water quality objectives and intends to use them as guidance in developing waste discharge requirements for discharges in the Valley.

### **COMMUNITY WASTEWATER SYSTEMS**

- A1. To the extent possible and reasonable wastewater should be treated and disposed of through the existing systems with export of effluent.
- A2. Full capacity of the existing export pipeline should be used, rented on an interim basis if feasible, before new land application projects are constructed. Additional export capacity should be added when needed.
- A3. If additional export is not feasible, limited land application may be an alternative. Land application will be considered acceptable only after a feasibility study by Zone 7, or another entity, finds export not feasible.

However, wastewater treatment (which may include demineralization) with land application may be permitted if one of the following conditions is met:

- a. The percolate (at the ground water table) meets the ground water quality objectives and does not cause poor quality rising ground water to violate any water quality objectives.
- b. The applied wastewater effluent has less than 250 mg/l TDS, does not cause any significant local problems, and does not cause rising ground water to create water quality problems in the Central Basin and Niles Cone areas.
- c. The application point is in the fringe subbasin or upland and highland area, and it can be shown that the project, because of its size and location, together with other possible projects in the area, will not cause adverse water quality effects either locally or in the Central Basin or Niles Cone areas. The site specific study will have to demonstrate that the percolate cannot reasonably be expected over time to move, either directly or indirectly, into the Central Basin or Niles Cone and degrade or pollute the ground water. All other State and Federal standards must be met.

Policies b and c above allow some degradation only when beneficial reuse of wastewater is proposed, as permitted in State Board Resolution No. 68-16 "Statement of Policy With Respect to Maintaining High Quality Waters in California". Land application will be discouraged in the Central Basin where salts, trace organics, and viruses may cause problems.

- A4. If demineralization is proposed the effluent should, if physically, financially and institutionally feasible, be used to replace poor quality wastewater being used for irrigation.
- A5. Each proposed community system will be considered on a case-by-case basis considering the overall wastewater disposal needs within the watershed as determined by planning studies under the direction of Zone 7. Proliferation of small inefficient plants should be avoided. Adding wastewater to the ground water in a manner that would force poor quality water into the streams must be avoided. For projects proposing land application, site specific studies of the soils, geohydrology, ground water, and of the impacts on ground water must be completed, and disposal method approved by Zone 7 and other appropriate agencies.
- A6. Direct discharge of wastewater to streams is prohibited during dry periods when there is no natural continuous flow from the point of discharge into the Bay and the dilution is less than 10:1, except as permitted by the Regional Board in accordance with the Basin Plan.

The following section repeats verbatim Zone 7's management policies for individual onsite wastewater systems. These policies are also consistent with the Board's policy on Discrete Sewerage Facilities and were developed from a cumulative impact analysis. The Board supports these policies and intends to use them as guidance in developing waste discharge requirements for dischargers in the Valley.

### **INDIVIDUAL ONSITE WASTEWATER SYSTEMS**

- B1. The current policy of discouraging onsite wastewater system (septic tanks or alternatives) installations should be continued.
- B2. In the Central Basin and in the fringe subbasins, where septic tanks are allowed, the minimum lot size for use of septic tanks should be five acres.
- B3. In the upland and highland areas current county policies should be continued. "Alternative" on

site wastewater systems other than septic tanks must still also be approved by the Regional Water Quality Control Board.

- B4. If more intense development proposing septic tanks is to be authorized in any area, and/or when land use zoning is changed to rural residential use with septic tanks:
- a. The minimum generally acceptable lot size should be five acres.
  - b. A site specific geohydrologic study may be required to determine if the wastewater would degrade the ground or surface water. Generally a detailed study will be required only if a cluster (five or more) of units is proposed. This Study will be used by Zone 7 to determine if the project is in conformance with the WMP. If it is, an Onsite Wastewater Management Zone (OSWMZ) probably will be required under Chapter 3 of the Health and Safety Code. The OSWMZ would be formed under Zone 7 or Contra Costa County and an approved septic tank maintenance program and ground water monitoring program would be required. Larger lot sizes may be required in special cases.
- B5. Exceptions to policy B4 may be permitted because of unusual land forms, ground water conditions, and other special circumstances. For example, because of geohydrologic conditions, clustering five tanks on 25 acres may decrease the chance of local problems and minimize degradation of the ground water. Site specific studies will be required to demonstrate the special conditions and the improvement in water quality.
- B6. To prevent contamination of the gravel pit lakes, holding tanks will be required within 1000 feet of the lakes, particularly along Arroyo Del Valle, for new development.

The following section repeats verbatim Zone 7's management policies for specific local problem areas. These policies were prepared after a thorough investigation of each area. The Board supports these policies and intends to use them as guidance in developing waste discharge requirements for dischargers in the Valley.

### **LOCAL AREA POLICIES**

- C1. Central-Scenic. Owner construction for lots of record or over the five acre minimum policy should be permitted. Proposed new housing clusters should be sewerred and a water supply provided because of poor ground water quality,

and because ground water levels may rise and interfere with septic systems as adjacent areas urbanize. This area has easy access to both water and sewage systems, and the area should be sewerred when the adjacent area is urbanized. Two or three additional wells should be monitored by Zone 7, with water levels observed spring and fall and water quality samples taken in the spring. If monitoring results show water levels rising significantly, is deteriorating water quality, it should be sewerred to the Livermore system, or an On-Site Wastewater Management Zone (OSWMZ) formed to resolve the problems.

- C2. Buena Vista. Construction under present policies, lots of record or over five acres, should be permitted. This area has a water supply as a result of public health concerns identified in the mid 1970's. Most of the area overlies the Central Ground Water Basin, and some of the area is highly permeable. The adjacent municipal well was shut down because of high nitrates. An additional two or three wells should be monitored by Zone 7, and if nitrates become a problem the area should be sewerred or an OSWMZ should be formed. If this area remains surrounded by agricultural lands sewerred may not be required for some time unless greater density housing is allowed—then connection to the Livermore system is essential.
- C3. Lomas-Bess-Marina. This is a large area so individual sectors must be considered. It is primarily in the Livermore upland formation, and there are not many good producing wells in the area. Shallow ground water and impermeable soils have been a problem, yet there is a deeper water bearing zone under some of the area. This is a typical fringe area. Livermore is sewerred some of the north side of this area. Water is now available along Lomas Avenue as a result of public health problems in the mid 1970's. Owner construction for lots of record or over the five acre minimum policy should be allowed. However, if new roads or clusters of homes are proposed and water and sewer are not provided, a rigorous soils and geohydrologic study should be completed under Policy B4. The soils and geology in this area are not favorable for septic tanks. Although partially in the uplands, the area is close to Arroyo Mocho and percolate could run into the surface and ground water. Zone 7 should monitor three to five additional wells, and if problems develop or high density housing

is permitted, the area should be sewered. This area should eventually be sewered through the Livermore system.

- C4. Happy Valley. Happy Valley is also in the Livermore upland formation. It is hilly and the ground water zones are small and probably only marginally connected, either to each other or to the Pleasanton ground water supply on the north or to Arroyo de la Laguna on the west. Some of the wells are old and shallow and probably not properly sealed. During the mid 1970's a construction ban was placed on the area as a result of public health concerns. Sporadic water quality analyses since then are not conclusive regarding deterioration or improvement. However, some wells do produce water with nitrate concentrations that exceed public health standards and TDS exceeding the 500 mg/l recommended standards. Accordingly, if the ban is lifted to allow construction under the lots of record or five acre policy, an OSWMZ should be formed under Zone 7 to monitor ten to fifteen wells and some septic tanks. If septic tanks appear to be failing, a septic tank inspection and maintenance program should be developed and implemented. If local water quality deteriorates, Zone 7, together with the County Environmental Health and Planning Departments, should restudy the land use (zoning) policies and the septic tank situation to determine if sewerage is needed. In any case, if high densities are permitted it should be sewered to the Pleasanton system.
- C5. Sunol-Kilkare. Water from the Sunol ground water basin is collected by the San Francisco Water Department's (SFWD) Sunol filter gallery. SFWD operates Calaveras and San Antonio Reservoirs and owns thousands of acres of watershed in and adjacent to the reservoirs and ground water basin to protect them from degradation. Water Quality data collected over the past 30 years indicate water quality is about the same as ground water along Arroyo del Valle, about 300 mg/l TDS.

Sewage disposal in the Sunol-Kilkare area is now by septic tank, and water is provided from the Hetch Hetchy Aqueduct and from Pleasanton. Local potential public health problems led to the establishment of the current general county policy (lots of record with five acre minimum). Because this is an old area most of the buildable area is used and, under current policies most new housing is replacement. Accordingly, the current policies should be continued in this area.

SFWD samples the ground water, and the County Division of Environmental Health samples Sinbad Creek in Kilkare Canyon. These agencies and Zone 7 should consider expanding this monitoring network to include and supplement these data so that information will be readily available to determine long term water quality trends.

- C6. East Tesla. This area has a diverse array of soils and ground water conditions and quality. It is only marginally connected to Arroyo Mocho, being topographically similar to upland areas. From the data available it appears there are no local problem areas at this time. However several additional wells should be monitored as it is an area where existing septic tanks could fail, and where considerable development could take place. If the area is urbanized, it should be sewered.
- C7. Las Positas Valley. Comprising the May, Spring, Vasco and parts of other subbasins, this valley is drained by Cayetano and Altamont Creeks which flow into Arroyo Las Positas. The studies show it should be sewered if it is urbanized. As the ground water basin is essentially full, there is very little storage space for additional water. Water quality is generally poor, some of it very salty. Any significant rise in water levels could force salty water into Arroyo Las Positas, and it would flow into and through the Central Ground Water Basin and into Alameda Creek and the Niles Cone. Seepage of salty water into Arroyo Las Positas and Alameda Creek may have a significant adverse impact on the Niles Cone ground water basin. This problem must be carefully considered in connection with disposal of wastewater in this area. Pumping of ground water for landscaping and other non high quality water uses should be encouraged in any development in this area, particularly if land disposal of wastewater is considered.
- C8. Tassajara Valley Area. Except in the shallow alluvium along Tassajara Creek, the Tassajara upland is a non-water bearing formation with water found only occasionally under certain local conditions. Even the alluvium has little sand and gravel in it, with discontinuous water bearing strata probably only two to five feet thick. Water supply is a problem and sometimes even a minimum well yield of three gallons per minute cannot be obtained. Houses on the hills generally have both wells and septic tanks located in the valley. Much of the development is less than 10

years old, and there are not many clusters of septic tanks yet, so there have not been many septic tank failures.

Ground water is reportedly about 10 feet from the surface in places, so if imported rather than well water were used, ground water levels could conceivably rise and cause septic tank failures. Except for the unpublished study recently completed for Contra Costa County by the U.S. Geological Survey (USGS) which locates certain wells, presents water quality data collected in 1981, and proposes a monitoring network, there are almost no data available for this area. Under the existing soils and water conditions, and because of the expected pressure to develop housing in this area, a monitoring network should be established. The USGS monitoring program for the area should be reviewed and implemented as soon as adequate staff and funding is available. There is not enough data at this time to determine if rising ground water will be a significant problem.

The agencies which will implement these policies will be Zone 7 in Alameda County and the appropriate agency within Contra Costa County. Approval of the policies will be sought from both the Alameda County Board of Supervisors and the Contra Costa County Board of Supervisors.

In response to the Board's request for additional valley-wide wastewater management, several local agencies performed a two-year study searching for feasible wastewater treatment and disposal alternatives. The City of Livermore did not participate in the study, but it was comprehensive because it did account for Livermore's anticipated future needs.

The Board's Resolution No. 85-21 acknowledges this wastewater management study, finds that the eleven recommended alternatives are consistent or can be made consistent with the Basin Plan, and requests Livermore's active participation in planning. The recommended alternatives favor export of wastewater consistent with the general Zone 7 policy, but two alternatives involve some wastewater reclamation in the fringe and upland sub-basins.

The Valley agencies, with the exception of Livermore, have formed a new joint powers agency, the Tri-Valley Wastewater Authority, to manage selection and implementation of one of the alternatives. While that is proceeding, the Board will continue to emphasize the surface and groundwater protection policies of Zone 7.

## **East Bay Municipal Utility District and Local Agencies**

The East Bay communities - Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont, and Stege Sanitary District - have serious problem with infiltration/inflow during the wet weather season. During major storms, community sewers receive up to 20 times more flow than in dry weather. As a result, the sewers frequently overflow to streets, local watercourses, and the Bay shoreline, with attendant risks to public health and water quality. The seven local agencies deliver sewage to EBMUD's interceptor and treatment plant. The interceptor is also subject to overflows during storm events, discharging at seven nearshore locations.

The Board directed EBMUD and the local agencies to take a regional approach to this problem. Following the Basin Plan policy for wet weather overflows, they set priorities to address the problem (in descending order of importance): eliminate community sewer overflows with public health risks, eliminate other community sewer overflows, and eliminate or mitigate interceptor overflows.

The seven local agencies recently completed a multi-year infiltration/inflow study, which proposed a \$400 million comprehensive sewer rehabilitation and replacement program over 20 years. In a 1986 enforcement order, the Board accepted the proposal, directing that initial projects focus on public health problems. The order allows the Board to review proposed projects each year to make sure that (1) high priority projects go first and (2) the communities stick to their 20-year schedule.

EBMUD recently completed a study of its own facilities, proposing \$145 million of improvements. The proposal would increase the peak capacity of its interceptor, without which community sewers would continue to overflow. It would also provide treatment for interceptor discharges, with the intent of meeting Basin Plan policies. Treatment would include screening, sedimentation, and disinfection-dechlorination. Board staff are reviewing EBMUD's proposal for conformance with the Basin Plan, especially the wet weather overflow policy. The Board will consider the proposal in early 1987 when it revises EBMUD's NPDES permit for wet weather discharges.

## **PRETREATMENT**

It is generally recognized that many pollutants can most economically be removed at their source, particularly for contributors to a POTW system. On that basis EPA has developed pretreatment requirements

for some industries and has developed minimum standards for POTW pretreatment programs. A POTW is required to implement a pretreatment program if its design flow is greater than five mgd or there are significant industrial users discharging to the POTW.

Sections 307 and 402(a) (5) of the Clean Water Act and 40 CFR Part 403 provide EPA the authority to approve "Equivalent" State pretreatment programs in lieu of the Federal program. To be approved, the State program must demonstrate equivalency with the requirements of 40 CFR 403.10.

On September 5, 1985 the State Board submitted California's request for pretreatment program approval to EPA. A decision on the equivalency of the California program is expected by the fall of 1986. The State Board proposal delegates most of the oversight responsibility to the Regional Boards and anticipates enforcement of the program through waste discharge requirements on POTWs.

The program calls for the Regional Board to:

- Implement and enforce the California Pretreatment Program.
- Review and approve new POTW pretreatment programs.
- Provide technical assistance to POTWs and Industrial Users (IUs).
- Review applications for requested POTW pretreatment program modifications.
- Provide monthly compliance updates to the data management system.
- Conduct audits and inspections of the implementation of pretreatment programs.
- Review annual and quarterly pretreatment program reports.

It is the intent of the Board to implement this program within the funding constraints imposed on it.

## **INDUSTRIAL WASTE DISCHARGES**

This section will discuss industrial waste discharges to surface waters. Other industrial waste disposal practices are discussed in a later section titled "Toxic Wastes and Hazardous Materials".

The Regional Board has adopted NPDES permits for 138 industrial discharges in the Region, 16 of which can be considered major discharges. The remainder are mostly small discharges of cooling water and/or runoff.

The 16 major discharges are identified and described in Table IV-8, and their locations are shown in Figure IV-5. These industries have all installed treatment fa-

cilities which can be considered to provide "best practicable treatment" (BPT). The next step in industrial discharge control will be the promulgation of "best available treatment economically achievable" (BAT) standards by EPA for each industrial classification. Federal law requires that industrial dischargers comply with such standards by July 1, 1984. If it becomes apparent in certain cases that such standards will not be promulgated by EPA, the Regional Board may define acceptable treatment standards on a case-by-case basis. The Board has successfully used this approach in regulating the waste discharges of those industries for which BPT standards were never promulgated.

The effect of the Board's regulation of industrial discharges has been to drastically reduce the pollutant loadings from these sources, but water quality concerns still do exist in this area. Further study, as will be performed under the Aquatic Habitat Program (see Chapter VI), is necessary to determine the true chronic effects of such discharges.

## **SAN LUIS DRAIN**

Agricultural irrigation in the San Joaquin Valley results in high salinity concentrations in the soil which may be harmful to crops. To alleviate this condition, tile drains have been and are being installed to carry the saline water away from the fields. The tile drains were to discharge ultimately to the San Luis Drain. The Interagency Drainage Program, a joint Federal and State program, recommended in 1979 that a master drain be constructed for ultimate discharge of this wastewater at Chipps Island at the western end of the Delta. This drain was to be an extension of the 82 mile section of drain which emptied into Kesterson Reservoir.

In 1981, the Bureau of Reclamation began working on an NPDES permit application for the San Luis Drain for discharge at Chipps Island. However, in 1982 the U.S. Fish and Wildlife Service discovered selenium concentrations in fish from the San Luis Drain and Kesterson Reservoir to be as much as 100 times higher than in a nearby area which was fed with water from the Delta- Mendota Canal. In the spring of 1983, high mortalities and deformities were discovered at Kesterson among newborn coots, grebes, stilts, and ducks.

The State Board has taken an active role in the remediation of the selenium problem at Kesterson. The San Joaquin Valley Drainage Program, another State and Federal interagency program, has begun to further investigate the problems associated with the drainage of agricultural lands to develop solutions to those problems.



## SOLID AND HAZARDOUS WASTE DISPOSAL

The disposal of solid and hazardous wastes can, if not properly regulated, cause impacts to beneficial uses of the waters of the region. These are typically groundwater impacts but in some cases surface waters can also be affected by disposal operations.

Historically, the Board has devoted its resources to the regulation of sanitary landfills receiving domestic solid wastes and off-site hazardous waste disposal facilities receiving industrial wastes from numerous generators. These sites are typically well regulated and monitored; however, some water quality problems have been detected and are in the process of being addressed. Recently, as a result of new federal laws in the area of hazardous waste regulation, more effort has been devoted to the on-site hazardous waste disposal sites (ie. those sites that are operated

by the company that generates the waste and where only wastes generated by the company are disposed).

The laws and regulation governing the disposal of both hazardous and non-hazardous solid wastes have been revised and strengthened in the last few years. Additionally, the State Department of Health Services (DOHS) and the State and Regional Boards are implementing the Federal Resource Conservation and Recovery Act (RCRA).

The most significant regulation used by the Board in regulating solid and hazardous waste disposal is Subchapter 15 of Title 23, Chapter 3, California Administrative Code. These regulations were revised in late 1984 to include very specific siting, construction, monitoring and closure requirements for all existing and new facilities. These regulations call for the review and update of waste discharge requirements for all disposal facilities by late 1989 utilizing these new regulations.

**TABLE IV-8  
MAJOR INDUSTRIAL DISCHARGERS**

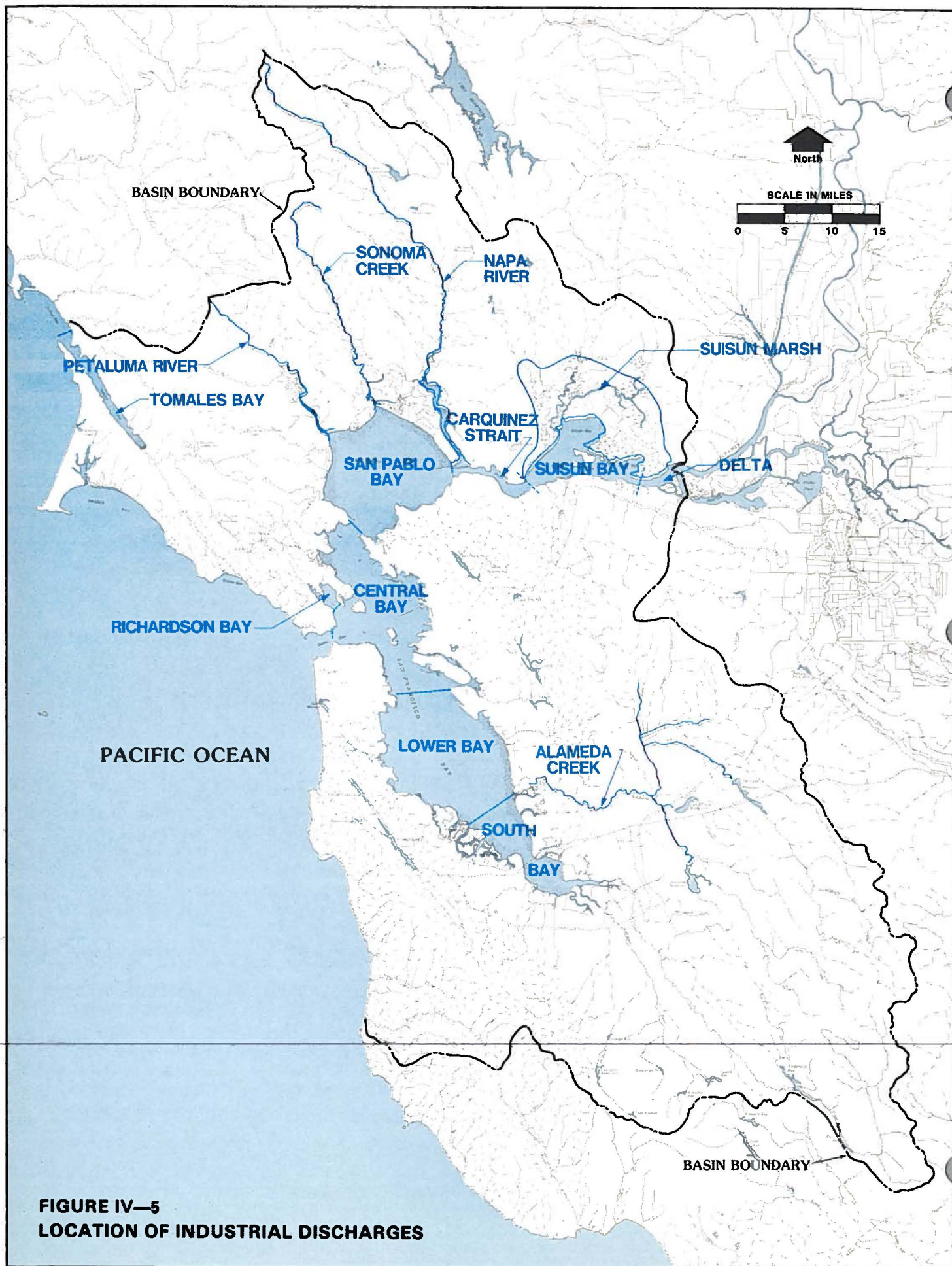
Facility Name	Industrial Category	Flow <sup>a</sup>	Treatment System
Allied-Bay Point Works.....	Chemical Manufacturing	0.820	pond
C and H Sugar Co. ....	Sugar Processing	21.000 <sup>b</sup>	activated sludge
Chevron Chemical Co. ....	Chemical Manufacturing	0.140	pond
Chevron U.S.A. ....	Petroleum Refining	80.900 <sup>c</sup>	pond
Dow Chemical Co.....	Chemical Manufacturing	0.800	pond
Exxon .....	Petroleum Refining	2.360	activated sludge/pond
FMC-Newark .....	Phosphate Manufacturing	0.098	neutralization/pond
Merck and Co. ....	Chemical Manufacturing	2.700	physical/chemical
PG&E-Pittsburg .....	Steam Electric Power	780.000 <sup>c</sup>	filtration
San Francisco Int. Airport .....	Various <sup>d</sup>	0.510	physical/chemical
Shell Oil Co.....	Petroleum Refining	3.480	activated sludge/pond
Stauffer Chemical Co.-Martinez .....	Chemical Manufacturing	0.129	neutralization/pond
Stauffer Chemical Co.-Richmond .....	Chemical Manufacturing	0.134	activated carbon/ neutralization/pond
Tosco Corp.....	Petroleum Refining	7.650	rotating biological contractor/filtration
Union Oil Co. ....	Petroleum Refining	45.000 <sup>c</sup>	activated sludge
U.S. Steel .....	Iron and Steel Manufacturing	18.800	physical/chemical

<sup>a</sup> Average daily wastewater discharge, 1981 (mgd).

<sup>b</sup> Includes waste for Crockett-Valona Sanitary District.

<sup>c</sup> Mainly once-through cooling water. Treatment applies only to non-cooling process wastes.

<sup>d</sup> Treats waste for several industrial plants in the airport.



**FIGURE IV—5  
LOCATION OF INDUSTRIAL DISCHARGES**

Subchapter 15 has redefined waste types to include hazardous wastes (previously called Group 1 wastes), designated wastes (also previously included in the Group 1 waste definition) and non-hazardous solid wastes (previously called Group 2 wastes). Hazardous wastes are those that are required to be managed as a hazardous waste pursuant to Title 22 of the California Administrative Code. Designated wastes are hazardous wastes pursuant to Title 22 that have been granted a variance by DOHS. In reality, these wastes are hazardous wastes by the State definition but not hazardous by the Federal RCRA definition since the State's hazardous waste universe is larger than the Federal. Additionally, designated wastes consist of those non-hazardous wastes that consist of or contain pollutants which under ambient landfill conditions could be released at concentrations which could cause water quality degradation. This criteria is extremely vague and subject to significant controversy in implementation. Finally, non-hazardous solid wastes (previously Group 2 wastes) are those normally associated with domestic and commercial activities. The previous Group 3 wastes which consisted of inert wastes have been eliminated from the new regulations but still can be regulated if necessary to protect water quality.

As described above, the State is implementing RCRA in California through DOHS and the Regional Boards. A portion of this program has already been delegated to the State. Further, the State is attempting to demonstrate equivalency with the recent 1984 amendments to RCRA in an attempt to get total program delegation. Subchapter 15 contains the RCRA equivalent requirements that the Regional Boards are committed to implement as part of the EPA program delegation. These would be implemented through the adoption of waste discharge requirements for hazardous waste sites covered by RCRA. The discharge requirements would then become a part of a State RCRA permit issued by DOHS. EPA is requiring the State to issue all RCRA permits by 1988. This is within the time frame for the reissuance of all waste discharge requirements pursuant to Subchapter 15. The Board has previously established a priority list for reissuing waste discharge requirements. The hazardous waste sites are at the top of the list.

The Regional Board is also implementing the Toxic Pits Cleanup Act (Article 9.5, Chapter 6.5 of Division 20 of the Health and Safety Code) which applies to surface impoundments accepting hazardous wastes. This statute contains three basic principles:

1. The prohibition of discharge into impoundments within one-half mile upgradient of a drinking water source after June 30, 1988, unless granted an exemption.
2. The prohibition of discharge into an impoundment after January 1, 1989, unless the impoundment is double lined, has a leachate collection system and ground water monitoring is conducted, unless granted an exemption.
3. The submittal of a hydrogeologic assessment report (HAR) by each impoundment owner by January 1, 1988.

Five exemption requests have been received and will be considered by the Board in 1987.

A significant issue in the implementation of Subchapter 15 is in defining designated wastes. The definition contained in Subchapter 15 is vague. Many wastes which are not hazardous still contain constituents of water quality concern that could become soluble in a non-hazardous solid waste landfill. Because of the minimal containment requirements for these landfills, this type of disposal poses a threat to beneficial uses of state waters. Staff of the Central Valley Regional Board are developing guidelines which could be utilized statewide in evaluating wastes to determine if they should be managed as designated wastes. Once developed, these guidelines may be subject to Statewide evaluation and regulatory approvals.

The regulation of non-hazardous waste disposal sites (Class 3 sites) has been on-going since the mid-1970's. Many of the small older sites have closed, and new waste is being transferred to large regional sanitary landfills. The Board's main actions on Class 3 sites are the review and revision of waste discharge requirements for the active sites to assure consistency with the revised Subchapter 15, the upgrading of groundwater monitoring systems to identify if water quality degradation occurs, and review and oversight of the development and implementation of proper closure plans.

Section 13273 was added to the Water Code in 1985 requiring all owners of both active and inactive non-hazardous landfills to complete an evaluation to determine if hazardous wastes have migrated from the landfill. It is estimated that there are at least 175 sites in the Region that will be subject to this requirement. Pursuant to a list adopted by the State Board, 150 site owners per year throughout the state must complete this evaluation, beginning in 1986. The Regional Board will be reviewing about 12 evaluations per year for a 14-year period.

A significant issue that the Board has addressed in two cases and will probably be asked to address for other sites is the expansion of existing bayfront landfills into wetland areas. The Board, in those two cases, allowed modest expansions (and undesirable loss of wetlands) to allow local government time to develop other disposal options. However, both expansions were only approved because there was a demonstrated immediate public need. The State Board, in a decision on an appeal of one of the expansions, clearly indicated that such future expansions into wetlands would not be given the same approvals and that local governments must complete the necessary planning to avoid this problem. Given that position and the wetlands protection provisions contained elsewhere in this Plan, the Board will not approve further expansions of bayfront landfills into wetlands.

### **Municipal Wastewater Sludge Management**

One particular type of solid waste is wastewater sludge. Wastewater sludge is a by-product of wastewater treatment. Raw sludge usually contains 93 to 99.5 percent water with the balance being solids that were present in the wastewater and that were added to or cultured by wastewater treatment processes. Most POTWs treat the sludge prior to ultimate use or disposal. Normally this treatment consists of dewatering and/or digestion. In some cases, such as at Palo Alto, the sludge is incinerated.

Treated and untreated sludges contain high concentrations of toxic metals and often contain significant amounts of toxic organic pollutants and pathogens. Storage and disposal of municipal sludges on land can result in degradation of ground and surface water if not properly performed. Therefore, sludge handling and disposal must be regulated.

Currently, the Board can regulate handling and disposal of sludge pursuant to Subchapter 15 and DOHS standards for hazardous waste management. The EPA has promulgated a policy of promoting those municipal sludge management practices that provide for the beneficial use of sludge while maintaining or improving environmental quality and protecting public health. The EPA has also proposed a rule which requires states to develop a program to assure that use and disposal of sewage sludges with Federal sludge use and disposal criteria which are being developed by EPA. The State Board will be developing a state sludge management program consistent with the EPA policy and criteria.

### **LEAKING UNDERGROUND TANKS AND ABANDONED SITES**

During the past five years the Board has investigated over 1650 industrial sites for possible leakage of hazardous materials which may threaten ground water supplies. During these initial investigations 220 sites were identified as having materials that threatened or leaked into ground water.

To cope with the growing number of ground water pollution cases, the Board implemented a program of correction and prevention. Implementation of this program resulted in the creation of a special regulatory branch to handle the increased activity from the investigation and cleanup of polluted ground water sites. The purpose of this regulatory branch is to oversee investigation and cleanup of ground water pollution sites.

Implementation of this program resulted in all clean up activities being handled on an equal basis throughout the region. It became apparent however, that ground water concerns were more acute in some areas within the region. With high reliance on ground water as a source of municipal supplies (nearly 50%), and high concentration of ground water pollution sites, special regulatory attention was determined necessary for Santa Clara County.

With cooperation and funding from EPA the Multi-Site Cooperative Agreement (MSCA) was created. The purpose of the MSCA is to augment existing state programs and to insure sites are handled consistently and within appropriate federal requirements as defined in the National Contingency Plan.

Currently, the Board under these programs is handling 256 subsurface toxic pollution sites. In the South Bay the Board is regulating 173 ground water and potential ground water pollution sites and has 42 active ground water cleanups. Throughout the rest of the region the Board is regulating 83 ground water and potential ground water pollution sites and has 15 active ground water cleanups.

A special part of the subsurface pollution problem is that of gasoline leakage from service stations. Over the years, Board staff has dealt with a significant number of these cases and has since identified nearly 1500 leakage sites regionally. To deal with the growing number of fuel sites the Board has developed a program of interim corrective and cleanup measures from leaks at gasoline stations.

The continuing planning section of this chapter contains a recommendation regarding the development of Memorandums of Understanding (MOUs) based on the need for regional response to groundwater

pollution sites. These MOUs could be written between local agencies and the Board regarding preliminary evaluation of groundwater pollution sites and interim measures to reduce water quality impacts.

## WET WEATHER OVERFLOWS

Wet weather overflows of wastewater affect three types of beneficial uses: water contact recreation, non-contact water recreation, and shellfish harvesting. The water quality characteristics which can adversely affect these beneficial uses are coliform bacteria, floatable materials, and heavy metals (chronic toxicity). The following is the Board's recommended approach to control the seasonal degradation of water quality which results from wet weather overflows of wastewater.

### Conceptual Approach

The recommended approach to controlling wet weather overflows of wastewater containing particular characteristics of concern to beneficial uses is a combination of designated alternative levels of maintenance (i.e. combination of treatment levels and beneficial use protection categories) and guidance for the design of overflow discharge structures. The Board is not endorsing any specific control measures but is presenting a conceptual framework which allows for the evaluation of costs and benefits to be used as guidance in adopting specific control measures. As with all of its programs, the Board will implement this conceptual approach consistent with the national goal of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water."

The three levels of maintenance are as follows:

#### Maintenance Level

- A Complete protection for areas where the aquatic environment should be free of any identifiable risk from the discharge of untreated waste (i.e. shellfish beds for year-round harvesting).
- B Areas which do not need complete year-round protection such as shellfish beds for dry weather harvesting, public beaches, and other water contact areas.
- C Areas where water quality or aquatic productivity may be limited due to the pollution ef-

fects of a dense human population or other urban activities which are largely uncontrollable. Such areas may include some shipyard and harbor areas.

Associated with the three maintenance levels are the following treatment and overflow requirements. These criteria are pictured in Figure IV-6.

Maintenance Level	Treatment
A	Secondary treatment up to 20-year recurrence interval; above 20-year overflows allowed.
B	Secondary for all flows up to two-year recurrence interval; primary up to 20-year; above 20-year overflows allowed.
C	Secondary to half-year; primary to five-year; above five-year overflows allowed.

The following requirements should be met for all overflows:

- a. Outfalls achieve an initial dilution of 10:1;
- b. Overflows receive treatment to remove large visible floatable material and to protect the outfall system; and
- c. Overflow locations be removed from dead-end sloughs and channels, and from close proximity to beaches and marinas.

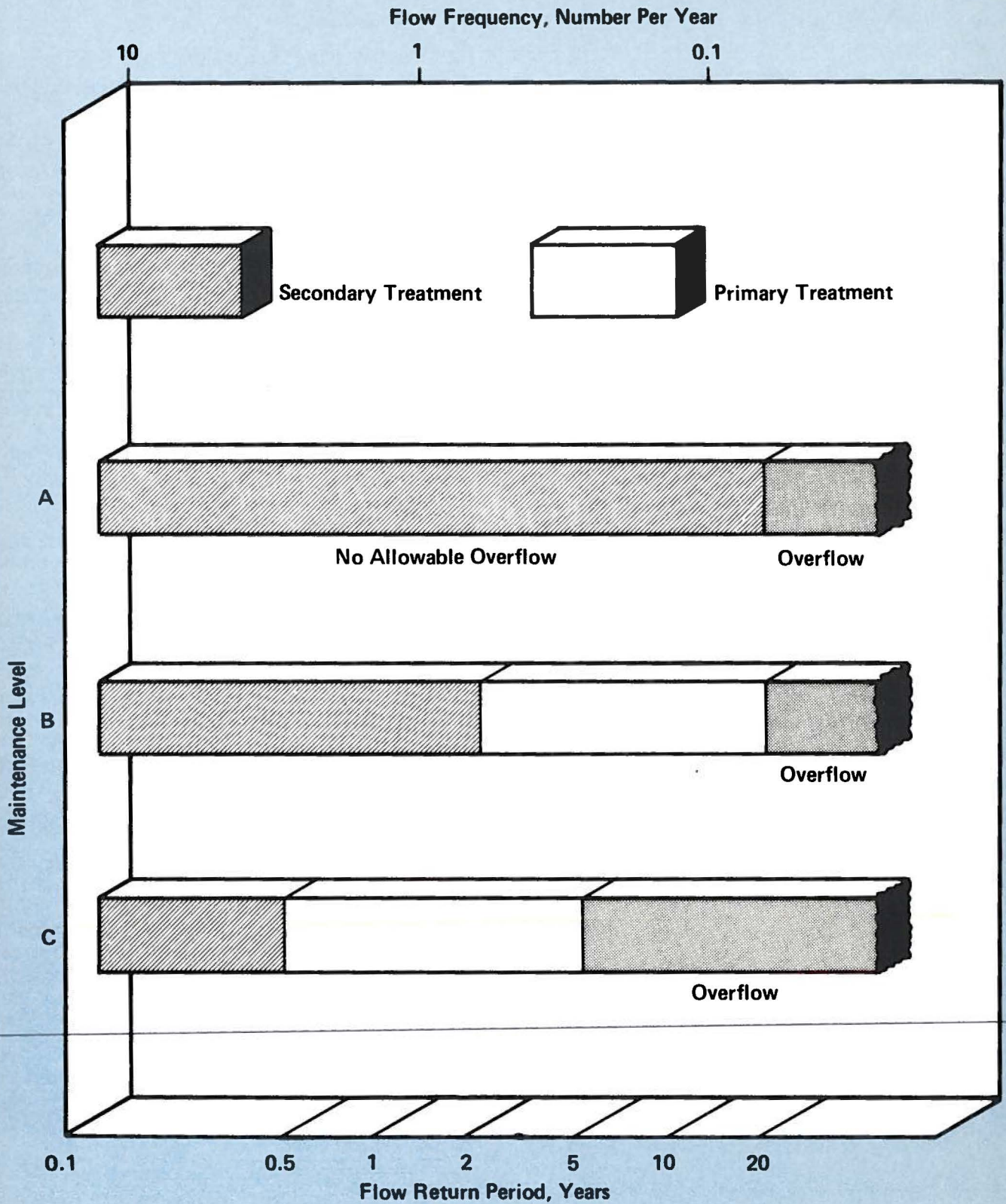
Exceptions to a and c will be considered where an inordinate burden would be placed on the discharger relative to beneficial uses protected, and when an equivalent level of environmental protection can be achieved by alternative means, such as an alternative discharge site, a higher level of treatment,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

### Industrial Facilities

The conceptual approach described above will be used by the Board in evaluating wet weather discharge conditions where polluted storm water or process wastewater bypasses any treatment unit or units that are used in the normal treatment of the waste stream. Evaluation of such discharges must include identification of:

- the actual capacities of the collection system, each treatment unit, and the disposal system; and
- the flow return period probabilities for the specific facility location; and

**FIGURE IV-6  
OVERFLOW CONTROL CRITERIA  
FOR WASTEWATER COLLECTION SYSTEMS**



- the cost of providing complete storage or treatment capacity and disposal capacity for flow return periods of 1, 5, and 20 years; and
- the quality of the polluted storm water and process wastewater for flow return periods of 1, 5, and 20, years; and
- the beneficial uses that may be affected by such discharges.

### **Subchapter 15 Ponds**

In providing protection against wet weather overflows, Subchapter 15 requires that surface impoundments "have sufficient freeboard to accommodate seasonal precipitation and precipitation conditions specified for each class of waste management unit." Those specified precipitation conditions are probable maximum precipitation for Class I units; the 1000-year, 24-hour storm and the 100-year, 24-hour storm for Class II units.

To guarantee the protection of water quality, the Board will interpret seasonal precipitation to be the 100-year return period wet season for Class I units and the 10-year return period wet season for Class II units. The sources to be used for determining the applicable precipitation for a given return period and location are California Department of Water Resources Bulletin No. 195 (or any update by the Department), local water agency publication, or other source approved by the Executive Officer.

### **NONPOINT SOURCE CONTROL MEASURES**

Waste loads from nonpoint pollution sources include those originating from agricultural operations, on-site treatment and disposal systems, construction activities (erosion), urban runoff, vessel wastes, spills of oil and other hazardous materials, and dredging. Control of these diffuse waste loads can involve actions in any of these categories: (1) changes in existing operating practices, (2) collection and treatment of wastes, and (3) prohibition of waste generating practices. Depending upon the severity of the problem and the sensitivity of the area of concern, control measures may consist of one or a combination of these actions.

Before a control measure is applied, a diffuse source problem must be adequately assessed. It is necessary for new control actions to be preceded by thorough investigation of waste and receiving water relationships to accurately determine cause and effect of pollution problems. Some such relationships have

been identified, but many have not. Therefore, some of the following discussions are very general in nature.

### **AGRICULTURAL WASTEWATER MANAGEMENT**

Agricultural wastewaters and the effect of agricultural operations must be considered in terms of land use practices and controls developed in the agricultural element of land use plans. The activities of primary importance to water quality in this basin are animal confinement and irrigation practices. Pesticide use and limits on fertilizer application are not specifically considered because of the limited applicability in this Region, but it should be noted that the State Board has recently adopted the Pesticide Guidance Document which will facilitate the development of region-specific pesticide water quality objectives.

### **ANIMAL CONFINEMENT OPERATIONS**

Animal waste management practices in the past have caused water quality problems through runoff into surface and ground waters of the State. Stockpiled manure, wash water, and storm water runoff from corrals, pens and other animal confinement areas are potential sources of water pollution because of high coliform, ammonia, nitrate and TDS levels. Dairies located in Marin and Sonoma Counties have been particular sources of pollution in the past. A significant historic problem is nitrate pollution of ground water near Petaluma from chicken manure.

Minimum Guidelines for the Protection of Water Quality from Animal Waste were adopted by the State Board in March 1973. Generally, these guidelines prohibited the discharge into watercourses of manure wash water and other animal wastes and of stormwater runoff from animal confinement areas. Because of economic considerations, control of these pollution sources is mostly through proper management rather than treatment. Management techniques include routing of washwater and drainage to impervious areas, using more impervious soils or paving at manure storage areas, protection of retention basins from flood flows, and applying manures and wastewater on land at reasonable rates for minimal percolation.

The Regional Board adopted Resolution No. 74-11 establishing an enforcement policy for implementation of the State Board guidelines at dairies in the region. Most of the dairies have constructed facilities to comply with the guidelines, however, continuing surveillance is required to assure effective operation of the facilities. Regulation of other animal confine-

ment operations, such as chicken ranches, is performed on a case-by-case basis.

The State Board Guidelines have since been replaced by regulations contained in the California Administrative Code, Title 23, Chapter 3, Subchapter 15.

## **IRRIGATION OPERATIONS**

An increase in the concentration of soluble salts contained in percolating irrigation water is an unavoidable result of consumptive use of water. Salt management within soils and ground water is considered separate from water management but is closely related to drainage control and wastewater operations. For irrigated agriculture to continue in the future, acceptable levels of salts in soils and ground waters must be controlled.

Maintenance of a favorable salt balance, that being a reasonable balance between the import and export of salts from individual basins, must be considered to control increases in mineral content. This is especially applicable for the Livermore and Santa Clara Valley ground water basins.

The ultimate consequences of regulatory action for irrigation operations must be carefully assessed. The "no-degradation" concept in connection with salt levels is not appropriate in all circumstances.

A concept of minimal degradation might be considered in some areas which would need to be coupled with management of the surface and underground water supplies in order to assure acceptable degradation effects. If minimal degradation is considered, it can be offset by either recharge and replenishment of ground water basins with higher quality water which will furnish dilution water to the added salts, or by drainage of degraded waters as a sufficient rate to maintain low salts and salts leaving the basin. To aid recharge and dilution operations, additional winter runoff can be stored in surface reservoirs for subsequent use with either surface stream or ground water basin quant/quality management.

## **ON-SITE WASTEWATER TREATMENT AND DISPOSAL SYSTEMS**

As the population of the Bay Area increases, demand for new development increases. In many cases, new development is occurring in close proximity to sewerage agencies. More often, however, development is being proposed in outlying areas which cannot easily be served by existing sewerage agencies. In those instances new discrete sewerage systems are being proposed (i.e., new systems separate from existing public sewerage systems). Today there are about 110,000 septic tank soil adsorption

systems (septic systems) and cesspools throughout the Bay Area, and approximately 1000 new septic systems are approved each year.

In response to these development pressures, the Regional Board adopted a Policy on Discrete Sewerage Facilities in 1978. The policy set forth the actions the Regional Board will take with respect to proposals for individual or community sewerage systems serving new residential development. An important provision of the policy required the development of guidelines for the control of individual wastewater treatment and disposal systems. What follows is a discussion of the Board's Policy as well as its guidelines.

## **POLICY ON DISCRETE SEWERAGE FACILITIES**

The following principles, which apply to all wastewater discharges, are enumerated in the Policy:

1. The system must be designed and constructed, so as to be capable of preventing pollution or contamination of the waters of the State or creating nuisance for the life of the development.
2. The system must be operated, maintained and monitored so as to continually prevent pollution or contamination of the waters of the State and the creation of a nuisance.
3. The responsibility for both of the above must be clearly and legally assumed by a public entity with the financial and legal capability to assure that the system provides protection to the quality of the waters of the State for the life of the development.

The Policy also makes the following requests of city and county governments:

- That the use of new discrete sewerage systems be prohibited where existing community sewerage systems are reasonably available;
- That the use of individual septic systems for any subdivision of land be prohibited unless the governing body having jurisdiction determines that the use of the septic systems is in the best public interest and that the existing quality of the waters of the State is maintained consistent with the State Board's Resolution 68-16;
- That individual disposal systems are maintained to the satisfaction of the responsible Health Officer, and;
- That the cumulative impacts of individual disposal system discharges be considered as part of the approval process for development.



Finally, the policy also requires that a public entity assume legal authority and responsibility for new community wastewater treatment and disposal systems. Community systems are defined as collection sewers plus treatment facilities serving multiple discharges under separate ownership, such as package plants or common septic tanks plus disposal facilities such as evaporation ponds or leachfields. This policy requires local governments, during the approval process, to consider either the formation of a new government entity or the assumption of this responsibility by an existing entity.

## INDIVIDUAL SYSTEM GUIDELINES

In the early 1960's the Board, pursuant to Section 13296 of the California Water Code, adopted waivers for reporting certain septic system discharges in all Bay Area counties except San Francisco and Marin. In its policy, the Board required the development of individual system guidelines concentrate mainly on septic systems, providing information on system design and construction, operation and maintenance, and the conduct of cumulative impact studies.

On April 17, 1979, the Board adopted Minimum Guidelines for the Control of Individual Wastewater Treatment and Disposal Systems. The guidelines concentrated mainly on septic systems, providing information on system design and construction, operation and maintenance, and the conduct of cumulative impact studies.

Although the conventional septic system has long been one of the most reliable methods for on-site sewage disposal, there are wide spread conditions throughout the region which restrict its use. These include conditions of high ground water and shallow or impermeable soils. In recent years there has been active interest and research in the development of alternative means of on-site sewage disposal techniques to overcome these adverse conditions. One such alternative is the mound design development by the University of Wisconsin at Madison.

It should be pointed out that the conditions (i.e., soils, ground water, slope) which limit the use of conventional septic systems apply to alternative as well, since all such systems ultimately rely on soil adsorption of all or most of the wastewater generated. More importantly, failures of alternative systems are likely to be very difficult to correct given that conventional systems would not be suitable as a fallback. Moreover, most alternative systems require a high degree of design expertise, which increases the danger of faulty design and complicates the review of various proposals. Finally, most alternative designs require a far more intensive and sophisticated

operation and maintenance effort by the homeowner, which past experience suggests will not be forthcoming.

Recognizing the need for a position on alternative systems, the Board adopted the following statement in its guidelines:

"The Regional Board Executive Officer may authorize the Health Officer to approve alternative systems when all of the following conditions are met:

- a. Where the Health Officer has approved the system pursuant to criteria approved by the Regional Board Executive Officer;
- b. Where the Health Officer has informed the Regional Board Executive Officer of the proposal to use the alternative system and the finding made in (a) above; and
- c. Where a public entity assumes responsibility for the inspection, monitoring and enforcing the maintenance of the system through:
  1. Provision of the commitment and the necessary legal powers to inspect, monitor, and when necessary to abate/repair the system; and
  2. Provision of a program for funding to accomplish 1 above."

The fundamental point is that alternative systems will be approved only if adequate design review is provided, and if a County or some other public agency assumes ultimate responsibility for correction of failures. This goes beyond a County's existing regulatory system under which the County can order correction of failed systems, but has no practical means of ensuring this is done.

What is contemplated is a system by which the County would, as a last resort, arrange for a correction to be made even over a homeowner's objection. The homeowner could be billed for engineering and construction costs, and ultimate payment assured by a lien on the property. A service district such as this has been used with success in Stinson Beach and would be one means of implementing this regulatory system, but the County could probably acquire the necessary powers directly.

---

## DREDGING AND DISPOSAL OF DREDGE SPOIL

Dredging and dredge material disposal in the San Francisco Bay Area is an ongoing activity because continual shoaling acts to impede navigation and other water dependent activities. Large volumes of sediment are transported in the waters of the Sacra-

mento and San Joaquin Rivers which drain the Central Valley. The average annual sediment load to the San Francisco Bay system from these two rivers is estimated to be eight million cubic yards. Of this amount, some four million cubic yards is transported out of the Bay through the Golden Gate. The remaining four million cubic yards is circulated and/or deposited in the Bay. In addition, some two and one-half million cubic yards are deposited into the Bay from local watersheds.

In April 1972 the San Francisco District of the U. S. Army Corps of Engineers initiated a study of environmental impacts of dredging operations and material disposal. This project involved the study of (1) factors associated with the present system of aquatic spoils disposed in the Bay; (2) characteristics of dredge spoil pollutants; (3) alternative disposal methods; and (4) dredging technology. Thirteen separate study elements have identified problems associated with dredging and discussed alternative disposal methods for solution of those problems. The results of these studies and others indicate that dredging operations may cause temporary conditions that mobilize toxicants and release of biostimulatory substances from the sediments. Most dredging and dredge material disposal operations cause localized and ephemeral impacts with related biological consequences as follows:

<b>Impact</b>	<b>Potential Biological Consequences</b>
Bottom Disturbance	M a s c e r a t i o n o f sediment-inhabiting organisms; smothering of organisms living in or on the mud; habitat disruption.
Suspended Solids Loading	Abrasion and clogging of gills (fish and clams); impaired respiration, feeding, and excretory functions; reduced water pumping rates (clams); retarded egg development and reduced growth and survival of larvae.
Dissolved Oxygen Reduction	Reduced efficiency of oxygen uptake by aquatic organisms; ability to meet environmental and biological demands lessened.

Mobilization of Toxicants Adsorbed to Sediments

Release of Biostimulatory Substances (Nitrogen, Phosphorus, Ammonia)

Uptake and accumulation of toxicants by aquatic organisms.

Stimulation of algal growth; ammonia toxicity.

Although land disposal avoids those potential adverse impacts, the high cost of this alternative frequently makes it an unattractive option. The Corps of Engineers issues federal permits for dredging projects pursuant to Section 404 of the Clean Water Act. On July 30, 1979, the Corps of Engineers, San Francisco District, completed regional procedures for evaluating discharges of dredged or fill material into waters of the United States. These procedures supplemented the Corps of Engineers regulations for evaluating such discharges (33 CFR 323, published in the Federal Register on July 19, 1977) and EPA's 404(b) (i) guidelines (40 CFR 230, published in the Federal Register on September 5, 1975).

In August, 1980 the Board adopted its policy for the regulation of dredge spoil disposal. Under that policy, the Board has deferred most decisions on dredging to the Corps of Engineers, but many concerns have been raised about the adequacy of the Corps of Engineers' regional procedures to identify potential pollution conditions. The current analytical and biological testing criteria do not identify or determine the effects of pollutants bound in sediment at disposal sites in the Bay or at proposed dredging sites. Also, the current ocean disposal criteria are more stringent than the regional, inland criteria. At the same time, the single largest disposal site, the Alcatraz site, is filling up. Clearly, many of the assumptions about rapid dispersal of the dredge spoils have proven to be wrong.

The long-term solutions to these problems include complete reevaluation of the Board's dredge disposal policy, investigation of new ocean disposal sites (which the Corps is commencing), and reviewing both the ocean and inland disposal criteria. Completion of these actions may require one to two years or more. Therefore, interim action by the Board is necessary to protect the beneficial uses of the Bay from the effects of dredging. For all new dredging proposals, the Board will require:

1. Analyses of the sediments to be dredged for the pollutants listed in Table III-2A, PCBs, and pesticides according to EPA method 608; and
2. Bioassays as specified by the Board; and

3. Identification of the costs of ocean and upland disposal compared to the proposed disposal option.

The Board will require these measures through its certification of Corps of Engineers permits.

## **EROSION AND SEDIMENT CONTROL**

Current estimates of annual sediment inflow to San Francisco Bay are 10.5 million cubic yards with 8.1 million cubic yards contributed through the Delta and 2.4 million cubic yards from Bay Area tributary streams. By the year 1990 the Delta sediment inflow is expected to decrease to 4.3 million cubic yards annually. However, by the year 2000, ABAG has estimated that approximately 322,500 acres of land area will be converted to urban use. This is a 73 percent increase above the 1975 urbanized land area. This increase in urbanized land use can be expected to be the future source of much of the sediment that will reach the rivers, streams and channels and ultimately the Bay system each year.

Soil erosion and related water quality impacts may result from a wide variety of causes including construction, hillside cultivation, non-maintained roads, ranchettes, timber harvesting, and off-road vehicles.

Natural erosion processes are accelerated when existing protective cover is removed before, during, and following construction and agricultural activities. Studies relate that erosion on land where construction activities are taking place is about 10 times greater than on land in cultivated row crops, 200 times greater than on pasture land, and 2,000 times greater than on timber land that has not been logged.

The exposure of the soil mantle to falling rain, overland and channelized flow, and the impact of equipment moving over the site results in the increased movement and loss of soil.

Damage from erosion and sedimentation can be categorized in the following way:

- Damage to construction sites
- Damage to stream channels
- Damage to water quality/beneficial uses
- Damage to public and private property
- Damage to agricultural lands

In most cases, the adverse results of man's activities can be reduced and in some instances eliminated through the use of both structural and non-structural measures of various types that are properly employed at the appropriate time. The high cost of lost resources, resource replenishment and after-the-fact repair and maintenance make both pre-project ero-

sion control planning and preventive maintenance necessary. The goals of and the program for erosion and sediment control are summarized below.

### **Goal**

The goal of the Regional Board is to reduce and prevent accelerated (man-caused) erosion to the level necessary to restore and protect beneficial uses of receiving waters now significantly impaired, or threatened with impairment, by sediment.

This goal is to be attained through implementation of proper soil management practices. Voluntary implementation is encouraged, but enforcement authority will be exercised where beneficial uses of water are clearly threatened by excessive sediment.

### **Program**

In May of 1980, the Regional Board adopted two separate items to alert local governments to the Board's concern on erosion control problems related to construction activities. The first item was a statement of intent (Resolution 80-5) regarding erosion control which stated that the Regional Board:

- Recognizes that water quality problems are associated with construction related activities.
- Recognizes ABAG's progress in developing erosion and sediment control regulatory programs and assistance to local governments to implement these programs.
- Recognizes local governments power to adopt and implement these programs.
- Intends to strengthen its position with regard to regulation of sediment and erosion control problems especially with regard to construction activities.
- Intends to take appropriate enforcement action pursuant to the California Water Code in cases where land development or other construction activity causes or threatens to cause adverse water quality impacts associated with erosion problems and intends to consider, during enforcement actions, whether local government negligently contributed to the problem due to failure to adopt and/or effectively enforce erosion control programs.

The second item was a memorandum of understanding negotiated with the Council of Bay Area Resource Conservation Districts that is intended to provide the following:

- Assessment, control and monitoring of potential and existing soil erosion related water quality problems.

- Improvement of coordination between the Resource Conservation Districts and the Regional Board, and
- Monitoring of local government progress on the adoption and implementation of erosion and sediment control ordinances.

The Regional Board has recognized and encouraged the efforts that ABAG has made since mid 1980 in working with local Bay Area governments to improve their ordinance and regulatory programs on erosion and sediment control. However, over the past two years, only six local governments, as shown in Table IV-9, have adopted or revised their ordinances in conformance with the model ordinances contained in "Manual of Standards for Erosion and Sediment Control Measures". Also, during the 1980-81 rainfall season a number of erosion problems associated with construction activities were noted. These problems would probably have been far better controlled if local government erosion ordinances and regulatory programs had been in line with those recommended by ABAG.

**TABLE IV-9  
EROSION AND SEDIMENT CONTROL  
REGULATORY PROGRAMS  
NEEDING REVISION**

Cities	Counties
Benicia	Contra Costa
Daly City	Napa
Danville	Santa Clara
Fairfield	Sonoma
Fremont	
Napa	
Pacifica	
Pinole	
Pleasant Hill	
Redwood City	
San Pablo	
Tiburon	

The Board intends to follow the guidelines listed below in regulating erosion and sedimentation for the protection of beneficial uses of water:

1. Local units of government should have the lead role in controlling land use activities that cause erosion and may, as necessary, impose further conditions, restrictions, or limitations on waste

disposal or other activities that might degrade the quality of waters of the State.

2. Best Management Practices (BMPs) should be implemented to reduce erosion and sedimentation and minimize adverse effects on water quality. A BMP is a practice or combination of practices determined to be the most effective and practicable means to prevent or reduce erosion and sediment related water quality degradation. Examples of control measures are contained in the "Manual of Standards for Erosion and Sediment Control Measures." Further technical guidance can be obtained from the Resource Conservation Districts.
3. Local governments listed in Table IV-9 should develop an effective erosion and sediment control ordinance and regulatory program for the Executive Officer's approval. An effective ordinance and regulatory program must:
  - a. be at least comparable to the model ordinances in the "Manual of Standards for Erosion and Sediment Control Measures";
  - b. state that water quality protection is an explicit goal of the ordinance;
  - c. require preparation of erosion and sediment control plans consistent with the Manual of Standards with specific attention to both off-site and on-site impacts;
  - d. provide for installation of approved control measures no later than October 15 of each year; and
  - e. have provisions for site inspections with follow-up at appropriate times, posting of financial assurances for implementation of control measures, and an enforcement program to assure compliance with the ordinance.
4. All persons proposing alterations to land, except minor alterations as provided in Section 15104 of CEQA, in the communities listed in Table IV-9 may be required to file a Report of Waste Discharge and/or an Erosion Control Plan with the Regional Board.
5. The Regional Board may take enforcement action pursuant to the California Water Code to require the responsible persons (including local permitting agencies) to clean up and abate water quality problems caused by erosion and sedimentation in the event that the local permitting agency fails to take the necessary corrective action.

## URBAN RUNOFF MANAGEMENT

Urban runoff contributes significant quantities of pollutants to the waters of the Region. The most significant of these pollutants appear to be total suspended solids, heavy metals, and petroleum hydrocarbons. Municipal and industrial point sources of pollution have been controlled to some degree under the NPDES permit program for more than a decade, while urban runoff has remained unchecked as a major contribution of pollutants to the Bay system.

The water quality impacts of pollutants in urban runoff are many and varied. One example is the discharge of soil particles as suspended solids which act to destroy spawning grounds and marsh habitat. Another example is the discharge of lead and petroleum hydrocarbons from roadways and parking lots. ABAG has extensively evaluated hydrocarbons in runoff to San Francisco Bay, and the U.S. EPA is performing an ongoing evaluation of the environmental hazards posed by priority pollutants in urban runoff across the country. In preliminary findings of the EPA study, cadmium, copper, lead, and zinc exceeded freshwater acute aquatic life criteria in 9 to 50 percent of the samples. Additionally, those pollutants, plus beryllium, cyanide, mercury, and silver exceeded the freshwater chronic criteria in at least 10 percent of the samples.

The EPA has begun a program for controlling runoff pollution by defining storm water point sources in urban and industrial areas and requiring the filing of NPDES permit applications for such discharges. However, the deadline for filing such applications has been extended, and future extensions are likely. Given the program's history of delays and the concerns identified above, it is desirable to institute a program for identifying specific runoff problems in this Region and control strategies to remediate those problems.

The Board's program for investigating and controlling urban runoff will include:

- Supporting research by the Aquatic Habitat Institute, ABAG, EPA, and others to better define the impacts of nonpoint sources of pollution.
- Developing cooperative investigation and control strategies utilizing the expertise and resources of point source dischargers in each of the receiving water segments.
- Organizing local ad hoc task forces for each hydrologic sub-region with representatives from point source dischargers, local industries, local agencies, the Board, and EPA to facilitate the necessary investigations and development of control strategies.

Data collection and evaluation to assess urban runoff impacts should be performed on a hydrologic sub-regional basis with point source dischargers, local storm water discharge agencies, industries, and flood control agencies participating. The list of analytical parameters for investigation in each sub-region should include some metals, oil and grease, ammonia, COD or BOD, PAHs, TSS, acute and chronic bioassays, and flow.

For each sub-region, control measures to be evaluated should include, but not be limited to:

- routing dry weather discharges to sanitary sewer
- modifying street sweeping programs
- installing oil/water separators on inlets to storm drains
- routing storm water to retention basins
- routing storm water through marshes (managed vs. unmanaged)
- revising "litter" ordinances to stiffen penalties
- requiring control similar to above on new developments
- altering land use planning to include buffer marshes for runoff
- berming and roofing of chemical storage areas

The Board's role in the program will be to give overall direction to it, to provide consistency among all monitoring and evaluation programs, to perform quality assurance on the data generated, to fill necessary data gaps, to coordinate with the State Board and EPA on any of their programs, and ultimately to decide what requirements should be established for discharges of urban runoff. To help fulfill this role, the Board will request funding from the State Board to:

1. Conduct workshops for the development of uniform sampling programs and techniques as well as for the development of an overall monitoring strategy.
2. Collect additional data on certain streams and the Bay to specifically identify threats to beneficial uses.
3. Perform necessary duplicate sampling and analysis to verify the quality of the data being generated.

Where necessary, the Board will act to require individual industries and individual local agencies pursuant to Sections 13267 (b) and 13225 (c) of the California Water Code, respectively, to investigate specific runoff discharges to quantify the amount of pollutants discharged and to identify control strategies for

those problems and to implement control strategies for the control of pollution from urban runoff.

The Board will begin implementation of this program by gathering fundamental information that is available to local agencies which own or have maintenance responsibility for storm drain discharges and local flood control agencies throughout the Region. Additionally, the Board will require investigation, evaluation and possible implementation of urban runoff control programs in areas where urban runoff contributes a major portion of the pollutant load. The initial areas for such work are San Francisco Bay south of the Dumbarton Bridge and the East Bay shoreline from the Dumbarton Bridge to Richmond.

### **Basic Information from Local Agencies**

Pursuant to Section 13225(c) of the California Water Code, all local agencies which own or have maintenance responsibility for storm drain discharges to waters of the State (e.g., open channels, embayments, streams and creeks) are required to submit the following information regarding their jurisdictions before September 1, 1987:

1. The name and address of the local agency having jurisdiction over or maintenance responsibility for storm drains.
2. The name, title and telephone number of the individual to whom correspondence regarding urban runoff control should be addressed.
3. The location of all identifiable points of discharge of runoff into waters of the State (open channels or blue line streams or embayments of USGS 7 1/2 minute quad sheets).
4. The drainage area of all discharge points identified in Item 3 and land use characteristics of the drainage area.
5. Any available flow or water quality data regarding discharge from the points identified in Item 3.
6. All existing programs which control urban runoff, and an estimate with any available documentation, of their effectiveness.

### **Basic Information from Flood Control Agencies**

The Board expects county flood control agencies to assume a significant coordination role in this program. While they usually do not have direct jurisdiction over areas where runoff is generated, they are uniquely suited to coordinate the actions of municipalities and other local agencies which discharge

runoff into streams under the flood control agencies' jurisdiction. As such, county flood control agencies must:

- facilitate the flow of information between the State and EPA and municipalities;
- coordinate the collection data on runoff discharges;
- assist in the collection of data on streams in their jurisdiction;
- coordinate the evaluation and development of runoff control strategies for areas discharging into streams in their jurisdiction.

Therefore, pursuant to Section 13224(c) of the California Water Code, all flood control agencies are required to submit the following information regarding their jurisdictions before September 1, 1987:

1. The name and address of the agency.
2. The name, title and telephone number of the individual to whom correspondence regarding urban runoff control should be addressed.
3. The location of all open channels or blue line streams or embayments of USGS 7 1/2 minute quad sheets that are within the jurisdiction of the agency.
4. The boundaries of the watersheds contributing to streams identified in Item 3.
5. All local agencies (counties, cities, or special districts) that have storm sewers discharging into waters identified in Item 3.

### **San Francisco Bay South of the Dumbarton Bridge**

Pursuant to Section 13225(c) of the Water Code, local agencies (municipalities, counties, and special districts) in this sub-region with jurisdiction over storm runoff discharge facilities shall implement the following program:

1. Submit a detailed proposal by June 15, 1987 to evaluate nonpoint source pollution to commence no later than September 15, 1987:
  - a. dry weather - discharges by industries (NPDES, "non-polluted", and spills) and dry weather runoff from residential areas
  - b. wet weather - urban and agricultural runoff and sewage bypass/overflows

The proposal must contain specific monitoring locations and identified monitoring frequencies related to storm and discharge events. The proposal must contain a specific monitoring

program for runoff from industrial facilities. The monitoring parameters must include some metals, oil and grease, ammonia, COD or BOD, PAHs, TSS, acute and chronic bioassays, and flow. The proposal must provide for the evaluation of both concentrations of pollutants as well as total pollutant loadings and comparison with waste loads from point source discharges.

2. By June 15, 1987 identify existing nonpoint source pollution control measures and a program to evaluate their effectiveness.
3. Submit a program by September 15, 1987 to identify and evaluate the effectiveness of additional nonpoint source pollution control measures, including, but not limited to:
  - routing dry weather discharges to sanitary sewer
  - modifying street sweeping programs
  - installing oil/water separators on inlets to storm drains
  - routing storm water to retention basins
  - routing storm water through marshes (managed vs. unmanaged)
  - revising "litter" ordinances to stiffen penalties
  - requiring controls similar to above on new developments
  - altering land use planning to include buffer marshes for runoff
  - roofing of chemical storage areas
4. Submit a program no later than June 15, 1989 for the implementation of additional nonpoint source controls and an ongoing monitoring program to evaluate their effectiveness.

This program is intended to complement the Board's requirements for the South Bay Dischargers Authority described in the Municipal Facilities section of this chapter. Based on the program's progress, the Board may consider revisions of the time schedule stated above.

### **East Bay Shoreline from the Dumbarton Bridge to Richmond**

The Board will require local agencies in this area to implement a program similar to that described for the southern reach of the Bay. The Board will require such a program to commence at a reasonable time after the program south of the Dumbarton Bridge is under way and progressing to the Board's satisfaction.

## **VESSEL WASTES**

The discharge of wastes from pleasure, commercial, and military vessels has been a water quality concern of the Board since 1968 when Resolution No. 665 was adopted, suggesting that the Federal government regulate waste discharges from vessels. In 1970 the Board adopted two more resolutions, 70-1 and 70-65, on vessel wastes. The first urged BCDC to condition marina permits for new or expanded marinas to include pump out facilities, dockside sewers, and restrooms facilities. Resolution No. 70-65 also recommended that vessel wastes be controlled in such a manner through legislative action.

The Regional Board staff recently (March 1982) completed a study of vessel waste discharges in the San Francisco Bay area, including bacteriological sampling in 23 marinas. The following conclusions were reached as a result of that study:

1. Water contact recreation coliform objectives are being violated in marinas which have houseboats (and are not well flushed). Those marinas are located mainly in three areas: Alviso Slough, Redwood Creek, and Richardson Bay.
2. As a result of BCDC requirements, pump out facilities for vessel holding tanks are located throughout San Francisco Bay, but several are rarely used due to poor location and/or high user fees.
3. Military vessels are not causing water quality problems because they are almost all equipped with holding tanks for both sewage and graywater, and adequate pump out facilities exist at military docks. The remaining vessels and shore facilities will be modified by 1984.
4. Commercial vessel discharges were briefly reviewed. No conclusion could be reached regarding the impact of commercial vessel discharges on beneficial uses. Bay-wide coliform sampling indicates that commercial vessels are not causing a widespread water quality problem, but local problems in shellfish growing areas may occur. This potential problem is being studied as part of the San Francisco Bay Shellfish Program.

Based on this study the following action will be taken:

1. The Regional Board will notify Marin County, under Chapter 11 of the California Water Code, to abate the identified water quality problems at the Waldo Point, Yellow Ferry, and Kappas Small Boat

Marinas, and notify the City of Sausalito about the Napa Street Pier problems. These problems should be corrected by shoreline collection, treatment and disposal of houseboat wastewater.

2. The Regional Board will request the City of San Jose and the United States Fish and Wildlife Service to abate the identified water quality problems at Alviso Marina and Slough.
3. The Regional Board will notify the City of Redwood City, under Chapter 11 of the California Water Code, to abate the identified water quality problems in Redwood Creek. These problems should be corrected by shoreside collection, treatment, and disposal of houseboat wastewater.
4. Other marinas in the Bay will be investigated to determine if they have poor water circulation and accept houseboats. Those that do should be sampled, and appropriate action should be initiated.
5. The Regional Board reaffirms its position stated in Resolution Nos. 665, 70-1 and 70-65 pending revision of the Federal vessel waste regulations.
6. The San Francisco Bay Conservation and Development Commission is requested to investigate the accessibility and user fees associated with pump out facilities and the need for additional facilities.

## **OIL SPILLS**

As shown by past experience, oil spills can cause severe and extensive damage to the environment. Fortunately the petroleum industry has been improving its safety record in oil transfer operations, the step in petroleum handling where spills are most likely to occur. Figure IV-7 shows how the volume of oil spilled during transfer operations has decreased since 1975.

Reasons for this improvement are:

1. New U. S. Coast Guard regulations for oil transfer operations;
2. New State Lands Commission guidelines for petroleum facility operations manuals;
3. High cleanup costs and public concern associated with oil spills; and
4. Regional Board, Dept. of Fish and Game, and U. S. Coast Guard enforcement actions against parties responsible for spills.

The Regional Board considered adopting a policy requiring specific improvements in oil transfer operations, but due to the industry's improved perfor-

mance, the Board is holding the adoption of such a policy in abeyance while continuing to monitor the industry's performance. The Regional Board recognizes that additional regulation is unnecessary if the petroleum industry maintains its improved record.

## **WASTEWATER RECLAMATION**

Wastewater reclamation has been the subject of numerous studies by individual dischargers and has resulted in the actual reclamation projects shown in Table IV-10. Two large scale efforts, one technical region-wide study and one state-wide policy effort, were recently completed. These were the San Francisco Bay Area Regional Water Reuse Study and work performed by the Regional Water Quality Control Boards' Water Reclamation/Conservation Advisory Committee.

### **Regional Water Reuse Study**

The Regional Water Reuse Study, completed in December 1981, examined the potential for large scale reuse of wastewater from the Bay Area. Potential projects explored were irrigation in the San Joaquin Valley and salinity control in the Delta.

The study concluded that the most economical way to reuse the 510,000 acre-feet of available wastewater (1985 flow) would be salinity control in the Delta. This project would involve collecting the wastewater and transporting it to the Western Delta for discharge where it would repulse more saline waters.

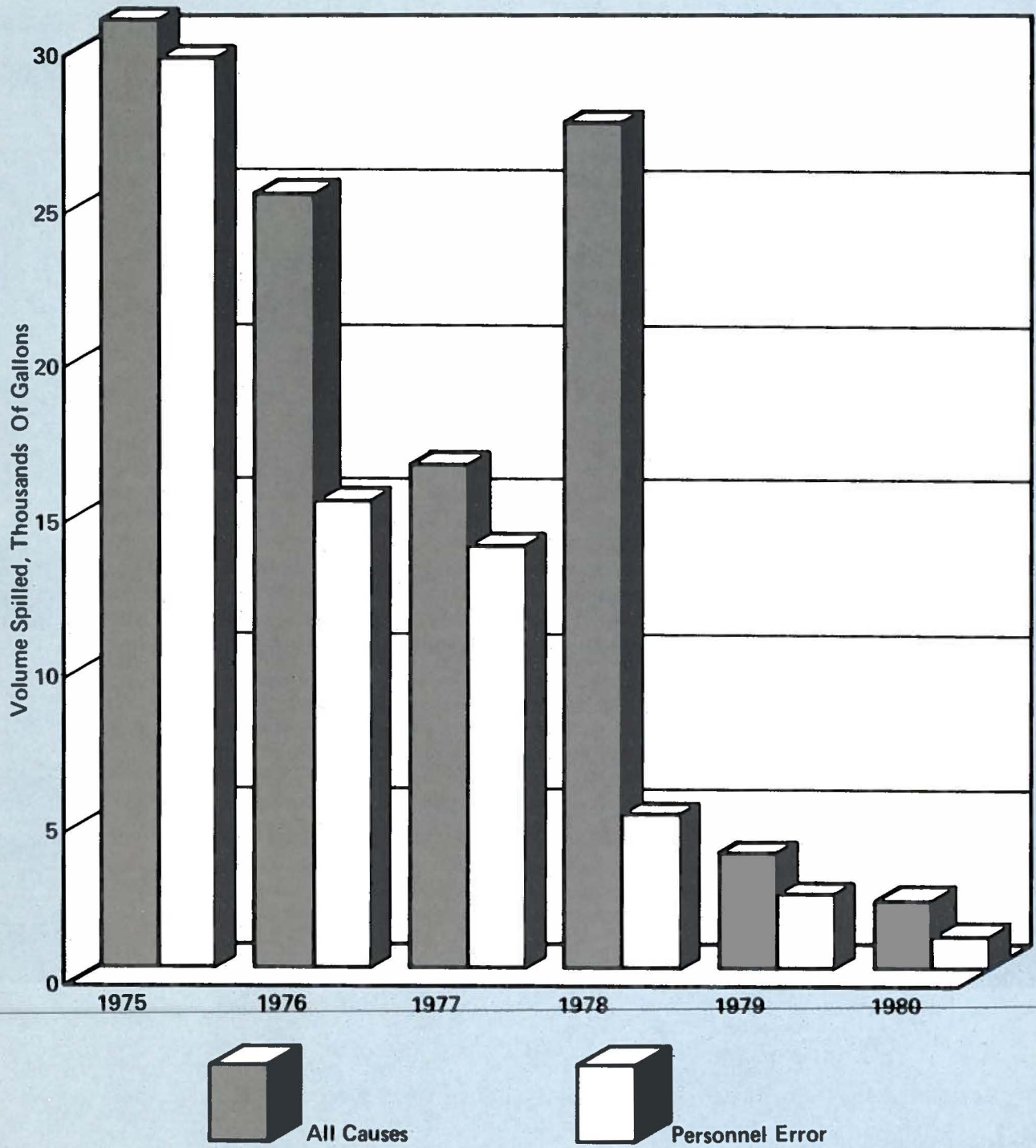
The Department of Water Resources has been urged to assume the lead in further investigating this project, but the Regional Board has recommended that further detailed planning of a regional reuse project in the Bay-Delta area be postponed until the effects of discharging a massive amount of waste in the Delta are better defined (also see the discussion of the San Luis Drain).

### **Reclamation/Conservation Advisory Committee**

The Water Reclamation/Conservation Advisory Committee (RCAC) consisted of Regional Board members from each Region in the State. The RCAC reviewed the status of reclamation throughout California. After reviewing specific problems in each region, the RCAC felt the following seven policies had merit and endorsed them. The RCAC urged the State Board to endorse them and send them on to all Regional Board members and Executive Officers for comment and action where feasible.



**FIGURE IV-7  
OIL SPILLED DURING TRANSFER OPERATIONS  
IN SAN FRANCISCO BAY AREA, 1975-1980**



**TABLE IV-10  
RECLAIMED WASTEWATER PROJECTS**

<b>Source of Wastewater</b>	<b>User</b>	<b>Use<sup>1</sup></b>	<b>Flow<sup>2</sup></b>	<b>Status<sup>3</sup></b>
<b>Marin County</b>				
Sanitary District #1	Larkspur Ferry Terminal	L	20,000	O
City of Mill Valley	Golf Course	LT	125,000	O
	Marin Municipal Water	LC	100,000	P
Las Gallinas Valley S.D.	Marin Civic Center	L	160,000	P
	McInnes Park (Expansion)	L	330,000	P/O
	Golf Course	L	80,000	O
	Marin Municipal Water	LT	Minor	O
	CALTRANS Highway 101	L	500,000	O
Sanitary Dist. #6	Local Agriculture	A	1,800,000	P
Richardson Bay	Shoreline Park	L	50,000	O
	Marin Municipal Water	LT	100	O
<b>Sonoma County</b>				
City of Petaluma	Local Agriculture	A	1,000,000	O
Sonoma V.C.S.D.	City of Sonoma	LT	Not Specified	P
	Local Agriculture	AL	3,000,000	O
Buena Vista Winery	Mulas Ranch	A	Not Specified	O
<b>Napa County</b>				
City of Yountville	Veterans Home & Pastures	A	500,000	O
City of Napa	Local Vineyards	AT	Not Specified	O
City of Calistoga	Frediani Vineyards	A	Not Specified	O
Napa Sanitation Dist.	Airport and Hayfields	A	Not Specified	O
<b>Solano County</b>				
Fairfield-Suisun	Turf Nursery, Landscape,	AL	7,000,000	O
Suregional STP	Agricultural, & Misc.			
	Various	AL	5,000,000	P
California Medical Fac.	Pasture	A	300,000	O
<b>Contra Costa County</b>				
San Pablo S.D.	Golf Course	L	Not Specified	O
<b>Alameda County</b>				
City of Livermore WRP	Golf Course, Freeway,	AL	830,000	O
	Landscape, Agricultural			
City of San Leandro WRP	Oakland Scavenger Co.	C	4,500	O
Sunol Valley Golf	Golf Course	L	7,000	O
Course STP				
Livermore Veteran's Home	Agricultural	A	44,000	O
<b>Santa Clara County</b>				
City of Palo Alto WRP	Golf Course	L	190,000	O
	Freeways, Parks, Streets	LT	4,000	O
	Salt Water Intrusion Control	G	190,000	O
	Venturini Constr. Co.	C	200	O
Kaiser Cement Co.	Slurry Water for Cement	C	20,000	O
<b>San Mateo County</b>				
No. San Mateo Co. S.D.	Golf Courses	L	500,000	O

**TABLE IV-10—Continued  
RECLAIMED WASTEWATER PROJECTS**

<b>Source of Wastewater</b>	<b>User</b>	<b>Use<sup>1</sup></b>	<b>Flow<sup>2</sup></b>	<b>Status<sup>3</sup></b>
Half Moon Bay WTP	Golf Course	L	170,000	O
Log Cabin Ranch School	Schoolyard	L	18,000	O
Menlo Park S.D.	City Medians	L	2,200	O
	Garbage and Refuse Disp.	C	7,000	O
Millbrae WTP	Freeway	LT	19,000	O
City of San Mateo	Golf Course & Parks	L	1,000,000	O/P
<b>San Francisco County</b>				
McQueen Reclamation STP	Golden Gate Park	L	800,000	O

<sup>1</sup> L=Landscape irrigation, C=Construction uses (i.e. compaction water, dust control), A=Agricultural uses, T=Delivery using tank trucks (all other by pipelines), and G=Groundwater recharge.

<sup>2</sup> Flow is in gallons per day.

<sup>3</sup> O=Ongoing and P=Proposed.

Recommendations approved by the RCAC include:

1. All Basin Plans should contain a policy statement regarding reclamation and conservation in a basin. The policy should recognize the interrelationship between water quality and quantity, optimum management of the basin's water resources and the role water conservation and reclamation will play to meet water management.

The policy should be followed by specific goals, objectives and management principles. Basin Plans should recognize that disposal of treated wastewater to saline waters or to evaporation ponds will not be considered a permanent solution where the potential exists for wastewater reclamation. The impact of water reclamation on in-stream beneficial uses should be considered.

2. All Basin Plans should include a reference to the California Water Code in regard to waste and unreasonable use of water (Sec. 275). In addition a statement should be included under the general provisions for reclamation regarding the use of potable water for landscape irrigation where reclaimed water is available (Sec. 13550).
3. Implementation of water reclamation projects and water conservation programs are in response to specific regional or local problems and need to be dealt with on a case-by-case basis in the Basin Plans. However, the following general policy may be considered:

Where ground water quality is being degraded due to overdraft, water reclamation and conservation must be evaluated as an integral part of the solution to the problem.

4. All reports for applications or revisions of waste discharge filed with the RWQCBs should include an explanation why the effluent is not being reclaimed for beneficial uses where the intended disposal is to land or to saline surface waters.
5. Where non-industrial wastewater flows to treatment plants are 70 gallons per capita per day or more (excluding inflow and infiltration), reports for new and revised waste discharge should include information regarding water conservation actions taken, or programs proposed which will reduce wastewater flow to the treatment plant. (The SWRCB is requiring a water conservation plan as part of Step 1 facilities planning).
6. Where wastewater flows are approaching treatment plant design capacity, a report must be filed with the Regional Board. This report should include a discussion of the water conservation measures which have been or will be taken to reduce plant inflow.
7. The benefits of existing (non-planned) wastewater reclamation should be recognized in the Basin Plan where appropriate. New incidental reclamation in lieu of disposal to saline waters or land would be recognized.

Recommendation for further action on reclamation and conservation for the State Board are included under Continuing Planning later in this chapter.

## ESTUARINE MANAGEMENT

Achievement of the water quality objectives and protection and enhancement of the beneficial uses of the San Francisco Bay estuarine system, particularly fish migration and estuarine habitat, are dependent on freshwater outflow from the Delta in addition to pollution control measures. Adequate freshwater inflow to the Bay system is necessary to control salinity, to provide mixing (particularly in the entrainment zone), to maintain proper temperature and flush out residual pollutants that cannot be eliminated by treatment or nonpoint pollutant source management. Except for local drainage and wastewater discharges, Delta outflow provides virtually all the freshwater inflow to San Francisco Bay. However, the availability of adequate Delta outflow to meet these needs is very uncertain because of existing and potential upstream diversions of water.

The State Board first addressed the issue of the Bay's inflow needs in the Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh and Water Rights Decision 1485 in August, 1978. In those documents the State Board established electrical conductivity (salinity) standards for the Delta. Recognizing that inadequate information exists to precisely determine the outflow needs of the estuary, the State Board required the two major water diverters, the U. S. Bureau of Reclamation and the Department of Water Resources, to participate in a research study to determine:

- i) Outflow needs in San Francisco Bay, including ecological benefits of unregulated outflows and salinity gradient established by them.
- ii) The need for winter flows for long-term protection of striped bass and other aquatic organisms in the Delta.

Beginning in July, 1987 the State Board will be conducting hearings to receive evidence on the beneficial uses of water within the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and the flows needed to maintain those uses. Because the effects of pollutants and Delta outflow must be considered together when evaluating control measures to protect the beneficial uses of the Bay Delta estuary, both this Board and the Central Valley Regional Board will actively participate with the State Board in the Bay/Delta hearing process. Evidence presented in that process will be used to help formulate future amendments to the Basin Plan.

## CONTINUING PLANNING

The Basin Plan is a flexible tool which must be reviewed and revised regularly for it to adapt to changing conditions. Continuing planning allows this to occur. The following continuing planning sections include specific recommendations in the form of prioritized Regional Board resource allocation and recommendations to the State Board, the Environmental Protection Agency, and the Aquatic Habitat Institute.

### REGIONAL BOARD RESOURCE ALLOCATION

The items indicated below have been identified in this review as specific areas for which Regional Board planning resources should be allocated. The items are divided into four categories of priority (I, II, III, & IV), and each item is followed by an estimate of the staff time needed to complete the item. Resolution of these items may result in future Basin Plan amendments. Necessary Regional Board staff resources are identified in the margin to the right of each item, and for those items requiring contract funding, the estimated contract needs are identified following the description of each item.

**Priority I**

**WASTELOAD ALLOCATION**

Conduct intensive surveys of receiving water segments suspected of being water quality limited to determine if water quality standards are being attained in those segments and in determining the relative contribution of pollutants from different sources to those segments. **\*\*\$200,000 per year for 4 years\*\*** ..... 0.5 sy  
4 yrs

Develop specific regional guidelines based on EPA and State Board guidelines for performing wasteload allocations for receiving water segments that are determined to be water quality limited. .... 0.3 sy

**TOXIC POLLUTION CONTROL**

Develop additional information on concentrations of toxic pollutants in the water column, sediments, and biota of the Bay/Delta estuary to allow for improved water quality-based regulation of toxic pollutants and to identify additional toxic pollutants of concern. **\*\*\$200,000 per year for 3 years\*\*** ..... 0.1 sy  
3 yrs

Prepare specific regional guidance based on EPA guidance for the development of alternate water quality objectives for toxic pollutants..... 0.1 sy

Prepare specific regional guidance for performing effluent characterization studies based on existing EPA guidance.. 0.1 sy

Develop an objective for copper for the Bay/Delta estuary..... 0.1 sy

Evaluate the environmental impact of and develop policy on the use of toxic chemicals for cooling water treatment where non-toxic alternatives exist. .... 0.2 sy

Review and revise the Board's mixing zone policy..... 0.1 sy

Prepare specific guidance on flow-through bioassay requirements and work with dischargers on its implementation.. 0.2 sy

**DREDGING**

Review and revise the Board's dredging policy including review of current meth-

ods for determining water quality and biological impacts of dredge spoil, reviewing the need to limit the volume of dredge spoils disposed in the Bay and to limit or prohibit the disposal of dredge spoils in the Bay containing certain pollutants, and reviewing the costs of and requirements for other disposal options such as ocean or upland disposal. .... 0.25 sy

**MOU'S WITH OTHER AGENCIES**

Develop memoranda of understanding between local agencies and the Regional Board regarding cooperative cleanup activities for groundwater pollution sites... 0.5 sy

**WETLANDS**

Develop procedures to improve coordination with Corps of Engineers on certification of Corps permits. .... 0.1 sy

Prepare guidelines for implementation of wetlands protection policies, emphasizing coordination with Department of Fish and Game and U. S. Fish and Wildlife Service in making wetlands and beneficial use determinations..... 0.2 sy

**URBAN RUNOFF CONTROL**

Work with local agencies and industries to develop and implement urban runoff pollutant loading and toxicity evaluations as well as appropriate control measures.. 1.3 sy

Conduct workshops for the development of uniform sampling programs and techniques (as well as for the) development of an overall monitoring strategy. **\*\* \$50,000 for one year \*\*** ..... 0.2 sy

Collect additional data on selected streams and sites in the Bay to specifically identify threats to beneficial uses from varied nonpoint sources. **\*\* \$100,000 per year for 3 years \*\*** ..... 0.1 sy  
3 yrs

Perform necessary duplicate sampling and analysis to verify the quality of the data being generated. **\*\* \$100,000 per year for 3 years \*\*** ..... 0.1 sy  
3 yrs

**ENFORCEMENT**

Develop a regional enforcement policy.. 0.15 sy

**Priority II**

**GROUNDWATER PROTECTION**

Review and update Board's Resolution No. 81, "Policy on Sewer and Drainage Wells" to include consideration of a prohibition of discharge to dry wells of wastes that may contain toxic pollutants.. 0.2 sy

Review data generated under the current groundwater resource evaluation contracts and identify methods for generating the data to fill data gaps..... 0.1 sy

Implement the State Board strategy for comprehensive groundwater basin management plans, prioritizing those basins where such management plans appear necessary and perform an inventory of local agency groundwater monitoring programs..... 0.3 sy

**TOXIC POLLUTION CONTROL**

Collaborate with AHL in development of updated receiving water monitoring techniques..... 0.1 sy

Develop specific regional toxicity reduction evaluation guidelines based on existing EPA guidance..... 0.2 sy

**WASTELOAD ALLOCATION**

Develop specific plans for wasteload allocations for copper and silver for water quality limited segments..... 0.2 sy

Identify additional toxic pollutants of concern to be included in bioaccumulation and sediment accumulation investigations in the Bay/Delta estuary. \*\* \$50,000 for one year \*\* ..... 0.1 sy

**PH EFFLUENT LIMITS**

Develop statistical effluent limits for pH or an enforcement guidance document similar to that developed for chlorine residual effluent limit violations..... 0.2

**SHELLFISH PROGRAM**

Identify new areas within the Region where shellfish resource and pollution investigations are necessary and alert BCDC to their existence..... 0.1 sy

**Priority III**

**SHELLFISH PROGRAM**

Perform further investigations in the San Francisco Bay Shellfish Program to determine what management programs are necessary for those areas already studied and to aid in development and implementation of those programs. \*\* \$50,000 per year for 3 years \*\* ..... 0.4 sy  
3 yrs

**UN-IONIZED AMMONIA**

Evaluate the need to revise the numerical objective for un-ionized ammonia for the Lower Bay and South Bay..... 0.1 sy

**GROUNDWATER PROTECTION**

Investigate the potential effects of overflow from the Livermore Amador Valley groundwater basin to the Niles Cone via Alameda Creek. \*\* \$150,000 for one year\*\* ..... 0.4 sy

**URBAN RUNOFF CONTROL**

Investigate the potential for treatment as a beneficial use of marshes as part of urban runoff control. .... 0.1 sy

**WASTELOAD ALLOCATION**

Update the segment rankings in Tables IV-3 and IV-4..... 0.1 sy

**Priority IV**

**VESSEL WASTES**

Review and update the Board's policies regarding vessel waste disposal..... 0.2 sy

**EROSION CONTROL**

Work with local agencies to develop and implement adequate erosion control ordinances..... 0.15 sy

**TOXIC POLLUTION CONTROL**

Evaluate and support progress in the development of water quality-based toxics control and sediment quality criteria by the EPA and NOAA..... 0.1 sy

**INSTREAM USES**

Implement a program to identify instream beneficial uses within the Region, with priority given to Lagunitas and Pescadero Creeks..... 0.2 sy  
3 yrs

**MINES AND QUARRIES**

Survey mines and quarries in the Region to determine pollution sources and develop strategies to control them. .... 0.5 sy

**SEPTIC SYSTEMS**

Review prohibitions of septic systems for Stinson Beach and Emerald Lake Hills pursuant to Water Code Section 13280.. 0.1 sy

---

**RECOMMENDATIONS FOR ACTION BY THE STATE BOARD**

The Regional Board recommends that the State Board take the following prioritized actions:

1. Develop a statewide strategy for groundwater protection which addresses pollutant source identification, clean up levels, beneficial use protection, and the roles of multiple regulatory agencies.
2. Develop marine and estuarine objectives and control strategies for selenium.
3. Develop an effective statewide strategy for urban runoff control and work to provide funding for implementing it.
4. Review the Bays and Estuaries Policy taking into account the achievements and information development of the last 12 years.
5. Develop a statewide mixing zone policy or assist the Regional Boards in developing Region-specific policies.
6. Develop objectives and effluent limits for total organic halogens (TOX).

**RECOMMENDATIONS FOR ACTION BY THE EPA**

The Regional Board recommends that the EPA take the following prioritized actions:

1. Maintain commitment of resources to the development of guidance on toxics issues for marine and estuarine environments, including funding research utilizing new experimental techniques for assessment of the fate and effects of toxic pollutants.
2. Provide extensive technical support for water quality modeling and wasteload allocation in the estuary, for both toxic and conventional pollutants.
3. Develop chronic toxicity data for silver, cyanide, and monocyclic aromatic hydrocarbons.
4. Develop freshwater criteria for polycyclic aromatic hydrocarbons.
5. Review the validity of the bioconcentration factor used in establishing the mercury criteria.
6. Assist in revising cadmium criteria as necessary using data on indigenous species.

## **RECOMMENDATIONS FOR ACTION BY THE AQUATIC HABITAT INSTITUTE**

The Regional Board recommends that the Aquatic Habitat Institute take the following prioritized actions:

1. Develop additional information on background concentrations of toxic pollutants in the water column, sediments, and biota of the Bay/Delta estuary, and aid in coordinating data collection in this area by other agencies and provide quality assurance for such data collection.
2. Constantly update the local effects monitoring and regional effects monitoring elements of the Aquatic Habitat Program to reflect the most current monitoring methods available.
3. Assist in revising cadmium criteria as necessary using data on indigenous species.
4. Provide a forum for organization and dissemination of knowledge relative to Bay/Delta environmental quality.



# V. PLANS AND POLICIES

---

## INTRODUCTION

In addition to the Basin Plan, many other plans and policies direct Regional Board actions or clarify the Regional Board's intent. The following pages contain brief descriptions of seven State Board plans and policies, and numerous Regional Board policies. Verbatim copies of the State Board policies are contained in Appendix A. The Regional Board policies are contained in a separately bound Appendix E.

All of these policies may be revised periodically. The Regional Board should be contacted to determine if a particular plan or policy is still current.

## STATEWIDE PLANS AND POLICIES

### STATE WATER RESOURCES CONTROL BOARD

#### Resolution 68-16

The "Statement of Policy with Respect to Maintaining High Quality of Waters in California" requires the continued maintenance of existing high quality waters. It provides conditions under which a change in water quality is allowable. A change must:

- be consistent with maximum benefit to the people of the State,
- not unreasonably affect present and anticipated beneficial uses of water, and
- not result in water quality less than that prescribed in water quality control plans or policies.

#### Thermal Plan

The "Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters

and Enclosed Bays and Estuaries of California" specifies water quality objectives, effluent quality limits, and discharge prohibitions related to thermal characteristics of interstate waters, enclosed bays, estuaries, and waste discharges.

#### Water Quality Control Policy

The "State Policy for Water Quality Control" declares the State Board's intent to protect water quality through the implementation of water resources management programs and serves as the general basis for subsequent water quality control policies.

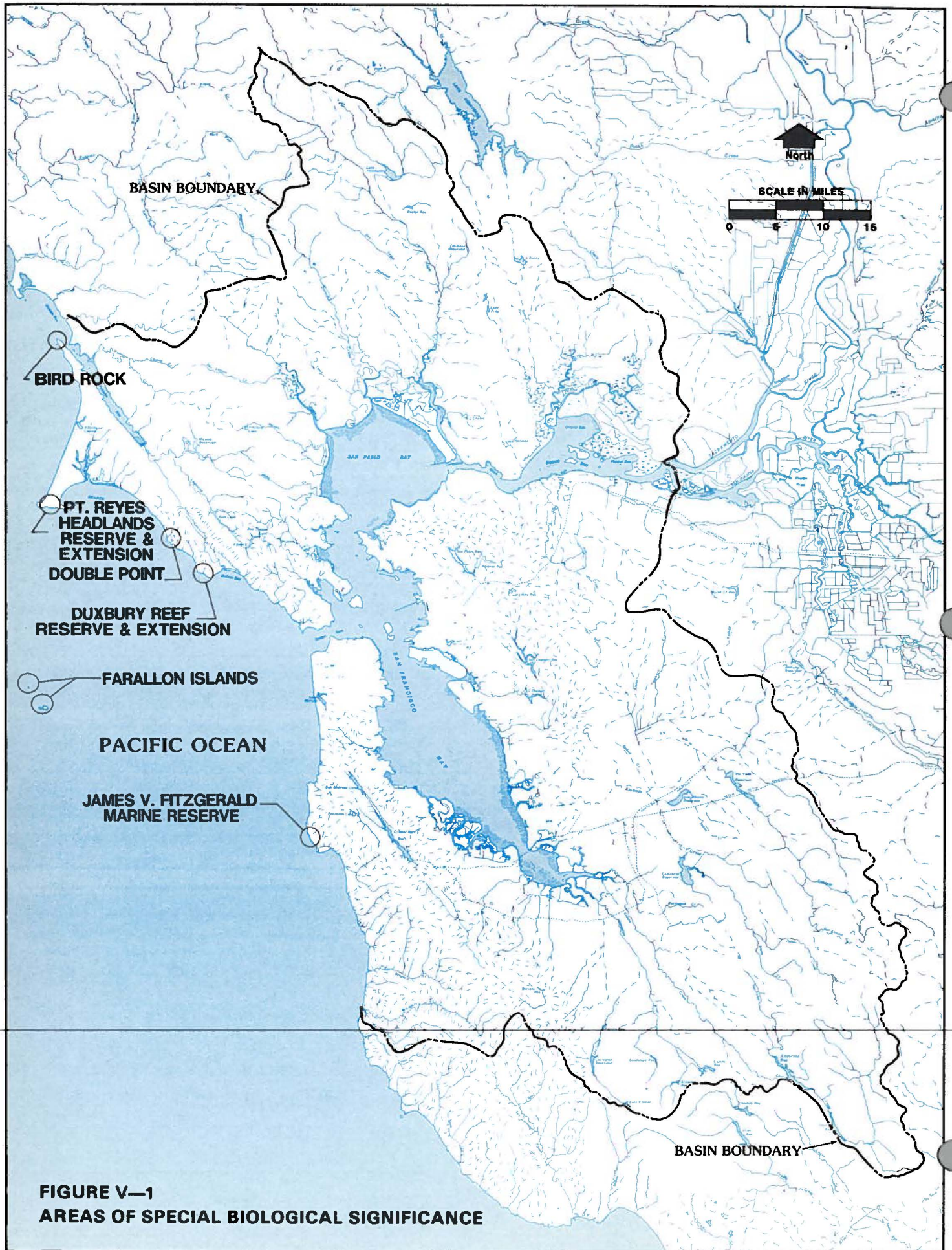
#### Ocean Plan

The "Water Quality Control Plan for Ocean Waters of California" established beneficial uses and water quality objectives for waters of the Pacific Ocean adjacent to the California coast outside of enclosed bays, estuaries, and coastal lagoons. The Ocean Plan prescribes effluent quality requirements and management principles for waste discharge and specifies certain waste discharge prohibitions.

The Ocean Plan also provides that the State Board shall designate Areas of Special Biological Significance (ASBS) and requires wastes to be discharged a sufficient distance from these areas to assure maintenance of natural water quality conditions. The following areas have been designated as ASBS in this Region:

- Bird Rock
- Double Point
- Duxbury Reef Reserve and Extension
- Farallon Island
- James V. Fitzgerald Marine Reserve
- Point Reyes Headland Reserve and Extension

These areas are identified in Figure V-1.



**FIGURE V—1  
AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE**

## **Bays and Estuaries Policy**

The "Water Quality Control Policy for the Enclosed Bays and Estuaries of California" provide water quality principles and guidelines for the prevention of water quality degradation and to protect the beneficial uses of waters. Decisions by the Regional board are required to be consistent with the provisions of this policy. This policy does not apply to wastes from vessels or land runoff except as specifically indicated for siltation and combined sewer flows.

## **Powerplant Cooling Policy**

The "Water Quality Control Policy on the use and Disposal of Inland Waters Used for Powerplant Cooling" indicates the State Board's position on powerplant cooling, specifying that fresh inland waters should be used for cooling only when other alternatives are environmentally undesirable or economically unsound.

## **Delta Plan**

The "Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh" (Delta Plan) and Water Rights Decision 1485 designated beneficial uses, established water quality (salinity) and flow standards to protect the beneficial uses from State Water Project and Central Valley Project operations, and specified an implementation program.

## **REGIONAL BOARD PLANS AND POLICIES**

Plans and policies adopted by the Regional Board are classified under the following twelve headings for easy reference. A discussion of each of the current Regional Board Policies is under the appropriate heading.

Aquatic Habitat Program  
Cooperative Agreements  
Dairy Wastes  
Delta Planning  
Dredging  
Erosion and Surface Runoff  
Marshlands  
On-Site Disposal  
Reclamation  
Shellfish  
Technical Reports  
Vessel Wastes

## **Aquatic Habitat Programs**

*Resolution No. 82-1(1982) Statement of Intent Regarding the Use of Data Collected by the Aquatic Habitat Program.*

The Board adopted this Resolution to state how data collected by the Aquatic Habitat Program would be used and to state its intent of seeking the assistance of the University of California in data quality control and interpretation.

Possible uses of data include the following:

- Amending water quality objectives
- Relaxing or tightening of effluent requirements
- Enforcement action
- Dissemination of information to the public
- Determining sources of pollution
- Determining assimilative capacities of receiving waters

## **Cooperative Agreements**

*Resolution No. 737 (1966) Coordination with the San Francisco Bay Conservation and Development Commission (BCDC)*

The Board stated its intent to cooperate with BCDC to the fullest extent necessary to ensure the protection of San Francisco Bay water quality and its shoreline.

*1966-Memorandum of Understanding with the Department of Fish and Game*

This MOU was initiated because the Board has no means of conducting surveillance of ocean waters within its jurisdiction. Under the terms of this MOU, the Department of Fish and Game agrees to notify the Regional Board of any suspected violations of the Board's requirements for ocean disposal.

*Resolution No. 68-1 (1968) State and Regional Boards Water Quality Coordinating Committee*

By adopting this Resolution the Board approved a State and Regional Boards Coordinating Committee for the purpose of (1) coordinating and exchanging technical and administrative information; (2) augmenting staff support to the Water Quality Advisory Committee of the State Board; and (3) recommending action to be taken on water quality programs.

*Resolution No. 70-19 (1970) BCDC*

In this Resolution the Board urged BCDC to (1) require wastes resulting from projects permitted by BCDC to be connected to existing sewer lines; and (2) disapprove or temporarily withhold approval of any project which would cause added waste loading

on a community sewerage system that is not meeting Board waste discharge requirements.

***Resolution No. 73-17 (1973) Local Agency Formation Commissions***

This Resolution describes actions which could be taken by the Board and LAFCOs which would result in a coordinated effort to prevent and abate pollution.

***1980-Memorandum of Understanding with the Council of Bay Area Resource Conservation Districts (RCDs)***

The purpose of this MOU is to combine the erosion control expertise of the RCDs with the regulatory authority of the Board to enforce erosion control measures. This action will increase the Board's ability to identify and current erosion control problems associated with construction or agricultural activities.

**Dairy Wastes**

***Resolution No. 74-11 (1974) Animal Waste Guidelines***

This resolution augmented the State Board's Minimum Guidelines for Animal Waste Management (1973) by prohibiting the discharge of manure into a water course subject to flooding. Full compliance with this prohibition throughout the Region was scheduled for September 1, 1977.

***Resolution No. 77-5 (1977) Dairy Waste Compliance Extension***

Because of a severe drought between 1976 and 1977, the Regional Board extended the compliance date in Resolution 74-11 for all dairies outside of the Tomales Bay and Walker Creek watersheds to September 1, 1978.

**Delta Planning**

***Resolution No. 535 (1964) San Luis Drain***

In this Resolution the Board expressed doubts regarding the effects on beneficial uses of the proposed discharge to the Bay of agricultural wastewater. The Board prohibited the proposed discharge until evidence that the discharge would not threaten beneficial uses was submitted by the dischargers. The Resolution also directed the staff to determine the beneficial uses of the proposed receiving waters and the conditions necessary for their protection.

***Resolution No. 80-6 (1980) Peripheral Canal***

This Resolution is the Board's position statement on Senate Bill 200, which authorized a major expansion on the State's Central Valley Project. The Board ex-

pressed its concerns with the adverse impacts on water quality of certain projects authorized by the bill and endorsed protective measures for the Delta, Suisun Bay and San Francisco Bay.

***Resolution No. 81-1 (1981) San Luis Drain***

In this Resolution the Board requested that the State Board, in close coordination with the Regional Board, assume the lead role in the development, revision, renewal and enforcement of waste discharge requirements for the proposed San Luis Drain.

**Dredging**

***Resolution No. 80-10 (1980) Regulation of Dredging Sediment Disposal***

This Resolution acknowledged the U. S. Army Corps of Engineers implementation of new procedures for evaluating dredged material. The Board agreed that the Corps should be responsible for the administration of the new procedures for evaluating discharges of dredged materials. The Board reserved the right to act to protect water quality, if necessary. The resolution also gave the Executive Officer considerable discretion regarding additional water quality and sediment testing requirements as well as dredged sediment disposal impact monitoring.

**Erosion and Surface Runoff**

***1953-Control of Water Pollution from Construction of Dams***

A motion was adopted by the Board to reduce the possibility of erosion during the construction of dams. For small projects not likely to cause erosion problems, it was recommended that the Executive Officer send a letter to the responsible person advising him to take appropriate precautionary actions. For larger projects, the responsible person was required to submit a report of waste discharge.

***Resolution No. 78-5 (1978) Surface Runoff***

In this Resolution the Board acknowledged surface runoff as a significant source of pollution in the San Francisco Bay Basin and resolved to take appropriate actions (e.g., best management practices) to reduce pollution loads from surface water runoff.

***Resolution No. 80-5 (1980) Erosion Control***

The Board, in this Resolution, recognized the seriousness of impacts on beneficial uses related to construction activities. Local governments were identified by the Board as having the responsibility for controlling erosion from development activities and for adopting and administering erosion control ordinances. The Board also stated its intent to monitor

the progress of local governments in their adoption and implementation of effective erosion control programs.

## **Marshlands**

### ***Resolution No. 77-1 (1977) Marsh Policy***

This Resolution described the Board's policy regarding the use of wastewater to create, restore, maintain and enhance marshlands.

## **On-Site Disposal**

### ***Resolution No. 81 (1951) Sewer and Drainage Wells***

In this policy the Board stated its objection to the construction and use of wells for the purpose of disposing of effluent from septic tanks or surface runoff from streets or highways. An exception was made for wells that discharge into geologic formations which at no time contain water suitable for domestic, agricultural or industrial use.

### ***Resolution Nos. 512, 596, 599, 600 (1962-64) County Waivers***

Between 1962 and 1964 the Regional Board adopted several policy statements regarding the Board's waiver of regulatory authority over the use of on-site disposal systems (e.g. septic tanks) in counties having satisfactory regulations for their use.

The above Resolutions apply to the Counties of Alameda, Napa, Sonoma and Santa Clara, respectively. These Resolutions were adopted in 1964, except Alameda's which was adopted in 1962.

### ***Resolution Nos. 73-13 and 73-14 (1973) System Prohibitions: Stinson Beach and Glen Ellen On-Site Disposal***

These Resolutions prohibited waste discharges to on-site disposal systems in the Stinson Beach (Marin County) areas. Exceptions to the discharge prohibitions were provided in the Resolutions.

Resolution No. 73-13 has since been amended or clarified in Resolution Nos. 73-18, 74-5, 74-6, 77-2, 78-1, and 81-5. Resolution No. 78-1 amended the prohibition of discharge outlined in Resolution No. 73-13 by allowing the discharge of wastes to individual leaching or percolation systems where such discharges are regulated by the Stinson Beach County Water District. The amendment was conditional.

### ***Resolution No. 72-12 (1975) Solano County Waiver Amendment***

Resolution No. 598 was amended in this resolution by requiring reports of waste discharge from family dwellings in Solano County for planned unit developments with lot sizes smaller than 2.5 acres.

### ***Resolution No. 76-7 (1976) On-Site Disposal System Prohibition: Emerald Lake Hills***

This Resolution prohibited waste discharges to on-site disposal systems in the Emerald Lake Hills and Oak Knoll Manor Areas of San Mateo County. Exceptions to the prohibition of discharge are provided in this Resolution.

### ***Resolution No. 78-14 (1978) Policy on Discrete Sewerage Facilities***

The discrete sewerage policy sets forth actions to be taken by the Board when it is presented with proposal for new discrete sewerage systems and describes what it will request of local governments.

### ***Resolution No. 79-5 (1979) Minimum Guidelines for the Control of Individual Wastewater Treatment and Disposal Systems***

This Resolution adopted minimum guidelines to determine the adequacy of local ordinances for the control of individual wastewater treatment and disposal systems, as discussed in the discrete sewerage policy.

### ***Resolution No. 80-9 (1980) Alameda County Waiver Deficiency***

This Resolution requested the County of Alameda to correct deficiencies in their individual waste treatment and disposal systems program.

### ***Resolution No. 81-9 (1981) San Mateo County Waiver***

This Resolution stated the Board's policy relating to waiving of reports of waste discharge from individual wastewater treatment and disposal systems in San Mateo County.

### ***Resolution No. 83-1 (1983) Solano County Waiver***

This resolution states that the Board's policy relative to waiving reports of waste discharge for individual wastewater treatment and disposal systems in Solano County.

### ***Resolution No. 83-2 (1983) Contra Costa County Waiver***

This resolution states the Board's policy relative to waiving reports of waste discharge for individual wastewater treatment and disposal systems in Contra Costa County.

**Resolution No. 84-12 (1984) Marin County Waiver**

This resolution states the Board's policy relative to waiving reports of waste discharge for individual wastewater treatment and disposal systems in Marin County.

**Reclamation**

**Resolution No. 79-2 (1979) Water Reuse Study**

In this Resolution the Board stated its position regarding Phase II of the San Francisco Bay Area Water Reuse Study. The Board acknowledged the importance of using reclaimed water to meet California's future water supply needs, and made comments on the economics of the delivery of reclaimed water to users.

**Shellfish**

**Resolution No. 74-14 (1974) Policy Statement with Respect to the Implementation of Time Schedules for Facilities to Protect Shellfish**

In this Resolution the Board directed the Executive Officer to determine whether or not dischargers were providing or would be providing adequate protection to allow for sport harvesting of shellfish. The Board also stated its intent to adopt a time schedule for protection (in conformance with staff guidelines).

**Resolution No. 78-8 (1978) Shellfish Program Authorization**

With the passage of this Resolution the Board directed the Executive Officer to develop and implement a program to determine the feasibility of opening shellfish beds for direct recreational use.

**Technical Reports**

**Resolution No. 67-3 (1967) Technical Reports**

This Resolution increased the responsibilities of dischargers filing technical reports to the Board. Specifically, this Resolution required dischargers to submit a letter of transmittal, signed by the discharger's senior administrative officer, with reports involving formal time schedules and Cease and Desist Orders.

**Resolution No. 73-16 (1973) Self-Monitoring Reports**

This Resolution specifies the current format and requirements for filing self-monitoring program reports.

**Resolution No. 74-10 (1974) Contingency Plans**

This Resolution required dischargers to develop and implement contingency plans to assure continuous

operation of facilities for the collection, treatment and disposal of wastes.

**Vessel Wastes**

**Resolution No. 665 (1965) Vessel Sewage Discharge Policy**

The Board, in this Resolution, expressed concern over the discharge of untreated sewage from certain vessels over which it had (or has) jurisdiction. The Board suggested that the discharge of vessel wastes be regulated by the Federal Government.

**Resolution No. 70-1 (1970) Urging BCDC to Require Shoreside Vessel Waste Facilities**

This Resolution urged BCDC to require applicants for new or expanded marinas or port facilities to provide the following as permit conditions: (1) dockside sewers; (2) pump-out facilities at marinas with disposal to shoreside sewage facilities; and (3) adequate restroom facilities.

**Resolution No. 70-65 (1970) Vessel Waste Discharges to San Francisco Bay**

Three recommendations were made in this Resolution. First, that owners of marinas provide dockside sewerage facilities and that owners of vessels with sanitary facilities install holding tanks; second, that the State Board request the Federal Government to prohibit discharges of vessel wastes; and third, that the legislature adopt legislation which would require waste holding tanks on vessels with sanitary facilities to transport the wastes to treatment plants.

**REGIONAL BOARD GUIDANCE DOCUMENTS**

In particular instances the Regional Board finds that it is more appropriate to adopt a general guidance document rather than a detailed plan or policy. The intent of such guidance documents is to provide a framework for regulatory decision making without the rigidity of a fully developed plan or policy. They are usually adopted for relatively new and complex regulatory problems. The following guidance document has been accepted by the State Board.

**ENFORCEMENT GUIDELINE FOR P.O.T.W. CHLORINE RESIDUAL VIOLATIONS**

This document contains enforcement guidance for Regional Board staff in evaluating violations of the chlorine residual effluent requirement based on duration, magnitude, and frequency of such violations.

# VI. SURVEILLANCE AND MONITORING

---

## INTRODUCTION

The effectiveness of a water quality control program cannot be judged without information supplied by a comprehensive surveillance and monitoring program. California's well-being is linked to the health of its water. To protect and preserve this basic resource, the State Board and the Regional Board closely monitor water quality throughout the state.

Historically, a wide variety of interested state, federal and local agencies has sampled, analyzed and tracked water quality. The State Board monitoring program coordinates existing information, gathering and supplementing it where necessary to meet data needs.

The State Board is the lead agency in California directing surveillance and monitoring of water quality. A routine program of systematic sampling of the State's waters is now in existence. The activity is coordinated through, and assisted by the California Departments of Fish and Game (DFG), Water Resources (DWR), and Health Services (DOHS) and the Federal Bureau of Reclamation, United States Geologic Survey (USGS), and the Environmental Protection Agency (EPA).

This chapter contains a discussion of the objectives of the State Board's program, and a description of various elements of that program, together with brief information on local monitoring programs.

## STATE SURVEILLANCE AND MONITORING PROGRAM

The State's surveillance and monitoring program is designed to assure the collection of data necessary to: (a) establish and review water quality standards, goals, and objectives; (b) determine maximum daily loadings, waste load allocations, and effluent limitation; (c) perform segment classifications and rank-

ing; and (d) establish the relationship between water quality and individual point and nonpoint sources of pollutants. These data must be verified and properly interpreted to evaluate water quality trends and to make the necessary changes in the enforcement and/or planning programs to carry out program objectives. Output based upon data obtained from this program is used to prepare reports satisfying the requirements of Sections 104, 106, 208, 301, 303, 304, 305, 307, 308, 314 and 402 of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) and the applicable portions of the State's Porter-Cologne Water Quality Control Act.

The overall objectives of the State's surveillance and monitoring program are:

1. To measure the achievement of water quality goals and objectives specified in the Basin Plan.
2. To measure specific effects of water quality changes on the established beneficial uses.
3. To measure background conditions of water quality and determine long-term trends in water quality.
4. To locate and identify sources of water pollution that pose an acute, accumulative, and/or chronic threat to the environment.
5. To provide information needed to relate receiving water quality to mass emissions of pollutants by waste dischargers.
6. To provide data for determining compliance with permit conditions.
7. To provide the documentation necessary to support the enforcement of permit conditions and waste discharge requirements.
8. To provide data needed to carry on the continuing planning process.

9. To measure the effects of water rights decisions on water quality and to guide the State Board in its responsibility to regulate unappropriated water for the control of quality.
10. To prepare reports on water quality conditions as required by federal and state regulations and other users requesting water quality data.

The State's present surveillance and monitoring program is designed to meet the objectives set forth above. An optimum surveillance and monitoring program requires flexibility and must be able to respond to needs specified in the Basin Plan as it is implemented and revised. Statewide water quality assessments performed every two years provide a timely cycle to evaluate the program's effectiveness and make appropriate changes. Thus, this program is flexible and constantly subject to change.

The surveillance and monitoring program provides for collection and analysis of samples and the reporting of water quality data. It includes laboratory support and quality assurance, storage of data for rapid and systematic retrieval, and preparation of reports and data summaries. Most importantly, it includes interpretation and evaluation of data leading to recommendations for action.

The current program to carry out the requirements for surveillance and monitoring is made up of nine tasks. The tasks are:

1. Primary Network
2. Ground Water Network
3. Compliance Monitoring
4. Complaint Investigation
5. Intensive Surveys
6. Aquatic Habitat Program
7. Aerial Surveillance
8. Lake Surveillance
9. Biennial Water Quality Inventory

## PRIMARY NETWORK

Section 13160 of the Porter-Cologne Water Quality Control Act delegates primary responsibility for coordination and control of water quality in California to the State Board. Section 13163 of the Act states that in conducting this mission, the State Board is to coordinate water quality investigations, recognizing that other State agencies have primary statutory responsibility for such investigations.

Pursuant to these mandates, the State Board developed and in April 1976 established a coordinated Primary Water Quality Monitoring Network for California. Participants in the Coordinated Network included the California Departments of Health, Water Resources, and Fish and Game; and the Federal

Bureau of Reclamation, the U. S. Geological Survey and the Environmental Protection Agency.

The goal of the Primary Network is to provide an overall, continuing assessment of water quality in the State. This goal is to be achieved by statewide monitoring of water quality parameters that can affect beneficial uses of State waters. Among such parameters, toxic substances have received increasing attention in federal and state water pollution control activities; accordingly, Toxic Substances Monitoring and the State Mussel Watch program are included in the Primary Network.

The Primary Network station locations for the San Francisco Bay Basin are summarized in Table VI-1 and are shown in Figure VI-1. The following freshwater, toxic substance, coastal marine, and estuarine sampling stations are included:

- A network of 5 freshwater stations. Two stream stations in the Napa River are jointly operated by DWR and USGS. Three lake stations in Anderson Reservoir have been operated by DWR (Monitoring of the Anderson Reservoir stations has been discontinued, at least temporarily).
- A single toxic substances monitoring station on the Napa River at which fish and benthic invertebrate organisms are sampled annually and analyzed for the presence of toxic pollutants by DFG. Future plans call for toxic substances sampling in additional fresh water habitats to determine background levels.
- A marine and estuarine network of 19 active stations in the Region, as part of the State Mussel Watch, at which mussel samples are analyzed by DFG for toxic pollutants. Other coastal and bay Mussel Watch stations sample between 1977 and 1981 have been deactivated.

## Toxic Substance Monitoring

One alternative in monitoring for toxic substances (toxic elements and organic compounds) is to collect and analyze water samples. A major problem with this approach is that toxic discharges are likely to occur in an intermittent fashion and are thus likely to be missed with "grab" sampling of the water. Another limitation to analyzing water samples is that, generally, harmful toxicants are present in low concentrations in the water. The process of bioaccumulation acts to concentrate toxicants through the aquatic food web. Therefore, in the Toxic Substances Monitoring Program the flesh of fish and other aquatic organisms is analyzed for toxic metals and synthetic organic compounds.



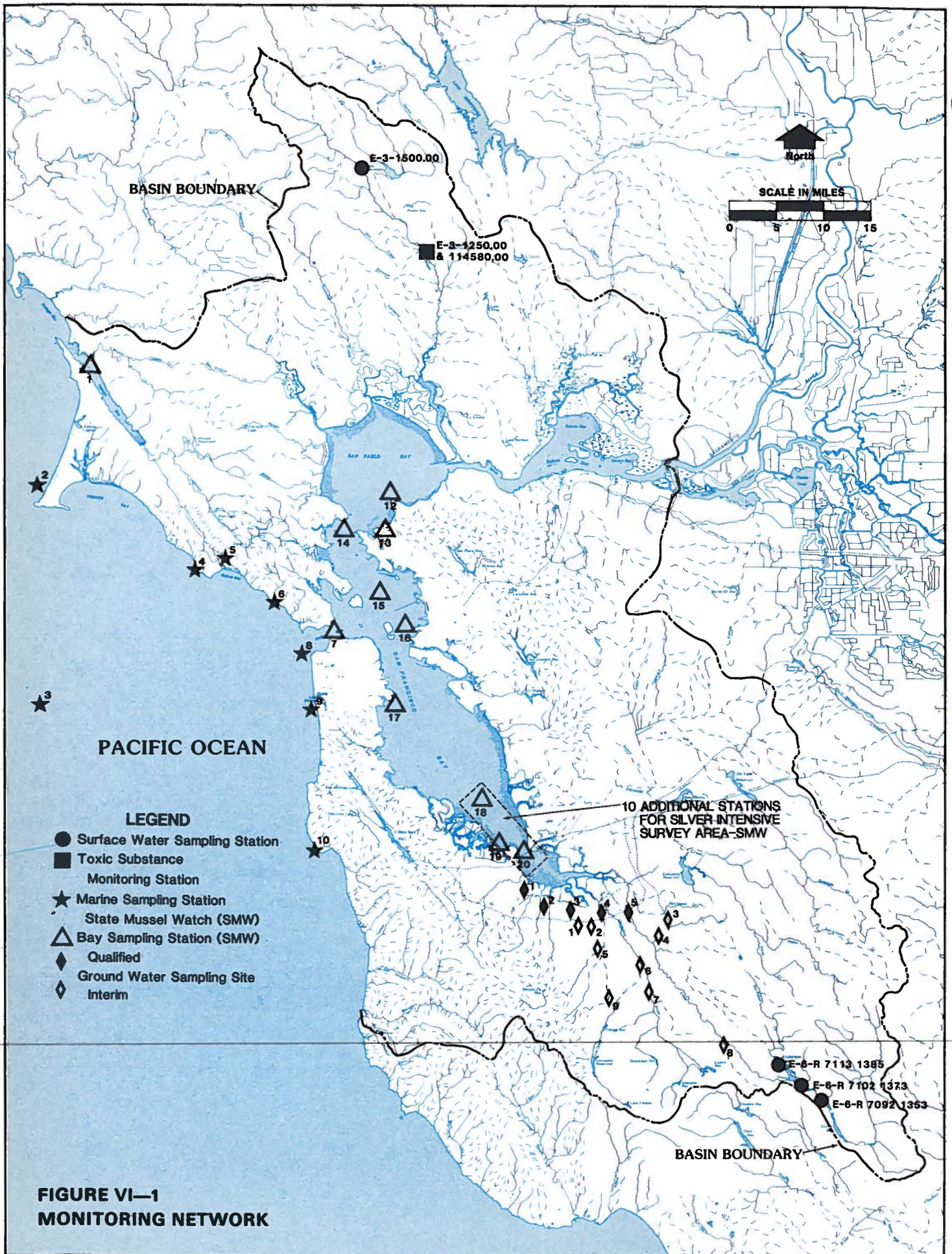
**TABLE VI-1  
MONITORING STATIONS**

**A. Primary Network  
Freshwater Stations**

<b>Station Number</b>	<b>Station Name</b>	<b>Location Lat./Long.</b>	<b>Period of Record</b>
E 3150000	Napa River @ St. Helena	382940, 1222550.	1974-81
E 3125000	Napa River @ Napa	382206, 1221808.	1967-81
11458000	Napa River @ Napa Anderson Lake @:	" "	1971-81
E6R 7113 1385	Las Animas Arm	371118, 1213830	1977-81
E6R 7102 1373	Center Nr. Dam	371012, 1213519	1977-81
E6R 7092 1353	South Arm	370912, 1213519	1977-81
<i>Toxic Substance Monitoring</i>			
206.5014	Napa River @ Napa	382206, 1221808	1976-81
<i>State Mussel Watch</i>			
1 210.1101	Tomales Bay	380900, 1225418	1977-80
2 201.2001	Point Reyes Headland	375935, 1225916	1977-78
3 203.1101	Farallon Island	374147, 1230000	1977-79
4 201.3001	Duxbury Reff	375357, 1224356	1979-80
5 201.3002	Bolinas Lagoon	375437, 1224100	1979-80
6 201.3003	Muir Beach	375128, 1223450	1979
7 203.1102	Point Bonita	374913, 1223237	1979-81
8 203.4001	Cliff House	374657, 1223046	1979
9 202.2101	Pacifica	374009, 1222941	1979-80
10 202.2102	James V. Fitzgerald	373045, 1223030	1977-78
12 206.6001	Point Pinole	380054, 1220211	1979-81
13 206.6002	Union Oil-Rodeo	380313, 1221535	1979-81
14 206.1001	Richmond Bridge	375513, 1222510	1979-81
15 203.1210	Angel Island	375117, 1222503	1979-81
16 203.1201	Treasure Island	374850, 1222128	1977-81
17 204.1001	Hunter's Point	374142, 1222018	1980-81
18 204.1002	San Mateo Bridge	373618, 1221722	1979-81
19 204.1003	Redwood City	373312, 1221146	1979-81
20 205.1001	Dumbarton Bridge	375050, 1220800	1979-81

**B. Ground Water Network**

<b>Qualified Wells</b>	<b>State Well Number (Township/Range/Section)</b>	
1	T6S/R3W—2J10	
2	T6S/R2W—17L03	
3	T6S/R2W—23D02	
4	T6S/R1W—22L04	
5	T6S/R1W—24N01	
<b>Interim Wells</b>	<b>Designated Site</b>	<b>(Tentative Well)</b>
1	T6S/R2W—2FL	R1W—1902
2	T6S/R1W—20Q	-28F.1
3&4	T6S/R1W—27K	-21R & -34B2
5	T7S/R1E—3F	-4E02
6	T7S/R1E—7P	R1W—1N02
7	T7S/R1E—29H	-29A02
8	T8S/R2E—17H	-7101
9	T7S/R1W—34Q	T6S/R1W—10F02



The Toxic Substances Monitoring (TSM) portion of the Primary Network has been integrated with other Primary Network monitoring. Streams and lakes were ranked according to various criteria established to indicate their importance to the State in terms of water quality. From this process, 28 streams were ranked Priority I, or highest priority. These Priority I streams were included in the Primary Network; routine chemical and biological water monitoring is performed by DWR and/or the USGS; and toxic substances monitoring of resident organisms is performed by the Department of Fish and Game.

The objectives of the Primary Network TSM program are:

1. To develop statewide baseline data and to demonstrate trends in the occurrence of toxic elements and organic substances in the aquatic biota.
2. To assess impacts of accumulated toxicants upon the usability of State waters by man.
3. To assess impacts of accumulated toxicants upon the aquatic biota.
4. Where problem concentrations of toxicants are detected, to attempt to identify sources of toxicants and to relate concentrations found in the biota to concentrations found in the water.

The samples collected in the TSM program are benthic invertebrates and predator fish. The flesh of bivalve mollusks or crayfish tailflesh and fish livers are analyzed for important metals, including arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc; fish flesh is analyzed for mercury. In addition, both invertebrate and fish flesh samples are analyzed for 55 synthetic organic compounds, most of which are pesticides (Table VI-2). TSM reports have been published annually since 1977.

### **State Mussel Watch**

The State Mussel Watch (SMW) program has been integrated with the Primary Network monitoring to provide documentation of the quality of coastal marine and estuarine waters. The SMW program fulfills the goal of providing the state with long-term trends in the quality of these waters.

Mussels were chosen as the indicator organism for trace metals and synthetic organic compounds in the coastal and estuarine waters. Although the mussel populations of bays and estuaries are of a different species than those found in the open coast, their suitability as sentinels for monitoring the presence of toxic pollutants stems from several factors including: (1) their ubiquity along the California coast; (2) their

ability to concentrate pollutants above ambient sea water levels and to provide a time-averaged sample; and (3) their non-motile nature which permits a localized measurement of water quality. The trace metals analyzed for in mussel tissues include aluminum, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver and zinc. Synthetic organic compounds analyzed for are summarized in Table VI-2. When compared with alternative sampling designs, such as seawater and sediment sampling, SMW is a more cost effective program. Reports have been published annually since 1978.

During the 1977 and 1978 sampling periods, the focus of the SMW was, for the most part, on open coast monitoring of sites outside the vicinity of known pollutant point sources. Monitoring water quality in the State Board's designated Areas of Special Biological Significance (ASBS), to establish baseline conditions relating to the range of typical conditions in water, sediment and biota, was given prime importance in the early years of the program.

Based on the identification "hot spot" areas during 1977 and 1978, intensive sampling of these areas was implemented in 1979. Such a sampling strategy was intended to confirm previous findings, establish the magnitude of the potential problem and identify pollutant sources. The program has since evolved to include transplanting *M. californianus* mussels into select California bays and estuaries at selected sites to confirm potential toxic substance pollution - i.e., in the vicinity of dischargers.

### **GROUND WATER NETWORK**

A ground water network consisting of 46 well sites was developed for Northern Santa Clara County. The monitoring network is used to: (a) record existing (ambient) conditions, including water levels and areal quality; (b) establish baseline conditions; (c) evaluate trends in quality; (d) detect pollution and water quality degradation at an early stage; and (e) evaluate the effects of point and non-point source pollution on ground water quality.

During the initial development and field evaluation of the network, only five wells were actually located at the sites selected, and, in the case of nine sites, nearby wells were found satisfactory for interim use. Data is currently obtained from those 14 wells, leaving 32 with no qualified well. A program is presently underway to locate additional qualified wells using information on wells developed since the original network design. The present ground water monitoring network for Northern Santa Clara County is illustrated in Figure VI-1.

Other ground water networks may be established in the future for the Livermore Valley and the Niles Cone.

**TABLE VI-2**  
**SYNTHETIC ORGANIC COMPOUNDS ANALYZED IN THE**  
**TSM AND SMW PROGRAMS**

<b>COMPOUND</b>	<b>COMPOUND</b>	<b>COMPOUND</b>
Aldrin	DDMU pp	Nitrofen (TOK)
Benefin	DDT pp	Oxychlor dance
BHC $\alpha$	Dialifor	Parathion, ethyl
BHC $\beta$	Diazinon	Parathion, methyl
BHC $\gamma$ (lindane)	Dichlofenthion	PCB 1248
BHC $\delta$	Dicofol (Kelthane)	PCB 1254
Carbophenothion	Dieldrin	PCB 1260
CDEC (Vege dex)	Endosulfan I (Thiodan I)	PCNB (Quintozene)
Chlorbenside	Endrin	Perthane
cis-Chlordane	EPN	Phenkapton
trans-Chlordane	Ehtion	Phorate (Thimet)
Chloroneb	Fenitrothion	Ronnel
Chlorpyrifos (Dursban)	Fonofos (Dyfonate)	Strobane
Dacthal	Heptachlor	Tetradifon (Tedion)
DDE op	Heptachlor epoxide	Toxaphene
DDE pp	Hexachlorobenzene (HCB)	2,4-D isopropyl ester
DDD op	Methoxychlor pp'	2,4-D isobutyl ester
DDMS pp	Mirex	2,4-D n-butyl ester

## **COMPLIANCE MONITORING**

Under this task, data collected are used to determine compliance with discharge requirements and receiving water standards and to support enforcement actions. Data are collected from self monitoring reports generated by waste dischargers and from compliance monitoring reports prepared by Regional Board staff members. Self monitoring reports submitted to the Regional Board are reviewed, and if violations are noted, appropriate action is taken, ranging from administrative enforcement to judicial abatement depending on the circumstances. Self monitoring report data have also been used to develop pollutant loadings and to indicate the general improvement noted in the receiving water.

Compliance monitoring reports are based on staff inspections of a particular site and include observations made by staff members and/or results of analyses performed on samples collected by staff members.

## **COMPLAINT INVESTIGATION**

This task involves investigation of complaints of citizens and public or governmental agencies on the discharge of pollutants or creation of nuisance conditions. It is a Regional Board responsibility which includes preparation of reports, letters, and taking other necessary follow-up actions to document observed conditions and to institute appropriate corrective actions.

## **INTENSIVE SURVEYS**

Intensive monitoring surveys provide detailed water quality data to locate and evaluate violations of receiving water standards and to make waste load allocations. They usually involve localized, intermittent sampling at a higher than normal frequency. These surveys are specially designed to evaluate problems in water quality class segments, areas of special biological significance, or hydrologic units requiring sampling in addition to the routine monitoring programs. Intensive surveys should be repeated at appropriate intervals depending on the parameters involved, the variability of conditions, and changes in hydrologic or effluent regimes. Intensive surveys have been performed in South San Francisco Bay and the Guadalupe River (June & October 1975), in the Petaluma River (1975, 1976, 1977, 1978), in Sonoma Creek (April 1978) and in Tomales Bay and its watershed (1977, 1978). Data from the Tomales Bay surveys indicate that a Regional Board program to control contaminated runoff dairy has resulted in water quality improvements.

## **AQUATIC HABITAT PROGRAM**

Recognizing the need for meaningful information on the effects of point and non-point discharges on the beneficial uses of San Francisco Bay, the State and Regional Boards initiated the San Francisco Bay-Delta Aquatic Habitat Program. The goals of this two-year (Phases 1 and 2) program are (1) achieve coordination of pollutant related monitoring and research activities; (2) develop an improved basis for pollution control actions and revision of water quality standards; and (3) establish a means of providing water quality data to interested persons.

The two major products of Phase 1 include a Master Plan consisting of a comprehensive, Bay-wide receiving water monitoring program and recommended pollutant-related studies, and establishment of an institute which will coordinate receiving water monitoring and pollutant-related studies. Phase 2 of the AHP will focus on implementation of the Master Plan.

## **AERIAL SURVEILLANCE**

Aerial surveillance is used primarily to gather photographic records of discharges and water quality conditions in the Bay and to observe conditions at solid waste disposal sites in the Region. This technique is used on a routine basis as well as in special cases such as major spills of hazardous materials. Aerial surveillance is particularly effective because of the overall view of a facility that is obtained and because many facilities can be observed in a short period of time.

## **LAKE SURVEILLANCE**

This element is responsive to the requirements set forth in Section 314 of PL 92-500 and applicable federal regulations. The State is required to identify and determine the present trophic condition of all publicly owned fresh water lakes. The lakes inventory is updated on a two year cycle to include additional data as it becomes available and to indicate changes in trophic conditions.

The Lakes Program priority listing for California includes 181 publicly owned lakes that are considered in need of restoration and/or water quality improvement. Federal provisions allow states to adjust priorities and to add lake projects through an updating process.

Four lakes in the San Francisco Bay Basin, Lake Merritt, Lake Temescal, Stafford Lake, and Lafayette Reservoir, have received federal financial assistance under the Clean Lakes Program. Grants are available for a two-year period for diagnostic and/or feasibility

studies. The grants, requiring 30 percent non-federal matching funds, are intended to define and select the best available lake restoration and protection procedures. Future federal funding under Section 314 currently has been discontinued by the Administration, and this outlook for additional 314 work is uncertain.

## **BIENNIAL WATER QUALITY INVENTORY**

Section 305 (b) of PL 92-500 requires the State to prepare and submit biennially to EPA the Water Quality Inventory. This report includes: (a) a description of the water quality of major navigable waters in the State during the preceding years; (b) an analysis of the extent to which significant navigable waters provide for the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water; (c) an analysis of the extent to which elimination of the discharge of pollutants is being employed or will be needed; and (d) an estimate of the environmental impact, the economic, and social costs necessary to

achieve the "no discharge" objective of PL 92-500, the economic and social benefits of such achievement and estimate of the date of such achievement. Recommendations as to the programs which must be taken to control them are provided, along with estimates of the cost.

Data collection and analyses already being carried out by the State in the permits, planning, facilities, monitoring and enforcement programs is utilized in preparing the reports on the quality of the waters of California. The first report was published in 1975 with subsequent reports in 1977 and 1979. The next biennial report is due in 1982.

## **LOCAL MONITORING PROGRAMS**

In addition to the State's surveillance and monitoring program, several local agencies in the Bay area monitor water quality, complementing the State's efforts. These agencies are usually local health departments or water supply agencies. As part of the Continuing Planning process a comprehensive inventory of these programs will be performed.