CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

RESOLUTION R2-2005-0062

Amending the Water Quality Control Plan For the San Francisco Bay Basin to Adopt the 2005 General Update with Non-regulatory Revisions

WHEREAS, the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), finds that:

1. An updated Water Quality Control Plan (Basin Plan) for the San Francisco Bay Region was adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on June 21, 1995, approved by the State Water Resources Control Board (State Water Board) on July 20, 1995, and approved by the Office of Administrative Law (OAL) on November 13, 1995; and

2. The Basin Plan contains the region's water quality standards, which consist of beneficial uses and water quality objectives necessary to protect those uses; and

3. The proposed Basin Plan amendment, which was developed in accordance with California Water Code (CWC) Section 13240, consists of the following non-regulatory changes: (1) document organizational update, including a numbering scheme for Basin Plan Sections to facilitate citation, a list of acronyms, and formation of a new Chapter 7 to describe Total Maximum Daily Loads (TMDLs) and other Water Quality Attainment Strategies, (2) beneficial uses maps and tables update, including correction of errors, and (3) program description updates for groundwater protection and management, wastewater pollution prevention, watershed management, wetlands, onsite (septic) systems, water recycling (formerly called reclamation), and selected municipal wastewater facilities; and

4. The amendments are either descriptive program updates, error corrections, or declarations of existing law or regulation, and serve only to summarize currently applicable state and federal requirements and are therefore non-regulatory; and

5. Water Board staff prepared and distributed the proposed Basin Plan amendment and a staff report dated August 12, 2005, in accordance with applicable state and federal environmental regulations (California Code of Regulations, Section 3775, Title 23, and 40 CFR Parts 25 and 131); and

6. The Water Board held public hearings on October 19 and November 16, 2005, to consider the Basin Plan amendment. Notice of the public hearing was given to all interested persons and published in accordance with CWC Section 13244; and

7. The Water Board reviewed and carefully considered all comments and testimony received on the proposed Basin Plan amendment; and

8. The Water Board finds that the proposed Basin Plan amendment is not a project under the California Environmental Quality Act (CEQA) because it has no potential for any direct or indirect physical change to the environment. Accordingly it is not subject to CEQA and no Fish and Game filing fees need to be paid; and

9. Because the Basin Plan amendment is non-regulatory, no scientific peer review is required; and

10. After the Water Board approves the proposed Basin Plan amendment, it must be submitted to the State Water Board for approval. It must also be transmitted to the Office of Administrative Law (OAL) for concurrence that it is non-regulatory.

NOW THEREFORE BE IT RESOLVED, that

1. The Water Board, after considering the record, including oral testimony at the hearing, hereby adopts the proposed Basin Plan amendment as set forth in Exhibit A hereto.

2. The Executive Officer is directed to forward copies of the Basin Plan amendment to the State Water Board in accordance with the requirement of Section 13245 of the CWC.

3. The Water Board requests that the State Water Board approve the Basin Plan amendment in accordance with the requirements of Sections 13245 and 13246 of the CWC and forward it to OAL for concurrence on its non-regulatory status.

4. If during its approval process the State Water Board or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Board of any such changes.

I, Bruce H. Wolfe, 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 November 16, 2005.

Bruce H. Wolfe

BRUCE H. WOLFE
Executive Officer

Exhibit A – Proposed Basin Plan Amendment

EXHIBIT A

Proposed Basin Plan Amendment

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DESCRIPTION OF ACRONYMS AND ABBREVIATIONS

The following list contains acronyms and abbreviations contained in the proposed 2005 Basin Plan General Update with Non-Regulatory Revisions. Additional acronyms and abbreviations used in the entire Basin Plan, including the portion of the Basin Plan that is not being updated in this proposed amendment, will need to be added to the list after the Basin Plan is approved.

Acronym or Abbreviation	Description
ACWD	Alameda County Water District
AGR	Beneficial use designation for Agricultural Supply
Antidegradation Policy	State of Policy with Respect to Maintaining High Quality of Waters in California; State Water Board Resolution No. 68-16
ASBS	Beneficial use designation for Areas of Special Biological Significance
ASTM	American Society of Testing Materials
BACWA	Bay Area Clean Water Agencies
BAPPG	Bay Area Pollution Prevention Group
Basin Plan	Water Quality Control Plan
Bays and Estuaries Policy	Water Quality Control Plan for the Enclosed Bays and Estuaries of California; State Water Board Resolution No. 73-43 and 95-84
BCDC	San Francisco Bay Conservation and Development Commission
BMPs	Best Management Practices
Brownfield Law	Small Business Liability Relief and Brownfields Revitalization Act
BTEX	Benzene, toluene, ethylbenzene, and xylenes
Cal/EPA	California Environmental Protection Agency
CCMP	Comprehensive Conservation and Management Plan for the San Francisco Estuary
CCR	California Code of Regulations
CCWF	Contra Costa Watershed Forum
CDFG	California Department of Fish and Game
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CHHSLs	California Human Health Screening Levels
CIWMB	California Integrated Waste Management Board
CLRRA	California Land Reuse and Revitalization Act
COLD	Beneficial use designation for Cold Freshwater Habitat
COMM	Beneficial use designation for Ocean, Commercial, and Sport Fishing
Corps	United States Army Corps of Engineers
CRAM	California Rapid Assessment Method for Wetlands
CSM	Conceptual site model
DDT	Dichloro-diphenyl-trichloroethane
Delta Plan	Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta; State Water Board Resolution No. 95-24
DHS	California Department of Health Services

DoD	Department of Defense
DoE	Department of Energy
DPR	Department of Pesticide Regulation, California Environmental Protection Agency
DSMOA	Defense-State Memorandum of Agreement
DSRSD	Dublin-San Ramon Services District
DTSC	Department of Toxic Substance Control, California Environmental Protection Agency
DWR	California Department of Water Resources
EBDA	East Bay Dischargers Authority
EBMUD	East Bay Municipal Utility District
ESLs	Environmental screening levels
EST	Beneficial use designation for Estuarine Habitat
Estuary Project	San Francisco Estuary Project
FRSH	Beneficial use designation for Freshwater Replenishment
FUDs	Formerly utilized defense facilities
GAMA	Groundwater Ambient Monitoring and Assessment Program
General Water Reuse Permit	General Water Reuse Requirements for Municipal Wastewater and Water Agencies, Water Board Order No. 96-011
GIS	Geographic information system
GWR	Beneficial use designation for Groundwater Recharge
Habitat Goals reports	Baylands Ecosystem Habitat Goals (1999) and Baylands Ecosystem Species and Community Profiles (2000)
IND	Industrial Service Supply
kg	Kilogram
LAVWMA	Livermore-Amador Valley Water Management Agency
LEAs	Local Enforcement Agencies
LIAs	Local Implementing Agencies
LLNL	Lawrence Livermore National Laboratory
LOP	Local Oversight Program, funded by the State Water Board
LTMS	Long Term Management Strategy
Lower South Bay	San Francisco Bay south of the Dumbarton Bridge
LUC	Land use covenant
LUFT	Leaking underground fuel tank
MAR	Beneficial use designation for Marine Habitat
Master Permit	Master Water Reuse Permit, Water Board Order No. 93-159
MCLs	Maximum contaminant levels
mg/L	Milligrams per liter
MGD	Million gallons per day
MIGR	Beneficial use designation for Fish Migration
MNA	Monitored natural attenuation
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPN/100 ml	Most probable number per 100 milliliters
MSW	Municipal solid waste
MtBE	Methyl tert-butyl ether
MUN	Beneficial use designation for Municipal and Domestic Supply

NAV	Beneficial use designation for Navigation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDMA	N-nitrosodimethylamine
NFA	No further action
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
non-LOP	Local Oversight Program, funded by the local agency
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint source pollution
NRCS	United States Natural Resources Conservation Service, formerly Soil Conservation Service
Ocean Plan	Water Quality Control Plan for Ocean Waters of California; State Water Board Resolution No. 90-27
OEHHA	Office of Environmental Health Hazard Assessment, California Environmental Protection Agency
PBDEs	Polybrominated diphenyl ethers
PCBs	Polychlorinated biphenyls
PDF	Portable document format
Polanco	Polanco Redevelopment Act
POTW	Publicly-owned treatment works
Powerplant Cooling Policy	Water Quality Control Plan on the Use and Disposal of Inland Waters Used for Powerplant Cooling; State Water Board Resolution No. 75-58
PPA	Prospective purchaser agreement
PRO	Beneficial use designation for Industrial Process Supply
RAP	Remedial Action Plan
RARE	Beneficial use designation for Preservation of Rare and Endangered Species
RBCA	Risk-based corrective action
RCDs	Resource Conservation Districts
RCRA	Resource Conservation and Recovery Act
REC1	Beneficial use designation for Water Contact Recreation
REC2	Beneficial use designation for Noncontact Water Recreation
Regional Water Boards	The nine Regional Water Quality Control Boards
RMP	San Francisco Estuary Regional Monitoring Program
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SBA	South Bay Aqueduct
SCRs	Site cleanup requirements
SCVWD	Santa Clara Valley Water District
SFEI	San Francisco Estuary Institute
SFPUC	San Francisco Public Utilities Commission
SHELL	Beneficial use designation for Shellfish Harvesting
SIP	Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California, also known as the State Implementation Plan
SLIC	Spills, Leaks, Investigations, and Cleanups Program

SMCLs	Secondary maximum contaminant levels
SMP	Salt Management Plan for Livermore-Amador Valley
SPCCP	Spill Prevention, Control, and Countermeasure Plan
SPWN	Beneficial use designation for Fish Spawning
SSO	Site-specific objective or Sanitary Sewer Overflow, depending on the context
State Water Board	State Water Resources Control Board
SVOCs	Semi-volatile organic compounds
SWAMP	Surface Water Ambient Monitoring Program
TDS	Total dissolved solids
Thermal Plan	Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and the Enclosed Bays and Estuaries of California
TMDLs	Total Maximum Daily Loads
TPCA	Toxic Pits Cleanup Act
U.S. EPA	United States Environmental Protection Agency
ug/L	Micrograms per liter
um	Microns
uS/cm	MicroSiemens per centimeter
USFWS	United States Fish and Wildlife Service
UST	Underground storage tank
VOCs	Volatile organic compounds
WARM	Beneficial use designation for Warm Freshwater Habitat
Water Board	San Francisco Bay Regional Water Quality Control Board
Water Code	California Water Code
WEA	Wetland Ecological Assessment
WDRs	Waste discharge requirements
WILD	Beneficial use designation for Wildlife Habitat
WMI	Watershed Management Initiative
Workgroup	Copper and Nickel TMDL Work Group
WPCP	Water Pollution Control Plant
WQAS	Water Quality Attainment Strategies
WRC	Water Recycling Criteria
WRRs	Water Reuse Requirements
Zone 7	Alameda County Flood Control and Water Conservation District, Zone 7 Water Agency

CHAPTER 1 INTRODUCTION

1.1 THE SAN FRANCISCO BAY REGION

The San Francisco Bay Region (Region) is 4,603 square miles, roughly the size of the State of Connecticut, and characterized by its dominant feature, 1,100 square miles of the 1,600 square mile San Francisco Bay Estuary (Estuary), the largest estuary on the west coast of the United States, where fresh waters from California's Central Valley mix with the saline waters of the Pacific Ocean. The Region also includes coastal portions of Marin and San Mateo counties, from Tomales Bay in the north to Pescadero and Butano Creeks in the south.

The ~~San Francisco Bay estuarine system~~ Estuary conveys the waters of the Sacramento and San Joaquin rivers into the Pacific Ocean. Located on the central coast of California (**Figure 1-1**), the Bay system functions as the only drainage outlet for waters of the Central Valley. It also marks a natural topographic separation between the northern and southern coastal mountain ranges. The Region's ~~region's~~ waterways, wetlands, and bays form the centerpiece of the United States' fourth-largest metropolitan region, including all or major portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

Because of its highly dynamic and complex environmental conditions, the Bay system supports an extraordinarily diverse and productive ecosystem. Within each section of the Bay lie deepwater areas that are adjacent to large expanses of very shallow water. Salinity levels range from hypersaline to fresh water, and water temperature varies throughout the Bay system. These factors greatly increase the number of species that can live in ~~this e~~ the Estuary and enhance its biological stability.

The Bay system's deepwater channels, tidelands, marshlands, freshwater streams, and rivers provide a wide variety of habitats that have become increasingly vital to the survival of several plant and animal species as other estuaries are reduced in size or lost to development. These areas sustain rich communities of crabs, clams, fish, birds, and other aquatic life and serve both as important wintering sites for migrating waterfowl and as spawning areas for anadromous fish.

1.2 THE BAY SYSTEM'S SURFACE WATER AND ~~&~~ GROUND-WATER~~S~~

The Sacramento and San Joaquin rivers, which enter the Bay system through the Delta at the eastern end of Suisun Bay, contribute almost all the freshwater inflow to the Bay. Many small rivers and streams also convey fresh water to the Bay system. The rate and timing of these freshwater flows are among the most important factors influencing physical, chemical, and biological conditions in the Estuary. Much of the freshwater

inflow, however, is trapped upstream by the dams, canals, and reservoirs of California's water diversion projects, which provide vital water to industries, farms, homes, and businesses throughout the state. This freshwater diversion has sparked statewide controversy over possible adverse effects on the Estuary's water quality, fisheries, and ecosystem.

Flows in the ~~region~~ Region are highly seasonal, with more than 90 percent of the annual runoff occurring during the winter rainy season between ~~November~~ October and April. Many streams go dry during the middle or late summer. For example, the Napa River, which is least affected by upstream regulation, clearly shows the seasonal nature of runoff. Only 4.5 percent of this river's average annual runoff occurs during the summer months.

Groundwater is an important component of the hydrologic system in the ~~San Francisco Bay region~~ Region. Groundwater provides excellent natural storage, distribution, and treatment systems. Groundwater also supplies high quality water for drinking, irrigation, and industrial processing and service. As an important source of freshwater replenishment, groundwater may also discharge to surface streams, wetlands, and San Francisco Bay.

A variety of historical and ongoing industrial, urban, and agricultural activities and their associated discharges degrade ~~the~~ groundwater quality, including industrial and agricultural chemical spills, underground and aboveground tank and sump leaks, landfill leachate, septic tank failures, and chemical seepage via shallow drainage wells and abandoned wells. In addition, saltwater intrusion directly attributed to over-pumping has degraded the purity of some groundwater aquifers.

These adverse impacts on groundwater quality often have long-term effects that are costly to remediate. Consequently, as additional discharges are identified, source removal, pollution containment, and cleanup must be undertaken as quickly as possible. Activities that may potentially pollute groundwater must be managed to ensure that groundwater quality is protected.

1.3 PROTECTING SAN FRANCISCO BAY: THE ~~REGIONAL BOARD~~WATER BOARD

Because of its unique characteristics, the San Francisco Bay estuarine system merits special protection. The adverse effects of waste discharges must be controlled. Extensive upstream water diversions must be limited, and their effects mitigated. To address these and other water issues, the California Legislature established the State Water Resources Control Board (~~State Board~~State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards) in 194~~9~~~~67~~. Operating under the provisions of the California Water Code (Water Code), their unique relationship couples 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 for effective state administration of federal water pollution control laws.

ORGANIZATION OF THE CALIFORNIA
ENVIRONMENTAL PROTECTION AGENCY (graphic)

The ~~State Board~~State Water Board administers water rights, water pollution control, and water quality functions for the state as part of the California Environmental Protection Agency (Cal/EPA). It provides policy guidance and budgetary authority to the Regional Water ~~Quality Control~~ Boards, which conduct planning, permitting, and enforcement activities. The ~~State Board~~State Water Board shares authority for implementation of the federal **Clean Water Act** and the state **Porter-Cologne Act** with the Regional ~~Board~~Water Boards.

The San Francisco Bay Regional Water Quality Control Board (~~Regional Board~~Water Board) regulates surface water and groundwater quality in the ~~San Francisco Bay~~ Region. The area under the ~~Regional Board~~Water Board's jurisdiction comprises all of the San Francisco Bay segments extending to the mouth of the Sacramento-San Joaquin Delta (Winter Island near Pittsburg).

California's governor appoints the nine-member ~~Regional Board~~Water Board, whose members serve for four-year terms. Water Board members must reside or maintain a place of business within the ~~region~~ Region and must be associated with or have special knowledge of specific activities related to water quality control. Members of the ~~Regional Board~~Water Board serve without pay and conduct their business at regular meetings and frequent public hearings where public participation is encouraged.

The ~~Regional Board~~Water Board's overall mission is to protect surface waters and ~~groundwaters~~groundwater in the Region~~of the San Francisco region~~. The ~~Regional Board~~Water Board carries out its mission by:

- Addressing ~~region~~ Region-wide water quality concerns through the creation and triennial update of a Water Quality Control Plan (Basin Plan);
- Preparing new or revised policies addressing ~~region~~ Region-wide water quality concerns;
- Adopting, monitoring compliance with, and enforcing waste discharge requirements and National Pollutant Discharge Elimination System (NPDES) permits;
- Providing recommendations to the ~~State Board~~State Water Board on financial assistance programs, proposals for water diversion, budget development, and other statewide programs and policies;

- Coordinating with other public agencies that are concerned with water quality control; and

- Informing and involving the public on water quality issues.

1.4 WATER QUALITY CONTROL PLAN

By law, the ~~Regional Board~~Water Board is required to develop, adopt (after public hearing), and implement a ~~Water Quality Control Plan (~~Basin Plan~~)~~ for the ~~San Francisco Bay region~~ Region. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the ~~San Francisco Bay region~~ Region. The plan must include:

• A statement of beneficial water uses that the ~~Regional Board~~Water Board will protect;

• The water quality objectives needed to protect the designated beneficial water uses; and

• The strategies and time schedules for achieving the water quality objectives.

The ~~Regional Board~~Water Board first adopted a plan for waters inland from the Golden Gate in 1968. After several revisions, the first comprehensive ~~Water Quality Control Plan~~ Basin Plan for the ~~region~~ Region was adopted by the ~~Regional Board~~Water Board and approved by the ~~State Board~~State Water Board in April 1975. Subsequently, major revisions were adopted in 1982, 1986, 1992, 1995, 2002, and 2004~~1995~~. Each proposed amendment to the Basin Plan is subject to an extensive public review process. The ~~Regional Board~~Water Board must then adopt the amendment, which is then subject to approval by the ~~State Board~~State Water Board. In most cases, the **Office of Administrative Law** and the **U.S. Environmental Protection Agency** (U.S. EPA) must approve the amendment as well.

The basin planning process drives the ~~Regional Board~~Water Board's effort to manage water quality. The Basin Plan provides a definitive program of actions designed to preserve and enhance water quality and to protect beneficial uses in a manner that will result in maximum benefit to the people of California. The Basin Plan fulfills the following needs:

- The U.S. EPA ~~Environmental Protection Agency~~ requires such a plan in order to allocate federal grants to cities and districts for construction of wastewater treatment facilities.

- The Basin Plan provides a basis for establishing priorities as to how both state and federal grants are disbursed for constructing and upgrading wastewater treatment facilities.

- The Basin Plan fulfills the requirements of the **Porter-Cologne Act** that call for water quality control plans in California.

- The Basin Plan, by defining the resources, services, and qualities of aquatic ecosystems to be maintained, provides a basis for the ~~Regional Board~~Water Board to establish or revise waste discharge requirements and for the ~~State Board~~State Water Board to establish or revise water rights permits.

- The Basin Plan establishes conditions (discharge prohibitions) that must be met at all times.

- The Basin Plan establishes or indicates water quality standards applicable to waters of the Region, as required by the federal Clean Water Act.

- The Basin Plan establishes water quality attainment strategies, including total maximum daily loads (TMDLs) required by the Clean Water Act, for pollutants and water bodies where water quality standards are not currently met.

The intent of this comprehensive planning effort is to provide positive and firm direction for future water quality control. However, adequate provision must be made for changing conditions and technology. The ~~Regional Board~~Water Board will review the Basin Plan at least once every three years. Unlike traditional plans, which often become obsolete within a few years after their preparation, the Basin Plan is updated as deemed necessary to maintain pace with technological, hydrological, political, and physical changes in the ~~region~~ Region.

This Basin Plan contains water quality regulations adopted by the Water Board, and approved by the State Water Board, the Office of Administrative Law, and U.S. EPA. It also contains statewide regulations adopted by the State Water Board and other state agencies that refer to activities regulated by the Water Board. For the most recent ~~and comprehensive~~ list of statewide regulations applicable in the Region, please refer to the State Water Board's **Compendium of Current, Statewide Applicable Water Quality Regulations**. Federal laws and regulations also specify water quality standards and are available at **U.S. EPA's website**.

1.5 WATERSHED MANAGEMENT PLANNING

In 1995, the Water Board initiated a watershed management approach to regulating water quality, expanding its primary focus from point sources of pollution to include more diffuse sources such as urban and agricultural runoff. A five-year statewide **Strategic Plan** was completed in 2001 and guides the water resource protection efforts by the State and Regional Water Boards. A key component of the Strategic Plan is the Watershed Management Initiative (WMI).

A watershed is the area of land drained by a stream or river system. It is where water precipitates and collects, extending from ridges down to the topographic low points where the water drains into a river, bay, ocean, or other water body. A watershed includes surface water bodies (e.g., streams, rivers, lakes, reservoirs, wetlands, and estuaries), groundwater (e.g., aquifers and groundwater basins) and the surrounding landscape. Watershed management is a strategy for protecting water quality in all water bodies by looking at all components that make up a watershed area, including the natural environment, water supply, land uses and their effects on drainage, wastewater collection and discharges, and the ways humans interact with the water bodies.

In the Water Board's watershed management approach to water quality protection, water resource problems are identified and prioritized primarily on the basis of water quality within individual watersheds (i.e., the geographic drainage areas and groundwater basins used for management purposes). Unique solutions are developed for each watershed that consider all local conditions and pollution sources and rely on the input and involvement of local stakeholders. Major features of a watershed management approach are: targeting priority problems based on water quality information and monitoring, promoting stakeholder involvement in prioritization and management decisions, developing integrated solutions that make use of the expertise and authority of multiple agencies and organizations, and measuring success through monitoring and other collected data. The approach culminates in the creation and implementation of "watershed action plans."

The water quality of many water bodies continues to be degraded from pollutants discharged from diffuse sources, referred to as nonpoint sources, and from the cumulative impacts of multiple point sources such as drainage from urban areas, known as urban runoff. This degradation persists despite successful pollutant reduction efforts in the regulation of municipal and industrial wastewater point source discharges through the NPDES program. Watershed management represents a shift from the approach that focuses on regulation of point sources to a more regional approach that acknowledges environmental impacts from all activities, and prioritizes regulation of these activities with input from local stakeholders.

Watersheds transcend political, social, and economic boundaries. It is important to engage all affected stakeholders in designing and implementing goals for the watershed to protect water quality. Groups formed to create watershed action plans may include representatives from all levels of government, public interest groups, industry, academic institutions, private landowners, concerned citizens and others. Tasks in a watershed action plan could include a wide range of actions, such as improving coordination between regulatory and permitting agencies, increasing citizen participation in watershed planning activities, improving public education on water quality and protection issues, and enforcing current regulations on a more consistent and prioritized basis.

~~The Regional Board has administered the NPDES program for nearly two decades to control municipal and industrial wastewater discharges. At the same time, however, urban and agricultural runoff have continued, for the most part unchecked. Stormwater runoff now contributes much of the pollutant loading to rivers, streams, bays, lakes, and~~

~~lagoons in the San Francisco Bay region. Over the next few years, the Regional Board will focus a significant amount of effort on controlling pollution from urban and agricultural runoff. The emphasis will be on preventing pollution before it occurs by managing resources more carefully, as opposed to cleaning up pollution after the fact. To help accomplish this goal, the Regional Board is initiating watershed management planning for several counties. The Regional Board firmly believes that watershed planning and protection efforts will not be effective unless solutions are defined and implemented at the local level. An effective watershed management plan will require formulating water quality goals and objectives for watershed protection and enhancement, then committing to specific tasks that will eventually allow the objectives, and ultimately the goals, to be met.~~

1.6 THE SAN FRANCISCO ESTUARY PROJECT

The ~~Regional Board~~Water Board has been an active participant in the **San Francisco Estuary Project** (Estuary Project), a cooperative program aimed at promoting effective, environmentally sound management of the San Francisco Bay Estuary while protecting and restoring its natural resources. In 1993, the Estuary Project reached its goal of developing a **Comprehensive Conservation and Management Plan** (CCMP). The CCMP addresses five critical concerns identified by the Estuary Project's broad-based advisory committees: decline of biological resources; increased pollutants; freshwater diversion and altered flow regime; dredging and waterway modification; and intensified land use.

Implementation of the CCMP's over 140 recommended actions has been ongoing since the early 1990s~~is now underway~~. The ~~Regional Board~~Water Board ~~will~~ serves as lead state agency, undertaking responsibility for ensuring that CCMP actions are carried out. The Estuary Project's Public Involvement and Education Program, which seeks to inform and involve the public in Estuary issues, is currently housed at the ~~Regional Board~~Water Board's office~~s~~.

CHAPTER 2 BENEFICIAL USES

2.1 DEFINITIONS OF BENEFICIAL USES

2.1.1 (AGR) AGRICULTURAL SUPPLY

2.1.2 (ASBS) AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

Areas designated by the State Water ~~Resources Control~~ Board.

These include marine life refuges, ecological reserves, and designated areas where the preservation and enhancement of natural resources requires special protection. In these areas, alteration of natural water quality is undesirable. The areas that have been designated as ASBS in this ~~region~~ Region are Bird Rock, Point Reyes Headland Reserve and Extension, Double Point, Duxbury Reef Reserve and Extension, Farallon Islands, and James V. Fitzgerald Marine Reserve, depicted in **Figure 2-1**. The 2001 **California Ocean Plan** (see **Chapter 5**) prohibits waste discharges into, and requires wastes to be discharged at a sufficient distance from, these areas to assure maintenance of natural water quality conditions. These areas have been designated as a subset of State Water Quality Protection Areas per the **Public Resources Code**. ~~The State Ocean Plan (see Chapter 5) requires wastes to be discharged at a sufficient distance from these areas to assure maintenance of natural water quality conditions. As of 2003, these areas have been re-designated by the State Water Board as State Water Quality Protection Areas.~~

2.1.3 (COLD) COLD FRESHWATER HABITAT

2.1.4 (COMM) OCEAN, COMMERCIAL, AND SPORT FISHING

2.1.5 (EST) ESTUARINE HABITAT

2.1.6 (FRSH) FRESHWATER REPLENISHMENT

2.1.7 (GWR) GROUNDWATER RECHARGE

2.1.8 (IND) INDUSTRIAL SERVICE SUPPLY

2.1.9 (MAR) MARINE HABITAT

2.1.10 (MIGR) FISH MIGRATION

2.1.11 (MUN) MUNICIPAL AND DOMESTIC SUPPLY

2.1.12 (NAV) NAVIGATION

2.1.13 (PRO) INDUSTRIAL PROCESS SUPPLY

2.1.14 (RARE) PRESERVATION OF RARE AND ENDANGERED SPECIES

2.1.15 (REC1) WATER CONTACT RECREATION

2.1.16 (REC2) NONCONTACT WATER RECREATION

2.1.17 (SHELL) SHELLFISH HARVESTING

2.1.18 (SPWN) FISH SPAWNING

2.1.19 (WARM) WARM FRESHWATER HABITAT

2.1.20 (WILD) WILDLIFE HABITAT

2.2 PRESENT AND POTENTIAL BENEFICIAL USES

2.2.1 SURFACE WATERS

Surface waters in the ~~region~~ Region consist of non-tidal wetlands, ~~freshwater~~ rivers, streams, and lakes (collectively described as inland surface waters), estuarine wetlands known as baylands, estuarine waters, and coastal waters. In this Region, ~~E~~estuarine waters consist ~~are comprised~~ of the Bay system including intertidal, tidal, and subtidal habitats from the Golden Gate to the Region's ~~regional~~ boundary near Pittsburg and the lower portions of streams that are affected by tidal hydrology ~~flowing into the Bay~~, such as the Napa and Petaluma rivers in the north and Coyote and San Francisquito creeks in the south.

Inland surface waters support or could support most of the beneficial uses described above. The specific beneficial uses for inland streams include municipal and domestic supply **(MUN)**, agricultural supply **(AGR)**, industrial process supply **(PRO)**, groundwater recharge **(GWR)**, water contact recreation **(REC1)**, noncontact water recreation **(REC2)**, wildlife habitat **(WILD)**, cold freshwater habitat **(COLD)**, warm

freshwater habitat **(WARM)**, fish migration **(MIGR)**, and fish spawning **(SPWN)**. The San Francisco Bay Estuary supports estuarine habitat **(EST)**, industrial service supply **(IND)**, and navigation **(NAV)** in addition to all of the uses supported by streams.

Coastal waters' beneficial uses include water contact recreation **(REC1)**; non-contact water recreation **(REC2)**; industrial service supply **(IND)**; navigation **(NAV)**; marine habitat **(MAR)**; shellfish harvesting **(SHELL)**; ocean, commercial and sport fishing **(COMM)**; and preservation of rare and endangered species **(RARE)**. In addition, the California coastline within the ~~San Francisco Bay Basin~~ Region is endowed with exceptional scenic beauty.

Beneficial uses of each significant water body have been identified and are organized according to the seven major ~~watersheds~~ hydrologic units within the ~~region~~ Region (**Figure 2-2**). **Table 2-1** contains the beneficial uses for water bodies that have been designated in the Region. The maps locating each water body (**Figures 2-3 through 2-9**) ~~and tables keyed to each map (**Tables 2-1** through 2-7) describing associated present and potential beneficial uses~~ were produced using a geographical information system (GIS) at the ~~Regional Board~~Water Board. The maps use the hydrologic basin information compiled by the **California Interagency Watershed** map, with supplemental information from the **Oakland Museum of California Creek and Watershed Map Series**, the **Contra Costa County Watershed Atlas**, and the **San Francisco Estuary Institute EcoAtlas**. More detailed representations of each location can be created using this ~~computerized~~ GIS version.

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~~ Richardson Bay or shellfish harvesting in the Pacific Ocean. In these cases, the ~~Regional Board~~Water Board's judgment regarding water quality control measures necessary to protect beneficial uses will be applied.

2.2.2 GROUNDWATER~~S~~

Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it can be defined as an aquifer. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.

Water-bearing geologic units occur within groundwater basins in the ~~region~~ Region that do not meet the definition of an aquifer. For instance, there are shallow, low permeability zones throughout the ~~region~~ Region that have extremely low water yields. Groundwater may also occur outside of currently identified basins. Therefore, for basin planning purposes, the term "groundwater" includes all subsurface waters, whether or not these

waters meet the classic definition of an aquifer or occur within identified groundwater basins.

The **California Department of Water Resources** (DWR) evaluated ~~T~~the characteristics of the ~~areal extent of~~ groundwater basins in the ~~region~~Region and throughout the state and summarized the results in **California's Groundwater, Bulletin 118 (2003).** ~~has been evaluated by the Department of Water Resources (DWR) (Bulletin 118, 1980~~ Of special importance to the ~~region~~ Region are the 28 ~~31~~ groundwater basins and seven sub-basins classified by DWR that produce, or potentially could produce, significant amounts of groundwater~~.~~ ~~**Table 2-82** summarizes the hydrogeologic characteristics of basins depicted in~~ **(Figures 2-10 and 2-10A-D)**. ~~This~~ The Water Board maintains a GIS for all water bodies in the Region and ~~computer groundwater mapping GIS system was developed by the Regional Board and~~ has the capacity to present information on each basin at a much higher level of resolution than is depicted in **Figure 2-10a-d**.

Existing and potential beneficial uses applicable to groundwater in the ~~region~~ Region include municipal and domestic water supply (**MUN**), industrial water supply (**IND**), industrial process ~~water~~ supply (**PRO~~C~~**), agricultural water supply (**AGR**), groundwater recharge (**GWR**), and freshwater replenishment to surface waters (**FRESH**). **Table 2-~~9~~2** lists the 28 ~~31~~ identified groundwater basins and seven sub-basins located in the ~~region~~ Region and their existing and potential beneficial uses.

Unless otherwise designated by the ~~Regional Board~~Water Board, all ~~groundwaters~~groundwater is ~~are~~ considered suitable, or potentially suitable, for municipal or domestic water supply (**MUN**). In making any exceptions, the ~~Regional Board~~Water Board will consider the criteria referenced in ~~Regional Board~~ **State Water Board Resolution No. 88-63** and **Water Board Resolution No. 89-39**, "Sources of Drinking Water," where:

- The total dissolved solids exceed 3,000 milligrams per liter (mg/L~~l~~) (5,000 microSiemens per centimeter, µS/cm, electrical conductivity), and it is not reasonably expected by the ~~Regional Board~~Water Board that the groundwater could supply a public water system; or

- There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices (BMPs) or best economically achievable treatment practices; or

- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or

- The aquifer is regulated as a geothermal energy-producing source or has been exempted administratively pursuant to **40 Code of Federal Regulations (CFR) Part 146.4** ~~(revised April 1, 1983)~~ for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy,

provided that these fluids do not constitute a hazardous waste under **40 CFR Part 261.3** ~~revised October 30, 1992).~~

2.2.3 WETLANDS

Federal administrative law (e.g., **40 CFR Part 122.2**, revised December 22, 1993) defines wetlands as waters of the United States. National waters include waters of the State of California, defined by the **Porter-Cologne Act** as "any water, surface or underground, including saline waters, within the boundaries of the State~~.~~" (**California Water Code ~~CWC~~ Section 13050[e]**). Wetland~~s~~ water quality control is therefore clearly within the jurisdiction of the State Water Board and Regional ~~Board~~Water Boards.

Wetlands are further 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 generally include swamps, marshes, bogs, and similar areas."

The ~~Regional Board~~Water Board recognizes that wetlands frequently include areas commonly referred to as saltwater marshes, freshwater marshes, open or closed brackish water marshes, mudflats, sandflats, unvegetated seasonally ponded areas, vegetated shallows, sloughs, wet meadows, playa lakes, natural ponds, vernal pools, diked baylands, seasonal wetlands, floodplains, and riparian woodlands.

Mudflats make up one of the largest and most important habitat types in the ~~San Francisco~~ Estuary. Snails, clams, worms, and other animals convert the rich organic matter in the mud bottom to food for fish, crabs, and birds. Mudflats generally support a variety of edible shellfish, and many species of fish rely heavily on the mudflats during at least a part of their life cycle. Additionally, San Francisco Bay mudflats are one of the most important habitats on the coast of California for millions of migrating shorebirds.

Another important characteristic of the ~~San Francisco~~ Estuary is the fresh, brackish, and salt-water marshes around the Bay's margins. These highly complex communities are recognized as vital components of the Bay system's ecology. Most marshes around the Bay have been destroyed through filling and development. The protection, preservation, and restoration of the remaining marsh communities are essential for maintaining the ecological integrity of the ~~San Francisco~~ Estuary.

Identifying wetlands may be complicated by such factors as the seasonality of rainfall in the ~~region~~Region. Therefore, in identifying wetlands considered waters of the United States,, the ~~Regional Board~~Water Board will consider such indicators as hydrology, hydrophytic plants, and/or hydric soils for the purpose of mapping and inventorying wetlands. The ~~Regional Board~~Water Board will, in general, rely on the federal manual for wetland~~s~~ delineation in ~~this region~~ the Region when issuing ~~for~~ Clean Water Act Section

401 water quality certifications ~~404 permits (Federal Manual for Identifying and Delineating Jurisdictional Wetlands, 1989; (~~U.S. Army Corps of Engineers (Corps)~~, U.S. EPA, U.S. Fish and Wildlife Service, and U.S. Soil Conservation Service, Washington, D.C., Cooperative Technical Publication)~~ **Wetlands Delineation Manual, 1987**). In the rare cases where the U.S. EPA and ~~Corps~~ Corps guidelines disagree on the boundaries for federal jurisdictional wetlands, the ~~Regional Board~~Water Board will rely on the wetlands delineation made by the U.S. EPA or the California Department of Fish and Game (CDFG). For the purpose of mapping and inventorying wetlands, the Water Board will rely on the protocols and naming conventions of the **National Wetlands Inventory** (NWI) prepared by the **U.S. Fish And Wildlife Service** (USFWS).

Many individual wetlands provide multiple benefits depending on the wetland type and location. There are many potential beneficial uses of wetlands, including Wildlife Habitat (**WILD**); Preservation of Rare and Endangered Species (**RARE**); Shellfish Harvesting (SHELL); Water Contact Recreation (**REC1**); Non-contact Water Recreation (**REC2**); Ocean, Commercial, and Sport Fishing (**COMM**); Marine Habitat (**MAR**); Fish Migration (**MIGR**); Fish Spawning (**SPAWN**); and Estuarine Habitat (**EST**). Some of these general beneficial uses can be further described in terms of their component wetland function. For example, many wetlands that provide groundwater recharge (GWR) also provide flood control, pollution control, erosion control, and stream baseflow.

Table 2-3 shows how beneficial uses are associated with different wetland types. **Table 2-~~10~~3** lists and specifies beneficial uses for 34 significant wetland areas within the ~~region~~Region; generalized locations of these wetlands are shown in **Figure 2-11**. It should be noted that most of the wetlands listed in **Table 2-~~10~~3** are saltwater marshes, and that the list is not comprehensive. ~~The Regional Board is facilitating the preparation of a Regional Wetlands Management Plan (RWMP) that will identify and specify beneficial uses of many additional significant wetlands.~~

The Water Board has participated in completing the **Baylands Ecosystem Habitat Goals Report (1999)** and the **Baylands Ecosystem Species and Community Profiles (2000),** which were written by scientists and managers in the Region in order to recommend sound wetland restoration strategies. Other efforts around the Bay to locate wetland sites include **San Francisco Estuary Institute (SFEI)'s** EcoAtlas Baylands Maps (**Baylands Maps**) and **Bay Area Wetlands Project Tracker (Wetlands Tracker)**, and the **Wetland Tracker** managed by the **San Francisco Bay Joint Venture**. Because of the large number of small and non-contiguous wetlands, it ~~will probably not be~~ is not practical to delineate and specify beneficial uses of every wetland area. Therefore, beneficial uses may be determined site-specifically, as needed. Chapter 4 of this Plan contains additional information on wetland protection and management and on the process used to determine beneficial uses for specific wetland sites.

CHAPTER 3 WATER QUALITY OBJECTIVES

3.1 WATER QUALITY OBJECTIVES

3.2 OBJECTIVES FOR OCEAN WATERS

3.3 OBJECTIVES FOR SURFACE WATERS

3.3.1 BACTERIA

3.3.2 BIOACCUMULATION

3.3.3 BIOSTIMULATORY SUBSTANCES

3.3.4 COLOR

3.3.5 DISSOLVED OXYGEN

3.3.6 FLOATING MATERIAL

3.3.7 OIL AND GREASE

3.3.8 POPULATION AND COMMUNITY ECOLOGY

3.3.9 pH

3.3.10 RADIOACTIVITY

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. Waters designated for use as domestic or municipal supply shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of **Title 22 of the California Code of Regulations** (CCR), which is incorporated by reference into this Plan. This incorporation is prospective, including future changes to the incorporated provisions as the changes take effect (see **Table 3-5**).

3.3.11 SALINITY

3.3.12 SEDIMENT

3.3.13 SETTLEABLE MATERIAL

3.3.14 SUSPENDED MATERIAL

3.3.15 SULFIDE

3.3.16 TASTES AND ODORS

3.3.17 TEMPERATURE

3.3.18 TOXICITY

3.3.19 TURBIDITY

3.3.20 UN-IONIZED AMMONIA

3.3.21 OBJECTIVES FOR SPECIFIC CHEMICAL CONSTITUENTS

3.3.22 CONSTITUENTS OF CONCERN FOR MUNICIPAL AND AGRICULTURAL WATER SUPPLIES

At a minimum, surface waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the following provisions of **Title 22**, ~~of the California Code of Regulations,~~ which are incorporated by reference into this plan. Table~~s~~ 64431-A (Inorganic Chemicals) of Section 64431, ~~and 64431-B~~ Table 64433.2-A (Fluoride) of Section ~~64431~~ 64433.2, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (SMCLs-Consumer Acceptance Limits) and 64449-B (SMCLs-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. **Table 3-5** contains water quality objectives for municipal supply, including the MCLs contained in various sections of Title 22 as of the adoption of this plan.

3.4 OBJECTIVES FOR ~~GROUNDWATERS~~GROUNDWATER

Groundwater objectives consist primarily of narrative objectives combined with a limited number of numerical objectives. Additionally, the ~~Regional Board~~Water Board will establish basin- and/or site-specific numerical groundwater objectives as necessary. For example, the ~~Regional~~ Water Board has groundwater basin-specific objectives for the Alameda Creek watershed above Niles to include the Livermore-Amador Valley as shown in **Table 3-7**.

> *The maintenance of existing high quality of groundwater (i.e., "background") is the primary groundwater objective.*

In addition, at a minimum, ~~groundwaters~~groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor in

excess of the objectives described below unless naturally occurring background concentrations are greater. Under existing law, the Water Board regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards.

3.4.1 BACTERIA

In ~~groundwaters~~groundwater with a beneficial use of municipal and domestic supply, the median of the most probable number of coliform organisms over any seven-day period shall be less than 1.1 most probable number per 100 milliliters (MPN/100 mL) (based on multiple tube fermentation technique; equivalent test results based on other analytical techniques as specified in the **National Primary Drinking Water Regulation, 40 CFR, Part 141.21 (f)**, revised June 10, 1992, are acceptable).

3.4.2 ORGANIC AND INORGANIC CHEMICAL CONSTITUENTS

All ~~groundwaters~~groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. To evaluate compliance with water quality objectives, the ~~Regional Board~~Water Board will consider all relevant and scientifically valid evidence, including relevant and scientifically valid numerical criteria and guidelines developed and/or published by other agencies and organizations (e.g., **U.S. Environmental Protection Agency** (U.S. EPA), State Water ~~Resources Control~~ Board, California **Department of Health Services** (DHS), **U.S. Food and Drug Administration**, **National Academy of Sciences**, **California Environmental Protection Agency's** (Cal/EPA) **Office of Environmental Health Hazard Assessment** (OEHHA), **U.S. Agency for Toxic Substances and Disease Registry**, Cal/EPA's **Department of Toxic Substances Control** (DTSC), and other appropriate organizations.)

At a minimum, ~~groundwaters~~groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the ~~following~~ provisions of **Title 22**. ~~of the California Code ofRegulations,~~ which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) of Section 64431, ~~and 64431-B~~ Table 64433.2-A (Fluoride) of Section ~~64431~~ 64433.2, and Table 64444-A (Organic Chemicals) of Section 64444. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect (See **Table 3-5**).

~~Groundwaters~~Groundwater with a beneficial use of agricultural supply shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. In determining compliance with this objective, the ~~Regional Board~~Water Board will consider as evidence relevant and scientifically valid water quality goals from sources such as the Food and Agricultural Organizations of the United Nations; University of California Cooperative Extension, Committee of Experts; and McKee and Wolf's "Water Quality Criteria," as well as other relevant and scientifically valid evidence. At a minimum, ~~groundwaters~~groundwater designated for use as agricultural supply (**AGR**) shall not contain concentrations of constituents in excess of the levels specified in **Table 3-6**.

~~Groundwaters~~Groundwater with a beneficial use of freshwater replenishment shall not contain concentrations of chemicals in amounts that will adversely affect the beneficial use of the receiving surface water.

~~Groundwaters~~Groundwater with a beneficial use of industrial service supply or industrial process supply shall not contain pollutant levels that impair current or potential industrial uses.

~~To assist dischargers and other interested parties, the Central Valley Regional Board's staff has compiled many numerical water quality criteria from other appropriate agencies and organizations in its staff report, "A Compilation of Water Quality Goals." This staff report is updated regularly to reflect changes in these numerical criteria.~~

3.4.3 RADIOACTIVITY

At a minimum, ~~groundwaters~~groundwater designated for use as domestic or municipal supply (**MUN**) shall not contain concentrations of radionuclides in excess of the ~~maximum contaminant levels (~~MCLs~~)~~ specified in Table 4 (Radioactivity) of Section 64443 of **Title 22.** ~~of the California Code of Regulations,~~ which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect (See **Table 3-5**).

3.4.4 TASTE AND ODOR

~~Groundwaters~~Groundwater designated for use as domestic or municipal supply (MUN) shall not contain taste- or odor-producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, ~~groundwaters~~groundwater designated for use as domestic or municipal supply shall not contain concentrations in excess of the ~~secondary maximum contaminant levels (Secondary~~ SMCLs~~)~~ specified in Tables 64449-A (Secondary MCLs-Consumer Acceptance Limits) and 64449-B

(Secondary MCLs-Ranges) of Section 64449 of **Title 22.** ~~of the California Code of Regulations,~~ which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect (See **Table 3-5**).

3.5 OBJECTIVES FOR THE DELTA ~~AND SUISUN MARSH~~

The objectives contained in the State Water Board's 1995 "**Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary**~~and Suisun Marsh~~" and any revisions thereto shall apply to the waters of the Sacramento-San Joaquin Delta and adjacent waters as specified in that plan ~~and Suisun Marsh~~.

3.6 OBJECTIVES FOR ALAMEDA CREEK WATERSHED

The water quality objectives contained in **Table 3-7** apply to the surface and groundwater~~s~~ of the Alameda Creek watershed above Niles.

Wastewater discharges that cause the surface water limits in **Table 3-7** 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~~ Water Board.

CHAPTER 4 IMPLEMENTATION

INTRODUCTION

The San Francisco Bay Regional Water Quality Control Board (Water Board)'s overall mission is to protect the beneficial uses supported by the quality of the San Francisco Bay Region (Region)'s ~~Basin's~~ surface water and ground-water~~s~~. Together, the beneficial uses described in detail in Chapter 2 define the resources, services, and qualities of aquatic ecosystems that are the ultimate goals of protecting and achieving water quality. The objectives presented in Chapter 3 present a framework for determining whether water quality is indeed supporting these beneficial uses. This chapter describes in detail the ~~Regional Board~~Water Board's regulatory programs and specific plans of action for meeting water quality ~~those~~ objectives and protecting beneficial uses.

The descriptions of specific actions to be taken by local public entities and industries to comply with the policies and objectives of this Water Quality Control Plan (Basin Plan) are intended for the guidance of local officials. The ~~Regional Board~~Water Board will consider any proposed alternative actions that are consistent with and achieve the policies and objectives of the Basin Plan.

This chapter ~~first~~ describes the watershed management conceptual framework for water quality control in the Region and ~~. Next, it~~ presents each of the individual regulatory programs that form part of this comprehensive approach. These programs are organized into general ~~five~~ categories, including ~~(1)~~ surface water protection and management, ~~point source control, (2) surface water protection and management - nonpoint source control, (3)~~ groundwater protection and management, wetland protection and management, and ~~(4)~~ emerging program areas. ~~, and (5) continuing planning.~~ Taken together, these programs constitute an integrated, comprehensive water quality control program that is protective, efficient, and flexible.

4.1 THE WATERSHED- MANAGEMENT APPROACH

In 1995, the Water Board initiated a watershed management approach to regulating water quality, expanding its primary focus from point sources of pollution to include more diffuse sources such as urban and agricultural runoff. A five-year statewide **Strategic Plan**, initiated in 1995 and last updated in 2001, guides the water resource protection efforts of the State and Regional Water Boards. A key component of the Strategic Plan is the Watershed Management Initiative (WMI), which promotes a watershed management approach for water quality protection as discussed in **Chapter 1**.

The WMI is designed to integrate various surface water and groundwater regulatory programs while promoting cooperative, collaborative efforts within a watershed that are

designed to improve water quality and protect the beneficial uses of the watershed's water bodies. The WMI is also designed to focus limited funding and resources on the highest priority water quality issues identified by the Water Board in consultation with local stakeholders. The Water Board's strategy ~~and the State Water Board's overall coordinating approach to~~for the WMI is~~are~~ contained in the report ~~Chapter~~ titled, "**~~Integrated Plan for~~ ~~Implementation of the~~San Francisco Bay Regional Water Quality Control Board Watershed Management Initiative, Integrated Plan Chapter**." This report is a regularly updated planning tool for identifying priorities to be funded by existing resources, as well as priority tasks that are currently not funded. For each update, activities are planned over the next one to two years, and in some cases, over the next five years. The report also contains descriptions of regional and watershed strategies, discusses how the Water Board is structured to implement the WMI, and how the Water Board is implementing a priority-setting process. The WMI builds upon the progress made to date by the Water Board's efforts, combined with local watershed efforts led by other entities, and it also identifies tasks to be accomplished to fully implement the WMI. Examples of local implementation of the WMI are included in **Section 4.1.3 Watershed Management in Countywide Programs and Individual Watersheds**.

To implement the WMI in the Region, there are three levels of watershed management: 1) region-wide, 2) countywide, and 3) in sub-watersheds. This watershed management process is flexible and recognizes the existing institutional structures that can implement watershed management to protect water quality.

~~The watershed approach consists of programs aimed at three different levels:~~

~~1) The larger San Francisco Bay Estuary,~~

~~2) Smaller segments within the Estuary, and~~

~~3) Individual watersheds draining into the larger system.~~

~~A major part of the~~Some water quality issues are managed at the region-wide level. For example, the Water~~Regional~~ Board's water quality control program focuses in part on managing the influx of toxic pollutants to the ~~larger San Francisco Bay~~ Estuary's aquatic system, described in **Section 4.1.2 Toxic Pollutant Management in the San Francisco Bay Estuary System**. The ~~overall~~ goal of this~~ese~~ program~~s~~ element is to limit the total amount of pollutants in the entire system to ensure protection of beneficial uses. In cases where evidence suggests beneficial uses are not protected due to specific pollutants in the system, the program described in **Section 4.1.1 Water Quality Attainment Strategies Including Total Maximum Daily Loads** is initiated.

Other water quality issues are managed at the countywide level. The Region includes portions of nine counties, which all include shoreline on the Bay, permitted discharges to the Bay, and watershed drainage to the Bay. These institutions are therefore well suited to organize and/or participate in a watershed management approach at the countywide level,

forming stakeholder groups that include municipalities, other organizations, and members of the public. Examples are discussed in **Section 4.1.3 Watershed Management in Countywide Programs and Individual Watersheds**. For example, several urban runoff management programs are organized at this countywide level.

Sub-watershed level watershed management occurs within the county-wide framework, as a result of priority setting that is strongly influenced by local input.

~~Regardless of whether the focus is on the whole system or on a single creek, watershed management involves ongoing research, investigation, and monitoring, along with control measures or changes in practice. The next three sections present the conceptual framework around which the Regional Board's water quality programs are structured.~~

4.1.1 WATER QUALITY ATTAINMENT STRATEGIES INCLUDING TOTAL MAXIMUM DAILY LOADS

The ~~Regional~~ Water Board intends to establish Water Quality Attainment Strategies (WQAS) including Total Maximum Daily Loads (TMDLs) where necessary and appropriate to ensure attainment and maintenance of water quality standards. WQAS and TMDLs for the Region are described in **Chapter 7**. **Section 303(d) of the federal Clean Water Act** requires states to identify water bodies that are not attaining water quality standards, and to establish TMDLs for pollutants causing the impairment (non-attainment of water quality standards) of listed water bodies. As such, TMDLs are the pollutant load levels necessary to attain the applicable water quality standards. A complete TMDL refers to the process and elements associated with establishing a TMDL that include, but are not limited to, problem statement, numeric target(s), source analysis, linkage analysis, wasteload and load allocations, implementation plan, and monitoring plan.

~~Water Quality Attainment Strategies~~ WQAS are development and implementation actions associated with implementing (attaining) water quality standards. Complete TMDLs are WQAS, but WQAS are not limited to 303(d)-list pollutants. For example, they may be developed for pollutants for which threat of impairment provides cause for pollution prevention actions and related activities. WQAS may contain, but not necessarily include, all or some of the complete TMDL elements.

The ~~Regional Board~~Water Board will establish WQAS ~~Water Quality Attainment Strategies~~ including TMDLs at the level (~~larger San Francisco~~the Estuary, smaller segments within the Estuary, or individual watersheds) deemed most appropriate in terms of effectiveness and efficiency relative to the applicable water quality standard, types and locations of pollutant sources, and type and scale of implementation actions.

4.1.2 TOXIC POLLUTANT MANAGEMENT IN THE ~~LARGER SAN FRANCISCO BAY~~ ESTUARY ~~SYSTEM~~

~~INTRODUCTION~~

The ~~Regional Board~~Water Board's water quality programs began ~~nearly three~~ decades ago with a focus on controlling the discharge of point sources of pollution such as municipal sewage and industrial wastewater. Since then, highly effective waste treatment systems have been built, essentially eliminating what had been major water quality problems associated with high nutrient and organic loading. In addition, the overall influx of toxic pollutants from point sources has significantly declined as a result of these efforts. Still, certain toxic pollutants remain a great concern.

The focus of efforts to attain water quality goals has ~~shifted~~ expanded accordingly. Further reductions in point source pollutant loadings are being attained through complex, innovative programs often involving numerous public agencies and private organizations. Loading from diffuse ~~nonpoint~~ sources, such as urban and agricultural runoff, had until recently~~,~~ continued largely unchecked. These ~~nonpoint~~ sources are now generally considered to be the largest source of pollutants to aquatic systems. ~~New~~ Water Board programs aim to reduce this diffuse pollutant loading.

4.1.2.1 NUMERIC WATER QUALITY OBJECTIVES: WASTELOAD ALLOCATIONS
4.1.2.2 TOXIC POLLUTANT ACCUMULATION: MASS-BASED STRATEGIES
4.1.2.3 SCIENTIFIC RESEARCH: ONGOING REFINEMENT OF PROGRAMS
4.1.2.4 RIVERINE FLOWS, SYSTEM FLUSHING, AND POLLUTANT LOADING

~~TOXIC POLLUTANT MANAGEMENT IN SEGMENTS OF THE SAN FRANCISCO BAY ESTUARY~~

~~LOCAL WASTELOAD ALLOCATION~~

~~Protection of aquatic systems in the immediate vicinity of identified discharges is the second component of water quality control in the larger Estuary system. This approach is based on attaining objectives near discharges, and thereby providing a reasonable level of protection for the whole system.~~

~~Because of the high degree of uncertainty regarding pollutant fate and transport in the larger Estuary system, local wasteload allocation drives many of the Regional Board~~Water Board~~'s current programs. This chapter's sections on point source control describe how this approach is implemented for effluents.~~

~~EFFLUENT TOXICITY CONTROL PROGRAM: LOCAL TOXICITY OBJECTIVES~~

~~The water quality objective for toxicity (see Chapter 3) is designed to protect beneficial uses against mixtures of pollutants typically found in aquatic systems. Toxicity is used because numerical objectives for individual pollutants do not take mixtures into account. The Regional BoardWater Board implements this objective through its Effluent Toxicity Control Program and by monitoring the toxicity of waters at or near discharge sites.~~

~~The long-term goal of the Effluent Toxicity Control Program (ETCP) is to develop water quality-based effluent limits using information about the acute and chronic toxicity of each discharge and resulting toxicity in the receiving water. The toxicity approach is identical to meeting numerical water quality objectives near discharges, except that it includes the development of sophisticated toxicity objectives that are specific both to the Bay and characteristics of local discharges.~~

~~LOCAL TOXIC POLLUTANT ACCUMULATION~~

~~Some of the pollutants contained in nonpoint and point source discharge accumulate in sediment and/ or the tissue of aquatic organisms. In many cases, programs based on numerical objectives for individual pollutants and toxicity objectives do not fully consider the accumulation of these pollutants.~~

~~To address pollutant accumulation, the Regional BoardWater Board has initiated a program requiring major dischargers to monitor sediment and bioaccumulation near discharge sites. Information from such local-effects monitoring is then assessed in conjunction with data collected by the Regional Monitoring Program (Chapter 6) and other research.~~

~~The goal of local-effects monitoring is to assure that the narrative objectives regarding pollutant accumulation in sediments and aquatic organisms are met in each segment of the Estuary.~~

~~TOXIC POLLUTANT MANAGEMENT IN INDIVIDUAL WATERSHEDS~~

Move the following sections to Chapter 7:

CHAPTER 7 WATER QUALITY ATTAINMENT STRATEGIES INCLUDING TOTAL MAXIMUM DAILY LOADS

7.1 Water Quality Attainment Strategy to Support Copper and Nickel Site-Specific Objectives South of the Dumbarton Bridge

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4.1.3 WATERSHED MANAGEMENT IN COUNTYWIDE PROGRAMS AND INDIVIDUAL WATERSHEDS

Protection of beneficial uses associated with the ~~larger San Francisco Bay~~ Estuary also depends upon achieving water quality goals within each of the watersheds draining to the Bay. Successful wasteload allocations depend upon limiting pollutant influx from nonpoint as well as point sources. In turn, nonpoint source control is dependent on a wide range of factors, including physical factors such as the geology and hydrological characteristics of an area; existing natural resources such as vegetation along streambanks; and a wide range of human activities.

Watershed management planning in each countywide program or individual watershed involves a series of steps. First, a detailed assessment of current conditions, including identification of existing or potential problems, is conducted. Next, the process attempts to bring together all affected stakeholders and interested parties to determine how they would manage their watershed. Finally, specific actions are taken during implementation of the countywide or local watershed action plan.

The ~~Regional Board~~Water Board firmly believes that watershed planning and protection efforts will not be effective unless solutions are defined and implemented at the local level. The following sections present four ~~two~~ examples of local watershed management planning activities supported by the ~~Regional Board~~Water Board.

4.1.3.1 THE NAPA ~~EXAMPLE~~RIVER WATERSHED

The ~~Regional Board~~Water Board has initiated county-level watershed management planning efforts. The first began in the Napa River Watershed ~~County~~ where depressed oxygen levels, high coliform levels, and sedimentation due to erosion were recurring problems in segments of the Napa River.

The ~~Regional Board~~Water Board initiated the planning process by preparing a complete resource evaluation in cooperation with a wide range of local public and private entities. This evaluation encompassed traditional evaluations of natural resources and also included descriptions of existing management and regulatory frameworks, funding, and tax incentive programs to support the local planning process.

The ~~Regional Board~~Water Board is supporting local agency staff, public officials, agricultural landowners, urban residents of Napa County, and the Napa Resource Conservation District in their efforts to define watershed management goals and specific actions that will eventually allow those goals to be met. In 1999, the Water Board issued waste discharge requirements (WDRs) for the Napa River Flood Control Project, which has set a national standard for innovative, community-based planning to ensure a "Living River" corridor along the Napa River that protects water quality, successfully integrating flood control, water quality, and habitat protection requirements.~~The Regional Board will support other county-level watershed management planning in a similar manner.~~

4.1.3.2 THE SANTA CLARA BASIN WATERSHED MANAGEMENT INITIATIVE

In 1996, the Water Board and the U.S. EPA initiated a broad stakeholder effort to encourage local stewardship in the Santa Clara basin as part of the statewide WMI. The Santa Clara basin is defined as the San Francisco Bay south of the Dumbarton Bridge and the watersheds draining to that segment of the Bay. The **Santa Clara Basin Watershed Management Initiative** is a broad-based stakeholder group of 32 signatories from local, state and federal public agencies, business and trade associations, and civic and environmental groups and programs. The declared purpose of this WMI is "to develop and implement a comprehensive watershed management program - one that recognizes that healthy watersheds mean addressing water quality problems and quality of life issues for the people, animals and plants that live in the watershed." This WMI *first* established a mission statement, goals, planning objectives for development of a watershed action plan, implementation objectives, and a framework for conducting a watershed assessment. The most outstanding successes of this WMI have been in sustaining organizational continuity, providing a forum for stakeholder input on regulatory actions, and producing a variety of outreach materials for the general public to assist in natural resource protection. This WMI has continued to develop its foundation by producing watershed assessments (2002), and a watershed action plan (2003), and by further developing its priorities for implementation to protect and improve water quality (2005).

4.1.3.3 THE TOMALES BAY WATERSHED

The Tomales Bay watershed in western Marin County is one of the major estuaries on the west coast of the United States. It has a diverse ecosystem and several notable tributaries, including Lagunitas Creek, which has one of the few remaining viable coho salmon runs in central California. In December 1999, the local citizens and state, federal, and local agencies formed the **Tomales Bay Watershed Council**. The Council produced a **Stewardship Plan for the Tomales Bay** watershed to ensure that water quality in Tomales Bay and its tributary streams is sufficient to support natural resources and beneficial uses. The plan also includes recommendations to restore and protect the integrity of natural habitats and native plant communities, which contribute to improved water quality. The Water Board has actively participated on the Council, working with the other agencies and interested parties to coordinate monitoring and recommend funding for grant projects for a variety of pollution prevention and restoration projects within the watershed.

4.1.3.4 THE CONTRA COSTA WATERSHED FORUM

The **Contra Costa Watershed Forum** (CCWF) was established as a result of a countywide Creek and Watershed Symposium in 1999. The CCWF is an open committee of approximately 50 organizations, including federal, state, and local agencies; local governments; a professional watershed research organization; local non-profit

environmental and education organizations; community volunteer groups; and private citizens. The CCWF staff are from the Contra Costa County Community Development Department. This diverse group of stakeholders is united by their concern for the watersheds of Contra Costa County. Through the coordinated activities of the CCWF, local creek and watershed groups have been sustained, and the CCWF has received grant funding for creek surveys and mapping, biological water quality (benthic macroinvertebrate) monitoring, and production of the **Watershed Atlas**. The Watershed Atlas compiles information on geography, hydrology, demographics, impervious surface, drainage patterns and much other information pertinent to water quality protection and evaluation, including activities of local watershed groups and restoration projects. The Water Board supports the CCWF by attendance at meetings, management of grant-funded projects, and work with CCWF staff on setting watershed priorities. These efforts are leading to water quality improvements as the citizens of Contra Costa County become more directly involved in assessing, monitoring, restoring, and protecting their watersheds.

~~THE CORTE MADERA CREEK EXAMPLE~~

~~In 1994, the Regional Board completed a field survey of fisheries, macroinvertebrates, riparian habitat, erosion, land use, point and nonpoint discharges, and water quality in Marin County's Corte Madera Creek watershed. Combining the field data with existing information on community use of the creek, the Regional Board published a report outlining potential water quality problems and opportunities for enhancement.~~

~~Citizens, local agency staff, and public officials are using this information to help determine watershed management goals, such as enhancement of the steelhead trout population, and specific actions, such as eliminating discharge of swimming pool water to the creek.~~

~~The Regional Board is providing continuing support to local residents engaged in this planning process.~~

4.2 DISCHARGE PROHIBITIONS APPLICABLE THROUGHOUT THE REGION

4.3 POINT SOURCE CONTROL~~TYPES OF POINT SOURCES~~

~~SURFACE WATER PROTECTION AND MANAGEMENT - POINT SOURCE CONTROL~~

4.4 WASTE DISCHARGE PERMITTING PROGRAM

4.5 EFFLUENT LIMITATIONS

4.5.1 TECHNOLOGY- AND WATER QUALITY-BASED LIMITATIONS
4.5.2 SITE-SPECIFIC OBJECTIVES
4.5.3 BEST PROFESSIONAL JUDGEMENT
~~EFFFLUENT LIMITATIONS~~
4.5.4 DISCHARGES TO OCEAN WATERS
4.5.5 DISCHARGES TO INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES
4.5.5.1 LIMITATIONS FOR CONVENTIONAL POLLUTANTS
4.5.5.2 LIMITATIONS FOR SELECTED TOXIC POLLUTANTS
4.5.5.3 WHOLE EFFLUENT TOXICITY LIMITS AND CONTROL PROGRAM

4.6 CALCULATION OF WATER QUALITY-BASED EFFLUENT LIMITATIONS

4.6.1 DILUTION RATIOS
4.6.1.1 DEEP WATER DISCHARGES
4.6.1.2 SHALLOW WATER DISCHARGES
4.6.2 FRESH WATER VS. MARINE WATER
4.6.3 BACKGROUND CONCENTRATIONS

4.7 IMPLEMENTATION OF EFFLUENT LIMITATIONS

4.7.1 PERFORMANCE-BASED LIMITS
4.7.2 SITE-SPECIFIC OBJECTIVE INCORPORATION
4.7.3 AVERAGING PERIODS
4.7.4 METHOD DETECTION LIMITS, PRACTICAL QUANTITATION LEVELS (PQL), AND LIMITS OF QUANTIFICATION (LOQ)
4.7.5 SELECTION OF PARAMETERS
4.7.6 COMPLIANCE SCHEDULES

4.8 STORMWATER DISCHARGES

4.9 WET WEATHER OVERFLOWS

4.9.1 FEDERAL COMBINED SEWER OVERFLOW CONTROL POLICY
4.9.2 CONCEPTUAL APPROACH
4.9.3 SURFACE IMPOUNDMENT OVERFLOW PROTECTION

4.10 DISCHARGE OF TREATED GROUNDWATER

Cleanup of groundwater ~~contamination~~ pollution sites often includes groundwater extraction, and thus creates the need for proper disposal of treated groundwater. The majority of the groundwater pollution cases in~~of~~ the ~~region~~ Region involve surface spills, pipeline breaks, or leakages from tanks, vaults, sumps, surface impoundments, or landfills. Toxic pollutants commonly found in groundwater range from solvents (including volatile organic compounds [VOCs] and semi-volatile organic compounds [SVOCs]), petroleum hydrocarbons, heavy metals, or a combination of these pollutants. In many cases, the treated groundwater is discharged to surface waters via storm drains. These direct discharges would normally require an exception to the prohibitions against discharge into shallow or non-tidal waters.

To address this issue, the ~~Regional Board~~Water Board adopted **Resolution No. 88-160** (see **Chapter 5 Plans and Policies**). The Resolution urges dischargers of groundwater extracted from ~~site clean-up~~cleanup projects to recycle (reclaim) their effluent. When ~~reclamation~~ recycling is not technically and/or economically feasible, discharges must be piped to a publicly-owned treatment works (POTW)~~municipal treatment plant~~. Furthermore, as required in State Water **Board Resolution 89-21** (see **Chapter 5 Plans and Policies**), the ~~Regional Board~~Water Board recognizes the resource value of the extracted and treated groundwater and urges its utilization for the highest beneficial use for which applicable water quality standards can be achieved.

The ~~Regional Board~~Water Board will consider granting an exception to the discharge prohibitions only if (a) it has been demonstrated that neither ~~reclamation~~recycling nor discharge to a POTW is technically or economically feasible, and (b) beneficial uses of the receiving water are not adversely affected. Such an exception is based on the ~~Regional Board~~Water Board's recognition that discharges allowed under the exception are an integral part of a program to ~~clean-up~~cleanup polluted groundwater and thereby produce an environmental benefit.

Dischargers shall demonstrate that their groundwater extraction and treatment systems and associated operation, maintenance, and monitoring plans constitute acceptable programs for minimizing the discharge of toxic substances and for complying with effluent limitations deemed necessary for protection of the beneficial uses of receiving waters.

Applications for National Pollutant Discharge Elimination System (NPDES) permits to discharge treated groundwater directly to surface waters will be evaluated on a case-by-case basis. In some cases, the applicant may qualify for the requirements of a general NPDES permit for discharge of treated groundwater. ~~However, the Regional Board~~ The Water Board has adopted general NPDES permits for the following two types of groundwater ~~clean-up~~cleanup projects:

(a) Groundwater polluted by fuel leaks and other related wastes at service stations and similar sites (NPDES General Waste Discharge Requirements for Discharge or

Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Fuel Leaks and Other Related Wastes at Service Stations and Similar Sites, **NPDES No. CAG912002**)~~(adopted on April 17, 1991 in, Order No. 91-056, NPDES No. CA0029815);~~ ; and

(b) Groundwater polluted by ~~volatile organic compounds,~~ VOCs ~~(~~NPDES General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds, **NPDES No. CAG912003**)~~(adopted on July 20, 1994, in Order No. 94-087, NPDES No. CAG912003).~~.

These general permits ~~were~~are intended to streamline a common regulatory process and are not available for groundwater discharges with constituents other than fuels and VOCs. The ~~Regional Board~~Water Board may renew, revise, or rescind the permits if deemed appropriate. The general permits specify effluent limitations for discharges to surface water bodies, establish self-monitoring requirements, and identify trigger levels for non-routine constituents that are used to determine if additional effluent sampling and treatability studies are needed. Updates to these two general permits are considered every five years.

~~In establishing effluent limitations, no dilution credit was allowed in the general permits for primary pollutants of concern. However, ambient levels of heavy metals in groundwater may sometimes result in exceedances of effluent limitations that did not provide allowance for dilution. This is especially a concern for clean-up of groundwater polluted with VOCs when heavy metals were not contributed to the environment. The inadvertent discharge of background metals would be a result of the effort to extract groundwater for the removal of VOCs. A study conducted by Regional Board staff in 1993 concluded that metals concentrations in the effluent of these groundwater discharges would sometimes exceed effluent limitations with zero dilution credit, but would rarely exceed concentrations of twice of such limits. As a result, the general permit adopted for cleanup of VOCs-polluted groundwater (Order No. 94-087) sets heavy metals effluent limitations based on a 1:1 dilution credit.~~

~~Consideration for allowing limited dilution credit in this case is based on reasons which are unique to the specific type of groundwater cleanup discharges which are temporary and are due to non-metal contamination. Metal mass loading to the Bay from these discharges is insignificant compared to other sources and the dischargers usually have no feasible way to reduce the loadings. However, special studies shall be required in the event of any chronic violations of such metals limits.~~

4.11 MUNICIPAL FACILITIES (POTWs)

4.11.1 CITY AND COUNTY OF SAN FRANCISCO

4.11.2 SOUTH BAY MUNICIPAL DISCHARGERS (SAN JOSE/SANTA CLARA, PALO ALTO, AND SUNNYVALE)

The South Bay municipal dischargers consist of three sewage treatment facilities: the San Jose/Santa Clara Water Pollution Control Plant (WPCP), the Palo Alto Regional Water Quality Control Plant, and the Sunnyvale WPCP. These three plants serve all of the urban communities of Santa Clara County located in the ~~r~~Region. The South Bay municipal dischargers, as shown in **Figure 4-1**, presently discharge effluent receiving tertiary treatment (secondary plus nitrification, filtration, and disinfection) to shallow sloughs contiguous with the Bay, south of the Dumbarton Bridge. ~~Therefore, all three dischargers must meet shallow water effluent concentration limits for toxic pollutants.~~

~~In 1988, the Regional Board identified the following issues that needed further study in the South Bay. As part of the reissuance of the South Bay NPDES permits, the Regional Board required the three South Bay dischargers to address these issues.~~

~~· Identify the sources of metals to the WPCPs;~~

~~· Assure the quality of WPCP laboratory measurements;~~

~~· Evaluate existing WPCP performance relative to the removal of metals, and evaluate the feasibility and cost effectiveness of new processes;~~

~~· Initiate laboratory and field investigations relative to establishing site-specific numerical receiving water objectives for copper, nickel and mercury;~~

~~· Monitor conversion of saltwater marshes to freshwater marshes adjacent to the point of discharges;~~

~~· Evaluate the City of San Jose and Sunnyvale WPCP sludge lagoons;~~

~~· Establish an Avian Botulism monitoring and control program for the City of Sunnyvale treatment ponds and discharge area in the slough; and~~

~~· Evaluate WPCP ammonia removals.~~

~~Based on the results of these studies the Regional Board amended the NPDES permits for the three South Bay dischargers on several occasions.~~

~~In 1989, San Francisco Bay south of the Dumbarton Bridge (South Bay) was designated by EPA as an impaired water body under Section 304(l) of the Clean Water Act due to anthropogenic inputs of seven metals. The three municipal plants and stormwater runoff were designated as sources contributing to the impairment. As of 1994, the wastewater effluents of the three plants routinely exceed the concentration limit for copper and~~

~~occasionally exceed the limits for other metals such as nickel. South Bay monitoring data collected by the dischargers from 1989 to 1992 indicate that U.S. EPA water quality criteria for copper, nickel, and mercury were regularly violated in the receiving waters south of the Dumbarton Bridge.~~

~~The beneficial uses of San Francisco Bay, South Bay (south of the Dumbarton Bridge) and contiguous water bodies are defined in the to be:~~

~~Water contact recreation~~
~~Non-contact water recreation~~
~~Wildlife habitat~~
~~Preservation of rare and endangered species~~
~~Estuarine habitat~~
~~Fish migration~~
~~Fish spawning (potential use)~~
~~Industrial service supply~~
~~Shellfish harvesting~~
~~Navigation~~
~~Commercial and sport fishing~~

~~Contiguous water bodies of the South Bay in the vicinity of the discharge include freshwater and saltwater sloughs such as Artesian Slough, Coyote Slough, Mud Slough and Coyote Creek. Beneficial uses of the sloughs have been established based on the beneficial uses formally identified for the South Bay. However, beneficial uses specific to the sloughs need to be assessed to determine which uses exist or potentially could exist. Until such determination is made, Regional Board policy has been to use the tributary rule to interpret which beneficial uses are currently or potentially supported where beneficial uses have not been specifically designated.~~

The existing discharge locations for the Lower South SF Bay municipal wastewater dischargers are contrary to Basin Plan policy concerning discharge prohibitions (listed in **Table 4-1**). Exceptions to the first three of these prohibitions are discussed in ~~the later section "Discharge Prohibitions Applicable Throughout the Region."~~ **Section 4.2 Discharge Prohibitions Applicable Throughout the Region.**

State Water Board Order WQ 90-5 (1990) found that a net environmental benefit exception to these prohibitions could not be made for the three South Bay municipal discharges. However, the Order found that a finding of equivalent protection can be made if water quality based concentration limits for metals and revised mass loading limits for metals are placed in the dischargers' NPDES permits, if Sunnyvale and San Jose/Santa Clara continue avian botulism control programs, and if San Jose/Santa Clara implements mitigation for loss and degradation of endangered species habitat. Order WQ 90-5 also included provisions that would prevent increases in flows that would adversely impact endangered species habitats. In subsequent NPDES permit reissuances and Water Board resolutions from 1993 through 2003, the South Bay municipal dischargers met the three conditions required to support a finding of equivalent protection. The three conditions for

granting the discharge prohibition exception must be confirmed at each NPDES permit reissuance.

~~In an effort to demonstrate net environmental benefit, the three South Bay municipal dischargers participated in a five-year Water Quality Monitoring Study conducted by the South Bay Dischargers Authority. Based on that study, the Regional Board found that water quality enhancement occurs due to localized increase of receiving water dissolved oxygen and the flushing effects of the discharge. These effects enhance beneficial uses of non-contact recreation, estuarine habitat, commercial and sport fishing. A finding of net environmental benefit was denied by the State Board, however, based on the impacts of fresh water flow on salt marsh habitat and the uncertainties of the impacts of nutrient and metals loading on beneficial uses. The conversion of salt marsh to brackish or fresh water marsh threatens the habitat of two endangered species (California clapper rail and salt marsh harvest mouse). State Board Order WQ 90-5 directed the San Jose/Santa Clara treatment plant to mitigate for degradation of endangered species habitat. As of December 2001, the three principal issues of WQ 90-5 have been addressed in the following fashion.~~

~~WATER-QUALITY BASED EFFLUENT LIMITS~~

~~The Regional Board has amended and reissued permits to the South Bay municipal dischargers to provide equivalent protection. On April 17, 1991, the NPDES permits of the three South Bay Municipal Dischargers were amended to include water quality based concentration limits and revised mass loading limits for metals, as directed by State Board Order WQ 90-5.~~

~~AVIAN BOTULISM~~

~~Annual avian botulism control program reports are provisions of the Sunnyvale and San Jose/Santa Clara permits. These two dischargers have conducted an avian botulism control program by monitoring Artesian Slough, Guadalupe Slough, Coyote Creek, and Alviso Slough for the presence of avian botulism since 1982. Outbreaks of avian botulism as well as other diseases have been controlled by the prompt removal of sick and dead vertebrates. The discharger also supports the collection of bird and other wildlife data, in conjunction with the avian botulism program, to better understand the potential beneficial and detrimental impacts of the discharge on the associated habitat.~~

~~MITIGATION FOR LOSS OF ENDANGERED SPECIES HABITAT AND PREVENTION OF FLOW INCREASES~~

~~On March 6, 1991 the San Jose/Santa Clara treatment plant submitted an "Action Plan", with a request that the Action Plan be accepted by the Regional Board as fulfillment of the State Board requirement for a discharge flow limit. In Resolution 91-152, the~~

~~Regional Board stated that the Action Plan (revised), dated September 30, 1991, fulfilled the intent of the State Board Order WQ 90-5 requirement to limit flows from the San Jose/Santa Clara Water Pollution Control Plant to a level that will halt any further loss or degradation of endangered species habitat. The Resolution contained a provision requiring a Regional Board hearing to consider adopting a 120 million gallon per day average dry weather effluent flow (MGD ADWEF) discharge limit if delays occur that threatened the timely completion or implementation of reclamation projects, or if ADWEF exceed 120 MGD. By letter dated November 26, 1991, the State Board found Resolution 91-152 to be consistent with Order WQ 90-5.~~

~~On September 18, 1996 the Regional Board adopted Resolution 96-137, which accepted the discharger's proposal for wetland loss mitigation as required by Provision 6.1 of Order No. 93-117 and requested State Board concurrence that the proposal fulfilled mitigation requirements contained in WQ 90-5. By letter dated October 10, 1996, the State Board concurred that the proposal satisfied requirements of Order WQ 90-5 pertaining to salt marsh conversion.~~

~~In 1996, the ADWEF of 132 MGD triggered the requirement in Resolution 91-152 for the Regional Board to hold a hearing. On December 18, 1996 the Regional Board held a hearing on this issue. It considered three options: 1) amend the NPDES permit to limit flows to 120 MGD ADWEF; 2) direct the discharger to propose an alternative solution by June 1997; and 3) no action. The Regional Board adopted the second option (Order No. 97-111). Also at the December 1996 hearing, the Regional Board directed the discharger to conduct a wetland conversions assessment in 1997.~~

~~Responding to the 120 MGD ADWEF flow limit, On May 28, 1997, the San Jose/Santa Clara treatment plant submitted the South Bay Action Plan (SBAP) to the Regional Board. The SBAP proposed both near and long-term solutions to reduce the discharge: 1) two projects to begin in the near term (1997-98), (i.e. public education aimed at water conservation and on-site reuse) 2) A third near term project of wastewater diversion to the Sunnyvale treatment plant is under investigation. 3) Seven long-term projects to be completed between 1997 and 2002: indoor water conservation, two expanded water recycling projects, industrial water recycling, inflow/infiltration reduction, and two environmental enhancement projects. Total costs of these projects were estimated to be $150 million and were expected to reduce effluent flows by up to 60 MGD.~~

~~The results of a wetlands conversions assessment were submitted on November 30, 1997. The assessment indicated that there were no significant additional salt marsh conversions between 1996 and 1997 and if data are compared to the baseline period of 1989-1991, an increase of 1.3 acres of salt marsh conversion had occurred. It is the intent of the Regional Board to require appropriate mitigation for any wetland losses due to the discharge. Appropriate mitigation shall be determined after consultation with appropriate resource agencies and other interested parties.~~

~~RECENT DEVELOPMENTS FOR COPPER AND NICKEL~~

~~Starting in 1998, technical studies were initiated to assess the impairment status of South San Francisco Bay south of the Dumbarton Bridge with respect to copper and nickel and determine appropriate site-specific objectives for dissolved ambient concentrations of these two metals. It was determined that impairment of beneficial uses due to these metals is unlikely and recommended ranges of site-specific objectives were established. The site-specific objectives resulting from this work are given in Table 3-3a, and the Water Quality Attainment Strategy to support these objectives is described earlier in this Chapter.~~

4.11.3 FAIRFIELD-SUISUN SEWER DISTRICT (FSSD)
4.11.4 LIVERMORE-AMADOR VALLEY

~~INTRODUCTION~~

The primary Water Board concern in the Livermore-Amador Valley (Valley) is the increase in salt loading that has occurred in the Valley's main groundwater basin. ~~that an integrated water/wastewater resource operational plan be implemented to protect the main groundwater basin from increased salt (TDS) loading. Existing~~ It is projected that with natural saline sources and historical basin management practices, and with minimal water recycling, there will be a net salt loading increase from an average of 4,000 tons per year to 6,000 tons per year, resulting in a 10 milligram per liter (mg/L) per year increase in total dissolved solids (TDS) in groundwater. As a result, it has become increasingly important to develop and implement an integrated water/wastewater resource operational plan to protect the water quality and beneficial uses of the groundwater basin.

To achieve this goal, the Water Board supports local water management efforts to concurrently improve the salt balance in the main basin, to increase the local water supply, and to reduce the need for wastewater export through recycled water irrigation and groundwater recharge and other basin management practices.

~~. In 1993, the Regional Board approved a Master Water Reuse Permit for the water and wastewater agencies in the valley that provides the framework (described below) within which these goals can be accomplished.~~

~~A Salt Management Program being developed by the permittees prior to implementation of valley-wide recycling projects will provide updated water quality management policies and objectives. The Regional Board will consider permittee requests for future modifications to Basin Plan policies and objectives as appropriate to facilitate implementation of beneficial reuse projects.~~

4.11.4.1 SALT MANAGEMENT IN THE LIVERMORE-AMADOR VALLEY

~~BACKGROUND~~

The Livermore-Amador Valley groundwater basin is located in the middle of the Livermore-Amador Valley in eastern Alameda County and is primarily a closed groundwater basin within the Alameda Creek Watershed with multiple groundwater sub-basins of variable water quality. The ~~main portion of the~~ Main Basin (that portion underlying the Cities of Livermore and Pleasanton) has the highest water quality, supplies most of the municipal wells in the area, and is used to store and distribute high quality imported water.

Alameda Creek and its tributaries recharge the ~~Livermore-Amador~~ Valley's groundwater basin and serve as ~~a~~ channels to convey water released from the South Bay Aqueduct (SBA) to the main basin and the Niles Cone groundwater basin for artificial recharge. During dry weather, creek flow consists primarily of SBA release water.

The Alameda County Flood Control and Water Conservation District, locally known as the~~The~~ Zone 7 Water Agency **(Zone 7)** is the potable water wholesaler for ~~the~~ most of the ~~Livermore-Amador~~ Valley ~~area~~ and operates facilities to import and treat surface water from the State Water Project, groundwater wells, and distribution pipelines. Zone 7 serves as the overall water quality management planning agency for the Livermore-Amador watershed ~~Alameda Creek Watershed above Niles~~ and is responsible for managing ~~management of~~ the ~~valley~~Valley's surface water and groundwater resources for the Valley's drinking water supply.

Dublin-San Ramon Services District (DSRSD) distributes potable water and treats wastewater in the western portion of the ~~valley~~Valley, including parts of Contra Costa County. The **City of Livermore** distributes potable water to about one-fourth of Livermore and treats wastewater from the city and the adjacent national laboratories, Lawrence Livermore and Sandia National Laboratories.

The City of Livermore and DSRSD are member agencies of the **Livermore-Amador Valley Water Management Agency** (LAVWMA). Since 1980, wastewater has been exported from the ~~valley~~Valley via LAVWMA-operated facilities that connect to ~~an~~ the **East Bay Dischargers Authority's** (EBDA) interceptor in San Leandro. These waters are ultimately discharged through the EBDA ~~East Bay Dischargers Authority~~ outfall into south San Francisco Bay west of the Oakland Airport.

The current surface water quality objectives for the Alameda Creek Watershed above Niles (**Table 3-7**) were adopted in 1975. They were set based on historic SBA water quality primarily to prevent degradation by wastewater discharges of imported SBA water being conveyed and used for groundwater recharge during dry weather periods. Wastewater discharges were terminated in 1980.

~~The Table 3-7 groundwater quality objectives and basin boundary definitions for the Valley were developed by Zone 7 in its May, 1982 "Wastewater Management Plan for the Unsewered, Unincorporated Area of Alameda Creek Above Niles." This plan was prepared when wastewater demineralization and reuse was not considered cost-effective in comparison to export; the LAVWMA export project had only recently become operational; the safety of reuse was less widely accepted; and extensive development with on-site systems remained a possibility.~~

~~The policies in the 1982 plan consist of a general policy, community wastewater system policies, individual on-site wastewater system policies, and local area policies for known problem areas at that time. The policies were intended to discourage small community wastewater systems and septic tanks in favor of connection to existing large community systems. They also encourage export of wastewater, rather than beneficial reuse via irrigation or groundwater recharge~~.

~~Since adoption of the wastewater management plan, Zone 7, DSRSD and Livermore's interest in water recycling has been increased by droughts, continuing scarcity of new water supplies, institutional barriers to increasing wastewater export capacity from the valley, and increasing public acceptance of water recycling throughout California. Technological advances and reduced costs of demineralization also now make groundwater recharge with demineralized wastewater a viable tool for managing salt concentrations in the basin.~~

4.11.4.2 WATER RECYCLING AND VALLEY WATER - WASTEWATER MANAGEMENT

~~Zone 7 has projected a need for 10,000-25,000 acre-feet per year of additional water supply within the next 10-15 years. Livermore-Amador Valley Water Management Agency wastewater export disposal capacity is currently limited to 21 million gallons per day. This capacity is projected to be exceeded within the next 10-15 years. Wet weather disposal capacity may be exceeded sooner. Additional effluent storage may achieve marginal increases in effective capacity, but will not meet projected disposal demand at buildout.~~

The water and wastewater agencies of the ~~Livermore-Amador~~ Valley have studied water recycling as an alternative to import of new water supplies and export of wastewater since the early 1970s (**see Section 4.16 Water Recycling**). ~~for over 20 years. While LAVWMA continues to investigate export alternatives, the agencies have also developed a strategy for implementing large-scale water recycling.~~

Zone 7, DSRSD and the City of Livermore's interests in water recycling have increased over the years due to droughts, continuing scarcity of new water supplies, institutional barriers to increasing wastewater export capacity from the Valley, and increasing public acceptance of water recycling throughout California. Technological advances and

reduced costs of demineralization also now make groundwater recharge with demineralized recycled water a technically viable tool to help manage salt concentrations in the Valley.

Valley-wide water recycling is consistent with the ~~Regional Board~~Water Board's policy on recycled water~~Reclamation~~, which states in part that disposal of wastewater to inland, estuarine, or coastal waters is not considered a permanent wastewater disposal solution where the potential exists for conservation and water recycling (see **Section 4.16 Water Recycling**)~~reclamation~~. As directed by **California Water Code (Water Code) Sections 13511 and 13512**, the ~~Regional Board~~Water Board strongly supports the use of recycled water to supplement existing surface water and groundwater supplies and will work with agencies to facilitate development of water recycling ~~reclamation~~ facilities.

~~An important Valley water recycling milestone was the City of Livermore's study, "Advanced Treatment and In-Valley Effluent Reuse/Disposal" (October, 1989). The study recommended installing advanced treatment (reverse osmosis demineralization) facilities at the Livermore Water Reclamation Plant to provide recycled water for irrigation and groundwater recharge. The agencies then formed the Tri-Valley Water Recycling Task Force and held several public meetings in 1990 and 1991 to present the findings.~~

The Valley water and wastewater agencies ~~then~~ jointly sponsored the "Livermore-Amador Valley Water Recycling Study" (May 1992) that includes~~,~~ a comprehensive investigation of water recycling options. The study documented the ~~area's~~ Valley's hydrogeology. It also identified and analyzed potential projects throughout the ~~valley~~Valley, including irrigation with non-demineralized effluent, groundwater recharge with demineralized effluent, and export of brine. The report included a discussion of how water recycling could be implemented in conformance with Water Board ~~Basin Plan~~ requirements and Zone 7 policies and still manage salt loading on a Valley-wide scale.

The report also detailed a strategy for developing a water recycling program incrementally, beginning with small demonstration projects to gain experience and public acceptance and building up to ~~full~~large-scale projects that could contribute substantially to water supply and wastewater disposal needs in future years.

The 1992 study documented that between 19,000 and 38,000 acre-feet per year of recycled water could be beneficially reused within the ~~Livermore-Amador~~ Valley via irrigation and groundwater recharge. Well-~~-~~established technologies and procedures exist for accomplishing such uses and could be in full compliance with the Water Board requirements ~~Basin Plan~~ and the **Department of Health Service** (DHS)'s **Title 22**~~-~~**, CCR** requirements. The long-operating Orange County Water District Water Factory 21 project has served as a model for many recycled water groundwater recharge facilities.

4.11.4.3 VALLEY-WIDE SALT MANAGEMENT PLAN

As recommended in the 1992 study, the agencies jointly applied for a Master Water Reuse Permit (Master Permit) to cover proposed water recycling activities throughout the Valley. The Water Board issued the Master Permit in 1993 (**Order No. 93-159**). The permit specifies the various technical reports that were required to be submitted for review and approval by the Executive Officer before projects could commence operation. In this manner, the Master Permit fully addresses the regulatory requirements that projects must comply with, while facilitating the approval process.

~~A key element of proposed valley-wide water recycling is a salt management program for the groundwater basin. This program includes~~ The permit allows small-scale irrigation projects to be developed by the cooperating agencies. Before large-scale recycling projects could be approved, a long-range Valley-wide **Salt Management Plan** (SMP) was required to be developed and implemented. The Master Permit required further characterization of basin hydrogeology, refinement of salt balance calculations, selection of TDS policy targets and examination of alternative ways to offset natural and recycled water sources of salt loadings. ~~(These measures might include wellhead demineralization of pumped groundwater or diversion of natural salt inflows to export facilities.)~~ The ~~Salt Management Program~~ SMP would need to address~~es~~ the ~~Basin Plan~~ water quality objectives for the Alameda Creek Watershed, which states that wastewater disposal/reuse projects be part of an "overall water-wastewater resource operational program developed by the agencies affected and approved by the ~~Regional Board~~Water Board."

Zone 7, in partnership with a technical advisory group composed of local water retailers and a Zone 7 citizens committee, prepared the SMP as required by the Master Permit. The development of the SMP occurred through a lengthy public process (1994 to 1999) and resulted in Water Board approval in 2004. Over the years, the scope of the SMP broadened beyond that outlined in the Master Permit to one more resembling a comprehensive watershed and water resources management plan.

The purpose of the SMP is to identify and document the long-term strategy for managing salt and mineral water quality in the Valley's groundwater basin. The primary strategy is to increase conjunctive use combined with ~~shallow~~ groundwater demineralization in the western portion of the service area to fully offset current and future sources of salt loading to the Valley's Main Basin. This strategy was designed to also maintain and improve delivered water quality and to facilitate increased use of recycled water using Zone 7 facilities to offset the associated increase in salt loading. Other strategies were identified and may be implemented through Zone 7's monthly Water Operations Plans using an adaptive management process.

~~MASTER WATER REUSE PERMIT~~

~~As recommended in the study, the agencies jointly applied for a master water reuse permit to cover proposed water recycling activities throughout the Valley. The permit~~

~~was issued by the Regional Board in December, 1993 (Order No. 93-159). The permit specifies the various technical reports that are required to be submitted for review by the Executive Officer, and approval before projects can commence operation. In this manner, the master permit fully addresses the regulatory requirements that projects must comply with, while facilitating the approval process for individual projects in this long-term, valley-wide program.~~

~~This permit identifies two phases and three categories of water recycling projects. During Phase I of the water recycling program, the agencies have proposed first to construct a few small-scale irrigation projects (Group A). This would be followed by startup of a 0.75 MGD demonstration demineralization facility or possibly other salt management projects (Group B). The Phase I projects would be accompanied by a thorough groundwater monitoring program to assess any potential impacts.~~

~~As specified in the master permit, during the first three years of small-scale project operation, the agencies would complete the salt management plan, as well as the complex engineering reports, design studies and other documentation the Executive Officer will require before approval of any Phase II full-scale, valley-wide irrigation and groundwater recharge projects (Group C). Within five years of start-up of the first new small-scale (Phase I) project, the salt management plan would be implemented to achieve 100 percent mitigation of impacts on groundwater quality from water recycling activities.~~

~~The salt management plan will be developed beginning in 1995 based on the concept that the effect of each individual project on the main basin groundwater resource is best assessed in the context of the cumulative effects of all such projects, as well as the effects of groundwater management policies and natural conditions. The relative geological homogeneity of the Main Basin lends itself to a mass-balance approach for assessing cumulative impacts. For a planning horizon of 10 years, the salt management plan will define a project or set of projects that will:~~

~~· Fully mitigate the effects of salt loading due to water recycling on the Main Basin groundwater resource;~~

~~· Minimize the current trend toward increasing main basin groundwater salinity due to subsurface groundwater inflow, natural recharge;~~

~~· Ensure that water imports and water recycling will not contribute to the degradation of groundwater quality; and~~

~~· Protect groundwater beneficial uses.~~

~~The Salt Management Plan will also provide a technical basis for estimating and allocating salt loading or removal among existing sources and new projects. Accordingly, the SMP includes development of a basin-wide model of salt sources and sinks. Numerical factors, representing (for example) connectivity between groundwater basins and effects of filtering through the soil mantle, will be estimated using the preparer's best~~

~~professional judgement. The SMP will also provide information needed to support the DHS engineering report for full-scale groundwater recharge projects.~~

~~Groundwater recharge or conveyance via ephemeral streams or waters of the state is an essential component of the proposed valley-wide, year-round water recycling and groundwater quality management program. Projects subject to NPDES requirements are not authorized under the master water reuse permit. The permit solely identifies the technical reports necessary to support a future NPDES permit application. The Regional Board will consider issuing a separate NPDES permit to the permittees following receipt of a complete NPDES application.~~

4.11.4.4 GENERAL WATER REUSE PERMIT

The City of Livermore and DSRSD were approved for the General Water Reuse Requirements for Municipal Wastewater and Water Agencies, (**General Water Reuse Permit)** (see **Section 4.16 Water Recycling**), to administer their current and future recycled water projects involving landscape and/or agricultural irrigation recycling water projects. The General Water Reuse Permit, which delegates the administration of domestic wastewater reuse to water recycling agencies and water agencies, replaces the Master Permit for surface irrigation projects. The General Water Reuse Permit issued to the City of Livermore and DSRSD incorporates the requirements of the approved SMP. The Master Permit will remain on record, and, if needed, will be revised to address any future groundwater recharge projects that may be planned by the two agencies.

Groundwater recharge or conveyance via ephemeral streams is an essential component of the proposed Valley-wide, year-round water recycling and groundwater quality management program. However, projects subject to NPDES requirements are not authorized under the Master Permit. The Master Permit identifies the technical reports necessary to support a future NPDES permit application. The Water Board will consider issuing a separate NPDES permit to the permittees following receipt of a complete NPDES application.

4.11.4.5 WATER BOARD SUPPORT FOR WATER QUALITY MANAGEMENT STRATEGIES PROTECTING THE LIVERMORE-AMADOR VALLEY GROUNDWATER BASIN

~~IMPLEMENTATION POLICIES~~

The ~~Regional Board~~Water Board supports the concept that water recycling is an essential component for planning the ~~valley~~Valley's future water supply. Water recycling is particularly important in areas like this, which ~~that~~ are dependent on imported water.~~, such as the valley.~~

As demonstrated by its 2004 approval, the Water Board supports the **Salt Management Plan** developed by the cooperating agencies in the Valley to facilitate increased use of recycled water to offset salt loading.

The Water Board supports the export of concentrate from the demineralization of groundwater via the LAVWMA and EBDA pipelines when implemented as part of the Salt Management Plan and is protective of beneficial uses of the San Francisco Bay.

~~The Regional Board supports managing the basin-wide salt balance can best be managed through an integrated water-wastewater resource operational plan. Such a plan should combine management of the groundwater basin, water conservation, salt management projects, and water recycling, with and without demineralization.~~

The ~~Regional Board~~Water Board supports the concept of transport and groundwater recharge through the ~~valley~~Valley's ephemeral streams. Recharge of the groundwater basin may be accomplished with imported water, as is done now, or combined with high-quality recycled water under a future groundwater-recharge NPDES permit or WDRs. The year-round, dependable recycled water resource may also be appropriate for streamflow augmentation to enhance beneficial uses of the ~~valley~~Valley's ephemeral streams.

4.11.5 EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD) AND LOCAL AGENCIES

4.12 INDUSTRIAL FACILITIES

4.13 PRETREATMENT AND POLLUTION PREVENTION

The Waste Discharge Permitting Program described ~~above~~ in **Section 4.12 Industrial Facilities**, focuses on limiting pollutant discharge to the Bay from industrial and municipal treatment systems. In most situations, however, the overall effectiveness of treatment depends on the type and amount of pollutants that enter these POTWs or industrial treatment systems. Some pollutants may cause upset to or interference with the operation of the treatment plant, sludge contamination, or harm to treatment plant workers and the public if discharged into sewer systems. In general, it is often more economical to reduce overall pollutant loading into treatment systems than to install complex and expensive technology at the plant. Both pretreatment and pollution prevention programs are key components of pollutant source control.

The goal of the pretreatment program is to protect treatment plants, worker health and safety, and the environment from the impact of discharges of certain toxic wastes (~~eg.~~e.g., explosive and corrosive materials) into collection ~~sewer~~ systems.

The pollution prevention program expands beyond the ~~P~~pretreatment program to include industrial, commercial, and residential sources. The goals of pollution prevention ~~expand beyond the original pretreatment goals and~~ are to:

1. Reduce or eliminate the discharge of all pollutants that have been found to impact or threaten beneficial uses;

2. Focus on pollutant source reduction "upstream" of treatment plants, with an emphasis on material recycling, efficient use of chemicals, waste reduction, material and/or product substitution, and process modification; and

3. Support reduction of pollutant discharges into collection systems through water conservation, recycling, and reuse.

~~(A) Generally support reducing all pollutant discharges into sewer systems through more efficient use of chemicals and water conservation, recycling, reuse, and waste reduction; and~~

~~(B) Identify sources and reduce overall discharge of specific pollutants that have been found to impact or threaten beneficial uses.~~

The combined efforts of the pretreatment and pollution prevention programs have influenced thousands of facilities in the Region to significantly reduce the amount of pollutants discharged to the Bay. Between 1986 and 1999, the loading of heavy metals discharged from 27 POTWs with pretreatment programs, were reduced by 59 percent, even though the total volume discharged from these 27 POTWs increased slightly over this period.

4.13.1 CALIFORNIA'S PRETREATMENT PROGRAM

Each POTW regulates the types of waste discharged into ~~sewer~~ collection systems leading to its treatment plant. ~~General standards for discharge to POTWs are set by the U.S. EPA for certain types of waste and industrial categories~~. The U.S. EPA, for certain types of waste and industrial categories, sets general standards for discharge to POTWs. Each POTW receiving a large amount of industrial waste and/or with a design flow greater than 5 million gallons per day (MGD) is required to develop and implement a pretreatment program, including enforce its own local discharge limits. The goal is to both protect treatment plants and ensure that the POTW is in compliance with its own discharge permit.

The ~~Regional Board~~Water Board oversees the implementation of the California ~~P~~pretreatment ~~P~~program under the California Water Code and federal Clean Water Act although, U.S. EPA retains its oversight role and is still actively involved in inspections and enforcement activities. POTW pretreatment programs must include components as specified in federal regulations and program descriptions incorporated into the NPDES permit for each POTW.

Specific monitoring and reporting requirements for the 27 POTWs in the ~~San Francisco Bay~~ Region with approved pretreatment programs are contained in ~~one "blanket"~~ the NPDES Permits for the POTWs. ~~Amendment~~. ~~This blanket amendment was first issued by the Regional Board in 1980, and later revised in 1984, 1989, and 1995.~~ Major budgeted program tasks for the ~~Regional Board~~Water Board's oversight activities include pretreatment compliance inspections and audits; annual and semiannual report reviews; program modifications, particularly local limits revisions; and enforcement activities.

4.13.2 POLLUTION PREVENTION

~~POLICY STATEMENT~~

The Water Board supports reducing toxic discharges through pollution prevention and expansion of the pretreatment program. ~~The Regional Board supports reducing toxic discharges through more efficient use, conservation, recycling, reuse, and waste reduction. The pollution prevention program is designed to eliminate or minimize the discharge of toxic wastes into waters of the region. The program emphasizes pollutant source reduction "upstream" of treatment plants, and techniques such as material recycling, reuse, conservations, material substitution, product substitution, and process modifications. In addition, the program also supports increased water recycling and reuse, wastewater treatment prior to discharge into sewers, and expansion of the Pretreatment Program.~~ This general approach to minimizing waste discharge is a necessary element in the implementation of the State Water Board's Mass Emission Strategy and will become increasingly important as alternative uses of wastewater are developed.

The Water Board’s pollution prevention program is a two-tiered program that consists of a general and a targeted program. The first tier is a general program, requiring dischargers to focus on long-term pollution prevention and overall reduction of toxics entering collection systems. The general program is structured to allow each discharger to develop and direct pollution prevention efforts in its own service area. It also allows dischargers to reduce toxic pollutant loading to their systems and remain in compliance with their discharge permits.

~~The Regional Board's Waste Minimization Program is a two-tiered program. The first tier is a general program, focused on long-term pollution prevention and overall reduction of toxics entering sewer systems. The general program is structured to allow each POTW to develop and direct pollution prevention efforts in its own service area. It also allows POTW to reduce toxic pollutant loading to their plants and remain in compliance with their discharge permit.~~

The second tier is a targeted program that aims to ameliorate existing water quality problems. The goal of the targeted program is to reduce the total amount of a specific pollutant (or pollutants) discharged to specific water bodies. Targeted programs are required when numeric or narrative water quality objectives are exceeded and beneficial uses are impaired or threatened.

Both the general and targeted pollution prevention programs take multimedia concerns into account by coordinating with other relevant regulatory programs related to air and land disposal (e.g., sludge or biosolids).

~~The second tier is a more involved, or targeted program aimed at ameliorating existing water quality problems. The goal of targeted programs is to reduce the total amount of a specific pollutant (or pollutants) discharged to specific water bodies. Targeted programs are required when numeric or narrative water quality objectives are exceeded and beneficial uses are impaired or threatened. Both programs will take multimedia concerns into account by coordinating with other relevant regulatory programs related to air and land disposal.~~

All POTWs with an approved pretreatment program and all major industrial dischargers are required to develop and implement a general pollution prevention program within their jurisdiction. Dischargers are required to develop and implement a targeted program under the circumstances described in **Section 4.13.2.4 Targeted Pollution Prevention for POTWs.**

~~All POTWs with an approved pretreatment program and all major industrial dischargers that are not required to implement a targeted program are required to develop and implement a general pollution prevention program within their jurisdiction.~~

~~When the Pollution Prevention Program was initiated, the largest dischargers (all POTWs with an average dry weather discharge over 10 MGD and all major industrials) were required to prepare and submit for Board approval an initial plan for general pollution prevention by July 1, 1992. Smaller POTWs were placed on a slightly longer schedule and required to submit plans by January 1, 1993. Dischargers submit mid-year progress reports and a comprehensive annual report, discussing progress and accomplishments with respect to the elements outlined below, possible program changes, and future program developments.~~

Presently, dischargers with required pollution prevention programs submit mid-year progress reports and/or a comprehensive annual report, which discusses progress and accomplishments along with program changes, and future program goals, developments and effectiveness measures. With forthcoming data needs for watershed permits, reporting formats will be standardized to improve comparability between programs.

4.13.2.1 GENERAL POLLUTION PREVENTION PRIORITIES

The following are the Water Board's priorities for the pollution prevention program in the coming years:

1. Encourage continued region-wide leadership across all pollution prevention programs through cross-program and cross media coordination, watershed-based

problem solving, and adaptability to new concerns through collaboration and partnerships.

2. Develop strategies to measure effectiveness of pollution prevention efforts over the long and short term.

3. Recognize and promote excellence through pollution prevention awards to programs that demonstrate resourcefulness, effectiveness, innovation, wide outreach (business, residential, and educational), and that take action to promote region-wide solutions.

4.13.2.2 POLLUTION PREVENTION PROGRAM HISTORY

In 1988, the Water Board began requiring "source control" programs from the three South Bay POTWs. In 1992, the Water Board required the remaining POTWs with pretreatment programs to develop and implement Waste Minimization Programs. Specifically, this included targeted programs for POTWs to reduce pollutants that exceeded water quality criteria, general programs for the remaining POTWs, and waste minimization audits for select industrial facilities discharging directly to surface waters. In 1993, the "Waste Minimization Program" was changed to "Pollution Prevention Program."

The Water Board formed the **Bay Area Pollution Prevention Group** (BAPPG) in 1990 and continues to support its significant successes in reducing pollution through product and chemical bans, targeted initiatives to reduce heavy metals, and regional technology transfer, outreach, and resource sharing.

In 2000, the state legislature enacted **Water Code Section 13263.3** on pollution prevention programs. Also in 2000, the **Policy for Implementation of Toxic Standards from Inland Surface Waters, Enclosed Bays and Estuaries of California** (State Implementation Plan, or SIP) became effective, which addresses pollutant minimization programs.

In 2003, the Water Board adopted **Resolution No. R2-2003-0096** promoting collaboration between the **Bay Area Clean Water Agencies** (BACWA) and the Water Board. It established 11 guiding principles for developing tools and guidance for POTW pollution prevention programs to balance program flexibility and program effectiveness. The products developed from this effort include a guidance document for pollution prevention program managers seeking to improve outreach and effectiveness of their programs, "**Pollution Prevention Guidance and Tools for POTWs" (April 2005).**

4.13.2.3 GENERAL POLLUTION PREVENTION PROGRAMS FOR POTWs

The general program is designed to allow individual POTWs to develop and direct long-term ~~waste~~ pollution prevention ~~minimization~~ efforts according to local needs and is more flexible than targeted programs. General programs should contain the following elements:

1. Pretreatment program review and enhancement should include a general review of opportunities for incorporating waste reduction goals into inspections, enforcement, and permitting (such as increased inspection, improved process flow measurements, etc.). In addition, previously unregulated types of industrial and commercial facilities that discharge pollutants of concern to the POTW should be identified. Each general program should include provisions for two additional categories of discharge that are not covered under the federal regulations (such as waste oil disposal, household products, car and truck washing operations, medical and dental facilities, etc.).

2. Prioritize the need for and conduct waste minimization audits of industrial users. The criteria for prioritization should include discharge of pollutants of concern, volume of flow, industrial user compliance, and opportunities for waste reduction.

3. Periodic analysis of the waste discharge to determine which pollutants are currently problems and/or which pollutants may pose problems in the future.

4. Identify sources of all pollutants of concern.

5. Identify and implement tasks to reduce the sources of pollutants of concern.

6. Design and conduct public outreach programs aimed at changing public behavior through educating the public about a pollutant, its sources, its impact to beneficial uses, how it is released into the environment, and where appropriate, options for safer product use, substitution, and product disposal (e.g., household hazardous waste management). Such efforts include advertising outreach and household hazardous waste programs. Current regional successes include product bans and advertising campaigns in English, Spanish, and Chinese. Successful outreach results in changing behaviors that lead to changes in purchasing behavior, or the way a toxic product is used, recycled, or disposed.

7. Coordination with other programs involving recycling, reuse, and source reduction of toxic chemicals. This includes programs involving other media, such as air, hazardous waste, and land disposal. This might include developing programs for joint inspections and sharing in enforcement activities.

8. An effectiveness monitoring program specifically designed to measure the success or effectiveness of specific pollution prevention activities, as well as overall successes achieved in reducing toxic loads to the receiving watershed where possible, as well as to air, or land via sludge disposal. Such evaluations of program effectiveness are conducted on a regular basis.

~~(a) Pretreatment program review and enhancement.~~

~~This should include a general review of opportunities for incorporating waste reduction goals into inspections, enforcement, and permitting (such as increased inspection, improved process flow measurements, etc.) In addition, previously unregulated types of industrial and commercial facilities that discharge pollutants of concern to the POTW should be identified. Each general program should include provisions for two additional categories of discharge that are not covered under the federal regulations (such as waste oil disposal, household products, car and truck washing operations, medical and dental facilities, etc.).~~

~~(b) Waste minimization audits.~~

~~Prioritize need for and conduct audits of industrial users. The criteria for prioritization should include discharge of pollutants of concern, volume of flow, industrial user compliance, and opportunities for waste reduction.~~

~~(c) Public outreach.~~

~~Design and conduct public education programs aimed at publicizing appropriate household waste management, including advertising campaigns and household hazardous waste programs.~~

~~(d) Coordination with other programs involving recycling, reuse, and source reduction of toxic chemicals, such as air, hazardous waste, and land disposal. This might include developing programs for joint inspections and sharing in enforcement activities.~~

~~(e) A monitoring program specifically designed to measure the effectiveness of waste minimization activities in reducing toxic loads to the receiving watershed, air, or land via sludge disposal.~~

4.13.2.4 TARGETED POLLUTION PREVENTION PROGRAMS FOR POTWs

The purpose of targeted pollution prevention programs is to reduce the total amount of specific toxic pollutants being discharged to POTWs. ~~through source reduction and recycling.~~ Targeted programs are more intensive versions of the general programs and are focused only on one or a select number of pollutants.

Specifically, targeted programs are required for POTWs when any of the following conditions exist:

a) When numeric or narrative water quality objectives are exceeded and beneficial uses are impaired or threatened;
b) Are required as part of a TMDL or site specific objective (SSO) implementation plan;
c) Are required under the SIP when there are effluent limit compliance problems; or
d) As authorized under Water Code Section 13263.3.

The Water Board may, at its discretion, require dischargers to implement pollution prevention plans consistent with Water Code Section 13263.3 and the SIP.

In those areas of ~~the~~ a watershed or the e~~E~~stuary ~~system~~ identified as exceeding water quality objectives or having impaired beneficial uses, dischargers that are significant contributors to the water quality problem will be identified and will be required to participate in a targeted waste minimization (pollution prevention) program. In addition to general program elements, a targeted pollution prevention program involves quantifying the sources to the POTW of the targeted pollutants in question. It may also be necessary to conduct further monitoring of the targeted pollutants in the receiving water, sediment, and biota by identified dischargers to POTW systems and/or POTWs at and near their discharge locations in order to more precisely determine associated effects.

A targeted program must also initiate reductions in pollutant loading through a control strategy designed to achieve the goal of maintaining concentrations of reportable priority pollutants in the effluent at or below the effluent limit, focusing on the most effective and economic control measures first. These reductions may be achievable through focused public outreach, implementation of Best Management Practices (BMPs), technical information transfer regarding effective management techniques, or installation of appropriate technologies.

The targeted program shall include all elements of the general program, expanding where appropriate to maximize the reduction of the targeted pollutants.

Targeted programs may also require other options such as performance-based effluent concentration limits and mass limitations for the pollutants of concern, in order to attain water quality objectives in the receiving water body.

~~In those areas of the watershed or estuary system identified as exceeding water quality objectives or having impaired beneficial uses, dischargers that are significant contributors to the water quality problem will be identified and required to participate in a targeted waste minimization program.~~

~~NPDES permits for each identified POTW will be amended by the Regional Board to require the development and implementation of appropriate pollution prevention measures within a given time schedule.~~

~~The first phase of a targeted pollution prevention program involves quantifying the amount of the pollutants in question being discharged to the POTW from (a) regulated industrial users, (b) commercial facilities, (c) water supplies, and (d) domestic sewage.~~

~~It may also be necessary to conduct further monitoring of pollutants of concern in water, sediment, and biota by identified dischargers to POTW systems and/or POTWs at and near their discharge locations in order to more precisely determine associated effects.~~

~~The second phase of the targeted program is to initiate reductions in pollutant loading, focusing on the most effective and economic control measures first. These reductions may be achievable through focused public outreach, technical information transfer regarding effective management techniques, or installation of appropriate technologies.~~

~~The targeted program shall include all elements of the general program, expanding where appropriate to maximize the reduction of the targeted pollutants.~~

~~Targeted programs may also require other options such as performance-based effluent concentration limits and mass limitations for the pollutants of concern, in order to attain water quality objectives in the receiving water body. Phased implementation of the program will be carried out in coordination with the development and implementation of other tasks under the Mass Emissions Strategy required in the State Board's Pollutant Policy Document.~~

4.13.2.5 DIRECT INDUSTRIAL DISCHARGER POLLUTION PREVENTION PROGRAM

Industrial entities discharging directly to receiving waters instead of public sewer systems are also subject to similar pollution prevention requirements. Overall source reduction and recycling of hazardous wastes, including audits, planning, and reporting to the Department of Toxic Substance Control (DTSC) is required under the **Hazardous Waste Source Reduction and Management Review Act of 1989**~~, (CCR Title 22,~~ (Title 23, CCR, Ch 31). Rather than require separate pollution prevention programs, ~~these~~ major dischargers ~~will be~~ were asked to submit copies of the required pollution prevention reports (those sections specifically addressing liquid waste and reduction of pollutants discharged to water) to the ~~Regional Board~~Water Board. These dischargers submitted initial ~~Initial~~ plans for pollution prevention, including detailed descriptions of tasks and schedules, ~~were submitted by these dischargers~~ in 1992.

In the event that existing pollution prevention reports do not adequately address reduction of toxic pollutants in effluent, the Water Board will require additional information.

In cases where water quality problems exist or where beneficial uses are impaired or threatened by direct industrial dischargers, focused pollution prevention programs similar to POTW targeted programs will also be required. In cases where Water Board staff determines that independent audits are justified, as opposed to audits conducted by the

involved companies, the issue will be brought before the Water Board. The effort should result in the reduction or elimination of specific pollutants of concern.

~~In the event that existing pollution prevention reports do not adequately address reduction of toxic pollutants in effluent, the Regional Board will require additional information.~~

~~In cases where water quality problems exist or where beneficial uses are impaired or threatened by direct industrial dischargers, focused pollution prevention programs similar to POTW targeted programs will also be required. In cases where staff feel that independent audits (as opposed to audits conducted by the involved companies) are justified, the issue will be brought before the Regional Board. The effort should result in the reduction or elimination of specific pollutants of concern.~~

~~SURFACE WATER PROTECTION AND MANAGEMENT -- NONPOINT SOURCE CONTROL MEASURES~~

~~During periods of wet weather, rain carries pollutants and sediment from all parts of the watershed into streams and the larger Estuary. These diffuse sources of pollutants range from parking lots and bare earth at construction sites to mining sites and farm enclosures. In addition to runoff from land, there are diffuse pollutant sources associated with maritime activity such as dredging, wastes from vessels, and accidents such as oil spills.~~

~~The total amount of pollutants entering aquatic systems from these diffuse, nonpoint sources is now generally considered to be greater than from any other source. Protecting the region's aquatic systems from impacts associated with these diffuse sources is a long-term challenge and requires very different approaches than the control of pollutants from point sources.~~

~~Nonpoint source pollution management involves three basic elements: (1) changes in existing operating practices to minimize the potential of untreated wastes reaching aquatic systems, (2) collection and treatment of wastes, and (3) prohibition of waste-generating practices. The degree of changes required to control or eliminate nonpoint source pollution depends on several factors, including the magnitude of the pollution problem and the sensitivity of exposed aquatic systems.~~

~~In order to identify and apply the most effective and economically efficient control measures, thorough investigations relating receiving water conditions to specific nonpoint sources are necessary. In many cases, however, specific water quality problems are already known to be generally linked to nonpoint source pollution, but sufficient information is not available to pinpoint the exact cause-and-effect relationship. Thus, the first step in nonpoint source management is often to conduct these investigations and refine control plans as information becomes available. Concurrently, general improvements may be gained from "good practice" techniques.~~

~~The Regional Board's nonpoint source control programs are designed around very specific sets of problems, each of which involves a unique set of institutions and technical issues. This section describes each separate program.~~

4.14 URBAN RUNOFF MANAGEMENT

4.14.1 MANAGEMENT OF POLLUTANT DISCHARGE FROM STORM DRAINS

4.14.1.1 BASELINE CONTROL PROGRAM
4.14.1.2 COMPREHENSIVE CONTROL PROGRAM

4.14.2 HIGHWAY RUNOFF CONTROL PROGRAM

4.14.3 INDUSTRIAL ACTIVITY CONTROL PROGRAM

4.14.3.1 TIER I: GENERAL PERMITTING
4.14.3.2 TIER II: SPECIFIC WATERSHED PERMITTING
4.14.3.3 TIER III: INDUSTRY-SPECIFIC PERMITTING
4.14.3.4 TIER IV: FACILITY-SPECIFIC PERMITTING

4.14.4 CONSTRUCTION ACTIVITY CONTROL PROGRAM

4.15 AGRICULTURAL WASTEWATER MANAGEMENT

4.15.1 ANIMAL CONFINEMENT OPERATIONS

4.15.2 IRRIGATION OPERATIONS

4.15.2.1 Dairy Waste Management
4.15.2.2 Dairy Waste Regulation

4.16 ~~-~~WATER RECYCLING ~~RECLAMATION~~

~~POLICY STATEMENT~~

Per Water Code Section 13050, recycled water means water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource. To date in the~~is region~~Region, disposal of most municipal and industrial wastewater has primarily involved discharges into the ~~r~~Region's watersheds and the ~~San Francisco e~~Estuary ~~system~~. With growing awareness of the impacts of toxic discharges, ~~the~~ drought, future urbanization, and growth on the local aquatic habitat, there is an increasing need to look for other sources of water. Increasingly, conservation and water recycling (formerly referred to as reclamation) will be needed to deal with these long-term water issues. The ~~Regional Board~~Water Board recognizes that people of the ~~San Francisco Bay~~ Region are interested in developing the capacity to conserve and recycle ~~reclaim~~ water to supplement existing water supplies, meet future water requirements, and restore the R~~r~~egion's watersheds and E~~e~~stuary ~~system~~. Disposal of wastewater to inland, estuarine or coastal

waters is not considered a permanent solution where the potential exists for conservation, water recycling, and reuse ~~and reclamation~~.

The Constitution of California, Article X, declares that, "…because of the conditions prevailing in the state, the general welfare requires that the water resources of the state be put to beneficial use to the fullest extent to which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof ~~is~~ in the interest of the people and for the public welfare." In other words, when suitable recycled water is available, it should be used to supplement existing water supplies used for agricultural, industrial, municipal, and environmental purposes.

The Water Board also recognizes and supports the concept that water reuse is an essential component for planning future water supply, especially in areas dependent on imported water. This includes projects that use recycled water to increase the local water supply, to improve the salt balance in the groundwater basin, or to reduce the need for wastewater export through recycled water irrigation and groundwater recharge with imported water or with high-quality recycled water. The year-round, dependable recycled water resource may also be appropriate for stream flow augmentation to enhance beneficial uses of streams.

State Water Board Resolution 77-1, adopted in 1977, requires the State and Regional Water Boards to encourage water recycling projects for beneficial use using wastewaters that would otherwise be discharged to marine or brackish receiving waters or evaporation ponds. The resolution also specifies using recycled water to replace or supplement the use of fresh water or better quality water, and to preserve, restore, or enhance in-stream beneficial uses, including fish, wildlife, recreation and aesthetics associated with any surface water or wetlands.

~~California Water Code, Section 275, states that the Regional Board shall take all appropriate proceedings or actions to prevent waste, unreasonable use, or unreasonable method of use. In section 13550, the Legislature defines the use of potable domestic water for the irrigation of greenbelt areas, including but not limited to, cemeteries, golf courses, parks, and highway landscaped areas is a waste or an unreasonable use of such water within the meaning of Section 2 of Article X of the California Constitution when suitable reclaimed water is available. In section 13510, the Legislature states that the development of facilities to reclaim water is in the interest of the people of the state. In this section of the Water Code, the Legislature intended that the state undertake all possible steps to encourage development of water reclamation facilities so that reclamation may be a significant source to meet the growing water needs of the state. Reclamation is defined as the process of augmenting the long-term dependable yield of the state's water supply by recapturing or treating wastewater, degraded or contaminated groundwater, or other nonpotable water for beneficial uses; its transportation to the place of use; and its actual use. Finally, Section 13225(I) mandates that the Regional Board encourage regional planning and action for water quality control.~~

4.16.1 WATER RECYCLING AND REUSE PROGRAM~~REGULATORY REQUIREMENTS~~

Before a wastewater producer can obtain an increase in connections and discharge flows under the Water Board's NPDES program, it must demonstrate that a maximum effort has been made to develop and implement a credible and effective water recycling program. This program must be integrated with a source control program (~~waste minimization and wastewater~~ Pretreatment and Pollution Prevention Program **(Section 4.13 Pretreatment and Pollution Prevention**) and a water conservation program.

All water recycling projects involve three components: 1) treatment of wastewater to produce water of quality suitable for the intended reuse; 2) distribution, which may also include storage, to convey the treated water to the place(s) of use; and 3) the end use, reuse. The most common types of reuse involve discharges to land for irrigation of landscape plants or crops, but reuse may also include non-discharge uses such as for cooling water or toilet flushing. Each of these components is subject to various design and operational requirements specified in the **Water Recycling Criteria** (WRC) codified at **Title 22, CCR, Division 4, Chapter 3**, which were extensively revised and updated by Department of Health Services (DHS) from 1993 to 2001.

The Water Board in conjunction with DHS implements the WRC. DHS and the State Water Board have entered into a **Memorandum of Agreement (MOA) on Use of Reclaimed Water**. The intent of the MOA is to insure that there is coordination among DHS, the State Water Board and the Regional Water Boards to implement the recycled water program.

The Water Board is the permitting agency for water recycling projects through issuance of water recycling requirements, also called **Water Reuse Requirements** (WRRs). The WRRs require a discharger proposing a new water-recycling project to prepare an engineering report describing the project, for review and approval by DHS. The Water Board may then prescribe WRRs for the project based on recommendations from DHS. WRRs include relevant specifications from the WRC and other applicable requirements based on Water Board plans and policies, such as effluent limits and operation, and monitoring and reporting requirements. WRRs may be issued for discrete single-facility reuse projects or for large-scale projects such as municipality-based reuse programs involving multiple types and places of reuse.

In 1996, in order to facilitate water recycling and reuse in the Region, the Water Board adopted the General Water Reuse Requirements for Municipal Wastewater and Water Agencies, Water Board Order No. 96-011(**General Water Reuse Permit**). This permit is applicable to producers, distributors, and users of non-potable recycled municipal wastewater throughout the Region. The intent of the General Water Reuse Permit is to streamline the permitting process and delegate, to the fullest extent possible, the responsibility of administrating water reuse programs to local agencies. Regulation under

the General Water Reuse Permit requires submittal of a Notice of Intent (NOI) to the Water Board and written authorization from the Water Board's Executive Officer.

Under the General Water Reuse Permit, water recycling and reuse have expanded rapidly throughout the Region. It is estimated that twenty wastewater or water distribution agencies in the Region will be operating under the General Water Reuse Permit by 2007.

In 2001, the State Legislature established the **California Recycled Water Task Force** (Task Force). The mission of the Task Force was to evaluate the current framework of state and local rules, regulations, ordinances, and permits to identify opportunities for and obstacles to the safe use of recycled water in California. The Task Force consisted of representatives from federal, state, and local agencies, private entities, environmental organizations, universities, and public-interest groups. The Task Force identified and adopted recommendations to address obstacles, impediments, and opportunities for California to increase its recycled water usage as described in the report "**Water Recycling 2030, Recommendations of California's Recycled Water Task Force**.

4.16.2 INTERAGENCY WATER RECYCLING PROGRAM AND COORDINATION

Implementation of water recycling projects requires the involvement, approval, and support of a number of agencies, including state and local health departments, the Water Board, local POTWs and water districts, and land use planning agencies. Interagency coordination must be a priority of all parties involved in water recycling. Failure to coordinate activities can result in the inability to carry out water recycling projects in a timely, consistent, and cost-effective manner. The Water Board seeks cooperation and participation of professionals from the water recycling industry and the water, health, and regulatory agencies to assure the development of criteria that are both attainable and appropriate. To facilitate inter-/intra-regional recycling projects, interagency coordination is necessary when the wastewater agency produces recycled water outside of an interested water purveyor's service area. Effective communication and cooperation between agencies regarding distribution and service is vital and should begin early in the planning process. This will assure the water purveyor that there will be no duplication of service, enable interagency agreement on project development and implementation, and help avoid any unnecessary delays that could jeopardize a project.

Several regional water recycling programs have been initiated in the Region to facilitate water reuse in contiguous areas. This has heralded a new way to implement water recycling projects by focusing agencies toward regional collaboration, irrespective of jurisdictional boundaries. This has the effect of integrating water and wastewater planning to concurrently solve water supply and wastewater discharge problems, and will lead to more efficient water recycling projects by taking advantage of economics of scale. One such program is the South Bay Recycling Program in Santa Clara County. In addition, the **North Bay Watershed Association** was created, "to help regulated local and regional public agencies work cooperatively on water resource issues that impact

areas beyond traditional boundaries in order to promote stewardship of the North Bay Watershed (Marin, Sonoma and Napa Counties)." The coordination and integration of water reuse activities in the North Bay is an important component of the Association's functions.

~~If reclamation is to be made feasible and efficiently utilize the water resources of the state, there are certain issues that will have to be addressed on a state-wide and regional basis.~~

~~More than 850 reclamation projects are currently operating successfully in California. The California Department of Toxic Substances Control (DTSC) and local health and regulatory agencies have been integrally involved in both the development and operation of all of these projects. In the past decade, there have been significant improvements in the design and operation of reclamation facilities and in health monitoring and analysis. As a result, the DTSC is currently revising the California Code of Regulations, Title 22, Wastewater Reclamation Criteria regulations to make it consistent with existing capabilities. These revisions should allow for the expansion of possible uses for reclaimed water. In order to implement reclamation more effectively, it is recommended that: 1) research into environmental and health effects be conducted in those areas where information is still lacking or inconclusive; 2) cooperation and participation be sought from professionals from both the water reclamation industry and the health and regulatory agencies to assure that the criteria developed are both attainable and appropriate; 3) uniform guidelines be jointly developed and implemented by state and local health and regulatory officials; and 4) guidelines and regulations be allowed to evolve in a timely fashion to reflect technological advances and operational experience.~~

~~In order to uphold the state's Antidegradation Policy, reclamation project requirements and water quality objectives, should be developed that consider the public health risks protected under Title 22 and potential environmental risks that may impact water quality and beneficial uses. The State Department of Toxic Substances Control and the State and Regional Boards must develop discharge standards and treatment requirements for reclaimed water used for groundwater recharge requirements as well as recharge site requirements. In addition, groundwater quality objectives set in the Basin Plan must be updated and expanded to include constituents of concern, particularly metals and organic chemicals.~~

~~The Regional Board adopted Order No. 91-042, which is incorporated by reference into this plan, to allow certain pre-approved waste dischargers to issue their own permits for the use of reclaimed water. Specific guidelines are included in the Order. Uses are limited to those that do not have unrestricted access or exposure. Requirements conform to statewide reclamation criteria established by DTSC as prescribed in Title 22, Sections 60301-60335, California Code of Regulations.~~

~~Enforcing the water quality nondegradation standards will require better monitoring and assessment of wastewater and ambient water quality. Those entities implementing any~~

~~major use of reclaimed water will need to implement and regulate consistent monitoring programs.~~

~~SOURCE QUALITY CONTROL~~

~~The quality of influent to a reclamation plant affects the quality of effluent production, particularly in those communities that import high-quality surface water from the Sierra Nevada. Reclamation treatment and costs are directly dependent on the quality of influent into the plant. The quality of this influent depends on the quality of the water supply and the quality of the waste discharges to the reclamation plant. Reclamation requires that industrial pretreatment and pollution prevention programs be sufficient to remove toxic constituents. Reclamation also requires adequate monitoring and enforcement. Additionally, maximum recycling and separate treatment of waste by industries should be encouraged where feasible. Educational programs for industries and households on the appropriate handling and disposal of potentially toxic materials should be part of any pretreatment and pollution prevention program.~~

~~GOVERNMENTAL COORDINATION~~

~~Implementation of reclamation projects requires the involvement, approval, and support of a number of agencies, including state and local health departments, the Regional Board, local POTWs and water districts, and land use planning agencies. Interagency coordination must be a priority of all parties involved in reclamation. Failure to coordinate activities can result in the inability to carry out reclamation projects in a timely, consistent, and cost-effective manner. The Regional Board seeks cooperation and participation of professionals from the water reclamation industry and the water, health, and regulatory agencies to assure the development of criteria that are both attainable and appropriate. To facilitate inter-/intra-regional reclamation projects, interagency coordination is necessary when the wastewater agency produces reclaimed water outside of an interested water purveyor's service area. Effective communication and cooperation between agencies regarding distribution and service is vital and should begin early in the planning process. This would assure to the water purveyor that there will be no duplication of service, enable interagency agreement on project development and implementation, and help avoid any unnecessary delays that could jeopardize a project.~~

~~Future reclamation prospects are also dependent on effective coordination between reclamation agencies and land use planning agencies. Many reclamation ordinances in the state require dual distribution systems in new high rise buildings and other new developments. This requires that a land use planning agency mandate the use of reclaimed water as a condition of development approval. In addition, efforts of regulatory agencies, such as the State Board, Regional Board, DOHS, and County Health Departments, should be coordinated to minimize conflicts or confusion when projects are permitted.~~

4.17 MUNICIPAL WASTEWATER SLUDGE MANAGEMENT

4.18 ON-SITE WASTEWATER TREATMENT AND DISPERSAL DISPOSAL SYSTEMS

As the population of the Bay Area Region increases, demand for new development increases. In many cases, new development is within areas served by municipal sewer systems. However occurring close to sewerage agencies. More often, however, development is also occurring being proposed in outlying areas not that cannot 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). These are primarily onsite wastewater treatment and dispersal systems (onsite systems or septic systems) serving individual homes, but include community systems serving multiple residences. Today there are more than 110,000 onsite systems septic tank soil adsorption systems (septic systems) and cesspools throughout the Bay AreaRegion, and approximately 1,000 new septic systems are approved each year.

In response to these development pressures, the Regional BoardWater Board adopted a **Policy on Discrete Sewerage Facilities** in 1978. The policy set forth the actions the Regional BoardWater 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 acceptable onsite system practices the control of individual wastewater treatment and disposal systems. The Regional BoardWater Board's policy and guidelines are presented below.

4.18.1 POLICY ON DISCRETE SEWERAGE FACILITIES

Thise policy enumerates the following principles, which apply to all wastewater discharges:

- 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;

- 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;

- 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 onsite~~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**; 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~~ dispersal 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.~~ The~~is~~ policy requires local governments, during the development approval process, to consider either the formation of a new government entity or an existing public entity to assume ~~or the assumption of~~ this responsibility. ~~by an existing entity.~~

4.18.2 ~~INDIVIDUAL~~ ONSITE SYSTEM GUIDELINES

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

~~On April 17,~~ In 1979, the ~~Regional Board~~Water Board adopted Resolution No. 79-5: **Minimum Guidelines for the Control of Individual Wastewater Treatment and Disposal Systems** ~~(Minimum Guidelines)~~. These guidelines include recommended practices for onsite system design, construction, operation and maintenance, and cumulative impact assessments, along with supporting rationale. The guidelines focus on the most common and conventional type of onsite systems, a septic tank followed by gravity-flow discharges into a subsurface soil absorption system, but underlying principles remain applicable to all types of onsite 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.~~

4.18.3 ALTERNATIVE ON-SITE ~~WASTEWATER~~ SYSTEMS

The conventional onsite system, when properly constructed and operated, has long been a reliable and acceptable method of providing onsite sewage management. However, there are widespread conditions throughout the Region that preclude the use of conventional systems, including high groundwater, shallow or poor quality soil, or steep slopes. In recent years, there has been active interest and research in the development of alternative methods of onsite wastewater management to accommodate these limiting conditions. Alternative methods currently in use include additional treatment prior to soil discharge such as by a sand filter, or improved methods of dispersal into native soil such as by pressurized distribution throughout the soil absorption system, or via an engineered above-grade mound unit.

~~Although the conventional septic system has long been one of the most reliable methods of on-site sewage disposal, there are widespread conditions throughout the region that restrict its use, including conditions of high groundwater and shallow or 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.~~

While alternative methods can afford improved practices, the use of alternative systems is not without limitations. The site and soil conditions that preclude conventional practices remain and must be appropriately addressed, since all onsite systems ultimately rely on soil absorption of all or most of the wastewater generated. Most alternative systems require a high degree of design expertise, which increases the danger of faulty design or installation and complicates the review of various proposals. Furthermore, given that alternative systems are primarily used in areas of existing site or soil limitations, in the event of failure, options for replacement will be few, and corrections difficult to achieve. Finally, most alternative systems require a far more intensive and sophisticated level of management than conventional systems, including inspection, monitoring and maintenance by qualified service providers, and increased regulatory oversight, as well as careful use and operation by the homeowner.

~~It should be pointed out that the conditions (i.e. soils, groundwater, 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 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 highdegree 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 ~~Regional Board~~Water Board adopted the following statement in the 1979 ~~its~~ Minimum Guidelines:

"The ~~Regional Board~~Water 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~~Water Board Executive Officer;

b. Where the Health Officer has informed the ~~Regional Board~~Water 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 of the inspection, monitoring and enforcing the maintenance of the system through:

   (i) Provision of the commitment and the necessary legal powers to inspect, monitor, and when necessary to abate/repair the system; and

   (ii) Provision of a program for funding to accomplish (i) above."

The fundamental point is that the Water Board will allow the use of alternative systems only if adequate design review, system management, and means for failure correction are assured, and a county or some other public agency assumes ultimate responsibility for these actions.
~~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.~~

The Water Board may authorize ~~Local~~ local agencies ~~may~~ to approve and permit ~~certain types of~~ alternative on-site systems, provided the local regulatory program is found to be acceptable and in accordance with the Water Board's position on alternative systems discussed above. ~~The Regional Board will consider the local agency's alternative system program, in accordance with the Regional Board's position on alternative systems discussed above.~~ An acceptable program should include a) siting and design criteria for the types of alternative systems being approved, b) procedures for on-going inspection, monitoring, and evaluation of these systems, and c) appropriate local regulations for

implementation and enforcement of the program. ~~Such a~~Authorization may be granted through a conditional waiver adopted by the Water Board and will typically include ~~n~~ a Memorandum of Understanding (MOU) between the ~~Regional Board~~Water Board and the local agency. Typically, that agency will be the county environmental health department. The MOU provides a means for identifying the responsibilities of both the ~~Regional Board~~Water Board and the local agency, applicable criteria for ~~such as mutually agreed~~ siting, design, ~~and~~ construction, ~~criteria, and guidelines for the~~ operation, maintenance~~,~~ and monitoring, and procedures for implementing the program. ~~of alternative systems.~~

Alternative onsite system designs proposed for approval in a local agency program should be substantiated by suitable reference materials demonstrating successful performance under site and soil conditions similar to the local conditions, including previous field or research facility testing and documentation of applicable design, installation and use criteria. System designs that have not been fully proven under proposed conditions will be considered experimental and treated with caution. In general, experimental systems will require more careful siting and design review and, if approved, intensive monitoring and inspection to ensure adequate system operation and performance. Experimental systems are generally approved only for limited use, until successful performance has been demonstrated and documented, and acceptable design, installation and use criteria determined.

~~Alternative on-site system designs should be substantiated by suitable reference materials including previous field testing and documentation of successful performance under site and soil conditions similar to the local conditions. System designs that have not been fully proven under proposed conditions will be considered experimental and treated with caution. In general, experimental systems will require more careful siting and design review and, if approved, intensive monitoring and inspection to ensure adequate system operation and performance.~~

4.18.4 GRAYWATER ~~DISPOSAL~~ SYSTEMS

Graywater systems are a special group of onsite systems that are used to manage only isolated domestic wastewaters that have not come in contact with toilet wastes. In 1997, the California Building Standards Commission approved revised **California Graywater Standards**. These standards were developed by the California Department of Water Resources (DWR), are codified at Title 24, CCR, Part 5, Appendix G, and apply to all graywater systems statewide.

~~On March 8, 1994, the California Building Standards Commission approved new graywater rules developed by the California Department of Water Resources (DWR). These rules became effective on November 8, 1994 and supersede local graywater regulations.~~

The standards specify the means by which certain non-toilet wastewaters may be collected, filtered, and discharged into onsite subsurface irrigation systems. Allowable sources of graywater include showers, tubs, bathroom sinks and laundry water. Discharged graywater may only be used for subsurface landscape irrigation. The standards apply to both residential and commercial buildings.

~~Under DWR's rules, a homeowner, builder, developer, or other owner of a single dwelling may plumb such dwellings for, and install now or later, a collection, filtration, and subsurface irrigation system using water from showers, tubs, clothes washers, bathroom and laundry sinks. The treated graywater is to be used for subsurface landscape irrigation.~~

Cities and counties have authority to develop policies and procedures for the implementation of graywater programs. In developing these, consultation with the ~~Regional Board~~Water Board and local water districts can ensure that potential impacts on local water quality are taken into consideration.

4.19 EROSION AND SEDIMENT CONTROL

4.20 DREDGING AND DISPOSAL OF DREDGED SEDIMENT

4.20.1 REGULATORY FRAMEWORK

4.20.2 ENVIRONMENTAL IMPACTS OF DREDGING AND DISPOSAL IN THE AQUATIC ENVIRONMENT

4.20.3 DREDGING STUDY PROGRAMS

4.20.3.1 DREDGE MANAGEMENT PROGRAM
4.20.3.2 LONG-TERM MANAGEMENT STRATEGY (LTMS)
4.20.3.3 THE LTMS PROCESS
4.20.3.4 OCEAN STUDIES
4.20.3.5 IN-BAY STUDIES
4.20.3.6 UPLAND AND NON-TIDAL/REUSE STUDIES

4.20.4 WETLAND RESTORATION USING DREDGED MATERIAL

4.20.4.1 SONOMA BAYLANDS
4.20.4.2 MONTEZUMA WETLANDS RESTORATION PROJECT

4.20.5 ~~REGIONAL~~ WATER BOARD POLICIES ON DREDGING AND DREDGED SEDIMENT DISPOSAL

4.20.5.1 NEED FOR REGIONAL AND LOCAL MONITORING
4.20.5.2 MATERIAL DISPOSAL RESTRICTION
4.20.5.3 VOLUME TARGETS
4.20.5.4 VOLUME TARGET IMPLEMENTATION
4.20.5.5 USE OF TESTING GUIDELINES
4.20.5.6 APPLICABILITY OF WASTE DISCHARGE REQUIREMENTS
4.20.5.7 DREDGING WINDOWS
4.20.5.8 IMPACTS AT DREDGE SITE
4.20.5.9 POLICY ON LAND AND OCEAN DISPOSAL

4.21 MINES AND MINERAL PRODUCERS

The Water Board oversees water quality problems associated with over 150 inactive and active mining and mineral producers in the Region, as described below.

4.21.1 INACTIVE SITES

Over 50 abandoned or inactive mines have been identified within the ~~San Francisco Bay r~~Region (**Table 4-~~16~~14** and **Figure 4-5**). The mineral resources extracted include mercury, magnesite, magnesium salts, manganese, pyrite, coal, copper, silver, and gold. A large percentage of the mining activities took place from 1890-1930, although some areas were mined as recently as 1971. The size of these mines varies from relatively small surface mines of less than half an acre to the world's second largest mercury mine, the New Almaden District, located in ~~southern~~ Santa Clara County.

Water quality problems associated with mining activities can be divided into ~~two~~ three categories:

- ✓ Erosion and sediment discharges from surface mines and ore tailings piles; ~~and~~
- ✓ Acid or otherwise toxic aqueous discharge from underground mines, ore tailings, slag, or other mining processes; and
- ✓ Atmospheric deposition, such as releases from stacks carried downwind from mine sites.

Problems of erosion and sediment discharged from mined areas may be intensified due to the fact that sediment from ore~~-~~-rich areas typically contain high concentrations of metals. Biological processes which take place in lake and stream bottom sediments may allow for these pollutants to be released in a form ~~which~~ that more readily bioaccumulates in the food chain.

~~Recent w~~Water quality and aquatic toxicity monitoring data suggest~~s~~ that the beneficial uses of a number of water supply reservoirs, creeks, and streams in the R~~r~~egion have been impacted as a result of past mining activities. Threatened beneficial uses of lakes, streams, bays and marshes due to mining activities so far identified in the R~~r~~egion include: fish migration, fish spawning, shellfish harvesting, wildlife habitat, preservation of rare and endangered species, cold and warm freshwater habitat, and water contact recreation. In response to these findings ~~surveys~~, the Water Board ~~were~~ conducted ~~by the Regional Board staff in order~~ surveys to locate ~~all~~ abandoned and operating mines in the R~~r~~egion. The results of the surveys are compiled in the 1998 report titled, "**San Francisco Bay Regional Water Quality Control Board Mines Report.**"

In many cases, the adverse results of previous surface mining activities can be reduced, and in some cases eliminated, through appropriate erosion and sediment control practices. The U.S. Natural Resource Conservation Service (NRCS, formerly Soil Conservation Service) has developed a **Resource Management System for Surface Mined Areas**. This management system references practices and treatment alternatives needed ~~in order~~ to address the following:

- ✓ Erosion control practices ~~which will dispose of~~ that route surface water run~~-~~off at non-erosive velocities and reduce soil movement by wind or water to within acceptable limits;
- ✓ Maintenance of adequate water quality and quantity for planned uses and to meet federal, state, and local requirements;
- ✓ Pollution control to meet federal, state, and local regulations; and

- ✓ A system of planned access and/or conveyance that is within local regulations and meets the needs for the intended use.

In 1980, a memorandum of understanding (MOU) was negotiated with **the Council of Bay Area Resource Conservation Districts** in order to provide for assessment and monitoring of potential and existing soil erosion-related water quality problems, and identification of control measures. It was agreed that local units of government should have the lead role in controlling land use activities that cause erosion. Control measures include the implementation of ~~best management practices (~~BMPs~~)~~. The Resource Management System for Surface Mined Areas developed by NRCS specifically references BMPs determined to be the most effective and practicable means of preventing or reducing erosion and sediment-related water quality degradation resulting from surface mining activities.

4.21.2 ACTIVE SITES

There are approximately 100 active ~~mines~~ quarries and mineral producers within the ~~San Francisco Bay region~~ Region. The primary ~~mineral~~ commodities produced include clay, salt, sand and gravel, shale, and crushed stone. Water quality problems associated with active mineral production ~~activities~~ generally consist of erosion and sediment discharge into nearby surface water bodies and wildlife habitat destruction.

~~Active mining and mineral production~~ Mining activities are in part regulated under the **Surface Mining and Reclamation Act of 1975**. This Act requires all mine operators to submit a reclamation plan to the **California Department of Conservation, Division of Mines and Geology**, and the recognized lead local agency for the area in which the mining is taking place. Recognized lead local agencies for the ~~San Francisco Bay region~~ Region include c~~C~~ounty p~~P~~lanning and p~~P~~ublic w~~W~~orks d~~D~~epartments. Additionally, some local planning departments regulate mining activities through the issuance of conditional land use permits. The goal of each reclamation plan is to assure that mined lands are reclaimed to a usable condition ~~which~~ that is readily adaptable for alternate land uses and creates no danger to public health and safety. ~~To date,~~ The current permitting process places very little emphasis ~~has been placed~~ on the need to protect beneficial uses of surface and ~~groundwaters~~groundwater. ~~in the established permitting process.~~

Under ~~the California Code of Regulations,~~ **Title 23, CCR, Chapter 15, Article 7**, the ~~Regional Board~~Water Board has the authority to regulate mining activities that result in a waste discharge to land, through the use of WDRs~~waste discharge requirements~~. Additionally, the federal NPDES stormwater regulations (**40 CFR Parts 122, 123, and 124**) require active and inactive mining operations to obtain NPDES permit coverage for the discharge of stormwater ~~contaminated~~ polluted by contact with any overburden, raw material, intermediate products, finished products, byproducts, or waste products.

4.21.3 MINING PROGRAM GOAL

The ~~Regional Board~~Water Board's goal for its mining program is to restore and protect beneficial uses of receiving waters now impaired, or threatened with impairment, resulting from past or present mining activities. This goal will be attained by the coordinated effort of the ~~Regional Board~~Water Board, NRCS, the Council of Bay Area Resource Conservation Districts, the California Division of Mines and Geology, and lead local government agencies through the implementation of a mineral production and mining management program.

4.21.4 MINING PROGRAM DESCRIPTION

1. The ~~Regional Board~~Water Board intends to continue to work closely with Resource Conservation Districts and NRCS to identify all existing and abandoned mines and mineral production sites in the ~~r~~Region. Responsible parties will be identified. ~~and i~~If needed, potential funding alternatives for cleanup activities will also be identified. Sites will be prioritized based on existing and potential impacts to water quality and size.

2. The ~~Regional Board~~Water Board will require an NPDES permit for the discharge of ~~contaminated~~ polluted stormwater from active and inactive mining operations, as defined in ~~the~~ NPDES stormwater regulations. The ~~Regional Board~~Water Board will consider issuing individual permits or a general permit for such discharges, or will otherwise allow coverage under the State Water Board general permit for stormwater discharges associated with industrial activity as described in ~~the~~ **Section 4.14 Urban Runoff Management, Industrial Activity Control Program**. Requirements of the notice of intent to be covered under the general permit(s) and the schedule for submittal will be established in the permit(s).

3. The responsible party or operator of each site discharging, or potentially discharging, waste to land shall be required to submit a Report of Waste Discharge to the ~~Regional Board~~Water Board. Submittal of a Report of Discharge will be requested by the ~~Regional Board~~Water Board pursuant to ~~the California~~ Water Code Section 13267. Requests will be made on a site-by-site basis and based on priority. A Report of Waste Discharge shall consist of a "Site Closure Plan" and an "Operation and Management Plan" for active sites, as described below:

   - Each plan shall be designed to ensure short- and long-term protection of beneficial uses of receiving waters.

   - The "Closure Plan" shall address site restoration and long-term maintenance and monitoring, which may include a financial guarantee to assure that adequate funds are available for proper site closure.

- The "Operation and Management Plan" shall address stormwater runoff and erosion control measures and practices.

- Each plan will be evaluated in regard to potential impacts to beneficial uses of receiving waters. ~~Waste Discharge Requirements~~ WDRs will be issued or conditionally waived at the discretion of the ~~Regional Board~~Water Board based on the threat to water quality and the effectiveness of identified and implemented control measures and the effectiveness of local agency oversight.

4.22 VESSEL WASTES

4.23 WETLAND~~S~~ PROTECTION AND MANAGEMENT

Wetlands and related habitats comprise some of the ~~San Francisco Bay r~~Region's most valuable natural resources. Wetlands provide critical habitats for hundreds of species of fish, birds, and other wildlife; offer open space; and provide many recreational opportunities. Wetlands also serve to enhance water quality, through such natural functions as flood control and erosion control, stream bank stabilization, and filtration and purification of ~~naturally occurring contaminants.~~ surface water.

The ~~Regional~~ Water Board will refer to the following for guidance when permitting or otherwise acting on wetland~~s~~ issues:

- Governor's **Executive Order W-59-93** (signed August 23, 1993; also known as the California Wetlands Conservation Policy, or the "No Net Loss" policy);

- **Senate Concurrent Resolution No. 28**; and

- ~~California~~ **Water Code Section 13142.5** (applies to coastal marine wetlands).

The goals of the California Wetlands Conservation Policy include ensuring "no overall net loss," achieve a "long-term net gain in the quantity, quality, and permanence of wetlands acreage and values..." and reducing "procedural complexity in the administration of state and federal wetlands conservation programs."

Senate Concurrent Resolution No. 28 states, "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~~Water Board may also refer to the ~~San Francisco~~ **Estuary Project's Comprehensive Conservation and Management Plan** (June, 1994) for recommendations on how to effectively participate in a R~~r~~egion-~~-~~wide, multiple-agency wetland~~s~~ management program.

~~REGIONAL WETLANDS MANAGEMENT PLAN~~

4.23.1 BAYLANDS ECOSYSTEM HABITAT GOALS

Consistent with the California Wetlands Conservation Policy, the ~~Regional Board~~Water Board ~~is~~ participated~~ing~~ in the preparation of ~~a Regional Wetlands Management Plan (RWMP)~~ two planning documents for wetland restoration around the Estuary: **Baylands Ecosystem Habitat Goals** (1999) and **Baylands Ecosystem Species and Community Profiles** (2000), together known as the Habitat Goals reports. The Habitat Goals reports ~~RWMP will~~ provide ~~the framework~~ a starting point for coordinating and integrating wetland~~s~~ planning and regulatory activities ~~in~~ around the ~~San Francisco Bay~~ Estuary~~region and will therefore include both regulatory and non-regulatory components~~. The ~~RWMP~~ Habitat Goals reports ~~will~~ identify and specify the beneficial uses and/or functions ~~*and values*~~ of existing wetlands and ~~establish~~ suggest wetland habitat goals for the baylands, defined in the Habitat Goals reports as ~~Region~~ shallow water habitats around the San Francisco Bay between maximum and minimum elevations of the tides. The baylands ecosystem includes the baylands, adjacent habitats, and their associated plants and animals. The boundaries of the ecosystem vary with the bayward and landward movements of fish and wildlife that depend upon the baylands for survival. The Habitat Goals reports were the non-regulatory component of a conceptual regional wetlands management plan from the mid-1990s.~~As beneficial uses are identified for specific wetlands, the Basin Plan will be amended to incorporate the new information into Chapter 2.~~

~~The RWMP will also seek to streamline the wetlands regulatory process through improved interagency coordination and consolidation of the permitting process. Towards this end, the Regional Board has undertaken the 404/Regulatory Pilot Project, which will be discussed in more detail under "Emerging Program Areas."~~

4.23.2 DETERMINATION OF APPLICABLE BENEFICIAL USES FOR WETLANDS

Beneficial uses of water are defined in **Chapter 2 Beneficial Uses** and are applicable throughout the ~~r~~Region. Chapter 2 also identifies and specifies the beneficial uses of 34 significant marshes within the ~~r~~Region (**Table 2-3**). Chapter 2 indicates that the listing is not comprehensive and that beneficial uses may be determined site-specifically. In making those site-specific determinations, the Water Board will consider the Habitat Goals reports, which provide a technical assessment of wetlands in the Region and their existing and potential beneficial uses. ~~The Regional Wetlands Management Plan will~~

~~identify and specify the beneficial uses of many additional significant wetlands~~. In addition to the wetland areas identified in Chapter 2, the Habitat Goals reports identified additional wetlands in the Region as having important habitat functions ~~*and values*~~. ~~However, b~~Because of the large number of small and non-contiguous wetlands within the Region, it ~~will probably~~ is not ~~be~~ practical to specify beneficial uses for every wetland area. Therefore, beneficial uses will frequently be specified as needed for a particular site. This section provides guidance on how beneficial uses will be determined for wetlands within the ~~r~~Region.

~~General i~~Information contained in the Habitat Goals reports, the National Wetlands Inventory (NWI) prepared by ~~and in~~ the U.S. Fish and Wildlife Service (USFWS), and in the scientific literature ~~maps~~ regarding the location and areal extent of different wetland types will be used as ~~an~~ initial references for any necessary ~~delineation and~~ beneficial use designation. ~~The Regional Board will then use the U.S. Fish and Wildlife Service~~ The NWI is the updated version of USFWS's **Classification of Wetlands and Deepwater Habitats of the United States** (Cowardin, et al. 1979), which is incorporated by reference into this plan, and was previously used by the Water Board ~~or other appropriate methods~~ to identify specific wetland systems ~~at specific~~ and their locations. The updated NWI or other appropriate methods will continue to be used to locate and identify wetlands in the Region. A matrix of the potential beneficial uses that may be supported by each USFWS~~Fish & Wildlife~~ wetland system type is presented in **Table ~~4-17~~15 2-4**.

It should be noted that, while the Habitat Goals reports and ~~Fish & Wildlife~~ USFWS's NWI wetlands classification system are~~is a~~ useful tools for helping to establish beneficial uses for a wetland site, it is not suggested that ~~this system~~ these tools be used to ~~identify or~~formally delineate wetlands.

4.23.3 HYDROLOGY

Hydrology is a major factor affecting the beneficial uses of wetlands. To protect the beneficial uses and water quality of wetlands from impacts due to hydrologic modifications, the ~~Regional Board~~Water Board will carefully review proposed water diversions and transfers (including groundwater pumping proposals) and require or recommend control measures and/or mitigation as necessary and applicable.

4.23.4 WETLAND FILL

The beneficial uses of wetlands are frequently 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 U.S. Army Corps of Engineers (Corps) prior to commencement of the fill activity. Under **Section 401 of the Clean Water Act**, the ~~S~~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.,~~e.g., Basin Plans or statewide plans), or ~~the state~~ can ~~waive~~ deny such certification,

with or without prejudice. In California, the State and Regional Water Boards are charged with implementing Section 401. California's Section 401 regulations are at **Title 23, CCR, Division 3, Chap 28, Sections 3830-3869**. Pursuant to these regulations, the Water Board and/or the Water Board's Executive Officer have the authority to issue or deny Section 401 water quality certification. The certification may be issued with or without conditions to protect water quality.~~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.~~

The ~~Regional Board~~Water Board has independent authority under the ~~State~~ Water Code to regulate discharges of waste to wetlands (waters of the state) that would adversely affect the beneficial uses of those wetlands through waste discharge requirements or other orders. The Water Board may choose to exercise its independent authority under the Water Code in situations where there is a conflict between the state and the Corps, such as over a jurisdictional determination or in instances where the Corps may not have jurisdiction. In situations where there is a conflict between the state and the Corps, such as over a jurisdictional determination or in ~~rare~~ instances where the Corps may not have jurisdiction, the ~~Regional~~ Water Board may choose to exercise its independent authority under the ~~State~~ Water Code.

The regulation of "isolated" waters determined not to be waters of the U. S. is one such instance where the Corps does not have jurisdiction. The U. S. Supreme Court, in its 2001 decision in Solid Waste Agency of Northern Cook County v. U. S. Army Corps of Engineers (**the "SWANCC decision**") determined that certain isolated, non-navigable waters are not waters of the U. S., but are the province of the states to regulate. The Water Code provides the State and Regional Water Boards clear authority to regulate such isolated, non-navigable waters of the state, including wetlands. To address the impacts of the SWANCC decision on the waters of the state, the State Water Board issued **Order No. 2004-0004-DWQ** in 2004, General WDRs for dredged or fill discharges to waters deemed by the Corps to be outside of federal jurisdiction. It is the intent of these General WDRs to regulate a subset of the discharges that have been determined not to fall within federal jurisdiction, particularly those projects involving impacts to small acreage or linear feet and those involving a small volume of dredged material.

Order No. 2004-004-DWQ does not address all instances where the Water Board may need to exercise its independent authority under the Water Code. In such instances, dischargers and/or affected parties will be notified with 60 days of the Water Board's determination and be required to file a report of waste discharge.

~~In such cases, the dischargers and/or affected parties will be notified within 60 days of the Regional Water Board's decision and be required to file a report of waste discharge.~~

For proposed fill activities deemed to require mitigation, the ~~Regional~~ Water Board will require the applicant to locate the mitigation project within the same section of the ~~r~~Region, wherever ~~possible~~ feasible. The ~~Regional~~ Water Board will evaluate both the

project and the proposed mitigation together to ensure that there will be no net loss of wetland acreage and no net loss of wetland ~~value~~functions. The Water Board may consider such sources as the Habitat Goals reports, the Estuary Project's Comprehensive Conservation and Management Plan, or other approved watershed management plans when determining appropriate "Out-of-kind" mitigation ~~may be permitted in situations where it is consistent with the goals of the Regional Wetlands Management~~.

The ~~Regional~~ Water Board ~~will~~ uses the U.S. EPA's Section 404(b)(1), "**Guidelines for Specification of Disposal Sites for Dredge or Fill Material**," dated December 24, 1980, which is incorporated by reference into this plan, in determining the circumstances under which wetland~~s~~ filling may be permitted.

In general, it is preferable to avoid wetland disturbance. When this is not possible, disturbance should be minimized. Mitigation for lost wetland acreage and ~~values~~ functions through restoration or creation should only be considered after disturbance has been minimized.

Completed mitigation projects should be assessed using established wetland compliance and ecological assessment methods, such as the **Wetland Ecological Assessment** (WEA) and the **California Rapid Assessment Method** (CRAM).

4.24 OIL SPILLS

4.25 GROUNDWATER PROTECTION AND MANAGEMENT

Per ~~Regional~~ **State Water Board Resolution No. 88-63**, ~~**89-39**, which is incorporated by reference into this plan,~~ almost all the R~~r~~egion's ~~groundwaters~~groundwater is~~are~~ considered to be an existing or a potential source~~s~~ of drinking water. With limited resources, the ~~Regional Board~~Water Board must concentrate its groundwater protection and management efforts on the most important groundwater basins. DWR has identified ~~31~~ 28 individual groundwater basins and seven sub-basins in the ~~San Francisco Bay~~ Region that serve, or could serve, as sources of high quality drinking water.

Increased demands on these groundwater resources have become evident in the rapidly developing ~~Bay Area~~Region. Years of drought and ~~a~~ decades of discoveries of groundwater pollution have resulted in impacts or impairment to portions of these basins. Some municipal, domestic, industrial, and agricultural supply wells have been taken out of service due to the presence of pollution. Some of the basins have also been affected by over-pumping, resulting in land subsidence and saltwater intrusion.

Such pressures on groundwater resources require that comprehensive environmental planning and management practices be developed and implemented for each individual basin by all concerned and affected parties. The ~~Regional Board~~Water Board will foster this concept with the following groundwater protection and management goals for the ~~San Francisco Bay region~~Region.

~~GROUNDWATER PROGRAM GOALS~~

1) Identify and update beneficial uses and water quality objectives for each groundwater basin.

Water quality objectives must maintain the existing high quality of groundwater, ~~and~~ protect its beneficial uses, and protect human health and the environment. The ~~Regional Board~~Water Board's program to identify and update objectives is described in~~below under~~ **Section 4.25.1 Application of Water Quality Objectives**.

2) Regulate activities that impact or have the potential to impact the beneficial uses of ~~groundwaters~~groundwater of the ~~r~~Region.

Federal, state, and local groundwater protection and remediation programs that will result in the overall maintenance or improvement of groundwater quality must be implemented ~~regionwide~~Region-wide in a consistent manner. When a potential threat or problem is discovered, containment and cleanup efforts must be undertaken as quickly as possible to limit groundwater pollution. Where activities that could affect the beneficial uses of groundwater are not regulated by other federal, state, or local programs, the ~~Regional Board~~Water Board will consider regulation depending upon the threat to beneficial uses and availability of ~~Regional Board~~Water Board resources. The overall requirements for

site cleanup and closure, setting cleanup levels, and future groundwater management strategies are described in **Section 4.25.2 Requirements for Site Investigation, Cleanup, and Site Closure**. The ~~Regional Board~~Water Board's programs for ~~hazardous and nonhazardous waste disposal, shallow drainage wells, and clean-up~~ cleanup of polluted sites are ~~s~~ described in ~~below under~~ ~~Regulation of Potential Pollution Sources~~ **Section 4.25.3 Program Areas**.

3) Prevent future impacts to the groundwater resource through local and regional planning, management, ~~and~~ education, and monitoring.

Groundwater is an integral component of a watershed's hydrologic system. A comprehensive watershed management approach is necessary to protect groundwater resources. The ~~Regional Board~~Water Board's program for broadening its information base on groundwater resources and individual protection needs of basins is described in ~~below under~~ **Section 4.25.4 Groundwater Protection Program**. Groundwater monitoring efforts by state and local agencies are described in **Chapter 6 Surveillance and Monitoring**.

Local water, fire, planning and health departments are actively involved with their own groundwater protection programs. These programs include: salt water intrusion and land subsidence control, wellhead protection, groundwater recharge area preservation, hazardous material storage and management ordinances, Local Oversight Programs and non-Local Oversight Programs for cleanup of leaking underground fuel tanks, potential conduit well destruction, and well permitting and inspection. For some agencies, maintaining funding for protection programs is an ongoing challenge. Through numerous regional projects, the Water Board is evaluating the groundwater protection needs in specific basins, and thus will provide additional support for local agency efforts.

4.25.1 APPLICATION OF WATER QUALITY OBJECTIVES

Water quality objectives apply to all ~~groundwaters~~groundwater, rather than at a wellhead or at a point of consumption. The maintenance of the existing high quality of groundwater (i.e., "background") is the primary objective, which defines the lowest concentration limit that the ~~Regional Board~~Water Board requires for groundwater protection. The ~~Regional Board~~Water Board also has narrative and numeric water quality objectives for bacteria, chemical constituents, radioactivity, and taste and odor (see **Chapter 3**). These objectives define the upper concentration limit that the ~~Regional Board~~Water Board considers protective of beneficial uses. The lower and upper concentration limits define the range that the ~~Regional Board~~Water Board considers for cleanup levels of polluted groundwater. Establishment of cleanup levels ~~are~~is discussed in~~below under Cleanup of Polluted Sites.~~ **Section 4.25.2 Requirements for Site Investigation, Cleanup and Site Closure**.

Numerical limits that implement all applicable water quality objectives~~, including~~ include Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs), and are only acceptable as the upper end of a concentration range to protect the beneficial uses of municipal and domestic drinking water sources. ~~Such numerical limits are appropriate only at the upper end as some are set after technical feasibility and treatment costs are considered, leave no margin for future spills, and do not account for the combined risks that exist when many chemicals are present.~~

Ideally, the ~~Regional Board~~Water Board would establish numerical groundwater objectives for all constituents. However, the ~~Regional Board~~Water Board is limited in its ability and resources to independently establish numerical objectives for groundwater. To evaluate compliance with water quality objectives, the ~~Regional Board~~Water Board will ~~cosider~~consider all relevant and scientifically valid evidence, including relevant and scientifically valid numerical criteria and guidelines developed and/or published by other ~~ageencies~~agencies and organizations (e.g., State Water Board, U.S. EPA, DHS ~~California Department of Health Services~~, Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA), Cal/EPA's Department of Toxic Substances Control (DTSC), etc.) to provide the numerical criteria for ~~Regional Board~~Water Board consideration as groundwater objectives.

The Central Valley Water Board summarized water quality standards and criteria from a variety of sources in "**A Compilation of Water Quality Goals**". This report contains an extensive compendium of numerical water quality limits from the literature for over 800 chemical constituents and water quality parameters.

~~he Central Valley Regional Water Board's staff compiled many numerical water quality criteria from other appropriate agencies and organizations in its staff report, "A Compilation of Water Quality Goals." This staff report is updated regularly to reflect changes in these numerical criteria.~~

In practice, the ~~Regional Board~~Water Board uses water quality objectives for groundwater somewhat differently from those for surface water. For groundwater, the ~~Regional Board~~Water Board's emphasis is the regulation of sites where water quality objectives are not being ~~met,~~met; cleanup is required and/or under way, and no further waste discharges will be allowed in the future. In contrast, surface water discharges regulated by the ~~Regional Board~~Water Board are usually for ongoing discharges regulated to meet water quality objectives in receiving waters.

In ~~the~~a typical situation, the ~~Regional Board~~Water Board must identify and establish site- and basin-specific groundwater beneficial uses and standards for the cleanup of groundwater polluted by ~~the~~ numerous and extensive spills and leaks of toxic chemicals (e.g., organic solvents, fuels, metals, etc.).

Very few waste discharges to land are allowed by the ~~Regional Board~~Water Board and those that are permitted (e.g., landfills, industrial waste disposal, above-ground soil treatment, etc.) are closely regulated under the requirements of existing laws and

regulations in order to maintain and protect groundwater quality objectives. An additional category of discharges to land is the numerous individual domestic waste disposal systems (e.g., onsite dispersal ~~septic~~ systems) that are permitted and regulated by the counties. The ~~Regional Board~~Water Board waives regulation based upon the fact that the counties' regulation of the systems complies with applicable ~~Regional Board~~Water Board requirements.

Groundwater objectives for individual basins may be developed in the future. As the ~~Regional Board~~Water Board completes projects that provide more detailed delineation of beneficial uses within basins, revised objectives may be developed for portions of groundwater basins that have unique protection needs. Examples of Water Board projects completed in the Region are ~~One such project is~~ described in ~~below under~~ **Section 4.25.5 Groundwater Protection Studies**.

~~REGULATION OF POTENTIAL POLLUTION SOURCES~~

~~CLEANUP OF POLLUTED SITES~~

~~The Regional Board has identified over 5,400 sites with confirmed releases of constituents of concern that have polluted or threaten to pollute groundwater. Sources of pollution at these sites include leaking underground storage tanks and sumps; leaking aboveground tanks; leaking pipelines; surface spills from chemical handling, transfer or storage; poor housekeeping; and illegal disposal.~~

~~The Regional Board's strategy for managing polluted sites is discussed below under the following five sections:~~

~~(1) Program areas;~~

~~(2) Requirements for site investigation and remediation;~~

~~(3) Progress of the Regional Board's program;~~

~~(4) Setting clean-up levels; and~~

~~5) Future regulatory management strategies.~~

~~Several important Regional Board policies are detailed in these five sections. Summaries of pertinent policies are provided below.~~

~~· The Regional Board will follow procedures and policies in State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement Abatement of Discharges Under Water Code 13304", regardless of the type of discharge. (See the "Requirements for Site Investigation and Remediation" section below.)~~

~~· Groundwater and soil clean-up levels are approved by the Regional Board. The Executive Officer or a local agency may approve clean-up levels as appropriately established by the Regional Board. (See the following section "Setting Clean-up Levels.")~~

~~· Groundwater clean-up levels are established based on beneficial uses of the water body and water quality objectives outlined in Chapter 3. The concentration range for clean-up levels is high quality "background" or between "background" and numerical limits that implement all applicable water quality objectives, including the more restrictive of Maximum or Secondary Maximum Contaminant Levels for groundwaters with a beneficial use of municipal and domestic supply. These numerical limits (e.g., MCLs or SMCLs) will only be considered worst-case, upper-concentration limits, as they may not provide adequate public health protection in the instance of exposure to multiple chemicals. (See the "Setting Clean-up Levels" section below.)~~

~~· The Regional Board will use risk management techniques to consider establishment of clean-up levels above background and at or below numerical limits that implement all applicable water quality objectives for groundwaters having beneficial uses. (See the "Setting Clean-up Levels" section below.)~~

~~· Compliance with groundwater cleanup levels must occur throughout the pollutant plume. (See the "Setting Clean-up Levels" section below.)~~

~~· Soil clean-up levels should be to background. Where soil clean-up levels remain above background, soil clean-up levels are established based upon acceptable health risks, if appropriate, and to ensure that any residual mobile pollutants generated would not cause ground or surface water to exceed applicable water quality objectives. Minimal dilution may be considered. (See the "Setting Clean-up Levels" section below.)~~

~~· Verification of soil cleanup generally requires follow-up groundwater monitoring. (See the "Setting Clean-up Levels" section below.)~~

~~· The Regional Board will review and seek input on its overall approach to managing site cleanups. (See the "Future Regulatory Management Strategy" section below.)~~

4.25.2 REQUIREMENTS FOR SITE INVESTIGATION, CLEANUP AND SITE CLOSURE

This section describes the regulatory requirements and their applications for investigation, cleanup, and closure at sites impacted by soil and groundwater pollution.

4.25.2.1 STATE WATER BOARD POLICIES FOR GROUNDWATER CLEANUP

ANTIDEGRADATION POLICY

The "**Statement of Policy with Respect to Maintaining High Quality of Waters in California," known as the Antidegradation Policy** (State Water Board Resolution No. 68-16), 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.

However, in cases where unauthorized releases have polluted groundwater, restoring groundwater quality to background concentrations is often technically impractical. In those situations, groundwater should be restored to attain applicable beneficial uses.

SOURCES OF DRINKING WATER POLICY

This policy, adopted by the State Water Board in 1988 (Resolution No. 88-63), established state policy that all surface and ground water in the state are considered suitable, or potentially suitable, for municipal or domestic supply (MUN) and should be designated for this use, with certain exceptions. The exceptions for groundwater are:

- The groundwater's TDS exceeds 3,000 mg/L (5,000 microSiemens per centimeter (µS/cm), electrical conductivity), and it is not reasonably expected by the Water Boards to supply a public water system; or

- There is contamination, either by natural processes or by human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use through implementation of BMPs or best economically achievable treatment practices; or

- The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or

- The aquifer is regulated as a geothermal energy-producing source or has been exempted administratively pursuant to **40 Code of Federal Regulations** (CFR), **Section 146.4** for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under **40 CFR, Section 261.3**.

POLICIES AND PROCEDURES FOR INVESTIGATION AND CLEANUP AND ABATEMENT OF DISCHARGES

~~The State Board adopted~~ State Water Board Resolution No. 92-49, "**Policies and Procedures for Investigation, Cleanup and Abatement of Discharges Under Water Code Section 13304**"~~ This resolution~~ contains the policies and procedures that all ~~Regional~~ Water Boards shall follow to oversee and regulate investigations and cleanup and abatement activities resulting from all types of discharge or threat of discharge subject to **Water Code Section 13304** ~~of the Water Code~~. Therefore, the five program areas described below ~~listed above (i.e., UST, SLIC, DoD/DoE, Superfund, and Aboveground Storage) now~~ follow the same policies and procedures outlined in Resolution No. 92-49 for determining:

- When an investigation is required;

- The scope of phased investigations necessary to define the nature and extent of contamination or pollution;

- Cost-effective procedures to detect, cleanup or abate contamination; and·

- Reasonable schedules for investigation, cleanup, abatement, or any other remedial action at a site.

~~State Water Board Resolution No. 92-49 outlines the five basic elements of a site investigation. Any or all elements of an investigation may proceed concurrently, rather than sequentially, in order to expedite cleanup and abatement of a discharge, provided that the overall cleanup goals and abatement are not compromised. State Water Board Resolution No. 92-49 investigation components are as follows:~~

~~a.Preliminary site assessment to confirm the discharge and the identity of the dischargers; to identify affected or threatened waters of the state and their beneficial uses; and to develop preliminary information on the nature and vertical and horizontal extent, of the discharge;~~

~~b.Soil and water investigation to determine the source, nature, and extent of the discharge with sufficient detail to provide the basis for decisions regarding subsequent clean-up and abatement actions, if any are determined by the Regional Water Board to be necessary;~~

~~c.Proposal and selection of clean-up action to evaluate feasible and effective cleanup and abatement actions and to develop preferred clean-up and abatement alternatives;~~

~~d.Implementation of clean-up and abatement action to implement the selected alternative and to monitor in order to verify progress;~~

~~e.Monitoring to confirm short- and long-term effectiveness of cleanup and abatement.~~

State Water Board Resolution No. 92-49 requires that the ~~Regional~~ Water Board ensure that the discharger is aware of and considers minimum cleanup and abatement methods. The minimum methods that the discharger should be aware of and consider, to the extent that they may be applicable to the discharge or threat thereof, are:

- Source removal and/or isolation;

- In-place treatment of soil or water, including bioremediation, aeration, and fixation;

- Excavation or extraction of soil, water, or gas for on-site or off-site treatment techniques including bioremediation; thermal destruction; aeration; sorption;

precipitation, flocculation and sedimentation; filtration; fixation; and evaporation; and,

- Excavation or extraction of soil, water, or gas for appropriate recycling, reuse, or disposal.

State Water Board Resolution No. 92-49 was amended in 1996 with Resolution No. 96-79, **Containment Zone Policy**. Per the revised resolution, it is not the intent of the State Water Board or the Regional Water Boards to allow dischargers, whose actions have caused, permitted, or threaten to cause or permit conditions of pollution, to avoid responsibilities for cleanup. However, in some cases, attainment of applicable water quality objectives for groundwater cannot reasonably be achieved. In these cases, the State Water Board determines that establishment of a containment zone is appropriate and consistent with the maximum benefit to the people of the state if applicable requirements contained in the policy are satisfied.

STATE WATER BOARD DECISIONS

In addition to State Water Board policies that specify requirements for investigation and cleanup of groundwater, **State Water Board precedential orders on petitions** provide guidance and direction to the nine Regional Water Boards with respect to cleanup orders. State Water Board decisions affecting site cleanup fall into three general categories: naming responsible parties, setting cleanup standards, and closing low-risk cases.

4.25.2.2 ELEMENTS OF GROUNDWATER CLEANUP AND SITE CLOSURE

State Water Board Resolution No. 92-49 outlines the five basic elements of a site investigation. Any or all elements of an investigation may proceed concurrently, rather than sequentially, in order to expedite cleanup and abatement of a discharge, provided that the overall cleanup goals and abatement are not compromised. State Water Board Resolution No. 92-49 investigation components are as follows:

1. Preliminary site assessment to confirm the discharge and the identity of the dischargers; to identify affected or threatened waters of the state and their beneficial uses; and to develop preliminary information on the nature and vertical and horizontal extent, of the discharge;

2. Soil and water investigation to determine the source, nature, and extent of the discharge with sufficient detail to provide the basis for decisions regarding subsequent cleanup and abatement actions, if any are determined by the Regional Water Board to be necessary;

3. Proposal and selection of cleanup action to evaluate feasible and effective cleanup and abatement actions and to develop preferred cleanup and abatement alternatives;

4. Implementation of cleanup and abatement action to implement the selected alternative and to monitor in order to verify progress; and

5. Monitoring to confirm short- and long-term effectiveness of cleanup and abatement.

The following additional requirements for site cleanup and closure may also apply, as described below.

"Cleanup Complete" Determinations – The Water Board provides no further action (NFA) confirmations and no-further-active-cleanup confirmations to responsible parties when no further active cleanup is needed. For petroleum-impacted sites, the Water Board provides a case closure letter as part of the case closure summary report.

Public Participation – The Water Board will provide opportunities for public participation in the oversight process so that the public is informed and has the opportunity to comment. The level of effort is tailored to site-specific conditions, depending on site complexity and public interest. The level of public participation effort at a particular site is based on the potential threat to human health, water quality, and the environment; the degree of public concern or interest in site cleanup; and any environmental justice factors associated with the site.

Electronic Data Reporting – The State Water Board maintains a web-based geographic information system (GIS) program that provides the public and regulators with online access to environmental data. The State Water Board adopted regulations that require electronic submittal of information for groundwater cleanup programs (**Title 23, CCR, Division 3, Chapter 30**). For several years, parties responsible for cleanup of leaking underground fuel tanks (LUFT) have been required to submit groundwater analytical data, the surveyed locations of monitoring wells, and certain other data to the **State Water Board database** over the Internet. As of 2005, all groundwater cleanup programs are required to submit these items as well as a portable data format (PDF) copy of reports.

Compliance Monitoring – Monitoring reports are required periodically that describe the status of the cleanup activities and monitoring results. The Water Board will conduct site inspections to ensure the responsible party is complying with Water Board enforcement directives.

Deed Restriction - A deed restriction (land use covenant) may be required to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to residual hazardous materials. **Water Code Section 13307.1** requires that deed restrictions be mandated for sites that are not

cleaned up to "unrestricted use", and that the restrictions be recorded and run with the land to prohibit sensitive uses such as homes, schools, or day care facilities. Underground storage tank (UST) sites are exempted from this requirement because of the sheer numbers and the small size of most of these sites. Site conditions are tracked in the statewide database developed by the State Water Board (**Section 4.25.2.2 Electronic Data Reporting**).

Liability Relief Tools – Several tools are available to municipalities, landowners, developers and responsible parties for seeking relief from contamination liability. The Polanco Act, California Land Environmental Restoration and Reuse Act, and California Land Reuse and Revitalization Act provide liability relief and help redevelopment agencies, cities and counties to guide and pursue redevelopment of Brownfield sites (**Section 4.25.3.1 Brownfields**).

~~PROGRESS OF THE REGIONAL BOARD'S PROGRAM~~

~~The Regional Water Board has over 12 years of experience in the cleanup of polluted sites. The following findings are drawn from this regulatory experience.~~

~~INVESTIGATION~~

~~· A complete on- and off-site investigation of soil and groundwater to determine full horizontal and vertical extent of pollution is necessary to ensure that adequate clean-up plans are proposed.~~

~~REMEDIATION~~

~~· Immediate removal of the source, to the extent practicable, is required to prevent further spread of pollution as well as its being among the most cost-effective remediation actions.~~

~~· Pump-and-treat groundwater remediation, in some instances, is effective in hydraulically containing pollution and removing pollutants.~~

~~· Vacuum extraction of pollutants in the vadose zone can be a cost-effective method to remove pollution sources.~~

~~· Bioremediation of petroleum pollution can be a cost-effective soil and groundwater treatment alternative.~~

~~LIMITS OF EXISTING TECHNOLOGY~~

~~· Available options for removing or treating in-situ polluted groundwater are limited.~~

~~· Recent research, much of which is being confirmed at sites within the Region, demonstrates that using pump and treat technology removes and controls pollutant mass migration. However, pump-and-treat technology is not adequate technology, in some situations, to meet low concentration groundwater objectives because the costs and time-frames may be prohibitive.~~

~~· Groundwater pollution cleanup is lengthy and requires significant resources of both the discharger and the regulator.~~

4.25.2.3 SETTING CLEANUP LEVELS

The ~~Regional Board~~Water Board approves soil and groundwater cleanup levels for polluted sites. Per **State Board Resolution No. 92-49**, the basis for Water Board decisions regarding investigation, and cleanup and abatement includes: (1) site-specific characteristics; (2) applicable state and federal statutes and regulations; (3) applicable water quality control plans adopted by the State and Regional Water Boards, including beneficial uses, water quality objectives, and implementation plans; (4) State and Regional Water Board policies, including State Water Board Resolutions No. 68-16 (**Antidegradation Policy**) and No. 88-63 (**Sources of Drinking Water Policy**); and (5) relevant standards, criteria, and advisories adopted by other state and federal agencies. ~~State Water Resolution No. 92-49 requires conformance with the provisions of State Board Resolution No. 68-16 and applicable provisions of CCR Title 23, Chapter 15.~~

State Water Board Resolution No. 92-49 directs the Regional ~~Board~~Water Boards to ensure that dischargers are required to cleanup and abate the effect of discharges. This cleanup and abatement shall be done in a manner that promotes attainment of either background water quality, or the best water quality that is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved: beneficial and detrimental, economic and social, tangible and intangible. ~~In approving any levels less stringent than background, apply Section 2550.4 of Chapter 15, or, for cleanup and abatement associated with underground storage tanks, apply Section 2725 of Chapter 16, while considering the factors in Section 2550.4 of Chapter 15.~~ Any ~~such~~ alternative cleanup levels less stringent than background shall:

- Be consistent with maximum benefit to the people of the state;
- Not unreasonably affect present and anticipated beneficial uses of such water; and
- Not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional ~~Board~~Water Boards.

GROUNDWATER CLEANUP LEVELS

The overall cleanup level established for a water body is based upon the most sensitive beneficial use identified. In all cases, the ~~Regional Board~~Water Board first considers high quality or naturally occurring "background" concentration objectives as the cleanup levels for polluted groundwater and the factors listed above under "**Setting Cleanup Levels**." For groundwaters with a beneficial use of municipal and domestic supply, cleanup levels are set no higher than:

- ~~Maximum Contaminant Levels (~~MCLs~~)~~ or adopted SMCLs,~~Secondary Maximum Contaminant Levels (SMCLs), incorporated by reference in Chapter 3,~~ whichever is more restrictive, or

- A more stringent level (i.e., below MCLs) based upon a site-specific risk assessment. Cleanup levels must be set to maintain the excess upperbound lifetime cancer risk to an individual of less than 1 in 10,000 (10^{-4}) or a cumulative toxicological effect as measured by the Hazard Index of less than one. For all sites performing risk assessments, an alternative with an excess cancer risk of 1 in 1,000,000 (10^{-6}) or less must also be considered.

The ~~Regional Board~~Water Board determines excess cancer risks and the Hazard Index following ~~the U.S. EPA~~ procedures described in the U.S. EPA's Risk Assessment Guidance for Superfund, Volume I, Parts A dated August 1989, B dated December 1991, and C dated December 1991, which are incorporated by reference into this plan. The ~~Regional Board~~Water Board may modify the U.S. EPA's approach ~~outlined in these publications~~ based on ~~Cal/EPA's~~ OEEHA's ~~Office of Environmental Health Hazard Assessment (OEHHA)~~ guidelines or more current site- or pollutant-specific information.

Groundwater cleanup levels are approved on a case-by-case basis by the ~~Regional Board~~Water Board. The Executive Officer or a local agency may approve cleanup levels as appropriately established by the ~~Regional Board~~Water Board. Proposed final cleanup levels are based on a discharger-developed feasibility study of cleanup alternatives that compares effectiveness, cost, time to achieve cleanup standards, and a risk assessment to determine impacts on beneficial uses, human health, and the environment. Cleanup levels must also take into account the mobility, toxicity, and volume of pollutants. Feasibility studies of cleanup alternatives may include the guidance provided by Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(**40 CFR 300**); **Section 25356.1(c) of the California Health and Safety Code**; ~~U.S. EPA's Comprehensive Environmental Response, Compensation, and Liability Act (~~CERCLA~~)~~; the **State Water Board's Resolutions Nos. 68-16 and 92-49**; and the ~~Regional Board~~**Water Board's Resolution No. 88-160**.

SOIL CLEANUP LEVELS

Soil pollution can present a health risk and a threat to water quality. The ~~Regional Board~~Water Board sets soil cleanup levels for the unsaturated zone based on these threats.~~upon threat to water quality~~. Guidance from the U.S. EPA, ~~Department of Toxics Substances Control (~~DTSC~~)~~, and ~~Cal/EPA's~~ OEHHA~~Office of Health Hazard Assessment is also~~ are considered when determining cleanup levels.~~ on health risks~~. Cleanup levels must be protective of human health for existing and likely future land use based on properly adopted land use designations in general plans, zoning, and other mechanisms. In addition, if it is unreasonable to cleanup soils to background concentration levels, the ~~Regional Board~~Water Board may:

- Allow residual pollutants to remain in soil at concentrations such that:

  a) Any residual mobile constituents generated would not cause groundwater to exceed applicable groundwater quality objectives, and

  b) Health risks from surface or subsurface exposure are within acceptable guidelines.

- Require follow-up groundwater monitoring to verify that groundwater is not polluted by chemicals remaining in the soil. Follow-up groundwater monitoring may not be required where residual soil pollutants are not expected to impact groundwater.

- Require measures to ensure that soils with residual pollutants are covered and managed to minimize pollution of surface waters and/or exposure to the public.

- Implement applicable provisions of ~~Chapter 15~~ CCR Title 27 where significant amounts of wastes remain onsite. This may include, but is not limited to, subsurface barriers, pollutant immobilization, toxicity reduction, and financial assurances.

In order for a discharger to make site-specific recommendations for soil cleanup levels above background, the fate and transport of leachate can be modeled by the discharger using site-specific factors and appropriate models. Assumptions for minimal leachate dilution, as proposed by the discharger, may be considered by the ~~Regional Board~~Water Board if deemed reasonable.

~~Cleanup levels are approved by the Regional Board. The Executive Officer or a local agency may approve cleanup levels as established by the Regional Board. Due to the tremendous number of sites with soil pollution, the Regional Board has considered developing "generic" cleanup levels for common soil pollutants. However, given the extreme variability of hydrogeologic conditions in the Region, the Regional Board is presently unable to recommend levels that would be protective of groundwater at every site. One exception to this are cleanup standards for volatile organic chemicals (VOCs) and semi-volatile organic chemicals.~~

~~Several Regional Board orders, adopted primarily for Superfund sites, include cleanup standards of 1 mg/kg (ppm) for total VOCs and 10 ppm for total semi-volatiles (as defined by EPA Methods 8240 and 8270, respectively, of the U.S. EPA Testing Methods for Evaluating Solid Waste, SW-846, 1986, which is incorporated by reference to this plan). These standards apply to unsaturated soils only and are based on the modeling results at a Superfund site in the Region and the professional judgement of Regional Board staff. As these are cleanup standards for total VOCs and total semi-VOCs, levels for individual constituents at polluted sites commonly are significantly lower than 1 ppm and 10 ppm, respectively. In particular, some constituents of concern have water quality standards less than 5 ppb (e.g., benzene, vinyl chloride, ethylene dibromide). Individual~~

~~cleanup levels well below the 1 ppm VOC and 10 ppm semi-volatile standards may be established for these constituents.~~

~~At this time the Regional Board finds that these are appropriate cleanup levels for total VOCs and total semi-VOCs in the unsaturated zone at sites where groundwater is being monitored and where cleanup to background is unreasonable. At sites where it is determined that the 1 ppm cleanup total VOC and 10 ppm total semi-VOC may be inappropriate, the Executive Officer may modify these cleanup levels to whatever level is considered adequately protective of water quality, human health, and the environment.~~

~~A common misconception is that the Regional Board has developed "generic" cleanup levels for petroleum hydrocarbons (gasoline, gasoline byproducts, and diesel). One source of the misconception is a misreading of Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites, written by the staff of the North Coast, Central Valley, and San Francisco Bay Regional Boards. This document is commonly referred to as the Tri-Regional Guidelines. The Guidelines use 100 ppm Total Petroleum Hydrocarbons in soil as one screening tool for prioritization. The 100 ppm level is not a "generic" cleanup level.~~

~~NON-ATTAINMENT OF GROUNDWATER CLEANUP LEVELS~~

~~The Regional Board has been developing policy, through the basin planning process, to address various situations when groundwater cleanup levels cannot be attained. After consideration of the Regional Board's proposed Basin Plan Amendment (Regional Water Board Resolution 94-101) to address non-attainment, the State Board adopted Resolution 94-117. Resolution 94-117 directs the State Water Board Executive Director to develop a statewide policy on groundwater and soil cleanup. In response to this, the State Board staff plans to amend State Board Resolution 92-49 to address non-attainment of groundwater cleanup levels. When Resolution 92-49 is formally approved, the Regional Board will implement the new sections on non-attainment.~~

4.25.3 PROGRAM AREAS

Sites with identified pollution problems are managed through five program areas: (1) Spills, Leaks, Investigations, and Cleanups (SLIC) Program; (2) ~~Underground Storage Tank (~~UST~~)~~ Program ~~(>5,000 sites); (2) Spills, Leaks, Investigation and Cleanup (SLIC) Program (>400 sites)~~; (3) Landfill Program, (4) Department of Defense/Department of Energy (DoD/DoE) Program ~~(15 sites); (4) U.S. EPA Superfund Program (30 sites);~~ and (5) Above-ground Petroleum Storage Tank Program ~~(approximately 200 sites)~~. Requirements for site investigation and remediation of groundwater under these programs are described in **Section 4.25.2. Requirements for Site Investigation, Cleanup, and Site Closure**.

4.25.3.1 SPILLS, LEAKS, INVESTIGATION, AND CLEANUP PROGRAM (SLIC)

The SLIC program focuses on unauthorized releases of pollutants to soil, surface water, and groundwater. Sites that are managed within the SLIC program include sites with pollution from recent or historical surface spills, subsurface releases (e.g., pipelines, sumps, etc.), ~~complaint investigations~~ and all other unauthorized discharges that pollute or threaten to pollute surface or groundwater. The SLIC program also includes groundwater cleanup at Brownfields, refineries, and other large industrial facilities. There is some overlap with the UST program as many SLIC cases also have leaking underground tanks. ~~Alternatively, some cases that involve both leaking solvent tanks and other pollution sources may end up in the UST program.~~

The Water Board identified many historical releases in the 1980s. New releases are identified through discharger reports, complaints to the Water Board, the Water Board's own surveillance, “due diligence” reports for proposed property transfer or redevelopment, and local agency reports.

~~Many historical spill cases were identified by the Regional Board in the 1980s. New spills are identified through discharger reports, complaints to the Regional Board's field investigation team, the Regional Board's own surveillance, proposed property transfer reports, and local agency reports. Initial response to spill incidents is generally handled by the Regional Board's Field Investigation Team. The case is then screened, with notices sent as appropriate under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Subsequent to the "control" of the spill, the case is transferred to SLIC program staff. High-priority cases are assigned for follow up by the SLIC program as staffing permits.~~

~~Investigation, remediation, and cleanup at SLIC sites proceeds under procedures outlined in State Water Board Resolution No. 92-49, discussed in the “Requirements for Site Investigation and Remediation” section below.~~

There are variety of different pollutants at SLIC sites, including chlorinated solvents, fuels and non-chlorinated solvents, SVOCs, inorganic constituents and metals, polychlorinated biphenols (PCBs), and pesticides. Persistent and mobile constituents, such as chlorinated solvents, tend to cause more serious pollution problems, while immobile constituents, such as metals, and biodegradable constituents, such as fuels, tend to be less serious. Two other factors can increase case complexity: multiple dischargers on a site (such as a current owner, past owner, and past operator) and commingled groundwater plumes, where contaminants from two or more source sites have merged. In both cases, dischargers may argue against being named in cleanup orders or may demand that other parties be named as well.

The Water Code provides authority for the Water Board to require investigation and cleanup of sites with unauthorized pollutant releases. **Water Code Section 13267** allows the Water Board to require technical reports from suspected dischargers. **Water Code Section 13304** authorizes the Water Board to issue "cleanup and abatement" orders requiring a discharger to cleanup and abate waste, "where the discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance." The Water Board coined the term "site cleanup requirements" (SCRs) to describe Water Code Section 13304 orders where soil or groundwater cleanup would take many years to complete and the dischargers are cooperating.

The Water Board also complies with any requirements in the state Health and Safety Code and the federal Superfund law for authority at federal Superfund sites where the Water Board is the lead agency.

SLIC COST RECOVERY PROGRAM

Water Code Section 13304 authorizes the Regional Water Boards to recover costs for oversight of site cleanup at sites where a discharge of waste has occurred and that discharge creates, or threatens to create, a condition of pollution or nuisance. The Water Board was instrumental in establishing the State Water Board's SLIC cost recovery program. Cost recovery was initially established in the early 1990s with the agreement of Bay Area petroleum refineries to reimburse the state for oversight of groundwater and soil remediation. Shortly thereafter the State Water Board organized a pilot program to expand the cost recovery program to other SLIC sites. During this period the legislature amended this section of the Water Code to strengthen the ability of the Regional Water Boards to recover staff oversight costs.

In 1993, the State Water Board established a unified SLIC cost recovery program. Program funding came initially from the General Fund but later switched to the **State Water Board's Cleanup and Abatement Account** (revolving fund mechanism). The net cost of this program to the state is a small fraction of this amount because dischargers repay almost all of the staff oversight costs.

In general, SLIC sites should be enrolled in the SLIC cost recovery program because there is very limited program funding for oversight of non-cost recovery sites. Exceptions include de minimus sites (e.g., sites where oversight can be completed with minimal staff effort), and under special circumstances (e.g., sites with significant potential threat to human health or water quality where there are limited funds available for remedial action).

FEDERAL SITES

Superfund Sites--The federal Superfund program was created in 1980 when Congress enacted CERCLA, known as Superfund. CERCLA was amended in 1986 with the Superfund Amendments and Reauthorization Act (SARA). The Water Board is the lead regulatory oversight agency for 16 federal Superfund sites in the South Bay. The Superfund program was designed to address the most seriously contaminated hazardous waste sites in the country. The Water Board previously had a U.S. EPA grant to oversee the 16 federal Superfund sites. Currently the sites are all enrolled in the Water Board's cost recovery program and are managed similar to SLIC cases while still ensuring that U.S. EPA's requirements, as defined in the **National Contingency Plan**, are met. The Water Board has adopted final SCRs for all 16 sites, and all 16 sites have implemented long-term remediation projects.

RCRA Sites – Six sites originally proposed as federal Superfund sites were subsequently dropped because cleanup could be required under Resource Conservation and Recovery Act (RCRA). As with the Superfund sites, the Water Board has adopted final SCRs for all sites in compliance with RCRA requirements, and all six sites have implemented long-term remediation projects. There are also about 20 RCRA “analogous” sites. These are sites where Water Board oversight has included extra steps to assure that oversight is analogous to the state and federal RCRA requirements. The Water Board has adopted SCRs for all “analogous” sites, and most have implemented long-term remediation.

BROWNFIELDS

The Water Board is one of several agencies with a role in the Brownfield cleanup and redevelopment process. Brownfields are properties that are contaminated, or thought to be contaminated, and are underutilized due to perceived remediation costs and liability concerns. The Water Board directly oversees investigation and cleanup at Brownfield sites. Other stakeholders in the process include: local redevelopment agencies (who designate redevelopment areas and often acquire and assist in redevelop of Brownfield sites), local governments (who must approve redevelopment proposals), developers and non-profits (who make redevelopment proposals), lenders, and community members.

BROWNFIELD REGULATIONS

There are several key federal and state environmental laws that have fostered Brownfield development, as described below.

Federal Legislation

The **Small Business Liability Relief and Brownfields Revitalization Act** (Brownfield Law) signed into law in 2002 contains three titles dealing with funding and liability for assessing and cleaning up contaminated properties. Title I codified and expanded U.S. EPA's current Brownfield program by authorizing funding for assessment and cleanup of Brownfield sites. Title II exempted contiguous property owners and prospective purchasers from Superfund liability, and clarified the extent of appropriate environmental inquiry for innocent landowners. "Innocent landowners" are those who hold property with contamination on it, but did not contribute to the pollution. Title III authorized funding for State response programs and limited U.S. EPA's Superfund enforcement authority at sites cleaned up under a State response program.

This law is important because it provides liability relief for innocent landowners and purchasers as long as they meet certain requirements. Many redevelopment deals have stalled previously because there was no clear-cut mechanism for providing liability relief to innocent purchasers who were willing to perform the cleanup, but unwilling to take on the long-term liability associated with the site.

State Legislation

The **Polanco Redevelopment Act of 1990** (Polanco) outlines the processes for redevelopment agencies to follow when cleaning up a hazardous substance release in a redevelopment project area. It also provides immunity from liability for redevelopment agencies and subsequent property purchasers for sites cleaned up under a plan approved by the Water Board (or DTSC). The Polanco process has become a widely used tool by redevelopment agencies to guide and pursue redevelopment of Brownfields. Redevelopment agencies requesting approval of their cleanup plans under the provisions of Polanco are required to reimburse oversight costs to the agencies.

The **California Land Environmental Restoration and Reuse Act of 2001** was enacted to enable cities and counties to direct or conduct investigation and remediation at Brownfield sites that are outside of redevelopment areas to help return Brownfields to productive uses. It requires Cal/EPA to provide a variety of data related to Brownfield cleanups, and to develop a set of screening values for hazardous substances commonly found at Brownfield sites. A centerpiece of the legislation was its requirement that Cal/EPA develop statewide screening levels, based on environmental screening levels developed at this Water Board (**Section 4.25.2.3 Setting Cleanup Levels**).

The **California Land Reuse and Revitalization Act of 2004** (CLRRA) is intended to bring California into conformity with the federal statutes concerning liability relief for innocent landowners, perspective (bona fide) purchasers, and contiguous property owners in urban areas. It allows for risk-based cleanups at Brownfield sites. Participants who seek immunity must enter into an agreement with the agency that includes the preparation and implementation of a site assessment plan, and if necessary, a response plan. A certificate of completion is issued upon determining that all response actions have been completed in accordance with the agency approval process.

BROWNFIELD GRANTS AND LIABILITY RELIEF TOOLS

Brownfield Grants

The U.S. EPA provides two types of Brownfield grants to states for the purpose of promoting Brownfield redevelopment, and to local agencies and non-profits to jump-start specific Brownfield redevelopment projects. The Water Board has worked closely with several cities in the Region to encourage Brownfield site cleanup and redevelopment, including writing letters of support for project-specific U.S. EPA grants. Between 1996 and 2005, U.S. EPA has awarded Brownfield grants totaling $9 million within the Region. The City of Oakland alone has received over $2 million in grants. Other recipient jurisdictions include: Emeryville, East Palo Alto, Richmond, San Francisco, Livermore, Alameda County, Contra Costa County, San Pablo, Petaluma, San Jose, and Union City.

Ca/lEPA's Brownfield Initiative

In 2004, Cal/EPA announced a Brownfield initiative aimed at improving the way Cal/EPA agencies coordinate their regulatory activities at Brownfield sites. The initiative includes an ambitious implementation plan to:

- Foster partnerships with Brownfield stakeholders;
- Develop an inventory of Brownfield sites in California;
- Provide liability relief to Brownfield owners and buyers; and
- Pursue necessary funding and resources for Brownfield cleanup.

The initiative also directed the State Water Board, Regional Water Boards, and DTSC to complete a **MOA**. The MOA was signed in 2005 and contains the following elements:

- Limit oversight to a single lead agency at any given site;
- Establish procedures for identifying the appropriate lead agency;
- Establish a uniform site assessment procedure to be used by both agencies;
- Require that cleanups address the issues and concerns of both agencies;
- Allow the lead agency to gain the advice and expertise of the other agency as appropriate;
- Ensure ample opportunities for public input and involvement;

- Establish target timeframes for completing investigation and cleanup; and
- Establish regular coordinating meetings.

California State Liability Relief Tools

Several tools are available to municipalities, landowners, developers and responsible parties for seeking relief from contamination liability. Polanco, the California Land Environmental Restoration and Reuse Act, and CLLRA provide liability relief and help redevelopment agencies, cities and counties to guide and pursue redevelopment of Brownfields. Prospective purchaser agreements (PPA) are agreements to protect purchasers from being named as a discharger for pre-existing pollution. The buyer must provide something in return, such as an agreement to provide reasonable access for site cleanup and monitoring.

The Water Board may issue "comfort letters" to buyers of polluted property or owners of off-site properties affected by migrating groundwater pollution to mollify buyers or lenders about the potential liability they face. Letters to offsite owners typically promise not to enforce against them as long as they provide reasonable access. Letters to onsite buyers typically promise not to enforce against them as long as they provide reasonable access and the current responsible parties continue to perform necessary cleanup work.

4.25.3.2 UNDERGROUND STORAGE TANK PROGRAM

A UST is defined by law as "any one or combination of tanks, including pipes connected thereto, that is used for the storage of hazardous substances and that is substantially or totally beneath the surface of the ground" (certain exceptions apply). The purpose of the UST Program is to protect public health and safety and the environment from releases of petroleum and other hazardous substances from tanks. State regulations regarding underground tank construction, monitoring, repair, closure, release reporting, and corrective action are contained within **CCR Title 23, Chapter 16**.

Implementation of the ~~Underground Storage Tank (~~UST~~)~~ Program is unique, as the **Health and Safety Code Division 20, Chapters 6.7 and 6.75**, gives local agencies the authority to oversee investigation and cleanup of UST leak sites. The Corrective Action regulations (**CCR, Title 23, Chapter 16, Article 11**) use the term "regulatory agency" in recognition of the fact that local agencies have the option to oversee site investigation and cleanup, in addition to their statutory mandate to oversee leak reporting and tank closure.

~~Local agencies now have independent authority under UST laws to require investigations and cleanup. The Regional Board still retains its Water Code authority to approve case closure. However, the Regional Board has authorized a few local agencies to close fuel leak cases where groundwater has not been polluted, and future groundwater impacts are not expected.~~

Some local agencies also provide oversight for underground fuel storage tank cases under a Local Oversight Program (LOP) contract with the State Water Board. Most oversight charges are billed to responsible parties. Some LOPs, known as Local Implementing Agencies (LIAs), have independent authority under UST laws to require investigations and cleanup. The Water Board still retains its Water Code authority to approve case closure. However, the Water Board has authorized a few local agencies to close fuel leak cases where groundwater has not been polluted, and future groundwater impacts are not expected.

Additionally, a few other local agencies have funded their own (non-LOP) oversight programs and have developed guidance documents based upon State and Regional Water ~~and Regional~~ Board guidance. In many areas throughout the Region the local agency has opted not to assume the lead position for fuel leak cases. Consequently, the Water Board is the lead agency for fuel leak sites in those areas.

CASE DETERMINATION

Certified Unified Permitting Agencies (CUPAs) permit and regulate UST operations including leak prevention and inspections. When a release occurs, the Water Board is generally notified of the release via a copy of an Unauthorized Release Form (URF). This form is tailored so as its notification hierarchy complies with **Proposition 65** notification requirements.

If the release is fuel based, and the CUPA happens to also be an LOP agency or an agency that has an agreement with the Water Board for fuel UST cleanup oversight, it will oversee cleanup operations from that point. All of this Region's LOP agencies are part of a CUPA. The same holds true in the case of our LIA agencies, with the exception of the Alameda County Water District (ACWD).

If the release is solvent based, the Water Board will provide oversight for cleanup. Exceptions may be found for those situations for which DTSC is the lead agency because the tank is on a site that is under DTSC lead, such as the solvent UST being located within a RCRA site, or by mutual agency agreement.

WATER BOARD LEAD UST SITES

The Water Board oversees cases for all of Contra Costa County, Marin County, and various cases within the LOP and LIA jurisdictions.

The Water Board having the lead in UST cases is the result of one or more of the following: 1) solvents or solvents commingled with fuels are the pollutant of concern; 2) the petroleum discharge is from something other than a UST under the Local Oversight Program or not necessarily under UST regulation such as sumps, spills, or agricultural tanks; 3) complex technical or policy issues; 4) conflict of interest issues in which the

local agency is the responsible party, there is inappropriate political pressure on the case, or for which the agency requests Water Board lead; 5) cases given to the Water Board as part of the **Site Designation Process** (AB 2061); 6) the local agency is unable, unwilling, and/or unavailable to provide proper oversight; 7) part of the site is within a larger facility currently under Water Board oversight; and 8) historical precedent.

Local Oversight Program (LOP) Agencies

Although the LOP agency contracts with the State Water Board, the Water Board provides technical guidance and enforcement support as needed. Upon determination by the LOP agency that a case is ready for closure, the LOP agency submits a closure package to Water Board for review. If the Water Board concurs or fails to act within 30 days, the closure is deemed approved and the LOP agency issues the closure letter.

The following agencies are LOPs in the Region, as of 2005:

- **Alameda County Health Care Services, Department of Environmental Health**
- **Napa County Department of Environmental Management**
- **San Francisco Department of Public Health, Bureau of Environmental Health Management**
- **San Mateo County Department of Health Services, Office of Environmental Health**
- **Santa Clara County Department of Environmental Health**
- **Solano County Department of Environmental Management**
- **Sonoma County Department of Health Services, Environmental Health Division**

Local Implementing Agencies (LIAs)

The Water Board provides technical and enforcement assistance to the LIAs, as necessary. However, these agencies essentially perform the same technical oversight duties (report requests, report review, etc.) that the Water Board would be expected to perform when overseeing case cleanups.

As part of this Region's case closure protocol with the LIA agencies, the Water Board reviews the LIA's case closure recommendation and case closure summary package (although in some cases the Water Board may prepare the summary package for the agency). If the Water Board concurs with the agency's recommendation, the Water Board issues the closure letter.

The following agencies are LIAs in the Region, as of 2005:

- **Alameda County Water District**
- **City of Berkeley Toxics Management Program**
- **City of Hayward Fire Department**

- **City of San Leandro**

~~Table 4-18 provides a brief summary of these agency's programs.~~

UST PROGRAM BACKGROUND

~~Pertinent reference documents related to releases from underground storage tanks are described below.~~

~~State regulations regarding underground tank construction, monitoring, repair, closure, release reporting, and corrective action are contained within CCR Title 23, Chapter 16~~.

~~· Specific recommendations regarding Chapter 16 soil and groundwater investigations are contained in "Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", written by the staffs of the North Coast, Central Valley, and San Francisco Bay Regional Water Quality Control Boards. This document is commonly referred to as the "Tri-Regional Guidelines." The document provides uniform procedures for performing investigations. It describes a systematic approach for determining which actions are required, including whether a soil cleanup only or a more comprehensive soil/groundwater investigation is required.~~

In 1995, the State Water Board commissioned the Lawrence Livermore National Laboratory (LLNL) and the University of California to conduct a review of the regulatory framework and cleanup process applied to LUFTs. The study titled, "**Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks (LUFTs)**" concluded that fuel hydrocarbons have limited impact on human health, the environment, or California's groundwater resources, and recommended applying a modified ASTM risk-based corrective action (RBCA) process for closing leaking UST sites (**ASTM E1739-95, 2002**). A risk-based approach to leaking UST cleanups has been widely applied following this recommendation.

In the mid 1990's, methyl tert-butyl ether (MtBE) was recognized as a major threat to groundwater resources. MtBE had been added to gasoline sold in California since 1979 until January 1, 2004, first as an octane booster, and later as an oxygenate comprising up to 11 percent by volume. MtBE prioritization guidelines were developed based on a risk-based approach, and the expedited site assessment has been used to cleanup high threat MtBE sites (**Expedited Site Assessment Tools for UST Sites (EPA 510-B-97-001, 1997**).

In 1998, the State Water Board commissioned LLNL to study the impacts of MtBE on groundwater in California. LLNL concluded that MtBE is a frequent and widespread contaminant in shallow groundwater throughout California and that MtBE plumes are more mobile than benzene, toluene, ethylbenzene, and xylenes (BTEX) plumes (**An Evaluation of MTBE Impacts to California Groundwater Resources, 1998**).

Guidelines were developed by the State Water Board for investigation and cleanup of MtBE and other ether-based oxygenates (**Guidelines for Investigation and Cleanup of MtBE and Other Ether-Based Oxygenates, 2001**).

Since 1998 several studies have been conducted that evaluated the occurrence of MtBE releases at UST sites. These studies indicated that effectiveness of the existing UST leak detection systems has been limited, and that MtBE has impacted the majority of the UST sites (**Report on MtBE Monitoring at Operating UST Facilities in Santa Clara County, 2004**).

~~Other local agency reference documents are listed in Table 4-18.~~

UST CLEANUP FUND

Federal and state laws require every owner and operator of a petroleum UST to maintain financial responsibility to pay for any damages arising from their tank operations. The **Barry Keene Underground Storage Tank Cleanup Fund Act of 1989** (Cleanup Fund) was created by the California Legislature, and is administered by the State Water Board, to provide a means for petroleum UST owners and operators to meet the federal and state requirements. The Cleanup Fund also assists a large number of small businesses and individuals by providing reimbursement for unexpected and catastrophic expenses associated with the cleanup of leaking petroleum USTs.

If a leak occurs, responsible parties or their representative must notify the appropriate Water Board or county agency and submit an **unauthorized release form** (URF). The Cleanup Fund can only reimburse costs after the site investigation and cleanup of the tank release has been reported to the Water Board or county regulatory agency.

4.25.3.3 LANDFILL PROGRAM ~~Hazardous and Nonhazardous Waste Disposal~~

Discharges of solid, semisolid, and liquid wastes to landfills, waste piles, surface impoundments, and land treatment facilities can create sources of pollution affecting the quality of waters of the state. Low-concentration liquid ~~W~~waste discharges can be assimilated by receiving waters, if the concentration of pollutants in the waste is regulated (i.e., treated wastewater from municipal or industrial facilities). Conversely, discharges of wastes to waste management units require long-term containment or active treatment ~~following the discharge~~ in order to prevent waste or waste constituents from migrating to and impairing the beneficial uses of waters of the state. Pollutants from such discharges may continue to affect water quality long after the discharger has stopped discharging new wastes at a site, either because of ~~continued discharges~~ undetermined releases from the site or because pollutants from the site have accumulated in underlying soils and are migrating to groundwater.

Landfills for disposal of municipal or industrial solid waste (solid waste disposal sites) are the major categories of waste management units located in the Region. ~~But there are also surface impoundments used for storage or evaporative treatment of liquid wastes, waste piles, and land treatment facilities where semi-solid sludge from wastewater treatment facilities and liquid wastes from refinery operations are discharged for biological treatment.~~ The ~~Regional~~ Water Board issues ~~waste discharge requirements~~ WDRs to ensure that these discharges are properly contained to protect the Region's water resources from degradation and to ensure that the dischargers undertake effective monitoring to verify continued compliance with requirements.

These discharges, and the waste management units at which the wastes are discharged, are subject to concurrent regulation by other state and local agencies responsible for land-use planning, solid waste management, and hazardous waste management. Local enforcement agencies (LEAs) implement the ~~both~~ state's solid waste management laws and local ordinances governing the siting, design, and operation of solid waste disposal facilities (usually landfills) with the concurrence of the California Integrated Waste Management Board (CIWMB). The ~~Waste Management Board~~ CIWMB also has direct responsibility for review and approval of plans for closure and post-closure maintenance of solid waste landfills. ~~The Department of Toxic Substance Control (~~DTSC~~)~~ issues permits for all hazardous waste. ~~management treatment, storage, and disposal facilities (which include incinerators, tanks, and warehouses where hazardous wastes are stored in drums, as well as landfills, waste piles and surface impoundments).~~ The State Water Board, Regional Water Boards, the CIWMB ~~Waste Management Board~~, and DTSC have entered into a Memorandum of Understanding to coordinate their respective roles in the concurrent regulation of these discharges.

Oversight costs for sites in the landfill program at the Water Board and CIWMB are primarily funded through waste discharge permit fees and landfill waste tipping fees.

The ~~Regional~~ Water Board regulates landfills receiving municipal solid wastes (MSW) and facilities receiving classified, nonhazardous, and industrial wastes of various types. **Figure 4-6** shows the active and inactive municipal solid waste landfill sites within the Region as of 2005. ~~These sites are closely regulated and monitored, but some water quality problems have been detected and are being addressed.~~ The Water Board regulates these sites closely, but the required monitoring has revealed water quality problems at some sites that the respective owners or operators are addressing through appropriate remedial measures. As a result of federal laws in the area of hazardous waste regulation, more effort is being devoted to regulation of the ~~on-site~~onsite treatment, storage, and disposal of hazardous waste. ~~These are discharges that are from entities that generate the waste and where only wastes generated by the entities are disposed.~~

~~The laws and regulations governing the discharges of both hazardous and non-hazardous solid wastes have been revised and strengthened in the last few years. Implementation of the following programs is described below: California Code of Regulations (CCR) Title 23, Chapter 15; Resource Conservation and Recovery Act; Toxics Pits Cleanup Act; and Solid Waste Assessment Tests. The Regional Board's policies on two significant areas of regulatory concern with respect to landfills – " Landfill Expansions" and "Bayfront Landfill Expansion Into Wetlands – " are also included below.~~

WASTE REGULATIONS ~~CCR TITLE 23 CHAPTER 15~~

In 1997, the State revised and strengthened the laws and regulations governing the discharges of both hazardous and nonhazardous solid waste. The primary purpose of the regulations is to: 1) assure the protection of human health and the environment, 2) ensure waste is properly contained or cleaned-up as appropriate, and 3) protect surface water and groundwater from the discharge of waste to land. The primary regulation used by the Water Board in regulating nonhazardous waste treatment, storage, and disposal is the combined State Water Board and CIWMB regulations contained in **CCR Title 27, Division 2 of the Solid Waste Regulations,** formerly CCR Title 23, Division 3, Chapter 15. Title 27 includes very specific siting, construction, monitoring, and closure requirements for all existing and new nonhazardous waste treatment, storage, and disposal facilities. Title 27 also contains a provision requiring operators to provide assurances of financial responsibility for: landfill closure activities; post closure monitoring and maintenance; and corrective action for landfill releases. Title 27 establishes detailed technical criteria for establishing water quality protection standards, monitoring programs, and corrective action programs for releases from waste management units.

~~The most significant regulation used by the Regional Board in regulating hazardous and non-hazardous waste treatment, storage, and disposal is CCR Title 23, Division 3, Chapter 15, formerly Subchapter 15. Chapter 15 includes very specific siting, construction, monitoring, and closure requirements for all existing and new waste treatment, storage, and disposal facilities. Chapter 15 also contains a provision requiring~~

~~operators to provide assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from their waste management units. Detailed technical criteria are provided for establishing water quality protection standards, monitoring programs, and corrective action programs for releases from waste management units. Chapter 15 required the review and update of waste discharge requirements for all hazardous waste treatment, storage, and disposal sites by January 1, 1993, and for all non-hazardous waste treatment, storage, and disposal sites by July 1, 1994.~~

~~Chapter 15 defines waste types to include hazardous wastes, designated wastes, non-hazardous solid wastes, and inert waste. Hazardous wastes are defined by DTSC in CCR Title 22. Designated wastes are defined as:~~

~~1) Those non-hazardous wastes that consist of or contain pollutants that under ambient conditions at the waste management unit could be released at concentrations in excess of water quality objectives, or~~

~~2) Hazardous wastes pursuant to CCR Title 22, which are not considered hazardous by the federal Resource Conservation and Recovery Act (RCRA) definition, that have been granted a variance from hazardous waste management requirements by DTSC.~~

~~Non-hazardous solid wastes are those normally associated with domestic and commercial activities. Non-hazardous solid wastes and inert wastes can be regulated by the Regional Board if necessary to protect water quality.~~

Title 27 defines three types of nonhazardous waste: 1) designated wastes; 2) nonhazardous solid waste; and 3) inert waste, as described below.

Unlike other waste classifications, designated waste is defined in Water Code Section 13173 (and in Title 27) as follows:

> "Designated waste," means either of the following:
>
> (a) Hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to **Section 25143 of the Health and Safety Code**.
>
> (b) Nonhazardous waste that consists of, or contains, pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state as contained in the appropriate state water quality control plan.

Title 27 Section 20220 defines nonhazardous solid waste as waste normally associated with domestic, agricultural, and commercial activities. In addition to the regulations under Title 27, landfills that receive nonhazardous solid waste are subject to the State

Water Board's special regulations for municipal solid waste landfills (**State Water Board Resolution No. 93-62**), which adapt federal municipal solid waste landfill standards to the state's landfill regulation scheme.

Title 27 Section 20230 defines inert waste as that subset of nonhazardous solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste. The Water Board regulates inert waste landfills outside of its Title 27 authority and only to the extent necessary to protect water quality from siltation and other indirect effects.

The Water Board regulates discharges of designated waste and nonhazardous solid waste pursuant to the regulations in Title 27; regulates discharges of municipal solid waste pursuant to both the Title 27 regulations and State Water Board Resolution No. 93-62; and regulates discharges of inert wastes only as necessary to protect water quality (e.g., to prevent sediment discharges to surface waters or to assure that such relatively unregulated units receive only inert waste).

Hazardous waste is defined by DTSC in **CCR Title 22, Division 4.5, Chapter 11**. Disposal of hazardous waste and hazardous waste sites located in the Region are regulated by DTSC.

The ~~Regional~~Water Board~~'s~~ has been regulating ~~regulation of~~ nonhazardous solid waste facilities ~~(Class III) has been on-going~~ since the mid-1970's, and in some instances since to the early 1950's. Many of the small, older facilities have closed, and waste is now being disposed of at large regional nonhazardous solid waste facilities. ~~At non-hazardous solid waste facilities,~~ T~~t~~he ~~Regional~~ Water Board reviews and revises WDRs ~~waste discharge requirements~~ at ~~for the~~ active nonhazardous waste sites, and at closed sites, ~~to~~ and assures consistency with the current regulations. These actions include defining the levels of designated wastes (see below), requiring the discharger to establish and operate groundwater monitoring systems capable of identifying ~~upgrading groundwater monitoring systems to identify~~ whether water quality objectives are being violated, establishing corrective evaluation monitoring (investigation) and corrective action programs where standards are violated, and reviewing and overseeing ~~of~~ the development and implementation of facility closure plans. Active landfills are also subject to construction and industrial stormwater NPDES permit requirements (**Section 4.14 Urban Runoff Management**).

To implement ~~Chapter 15~~ Title 27 at nonhazardous solid waste facilities, the ~~Regional~~Water Board must define designated wastes. Many wastes which are not hazardous still contain constituents of water quality concern that could become soluble in a non~~-~~hazardous solid waste facility and produce leachates and gases that could pose a threat to beneficial uses of state waters. Furthermore, a waste (e.g., salty solids) that might be a designated waste at a landfill that overlies potable water would not be a

designated waste at one that overlies groundwater with non-potable water at comparable concentrations (i.e., salty solids are not a threat to salty groundwater).

The criteria for determining ~~whether~~ if a nonhazardous waste is a designated waste are based on water quality objectives in the vicinity of the site, the containment features of the solid waste facility, and the solubility/mobility of the waste constituents. Therefore, all owners and operators of active non~~-~~hazardous municipal solid waste facilities in the ~~San Francisco Bay region~~Region who wish to receive wastes other than municipal solid waste or inert wastes must propose waste constituent concentration criteria above which wastes will be considered designated waste and therefore, not suitable for disposal at their site. ~~Such proposals are subject to approval by the Executive Officer when appropriately delegated by the Regional Board~~. In determining whether a non~~-~~hazardous waste is designated waste, the ~~Regional~~Water Board will consider all relevant and scientifically valid evidence, including relevant and scientifically valid numerical criteria and guidelines developed and/or published by other sources, such as the Central Valley ~~Regional~~Water Board's ~~staff~~ report, "**Designated Level Methodology for Waste Classification and Cleanup Level Determination**," or an equivalent methodology acceptable to the Executive Officer.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

The state implements federally authorized regulations that are equivalent to those promulgated by the U.S. EPA under **Subtitle C of ~~the Resource Conservation and Recovery Act~~RCRA~~'s Subtitle C~~ -- Hazardous Waste Regulations for Treatment, Storage, and Disposal** ~~-- through DTSC and the Regional Boards~~. In ~~August,~~ 1992, U.S. EPA formally delegated RCRA Subtitle C program implementation authority to DTSC. As described above, regulation of hazardous waste discharges is also included in **CCR Title 23, Chapter 15**. Chapter 15~~'s~~ monitoring requirements were amended in 1997 ~~1991~~ to be equivalent to RCRA requirements in regard to the discharge of hazardous waste to land. ~~These will be implemented through the adoption of waste discharge requirements for hazardous waste sites covered by RCRA. The discharge requirements will then become part of a state RCRA permit issued by DTSC.~~

~~Federal regulations required by RCRA's Subtitle D have been adopted for~~ The U.S. EPA promulgated federal regulations, as required by Subtitle D of the federal RCRA statute, applicable to municipal solid waste landfills (**40 CFR 257 and 258**). These regulations are self-implementing. The CIWMB and the State Water Board are jointly responsible for implementing the state program, which the U.S. EPA has approved as being equivalent. The Regional Water Boards implement the water quality aspects of the state program. The LEAs and the CIWMB implement the public health and safety aspects of the state program.

~~, with portions effective October, 1991; October, 1993; and later. The Waste Management Board is the state lead agency for Subtitle D implementation and has been delegated authority to implement the program by U.S. EPA.~~

TOXIC PITS CLEANUP ACT

The **Toxic Pits Cleanup Act of 1984** (TPCA) required that all impoundments containing liquid hazardous wastes or free liquids containing hazardous waste be retrofitted with a liner/leachate collection system or be dried out by July 1, 1988, and subsequently closed. In 1985, there were 26 sites in the Region with ponds subject to TPCA. As of 2005, one site is permitted to operate its ponds under TPCA's exemption requirement but is not accepting waste and is seeking closure. The remaining 25 sites have been closed.

~~in accordance with Chapter 15, Title 22, and RCRA regulations. In 1985, there were 26 sites in the region with ponds subject to the act. As of 1994, one site is continuing to operate its facility under the act's exemption requirements. Of the remaining sites, 19 have closed and the remainder have been delayed in closure either by complications in the federal/ DTSC RCRA closure process, or by the Regional Board's decision to delay closure to allow for gradual removal and reuse of materials in the ponds. All these sites are expected to close by 1995.~~

~~SOLID WASTE ASSESSMENT TESTS~~

~~Section 13273, added to the Water Code in 1985, requires all owners of both active and inactive landfills to complete a Solid Waste Assessment Test (SWAT) to determine if hazardous wastes have migrated from the landfill. There were 195 sites identified in the region subject to this program. Pursuant to a list adopted by the State Board, 150 site owners statewide per year would complete this evaluation, continuing to the year 2001. All sites eventually will be required to complete a SWAT unless waived or exempted in accordance with the law. Program funding was eliminated in 1991 and restored in 1992 solely for the review of backlogged SWAT documents submitted for sites ranked in the first five ranks. SWAT reports from rank six and above are currently reviewed only for sites under regulation by other Regional Board programs, thus significantly delaying completion of the program. More sites will be reviewed if more program funding becomes available, as is expected.~~

~~LANDFILL EXPANSIONS~~

~~The rate of solid waste generation in the region has increased. As a result, some existing disposal sites are filling up and need to be either closed or expanded, and new sites will need to be created. The Regional Board strongly discourages locating new landfills or expanding existing facilities in sensitive groundwater areas. To minimize the problems associated with the disposal of solid wastes, the Regional Board supports the vigorous implementation of the requirement for a 50 percent reduction in the total quantity of waste disposal by the year 2000 as called for in AB 939. Designated wastes should be precluded from Class III landfills through local checking programs, recycling, and~~

~~diversion. To reduce the potential for household hazardous wastes entering municipal landfills, the Regional Board supports local programs for public education and for household hazardous waste disposal and recycling.~~

BAYFRONT LANDFILL EXPANSIONS INTO WETLANDS

A significant issue that the ~~Regional~~ Water Board has addressed is the expansion of existing Bayfront landfills into wetland areas. The ~~Regional~~ Water Board, in a few cases, allowed modest expansions (and undesirable loss of wetlands) to allow local governments time to develop other disposal options. However, these expansions were only approved because there was a demonstrated immediate public need. One expansion permit was appealed to the State Water Board, which clearly indicated that the Water Board should disapprove future such expansions into wetlands, and that local governments must complete the necessary planning to avoid this problem. ~~would not be given the same approvals and that local governments must complete the necessary planning to avoid this problem.~~ Given the State Water Board's position and the wetland~~s~~ provisions contained elsewhere in this Basin Plan, the ~~Regional~~ Water Board will not approve further expansions of Bayfront landfills into wetlands.

4.25.3.4 DEPARTMENT OF DEFENSE AND DEPARTMENT OF ENERGY PROGRAM

The goal of the DoD/DoE program is the investigation and cleanup of pollution at federal military sites. DoD sites include active and inactive military bases and formerly utilized defense (FUDs) sites. DoE sites include active federal energy agency sites. DoD and DoE sites in the Region as of 2005 are shown on **Figure 4-7**. An adjunct to cleanup, particularly with respect to DoD sites, is the return of these sites to productive, civilian use.

Investigation and cleanup at these sites follows the CERCLA process. For DoD sites, the DoD has elected to follow the CERCLA process even if the sites are not listed as "Superfund" sites. This process follows a rigorous sequence of document preparation and agency approvals including completion of the formal Preliminary Assessment, Site Investigation, Remedial Investigation, and Feasibility Study, all leading to a Record of Decision (ROD) on an acceptable Remedial Action Plan (RAP).

Groundwater cleanup must also adhere to the requirements of the Basin Plan and existing state law (the Water Code), relevant regulations (e.g., **Title 27; Title 23, Chapter 16**, etc.), and policies set forth by **State Water Board Resolution Nos. 68-16, 88-63, and 92-49**.

Under the **Base Realignment and Closure Act of 1990** (**amended 2005**), the DoD has been conducting environmental investigation and cleanup at each of these sites with oversight from the Water Board and other agencies. There is considerable state and federal interest in moving these latter types of DoD sites into economically productive uses, in part to offset the negative economic impact of base closures on the local community or to invigorate the often depressed economies of local communities located near these sites. Progress has been slow in many cases due to competition for limited DoD cleanup funds, the complexities of the sites themselves, and uncertainty about the planned reuse. Cities have recently been pursuing "early transfers" that allow them to receive the military property prior to completion of cleanup. Local governments have contracted with developers and environmental firms to perform an integrated cleanup and redevelopment.

Closed military bases that are transferred to a local entity before the cleanup is complete may be subject to a land use covenant (LUC) issued by the Water Board to ensure the site cleanup is completed. The Water Board may issue SCRs per Water Code Section 13304 to allow investigation and cleanup after the military property is transferred. For additional regulatory tools, see **Section 4.25.2 Requirements for Site Investigation, Cleanup, and Site Closure.**

For the DoE program, all of the sites currently within the Region are active and are not expected to fall within public hands for the foreseeable future. Cleanup is ongoing at these sites. Contamination generally consists of discharges of solvents, petroleum hydrocarbons, PCBs, and/or metals to both soil and groundwater. In some cases,

radionuclides have also been released. DoE has regulatory authority over radionuclide discharges, although the Water Board provides input into the investigation and cleanup activities related to them.

Federal funding for both the DoD and DoE programs covers all costs associated with Water Board and State Water Board staff oversight. The state signed a Cooperative Agreement with the Department of Defense (**Defense- State Memorandum of Agreement, DSMOA**)). In the Cooperative Agreement, DTSC acts as the state's agent. Both the State Water Board and the Regional Water Boards coordinate with DTSC to allocate agency responsibility and funding and establish procedures under which site investigation and cleanup will proceed, decisions will be made, and disputes will be resolved. For the DoE program, a grant has been established which describes and funds Water Board oversight at DoE sites.

~~The goal of this program is the - cleanup of pollution at federal military sites.~~
~~The goal of this program is the clean-up of pollution at federal military sites (Department of Defense - DoD) and federal energy agency sites (Department of Energy -DoE).~~

~~Investigation and cleanup at these sites must meet the requirements of the U.S. EPA "Superfund" hazardous waste clean-up program. This involves completion of the formal Preliminary Assessment, Site Investigation, Remedial Investigation, and Feasibility Study, all leading to a Record of Decision on an acceptable Remedial Action Plan.~~

~~The State has signed agreements with the Department of Defense (Defense- State Memorandum of Agreement) and Department of Energy (Agreement in Principle) establishing procedures under which site investigation and cleanup will proceed, decisions will be made, and disputes resolved. Regional and State Water Board staff oversight costs are fully or partially reimbursed by various cost recovery mechanisms. At DoE sites, reimbursement is currently limited to tasks related to review of monitoring data and monitoring system adequacy to characterize sites and determine effectiveness of remedial actions. The potential exists to increase the scope of eligible reimbursement activities in the future.~~

~~The DoD program includes closing bases that are subsequently to be made avail able, to the extent possible, for sale or lease to private or public parties. There is considerable state and federal interest in moving parcels into economically productive uses, in part to offset the negative economic impact of base closures on the local community. Special care will be required to assure that such transfers are done in a manner consistent with protection of water quality, public health, and the environment.~~

~~In April, 1988, the State and Regional Boards received a U.S. EPA grant for coordinating and enforcing groundwater cleanup at federal Superfund sites in the South Bay. The grant is known as the "South Bay Multi-Site Cooperative Agreement" (MSCA). The primary goals of MSCA are:·~~

~~· To accelerate clean-up of polluted groundwater at Superfund sites in the South Bay;~~

~~· To augment the Regional Water Board's existing programs to ensure that U.S. EPA's requirements, as defined in the National Contingency Plan, are met for those sites on the National Priority List (Superfund) assigned to the Regional Board as lead agency; and~~

~~· To finance Regional Board staff support on U.S. EPA-lead Superfund sites to assure clean-up decisions meet state requirements.~~

~~At most of the 30 MSCA sites, the toxics threats and risks are either under short-term control (awaiting long-term solutions), or the responsible parties have constructed and/or implemented long-term remediation projects. At the remaining sites, the Regional Board is requiring completion of Remedial Investigation/Feasibility studies and proposed Remedial Action Plans (RAPs). After public review and comments on these studies and plans, the Regional Board will adopt the RAPs in individual Site Clean-up Orders. When U.S. EPA approves of the Regional Board's actions, it will administratively adopt a Record of Decision.~~

4.25.3.5 ABOVEGROUND PETROLEUM STORAGE ACT

The state's **Aboveground Petroleum Storage Act** was enacted in 1989 and amended in 1991. The ~~act~~ Act became effective on January 1, 1990.

The purpose of this Act ~~act~~ is to protect the public and the environment from the serious threat of spillage of millions of gallons of petroleum-derived chemicals stored in thousands of aboveground storage tanks. The Act ~~act~~ requires that the ~~Regional~~ Water Board inspect aboveground petroleum storage tanks used for crude oil and its fractions for their compliance with the federally required **Spill Prevention, Control, and Countermeasure Plan** (SPCCP). In the event that a release occurs that threatens surface or groundwater, the Act allows the ~~State~~ state to recover reasonable costs incurred in the oversight and regulation of the cleanup. The Water Board oversees sites where releases from aboveground storage tanks have impacted groundwater under the SLIC cost recovery program.

~~"Storage Statements" are required from the facilities describing the location, nature, and size of their tanks. Filing fees are required, which are intended to fund inspections, training, and research. There are approximately 225 facilities within the region that have filed their storage statements.~~

~~FUTURE REGULATORY MANAGEMENT STRATEGIES~~

~~The following findings are drawn from the Regional Board's current regulatory experience:~~

~~· Risk assessment and management techniques can provide the Regional Board with a quantitative estimate of risks to assist in decision-making.~~

~~· An inflexible, resource-intensive approach is not the most cost-effective, considering the multitude of existing and potential sources of groundwater pollution requiring cleanup.~~

~~· Institutional controls, such as deed restrictions, are an additional mechanism to protect beneficial uses and public health and safety. Guidance from the U.S. EPA and the Department of Toxics Substances Control is considered in setting institutional controls.~~

~~As a result of these findings regarding regulatory management strategy, the Regional Board will also review its overall approach to managing site cleanups. Table 4-19 lists options that the Regional Board plans to consider. Additional input regarding these and other options will be sought from all interested and affected parties during the Triennial Review of the Basin Plan.~~

4.25.4 GROUNDWATER PROTECTION STUDIES ~~PROGRAMS~~

The intimate ties among~~between~~ the land, surface water, groundwater, the Estuary, and human activity must be acknowledged in order to promote wise, balanced, and sustainable use of water resources. In this regard, the ~~Regional~~ Water Board will encourage planning and management by supplying tools and information that will provide an integrated environmental management approach to problem solving. It also must be recognized that groundwater quality and quantity are inextricably linked. Because an informed and involved citizenry is crucial to realizing groundwater protection, policies and plans should encourage and promote research, education, and public involvement as an integral part of any protection program.

~~Local water, fire, planning and health departments are actively involved with their own groundwater protection programs. These programs include: salt water intrusion and land subsidence control, wellhead protection, groundwater recharge area preservation, hazardous materials storage and management ordinances, Local Oversight Programs and non-Local Oversight Programs for cleanup of leaking underground fuel tanks, potential conduit well destruction, and well permitting and inspection. For some agencies, maintaining funding for protection programs is an ongoing challenge. Through three specific projects, the Water Board is evaluating the groundwater protection needs in specific basins, and thus will provide additional support for local agency efforts. These projects are described below.~~

4.25.4.1 GROUNDWATER PROTECTION AND BENEFICIAL USE STUDIES

Water Board staff, with contributions from local agencies, evaluated existing groundwater protection programs and beneficial uses of groundwater in the **Napa River Watershed** (1996), **San Francisco and Northern San Mateo Counties** (1996), **East Bay Plain, Alameda and Contra Costa Counties** (1999), and **South San Francisco Bay Basin, Alameda, San Mateo, and Santa Clara Counties** (2003). Extensive research was conducted and numerous references were compiled to prepare these groundwater studies. In general, each study included the following goals:

- Describe the hydrogeology and groundwater use for the groundwater basins;
- Identify major threats to groundwater and groundwater protection programs;
- Identify locations where groundwater is vulnerable to contamination;
- Identify locations where groundwater monitoring is needed;
- Use GIS to compile complex data sets to use as a decision-making tool for groundwater protection;
- Refine beneficial use designations for some groundwater basins;
- Identify inactive well locations;

- Describe groundwater extraction for municipal, agricultural, and industrial water supply;
- Summarize statewide initiatives for groundwater protection and data sharing; and
- Evaluate special problem areas that are typically not addressed by groundwater protection programs.

The results of these groundwater protection studies identified several key groundwater protection issues that are summarized in **Section 4.26 Emerging Program Areas**. The reports are available at the **Water Board website**.

4.25.4.2 STATE WATER BOARD GROUNDWATER PROTECTION PLANNING CONTRACT

At the ~~Regional~~ Water Board's request, the State Water Board ~~is~~ funded ~~ing~~ a contract with the University of California at Berkeley ~~for development of~~ to develop a regional groundwater protection plan. The project focused~~s~~ on several significant groundwater ~~the most-used, high resource-value~~ basins: Santa Clara Valley, Niles Cone, Livermore Valley, San Mateo Plain, and Half Moon Bay Terrace (**Table 2-2**). The vulnerability to pollution of each of the basins ~~will be~~ was determined ~~from~~ using the U.S. EPA's DRASTIC Index Method (**U.S. EPA Project No. 600/2-87-035, April 1987**) on a GIS.~~computer-based geographic information system.~~ The project was completed in 1994 by the Center for Environmental Design Research, University of California at Berkeley.

~~An important component of the project will be the evaluation of present land and water use conditions, as well as those planned for 2005 and a long-term buildout (e.g., 2025). Working closely with local agencies, comprehensive protection plans will be recommended that can mitigate or minimize future resource impacts. These plans may include revised water quality objectives for basins or subbasins that have differing protection needs. Developing basin-specific objectives is one policy option listed on Table 4-19 under "Streamline Existing Program." A final regional groundwater protection plan will be incorporated into the Basin Plan at a future date.~~

4.25.4.3 INTEGRATED ENVIRONMENTAL MANAGEMENT PROJECT

In 1987, the U.S. EPA completed the **Integrated Environmental Management Plan** (IEMP). This innovative study conducted in Santa Clara County sought to improve public health and environmental protection by integrating approaches for hazardous material management for land, air, and water. The IEMP's Drinking Water Subcommittee developed recommendations to address the question “How clean is clean?” The committee wrote, ".... because contamination and clean-up impacts vary significantly in different sites and different hydrogeologic zones, the ~~Regional~~ Water Board should

continue to develop and standardize a process for clean-up decision making, rather than establish across-the-board clean-up levels." The recommendations from this study were applied to developing site-specific cleanup levels. ~~This recommendation ties in with the policy options listed on Table 4-19 under "Streamline Existing Programs."~~

4.25.4.4 GROUNDWATER RESOURCE STUDY

A basin-wide approach for implementing and prioritizing groundwater cleanup was recommended in a series of reports titled, "**San Francisco Bay Region Groundwater Resource Study**" (1987). The reports were a cooperative effort by the ~~Regional~~ Water Board and the University of California at Berkeley, School of Public Health, and Department of Landscape Architecture. The ten volume series covered eight high priority groundwater basins: Niles Cone, Livermore and Sunol Valley, Ygnacio/Pittsburg/Clayton/San Ramon Basins, Suisun/Fairfield Basin, Napa Valley, Sonoma Valley, and San Mateo Basin. The Water Board used the results of this study to prioritize its workload in addressing polluted sites.

~~Information regarding well location, construction, areal geology, permeability, and depth to groundwater; land use characteristics; and location of pollution sources was compiled into a relational data base. A methodology was developed that weighs site sensitivity and pollution severity factors. Maps from the project illustrate the regional sensitivity of the above-groundwater basins to groundwater pollution.~~

~~Several of the policy options listed in Table 4-19 under "Streamline Existing Program" could be addressed by using the results of this planning program. In particular, the Regional Board will investigate the use of existing data and maps produced by the program, as well as other geographic information system-generated maps, as site screening tools to rank polluted sites and to assist in site-specific review of cleanup levels.~~

4.25.4.5 SHALLOW DRAINAGE WELLS

~~REGULATION OF POTENTIAL POLLUTION SOURCES~~

~~SHALLOW DRAINAGE WELLS~~

~~INTRODUCTION~~

The California Water Code, Section 13710, defines the term "well" or "water well" to mean any artificial excavation constructed by any method for the purpose of extracting water from, or injecting water into, the underground. The definition does not include (a) oil, gas, and geothermal wells, or (b) construction dewatering wells and hillside

stabilization dewatering wells. Therefore, all shallow drainage wells (also known as dry wells, infiltration basins, and shallow injection wells) used for the purpose of disposing of stormwater or surface runoff are covered under this definition. The purpose of this Basin Plan section is to clarify the ~~Regional~~ Water Board's position in regard to the construction, usage, and regulatory permitting aspects of shallow drainage wells.

~~BACKGROUND~~

In 1951, the ~~Regional~~ Water Board adopted Resolution No. 81, "Statement of Policy on Sewer and Drainage Wells", which is incorporated by reference into this plan. This resolution states that the ~~Regional~~ Water Board disapproves of the construction and use of wells for disposal of effluent from septic tanks and surface runoff from streets and highways except where such wells discharge into a formation that at no time will contain groundwater fit for domestic, agricultural, or industrial use. At the same time, the ~~Regional~~ Water Board recognized that these wells already existed in the Region and that immediate abandonment may be impractical. Therefore no new installations were to be permitted, more satisfactory drainage methods were to be substituted for existing installations at the earliest practicable date, and the ~~Regional~~ Water Board was to consider the matter of prescribing requirements for the discharge in granting any exceptions to the prohibition. After review of ~~Regional~~ Water Board files, it does not appear as if any exceptions to the resolution were officially granted.

~~An "Explanation of Policy" was adopted with the resolution. The reasons for concern over the continuation of such practices can be summarized as follows:~~

~~(A) Wells used to dispose of sewage and surface drainage bypass the normal processes of nature that occur at or near the surface of the soil. The use of such wells may allow for injection of waste into sub-surface strata rapidly and unchanged in chemical quality.~~

~~(B) It is not practical to control the quality of water entering these wells to the degree needed to protect beneficial uses. The only practical method of controlling groundwater pollution is prevention. Groundwater pollution is not usually noticed until the damage is done and rapid abatement is impractical.~~

~~(C) Relatively small quantities of pollutants may be introduced over a long period of time and eventually cause cumulative damage of large proportions.~~

~~Board staff in cooperation with U.S. EPA recently surveyed municipalities and a number of industries to determine the usage of shallow drainage wells in the region. Results indicate that shallow drainage wells have been haphazardly installed throughout the region, use of the wells is prevalent, and construction and usage has gone virtually unregulated. Additionally, shallow drainage wells are still being constructed in new residential and industrial developments.~~

~~U.S. EPA has investigated numerous cases nationwide in which the use of shallow drainage wells impacted drinking water supplies. Within the San Francisco Bay region, a number of groundwater investigations revealed stormwater drainage wells as possible sources of pollutants. While it was not possible to determine if the pollutants detected in groundwater originated from the identified wells, it was determined that current practices associated with these wells posed a serious threat to groundwater supplies.~~

~~Shallow drainage wells concentrate runoff and allow for its rapid infiltration to the subsurface. In turn, the buffering capacity of soils for removing pollutants and protecting groundwater supplies is reduced. The threat a shallow drainage well may pose to groundwater is directly related to the quality of the water entering the well as well as its location and design. The location of the well must be taken into consideration. Subsurface conditions, such as the permeability of underlying soils and the depth to groundwater, vary considerably throughout the region. In this regard, design is also important, as deeper wells may penetrate confining or semi-confining clay layers and serve as conduits for pollutants to migrate to lower aquifers. Managing surrounding land uses is one means of controlling the quality of water entering the well. For instance, wells should be labeled and not used in areas where there is a high probability of a highway accident or spill, and not located in certain industrial areas. With proper management, placement, and design, shallow drainage wells can have a positive environmental benefit, as there is a need to allow stormwater to recharge shallow groundwater and to protect surface water from excessive sedimentation and other water quality problems associated with high stormwater discharge flows.~~

The Federal Underground Injection Control Program was established in 1984 with the adoption of the Safe Drinking Water Act. In California, the U. S. EPA is the lead agency in charge of administering the program. Under this program, wells used to dispose of surface water runoff are classified as Class V injection wells. The owner or operator of any existing Class V well is required to submit information on each well, including the nature and type of discharge and operating status. U.S. EPA is conducting a well inventory statewide to identify Class V wells. ~~For the San Francisco Bay region, no voluntary reports of the existence of Class V wells were received by U.S. EPA as required under these regulations.~~

There are a number of applicable state regulations pertaining to the construction and use of shallow drainage wells. AB2182 (Ch. 1131, Sec. 4458) of the California Health and Safety Code, passed in 1961, prohibits the use of drainage wells for the disposal of sewer water unless authorized by the ~~Regional~~ Water Board. The ~~California~~ Water Code (Ch. 10, Secs. 13700 – 13806) defines the terms "well" and "water well" and states that any person who intends to dig, bore, or drill such a well must file a notice of intent with ~~California Department of Water Resources (~~DWR~~)~~ or the designated local enforcement agency. A detailed report of completion must then be filed after construction. If the ~~Regional~~ Water Board finds that standards of water well construction, maintenance, abandonment, and destruction are needed in any area to protect beneficial uses of groundwater, it shall determine the area to be involved and so report to each affected county and city in the area. Each such affected county shall, within 120 days of receipt of

the report, adopt an ordinance establishing standards of water well construction, maintenance, abandonment, and destruction for the designated area. To date, standards and siting criteria for shallow drainage wells are non-existent in the Region and subsequently not included in the well-permitting process.

The ~~Regional~~ Water Board ~~is now issuing~~ issues NPDES permits for stormwater discharges to surface water for certain industrial and construction activities and to the larger municipalities in the ~~r~~Region **(Section 4.14 Urban Runoff Management)**. The permits require the implementation of control measures to reduce pollutant loading, along with water quality monitoring to assure that the waters being discharged will not impact the beneficial uses of receiving waters. The discharge of industrial waste into the sanitary sewer system is now closely regulated under a pretreatment program. Likewise, the discharge of stormwater to the subsurface must also be regulated to assure the protection of groundwater supplies. Standards for shallow drainage well construction, maintenance, abandonment, destruction and siting criteria are needed throughout the Region. Land-use decisions, such as stormwater structural controls and well construction permitting, are most often made by local government agencies, including water districts, planning, and building departments. Many of these agencies are not aware of the Water Board's Resolution No. 81, or the rationale behind it.

~~In summary, the rationale for adopting Resolution No. 81 in 1951 is still very much applicable today. The only practical method of controlling groundwater pollution is prevention, since groundwater pollution is not usually noticed until the damage is done.~~

GOAL

The goal of the Shallow Drainage Program is to eliminate the unregulated construction and use of shallow drainage wells in areas where municipal, domestic, agricultural, and industrial groundwater supplies are threatened.

This goal is to be attained by a coordinated effort on the part of U.S. EPA, the ~~Regional~~ Water Board, DWR, and local government agencies to implement a shallow drainage well control program.

PROGRAM

The ~~Regional~~ Water Board prohibits the unauthorized construction and use of shallow drainage wells. The shallow drainage well control program shall consist of two main elements: 1) locating existing wells; and 2) regulating the construction and use of existing and new wells.

1. Locating existing wells

U.S. EPA, the ~~Regional~~ Water Board, and local government agencies will need to work together to identify all existing shallow drainage wells.

2. Regulating existing wells and new wells

Continued use of existing wells or construction of new wells may be authorized by a local enforcing agency through its well-permitting process. The ~~Regional~~ Water Board will work with DWR and each city, county, and local water supply and flood control agency on developing standards for adoption by ordinance for the construction, maintenance, abandonment, and destruction of shallow drainage wells. Additionally, it must be demonstrated that the use of the well will not result in a discharge that may pose a threat to municipal, domestic, agricultural, and industrial groundwater supplies. If this cannot be adequately demonstrated, the well must be permanently closed. Closure of each well must be done in compliance with U.S. EPA Class V injection well closure guidelines and applicable local agency guidelines or regulations.

4.26 EMERGING PROGRAM AREAS

There are several aspects of protecting beneficial uses associated with aquatic systems and groundwater protection that have emerged as critical issues in recent years. This section presents a prospective view of ~~two~~ emerging program areas that have increasingly become the focus of Water Board activity. Each involves both an integration of approaches used in current Water Board programs as well as innovative solutions.

~~WETLAND PLANNING~~

~~PILOT REGULATORY PROGRAM~~

~~The California Wetlands Conservation Policy included a 'regional strategy for wetlands planning and regulatory streamlining in the San Francisco Bay Area." This strategy calls for the incorporation of wetlands and restoration inventory information into a "broader, participatory wetlands planning effort", and directs the San Francisco Bay Regional Water Quality Control Board to undertake a "demonstration program" to determine the feasibility of the Sate assuming Section 404 permitting authority from the Federal Government.The Regional Board has undertaken a regulatory pilot project that will achieve the stated objective. The pilot project will allow the Regional Board to determine the most effective way to enhance the State's role in permitting efficiency of dredge and fill activities, while strengthening wetlands management and protection. The scope of the pilot project includes: improvement of enforcement, inspection, and monitoring of CWA 404 permit conditions and laws; facilitation and coordination of public and permit reviewing agency interactions; application of a "watershed management approach" to CWA 404/401 permit review and enforcement activities; and Regional Board processing of dredging and wetland fill permits.The pilot project will thus provide a basis for evaluating the effectiveness of uniting Section 404 permitting and Section 401 certification activities within one State agency that uses a watershed management approach. The evaluation of the results of the pilot project will be used to develop a long-term regulatory strategy that will enhance permitting efficiency and promote attainment of wetlands conservation goals as outlined in the State of California Wetlands Conservation Policy.A final report will present conclusions and recommendations, including: (a) assessment of the utility and feasibility of applying a watershed perspective to Section 404/401 decisions; (b) State consideration of Section 404 assumptions; and (c) development of a streamlined permit process. The final report will be completed in October 1996.~~

4.26.1 WETLAND RESTORATION

As documented in the **Habitat Goals reports**, a large percentage of historic tidal marsh and mudflats around the Estuary have been diked, drained, and/or filled to serve various human purposes. Current planning efforts by multiple agencies recognize the importance

of restoring wetland functions to the Estuary to protect and enhance beneficial uses. The Estuary Project's **Comprehensive Conservation and Management Plan** (June 1994) proposes several goals for wetland management in the Estuary, and recommends large scale restoration of salt ponds and other former wetlands in order to support sustainable populations of fish and wildlife as well as other benefits associated with wetlands. The Habitat Goals reports provide~~s~~ guidance to the Water Board and indicates where wetland restoration potential exists around the Estuary.

The Water Board participates in a number of wetland restoration projects in the Region, both in a regulatory role regarding proposed wetland fill and/or discharges, and in the role of an interested party or stakeholder, recognizing the multiple benefits of wetland restoration for water quality and beneficial uses. Major restoration projects underway include former salt ponds adjacent to South San Francisco Bay and San Pablo Bay, former DoD sites such as Hamilton Field in Marin County, and the Bair Island Ecological Reserve in South San Francisco Bay. While these projects are expected to have a positive impact on water quality and beneficial uses, certain challenges must be addressed, such as minimizing uptake of mercury into the food web, meeting water quality objectives for salinity and dissolved oxygen in discharges from ponds (impounded bay waters), protecting existing tidal mudflats, and controlling harmful invasive species such as *Spartina alterniflora* cordgrass and its hybrids.

4.26.2 DESALINATION

San Francisco Bay has only recently been identified as a potential drinking water source, and this has become an emerging program area for the Water Board. Producing drinking water from saltwater results in a concentrated brine stream that must be managed to protect water quality. In the late 1990s, some water supply agencies in the Region began investigating the feasibility of producing drinking water from the Estuary using desalination technology. As of 2005, several sites are being screened for potential desalination facilities by various agencies, and in 2005 the Water Board issued an NPDES permit to one pilot plant for the Marin Municipal Water District in the City of San Rafael.

Desalination plants are in operation throughout the world, with facilities most common in the Middle East, the Caribbean and Florida. To date, only a limited number of desalination plants have been built along the California coast, primarily because the cost of desalination is generally higher than the costs of other water supply alternatives available in California (e.g., water transfers and groundwater pumping). However, as drought conditions occur and concern over water availability increases, desalination projects are being proposed at numerous locations in the state.

Desalination plants produce liquid wastes that may contain all or some of the following constituents: high salt concentrations, chemicals used to clean plant equipment and used during pretreatment, and toxic metals (which are most likely to be present if the discharge

water was in contact with metallic materials used in construction of the plant facilities). Potential alternatives for disposal of liquid waste include discharge into waters of the state, combination with other discharges (e.g., power plant cooling water or sewage treatment plant effluent) before discharge, discharge into a sewer for treatment in a sewage treatment plant, or drying and disposal in a landfill. Desalination plants also produce a small amount of solid waste (e.g., spent pretreatment filters and solid particles that are filtered out in the pretreatment process).

If water supply agencies implement desalination to augment supplies along with waste management practices that protect beneficial uses, the Water Board will consider amending the Basin Plan to designate the municipal and domestic supply (MUN) beneficial use for applicable marine or estuarine areas of the Region.

4.26.3 EMERGING TOXIC POLLUTANTS OF CONCERN

As noted in **Section 4.1.2.1 Numeric Water Quality Objectives, Wasteload Allocations**, there are pollutants of local concern for which water quality objectives have not been developed and adopted. Both regulatory and research surveillance programs periodically detect pollutants that are persisting in the aquatic environment, which may or may not have published guidelines for protecting beneficial uses. Such pollutants may be inducing toxicity or exhibiting bioaccumulation in the food web. The Regional Monitoring Program for the San Francisco Bay, described in Section 6.1 Regional Monitoring Program, includes studies to anticipate potential water quality problems by identifying previously unmonitored and/or unknown pollutants. It is through such efforts that the potential pollutant problems of the future can be identified and addressed before they become environmentally and economically costly “legacy” pollutants, such as mercury, PCBs, and chlorinated pesticides such as dichloro-diphenyl-trichloroethane (DDT). Absent regulatory objectives or published guidelines, the Water Board will encourage source identification and control of pollutants found in the Region’s waters that exhibit characteristics of concern, such as detectable and/or increasing levels in tissues of the Estuary’s organisms, as in the case of polybrominated diphenyl ethers (PBDEs). The Water Board will establish water quality objectives for selected pollutants as the necessary technical information becomes available.

Groundwater quality has been impacted by several emerging contaminants and by previously known contaminants that have undergone increased regulatory concern. Emerging contaminants, including N-nitrosodimethylamine (NDMA), disinfection byproducts such as trihalomethanes, haloacetic acids, bromate, and chlorite, endocrine disruptors, and pharmaceutically active compounds, may be present in sanitary wastewater, recycled water, imported water, and any other water source that receives sanitary wastewater. Emerging contaminants may pose a threat to groundwater quality when such waters are used for artificial recharge or are otherwise intentionally infiltrated. Other contaminants of concern affecting groundwater quality that are of concern include

nitrate, total dissolved solids, perchlorate, solvent stabilizers (such as 1,4-dioxane), arsenic, and hexavalent chromium.

4.26.4 GROUNDWATER PROTECTION ISSUES

Groundwater protection studies conducted by Water Board staff identified several key groundwater protection issues and are summarized below.

4.26.4.1 VERTICAL CONDUITS

Vertical conduits can provide pathways for the migration of surface pollution or shallow groundwater pollution into deeper water bearing zones. Pollutants that enter groundwater through vertical conduits circumvent the natural migration process, which protects groundwater by filtering and other natural attenuation processes. Numerous agricultural and domestic wells installed in the Region have been abandoned or covered by subsequent development. Identification and proper destruction of these potential conduits is critical to include in any groundwater protection program.

4.26.4.2 HORIZONTAL CONDUITS/SANITARY SEWER LEAKS TO GROUNDWATER

Horizontal conduits also serve to spread contamination by providing preferential pathways for migration of contaminants and contaminated groundwater. Storm drain systems and their construction backfill can be significant pathways for migration of contaminated shallow groundwater to water bodies where the storm drains discharge. Similar protocols should be followed for investigating horizontal conduits as for vertical conduits. A horizontal conduit study should be conducted at all sites where releases of toxic or hazardous materials are documented and before development or new construction begins at sites where toxic or hazardous materials have been used or stored. This is particularly important at or near dry cleaners or other operations where chlorinated solvents have been used.

Sanitary sewer lines may also allow pollutants to migrate to groundwater. Exfiltration is leakage from sanitary sewer lines into the subsurface and, in most cases, into surrounding groundwater. This phenomenon usually occurs in areas where the water table is below the sewer line. Leaking sewer lines can introduce pathogens into surrounding groundwater. Of more significance are chemicals transported in sewer lines that are released and migrate to and affect both shallow and deeper aquifers. The most significant historical impacts of leaking sewer lines are often associated with dry cleaning operations and the

use of chlorinated solvents in electronics industries, such as wafer fabricators, plating shops, and printed circuit board shops.

4.26.4.3 GROUNDWATER SURFACE WATER INTERACTIONS

Nearly all surface water features (streams, lakes, reservoirs, wetlands, and estuaries) interact with groundwater. Several issues have been identified that simultaneously affect the quality and quantity of surface water and groundwater due to the dynamic relationship between the two. The affects of these issues on water quality and quantity must be understood in order to develop effective water resource management strategies. These issues include the effect of surface water diversion and groundwater withdrawal on creek and riparian habitat, water quality, surface water infiltration to groundwater (e.g., recharge and stormwater infiltration), groundwater discharge to surface water (e.g., plume discharges), and changing land use (as it affects runoff and recharge).

4.26.4.4 SALTWATER INTRUSION

Saltwater from San Francisco Bay and adjacent salt ponds has intruded freshwater-bearing aquifers in the Niles Cone, Santa Clara Valley, and San Mateo Plain basins. In both the Niles Cone and Santa Clara Valley basins, local agencies have implemented measures to prevent saltwater intrusion. The threat of saltwater intrusion in the Niles Cone is primarily due to the basin's proximity to San Francisco Bay and the large system of salt ponds that operate along the Bay's margin. In Santa Clara County, land subsidence, resulting from historical pumping that lowered the water table, has caused the lower reaches of streams and rivers to be invaded by saline tidal waters, increasing salinity in shallow groundwater. Land subsidence is no long occurring in Santa Clara Valley.

4.26.4.5 TRACKING INSTITUTIONAL CONTROLS

Due to the difficulty of accomplishing rapid cleanup at most sites, it is usually necessary to manage site contamination to avoid or minimize exposure pending attainment of cleanup standards. Risk management measures include engineering controls (such as slurry walls or engineered caps) and institutional controls (such as notifications to site occupants or deed restrictions prohibiting sensitive land uses). Because risk management measures usually need to remain effective for many years, their effective implementation needs to be tracked and enforced. At issue is how best to do this. The solution will involve some combination of oversight by the Water Board or other cleanup oversight agency, the local permitting agency, and the discharger.

4.26.5 SEDIMENT

Sediments in the ~~larger San Francisco Bay~~ Estuary ~~system~~ are both sources and sinks of pollutants. Under the **Bay Protection and Toxic Cleanup Program**, in 1999, the Water Board ~~is~~ ~~conducting~~ completed a detailed assessment of (a) the levels of pollutants in sediment throughout the Bay, and (b) the risks and benefits of cleaning or otherwise managing existing hot spots.

Pollutant transport associated with sediments is also the subject of numerous studies, many of which are supported by the Water Board. The dynamics of sediment movement, uptake of pollutants through the benthic food web~~chain~~, ~~and~~ measurement of pollutant levels on suspended material, and food web models associated with TMDL projects are examples of such studies.

Finally, the environmental effects associated with the disposal or reuse of Estuary sediments have been extensively investigated within the context of the Water Board's dredging management program. As part of this effort, the Water Board has supported detailed research on developing sediment toxicity tests and sediment quality objectives.

~~The Regional Board will develop a comprehensive Sediment Management Strategy that integrates information and concerns regarding pollutants in sediment.~~

4.26.6 NATIONAL "PORTFIELDS" INITIATIVE

The U.S. EPA, National Oceanic and Atmospheric Administration (NOAA), and a number of other federal agencies announced the "**Portfields**" initiative in 2003. This effort is a renewed focus on revitalizing the nation's port communities to protect the coastal environment and restore or maintain economic vitality. Many waterfront areas have suffered as waterfront-manufacturing industries changed their interests or went abroad. Abandoned properties with perceived contamination can prevent redevelopment, and local communities lose jobs and other economic benefit. Businesses that are today seeking viable waterfront lands for manufacturing, shipping, and tourism can benefit from Portfields revitalization projects. There are significant waterfront industrial areas in the Region that have undergone redevelopment, such as the Port of Oakland and Mission Bay, and more are expected as federal agencies direct funding to Brownfield project proponents in port areas.

4.26.7 HYDROMODIFICATION

Hydromodification is a general term that encompasses effects of projects on the natural hydrologic, geochemical and physical functions of streams and wetlands that maintain or enhance water quality. Regional Water Boards use this term to describe an alteration away from a natural state of stream flows or the beds or banks of rivers, streams, or creeks, including ephemeral streams, which results in hydrogeomorphic changes. Protecting beneficial uses within the Region consistent with the federal Clean Water Act and the Porter-Cologne Act requires careful consideration of projects that result in hydrogeomorphic changes and related adverse impacts to the water quality and beneficial uses of waters of the State.

An increasing number of Water Board regulatory actions pertain to the proposed hydromodification of stream and river systems in the Region. These actions include water quality certifications or waste discharge requirements for projects that apply for Clean Water Act Section 401 Certification, total maximum daily loads (TMDLs) for sediments and nutrients in some of the Region's streams, and requirements for municipal stormwater management programs to develop Hydromodification Management Plans. Additionally, many of the grants for clean water awarded under voter-approved bond measures and managed by Water Board staff involve restoration proposals on various components of stream systems. To ensure protection of streams through its regulatory and grant programs, and increase efficiency of the application process, Water Board staff developed a technical reference circular (Circular) in 2003, entitled, "**A Primer on Stream and River Protection for the Regulator and Program Manager**." The purpose of the Circular is to help various agency staff and permit applicants recognize the linkages between water quality and the good physical conditions of stream channels. The Water Board will consider amending the water quality standards and implementation program to clarify the dependence of water quality and beneficial uses on the functions and physical characteristics of water bodies.

CHAPTER 5 PLANS AND POLICIES

~~INTRODUCTION~~

In addition to the Water Quality Control Plan (Basin Plan), many other plans and policies direct San Francisco Bay Regional Water Quality Control Board (Water Board) actions or clarify the ~~Regional~~Water Board's intent. The following pages describe numerous ~~seven~~ State Water Resources Control Board (State Water Board) plans and policies and ~~numerous Regional~~Water Board policies.

*All of these policies may be revised periodically. Contact the **State Water Board** and the ~~Regional~~ **Water Board** for further information. ~~to determine whether a particular plan or policy is still current~~.*

5.1 STATE WATER BOARD ~~STATEWIDE~~PLANS AND POLICIES

STATE AND REGIONAL WATER BOARDS WATER QUALITY COORDINATING COMMITTEE—RESOLUTION NO. 68-1

By adopting this Resolution, the ~~Regional~~Water Board approved a State and Regional Water 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 Water Board; and (3) recommending action to be taken on water quality programs.

ANTIDEGRADATION POLICY—RESOLUTION NO. 68-16

The "Statement of Policy with Respect to Maintaining High Quality of Waters in California," known as the Antidegradation Policy, adopted in 1968, 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 potential beneficial uses of water; and
- ✓ Not result in water quality less than that prescribed in water quality control plans or policies.

STATE POLICY FOR WATER QUALITY CONTROL ~~POLICY~~ (1972)

The "State Policy for Water Quality Control", adopted in 1972, declares the State Water Board's intent to protect water quality through the implementation of water resources management programs. It serves as the general basis for subsequent water quality control policies.

POLICY REGARDING WATER RECLAMATION- RESOLUTION NO. 77-1

This resolution adopted in 1977 requires the State and Regional Water Boards to encourage water recycling projects for beneficial use using wastewaters that would otherwise be discharged to marine or brackish receiving waters or evaporation ponds. The resolution also specifies using recycled water to replace or supplement the use of fresh water or better quality water, and to preserve, restore, or enhance in-stream beneficial uses, including fish, wildlife, recreation and esthetics associated with any surface water or wetlands.

BAYS AND ESTUARIES POLICY -- RESOLUTION NOS. 74-43 and 95-84

The "Water Quality Control Policy for the Enclosed Bays and Estuaries of California" (Bays and Estuaries Policy), adopted in 1974 and amended in 1995, ~~will~~ provides water quality principles and guidelines for the prevention of water quality degradation and the protection of beneficial uses of waters.

THERMAL PLAN (1975)

The "Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (known as the Thermal Plan), adopted in 1972 and amended in 1975, specifies water quality objectives, effluent quality limits, and discharge prohibitions related to elevated temperature waste discharges to~~thermal characteristics of~~ interstate waters, enclosed bays, and estuaries.~~, and waste discharges.~~

POWERPLANT COOLING POLICY -- RESOLUTION NO. 75-58

The "Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling" (Powerplant Cooling Policy), adopted in 1975, ~~indicates~~specifies the State Water 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.

POLICY ON DISPOSAL OF SHREDDER WASTE – RESOLUTION NO. 87-22

In 1987, the State Water Board adopted this policy that describes specific conditions to be enforced by the Regional Water Boards with regards to disposal of mechanically destructed car bodies, old appliances, or other similar castoffs at landfills.

POLICY REGARDING THE UNDERGROUND STORAGE TANK PILOT PROGRAM -- RESOLUTION NO. 88-23

This policy adopted in 1988 implements a pilot program to fund oversight of remedial actions at leaking underground storage tank sites, in cooperation with the Department of Health Services.

SOURCES OF DRINKING WATER POLICY – RESOLUTION NO. 88-63

This policy, adopted by the State Water Board in 1988 ~~(Resolution No. 88-63)~~ and incorporated into the Basin Plan in 1989 (Water Board Order No. 89-039), established state policy that all surface and groundwater in the state are considered suitable, or potentially suitable, for municipal or domestic supply (MUN) and should be designated for this use, with certain exceptions. ~~assigns Municipal and Domestic Supply designations to all waters of the State with certain exceptions. A water body that serves municipal or domestic use cannot have that designation removed.~~

NONPOINT SOURCE MANAGEMENT PLAN – RESOLUTION NO. 88-123

The "Nonpoint Source Management Plan" adopted in 1988 outlines the objectives and framework for implementing source control programs, with an emphasis on voluntary Best Management Practices and cooperation with local governments and other agencies.

RESOURCE VALUE OF TREATED GROUNDWATER – RESOLUTION NO. 89-21

The State Water Board, in approving the ~~Regional~~Water Board's guidelines for the disposal of extracted groundwater from groundwater cleanup projects, urges the ~~Regional~~Water Board to recognize the resource value of treated groundwater and to maximize its utilization for the highest beneficial uses for which applicable water quality standards can be achieved.

OCEAN PLAN – RESOLUTION NO. 90-27

The "Water Quality Control Plan for Ocean Waters of California" (Ocean Plan) adopted in 1990 establishes 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.

POLLUTANT POLICY FOR SAN FRANCISCO BAY AND THE DELTA – RESOLUTION NO. 90-67

In 1990, the State Water Board adopted the "Pollutant Policy Document," which identifies and characterizes the pollutants of greatest concern in the Bay-Delta Estuary. This policy requires implementation of a mass emission strategy; a monitoring and assessment program; and strategies for discharges from boat yards, drydock facilities, and dredge disposal practices. In 1990, the ~~Regional~~Water Board passed a resolution directing implementation of the Pollutant Policy.

POLICIES AND PROCEDURES FOR INVESTIGATION AND CLEANUP AND ABATEMENT OF DISCHARGES – ~~STATE BOARD~~ RESOLUTION NO 92-49 AND 96-79

This policy defines the goal of pollution cleanup and abatement as achieving the best quality of water that is reasonable. In certain cases where it is not reasonable to restore water quality to background levels, case-by-case cleanup levels may be specified, subject to the water quality provisions of the Basin Plan, beneficial uses of the waters, and maximum benefit to the people of the state. The State Water Board may determine that establishment of a containment zone is appropriate and consistent with the maximum benefit to the people of the State if applicable requirements contained in the Policy are satisfied.

DEPARTMENT OF DEFENSE AND STATE MEMORANDUM OF AGREEMENT 1992

In 1992, the State signed a cooperative agreement with the Department of Defense, Defense-State Memorandum of Agreement (DSMOA). The Department of Toxic Substances Control (DTSC) acts as the State's agent. Both the State and Regional Water Boards coordinate with DTSC to allocate agency responsibility and funding and establish procedures under which site investigation and cleanup will proceed, decisions will be made, and disputes will be resolved.

CALIFORNIA WETLANDS CONSERVATION POLICY (EXECUTIVE ORDER W-59-93)

This policy, adopted in 1993, established state guidelines for wetland~~s~~ conservation. The primary goal is to ensure no overall net loss and to achieve a long-term net gain in the quantity, quality, and permanence of wetland acreage in California.

POLICY FOR REGULATION OF DISCHARGES OF MUNICIPAL SOLID WASTE - RESOLUTION NO. 93-62

Adopted in 1993, this policy directs the Regional Water Boards to amend waste discharge requirements for municipal solid waste landfills to incorporate pertinent provisions of the federal "Subtitle D" regulations under the Resource Conservation and Recovery Act (RCRA).

DELTA PLAN --RESOLUTION NO. 95-24

The "Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh" (Delta Plan), adopted in 1978, and Water Rights Decision No. 1485 designate beneficial uses and establish water quality (salinity) and flow standards to protect the beneficial uses in State waters

from the large scale water operations under the State Water Project and Central Valley Project ~~operations, and specify an implementation program~~. In 1991, the State Water Board adopted the Water Quality Control Plan for Salinity, which supersedes the 1978 Delta Plan. The 1991 Plan does not establish Delta outflow standards. ~~Outflow and salinity standards for the Bay and Delta are being considered as part of State Board planning processes.~~

In 1995, the State Water Board adopted Resolution No. 95-24 updating the 1991 Delta Plan. The Bay-Delta Plan protects the same beneficial uses that were protected by the 1991 Plan. The definitions of the beneficial uses, however, were changed non-substantively to ensure consistency with the State Water Board's policy.

MEMORANDUM OF AGREEMENT (MOA) BETWEEN THE DEPARTMENT OF HEALTH SERVICES AND THE STATE WATER BOARD ON USE OF RECLAIMED WATER (1996)

This MOA is intended to assure that the respective authority of DHS, the State Water Board, and the Regional Water Boards relative to use of recycled water will be exercised in a coordinated and cohesive manner to eliminate overlap of activities, duplication of effort, gaps in regulation, and inconsistency of action. It provides an important coordination role in the Water Board's recycled water regulation and resulted in the Water Board developing its **General Water Reuse Permit** (Order 96-011) and recycled water program.

POLICY FOR IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA (SIP) – RESOLUTION NOS. 2000-0015 AND 2000-0030

The State Water Board adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan, or SIP) in 2000. U.S. EPA subsequently approved all aspects of the SIP, except the TMDL Compliance Schedule provision. The SIP contains implementation provisions for 126 priority toxic pollutant criteria found within the National Toxics Rule, the California Toxics Rule and for priority pollutant objectives found in Basin Plans. The SIP applies to discharges of toxic pollutants and allows for a standardized approach for permitting, maintaining statewide consistency

THE WATER QUALITY ENFORCEMENT POLICY – RESOLUTION NO. 2002-0040

The primary goal of the Enforcement Policy, adopted in 2002, is to create a framework for identifying and investigating instances of noncompliance, for taking enforcement actions that are appropriate in relation to the nature and severity of the violation, and for prioritizing enforcement resources to achieve maximum environmental benefits.

COOPERATIVE AGREEMENT WITH DEPARTMENT OF NAVY FOR REGULATORY OVERSIGHT AT NAVAL FACILITIES – RESOLUTION NO. 2003- 043

The Department of Navy and the State Water Board agreed to remove the remaining Navy facilities from the DSMOA and place those facilities into the Navy Cost Recovery program.

POLICY FOR IMPLEMENTATION AND ENFORCEMENT OF THE NONPOINT SOURCE POLLUTION CONTROL PROGRAM (2004)

This policy adopted in 2004 is designed to assist all responsible and/or interested parties in understanding how the State's nonpoint source pollution (NPS) water quality requirements will be implemented and enforced.

WATER QUALITY CONTROL POLICY FOR DEVELOPING CALIFORNIA'S CLEAN WATER ACT SECTION 303(D) LIST – RESOLUTION NO. 2004-0063

This policy adopted in 2004 describes the process by which the State and Regional Water Boards will comply with the listing requirements of Section 303(d) of the federal Clean Water Act. The objective of the policy is to establish a standardized approach for developing California's Section 303(d) water body list in order to achieve water quality standards and maintain beneficial uses in California's surface waters.

MEMORANDUM OF AGREEMENT BETWEEN DTSC, STATE WATER BOARD, WATER BOARDS, AND CALEPA FOR THE OVERSIGHT OF INVESTIGATION AND CLEANUP ACTIVITIES AT BROWNFIELD SITES (2005)

The purpose of the Brownfield Memorandum of Agreement (MOA) is to improve coordination between the Department of Toxic Substances Control (DTSC), the State Water Board and the Regional Water Boards regarding the oversight of cleanup activities at Brownfield sites. The MOA was developed in 2005 to ensure effective and expeditious cleanup of Brownfield sites in a manner that is protective of both public health and safety and the environment.

5.2 ~~REGIONAL~~ WATER BOARD PLANS AND POLICIES

Plans and policies adopted by the ~~Regional~~Water Board are classified under the following ~~twelve~~ headings for easy reference.

Resolutions adopted prior to the revision date of the 1995 Basin Plan ~~plan~~ are superseded unless specifically incorporated by reference into the plan. A discussion of each of the current ~~Regional~~ Water Board Policies is under the appropriate heading.

- ✓ Cooperative Agreements
- ✓ Regional Monitoring, Data Use, and the Aquatic Habitat Program
- ✓ Discharger Reporting and Responsibilities
- ✓ Delta Planning
- ✓ Dredging
- ✓ Nonpoint Source Pollution
- ✓ ~~On-site~~Onsite Waste ~~Disposal~~ Dispersal and Waste Discharge
- ✓ Shellfish
- ✓ Vessel Wastes
- ✓ ~~Water Reclamation~~ Water Recycling• Wetlands
- ✓ Groundwater

5.2.1 COOPERATIVE AGREEMENTS

Many different local, state, and federal agencies oversee activities that affect the beneficial uses of ~~San Francisco Bay~~the Region. To ensure that these activities are coordinated to the greatest possible degree, the ~~Regional~~Water Board enters into formal cooperative agreements. These agreements indicate the specific issue area of concern to both agencies and may also describe processes by which coordination will take place. Agreements regarding general coordination are listed below. Others are listed under specific issue areas.

MEMORANDUM OF UNDERSTANDING WITH THE DEPARTMENT OF FISH AND GAME (1966)

The ~~Regional~~Water Board has no means to conduct surveillance of ocean waters within its jurisdiction. Under the terms of this MOU, the Department of Fish and Game (DFG) agrees to notify the ~~Regional~~ Water Board of any suspected violations of the ~~Regional~~ Water Board's requirements for ocean disposal.

COORDINATION WITH THE SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC) (1966)

In 1966, the Water Board stated its intent to cooperate with the San Francisco Bay Conservation and Development Commission (BCDC) to the fullest extent necessary to ensure the protection of the San Francisco Bay shoreline and water quality (**Resolution No. 737**). In 1970, the Water 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 that would cause added waste loading on a community sewerage system that is not meeting Board waste discharge requirements (**Resolution No. 70-19**).

LOCAL AGENCY FORMATION COMMISSIONS—RESOLUTION NO. 73-17

This Resolution describes actions that the Water Board and these commissions could take that would result in a coordinated effort to prevent and abate pollution.

MEMORANDUM OF UNDERSTANDING BETWEEN THE DEPARTMENT OF FISH AND GAME, STATE ATTORNEY GENERAL'S OFFICE, AND THE WATER BOARD ON NEGOTIATED SETTLEMENTS OF OIL SPILLS TO SAN FRANCISCO BAY FROM VESSELS TO SHORE FACILITIES DURING TRANSFER OPERATIONS

Due to the high frequency of oil spill events during the late 1970s, a MOU was developed between the Department of Fish and Game, the State Attorney General's Office and the Water Board to expedite enforcement of such spills. The MOU outlined a negotiated settlement process that emphasized industry preventative measures, a cleanup plan, and operational changes. In 1980 the Water Board contracted for a study and report to recommend technically feasible operational standards at marine transfer facilities in San Francisco Bay. The resulting 1980 report titled "Oil Pollution Prevention and Control in the San Francisco Bay Area" was instrumental in changing the oil industry's operational procedures and a 90% reduction in oil transfer incidents over a two-year period.

MEMORANDUM OF UNDERSTANDING WITH THE COUNCIL OF BAY AREA RESOURCE CONSERVATION DISTRICTS (RCD) (1980)

The purpose of this MOU is to combine the erosion control expertise of the Resource Conservation District (RCDs)~~RCDs~~ with the regulatory authority of the ~~Regional~~Water Board to enforce erosion control measures. This action will increase the ~~Regional~~Water Board's ability to identify and correct erosion control problems associated with construction or agricultural activities.

WATER QUALITY MANAGEMENT: MOU WITH BCDC, STATE WATER BOARD, AND THE ~~REGIONAL~~WATER BOARD—NO. 87-154

This MOU specifies a coordination process for the three agencies to implement water quality goals mandated by State and federal legislation and states the ~~Regional~~Water Board's support in concept for legislation that would require a project applicant to obtain all discretionary approvals from the Water Board before filing its BCDC permit application.

POLICY TO PROMOTE COLLABORATION BETWEEN BAY AREA CLEAN WATER AGENCIES AND THE WATER BOARD ON POLLUTION PREVENTION – RESOLUTION NO. 2003- 096

The Water Board and the Bay Area Clean Water Agencies (BACWA) agreed to pollution prevention guidelines and guiding principals in order to implement the requirements of Water

Code Section 13263.3 and the Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries (State Implementation Plan).

5.2.2 REGIONAL MONITORING, DATA USE, AND THE AQUATIC HABITAT PROGRAM

5.2.3 DISCHARGER REPORTING AND RESPONSIBILITIES

5.2.4 DELTA PLANNING

5.2.5 DREDGING

5.2.6 NONPOINT SOURCE POLLUTION

5.2.7 ON-SITE WASTE ~~(DISPOSAL)~~ DISPERSAL AND WASTE DISCHARGE

The ~~Regional~~ Water Board's policy on small waste discharge systems has evolved considerably as the Region has become more developed. The following section summarizes a series of resolutions regarding conditions under which the ~~Regional~~ Water Board would waive waste discharge reporting requirements. Generally, this waiver is only granted when a county or other government entity has an active permitting and monitoring program comparable to the ~~Regional~~ Water Board's.

SEPTIC, LEACHING, AND SMALL COMMUNITY SYSTEMS—RESOLUTION NO. 81 (1951)

This resolution stated the Water Board's objection to the construction and use of wells for septic effluent disposal or street runoff, except when such wells discharge into geologic formations that at no time contained water suitable for domestic, agricultural, or industrial use.

WAIVER OF REQUIREMENT TO REPORT WASTE DISCHARGE FOR SYSTEMS REGULATED BY COUNTY AND LOCAL AGENCIES

In 1963 and 1964, the Water Board waived its regulatory authority over waste discharge reporting for family dwellings using discrete systems, as long as they were already regulated by local health departments and met certain conditions. In the same resolutions, the Water Board also urged local planning and legislative bodies to require connection to sewer systems for all new development whenever feasible. Resolutions were adopted for Alameda County (No. 512; 1963), Contra Costa County (No. 583; 1964), Napa County (No. 596; 1964), San Mateo County (No. 597; 1964), Solano County (No. 598; 1964), Sonoma County (No. 599; 1964), and Santa Clara County (No. 600; 1964). The Solano County waiver (Res. 598) was later amended by Resolution No. 75-12 in 1975, which indicated that the waiver would not apply to planned unit development with minimum lot sizes ~~fewer~~smaller than 2.5 acres and by Resolution 83-1 (1983).

The Water Board's general policy on discrete sewerage facilities was later amended by Resolution Nos. 78-14 (1978) and 79-5 (1979). The first described specific actions that would be

taken by the Water Board when it was presented with a proposal for new discrete sewerage systems and what specific requests it would make of local governments. In 79-5, the Water Board set minimum guidelines for determining the adequacy of local ordinances for controlling individual wastewater treatment and disposal systems.

In 1980, the Water Board (Resolution No. 80-9) requested that the County of Alameda correct deficiencies in its individual waste treatment and disposal systems program, acting under policies adopted in the Alameda County waiver (Res. 512) and discrete sewerage policies (Res. 78-14 and 79-5). In 1981, the Water Board rescinded Resolution No. 597 and reissued a policy (Resolution No. 81-9) on waiving reporting of discharges from individual wastewater treatment and disposal systems in San Mateo County. The Contra Costa County Waiver was amended in 1983 (Res. 83-2), and the Marin County Waiver in 1984 (Res. 84-12).

SEWER AND ~~ON-SITE~~ONSITE SEWER DISPOSAL IN BOLINAS—RESOLUTION NOS. 85-007 AND 87-091

The Water Board indicated its support of a moratorium on new sewer connections and new ~~on-site~~onsite sewage disposal systems adopted by Marin County Board of Supervisors.

SPECIFIC PROHIBITIONS OF ONSITE DISPOSAL SYSTEMS FOR STINSON BEACH AND GLEN ELLEN (RESOLUTION NOS. 73-13 AND 73-14) AND EMERALD LAKE HILLS (RESOLUTION NO. 76-7)

These resolutions prohibited waste discharges to ~~on-site~~onsite disposal systems in the Stinson Beach (Marin County), Glen Ellen (Sonoma County), and Emerald Lake Hills and Oak Knoll Manor (San Mateo County) areas, with some exceptions to the prohibition. 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 conditionally amended the prohibition of discharge outlined in 73-13 by allowing the discharge of waste to individual leaching or percolation systems where such discharges are regulated by the Stinson Beach County Water District.~~ The amendment was conditional.~~

CITY OF NOVATO—RESOLUTION NO. 87-155

In this resolution, the Water Board stated its policy regarding a waiver of waste discharge reporting requirements from individual wastewater treatment systems in the City of Novato.

MEMORANDUM OF UNDERSTANDING WITH NAPA COUNTY REGARDING WINERY PROCESS TREATMENT AND DISPOSAL—1982 (UPDATED IN 1992)

Under this agreement, the Water Board approved Napa County's program for monitoring winery ~~on-site~~onsite disposal.

5.2.8 SHELLFISH

5.2.9 VESSEL WASTES

5.2.10 WATER RECYCLING ~~RECLAMATION~~

WATER REUSE STUDY—RESOLUTION NO. 79-2

In this resolution, the Water Board stated its position regarding Phase II of the San Francisco Bay Area Water Reuse Study. The Water Board acknowledged the importance of using ~~reclaimed~~ recycled water to meet California's future water supply needs and commented on the economics of the delivery of ~~reclaimed~~ recycled water to users.

~~REUSE OF MUNICIPAL WASTEWATER BY PETROLEUM REFINERIES—RESOLUTION NO. 88-083~~

~~The Water Board indicated its support for the refining industry's use of reclaimed water from municipal plants.~~

~~CONDITIONAL WAIVERS OF WASTE DISCHARGE REQUIREMENTS FOR CERTAIN RECLAMATION PROJECTS DURING DROUGHT CONDITIONS—RESOLUTION NO. 88-88~~

~~This resolution sets forth conditions for new or expanded reclamation projects that use wastewater to support beneficial uses and, as a result, conserve potable and/or groundwater supplies.~~

~~PLAN FOR WATER RECLAMATION AS FULFILLMENT OF FLOW LIMITATION REQUIREMENT—RESOLUTION NO. 91-152~~

~~In this action, the Water Board requested that the State Board accept a water reclamation plan submitted by the San Jose/Santa Clara Water Pollution Control Plant in lieu of a discharge flow limit. The reclamation plan includes potable and non-potable reclamation and the creation of a wetland to protect against the possibility of further degradation of salt marsh habitat by freshwater flows.~~

5.2.11 WETLANDS

5.2.12 GROUNDWATER

DISPOSAL OF EXTRACTED GROUNDWATER FROM CLEANUP PROJECTS—RESOLUTION NO. 88-160

In this resolution, the Water Board established priorities for the disposal of water extracted from groundwater cleanup sites. The first priority is to reclaim effluents to the extent reclamation is technically and economically feasible. If this is not possible, then discharge to a municipal treatment plant was determined to be in the public interest. If neither reclamation nor discharge to a municipal plant is feasible, the Board will issue NPDES permits authorizing discharge from these sites.

CHAPTER 6 SURVEILLANCE AND MONITORING

6.1 REGIONAL MONITORING PROGRAM

~~INTRODUCTION~~

The effectiveness of a water quality control program ~~cannot be judged without~~ requires information supplied by comprehensive surveillance and monitoring of water, sediment, aquatic resources, and the human activities that have the potential to impact beneficial uses. The following section describes the monitoring programs that together provide high quality, comprehensive scientific information on water quality in the ~~San Francisco Bay r~~Region. The ~~Regional~~Water Board uses information produced by the programs described below to satisfy the requirements of Sections 104, 106, 208, 301, 303, 304, 307, 308, 314, and 402 of the federal Clean Water Act and applicable portions of the state's Porter-Cologne Water Quality Control Act.

The Regional Monitoring Program forms the core of water quality ~~and~~, sediment quality, and tissue (including bivalves and fish) ~~quality~~ monitoring in the ~~San Francisco~~ Estuary. Historically, water quality in the Region was tracked by Water ~~Regional~~ Board and State Water Board research and monitoring programs and numerous studies carried out by other interested state, federal, and local agencies.

From 1989 to 1992, the Water Board developed and implemented pilot programs for the **San Francisco Estuary Regional Monitoring Program** (RMP), through **the Bay Protection and Toxic Cleanup Program** (BPTCP) and U.S. EPA grants. In 1993, the ~~Regional Monitoring Program~~RMP was formally established to provide integrated, comprehensive, and systematic information on water quality in the ~~r~~Region. Its goal is to evaluate the effectiveness of the Water ~~Regional~~ Board's water quality program in meeting Basin Plan objectives, including protection of beneficial uses in the ~~San Francisco~~ Estuary.

The Regional Monitoring Program's specific objectives are to:

1. Describe the distribution and trends of pollutant concentrations in the Estuary;
2. Project future contaminant status and trends using best understanding of ecosystem processes and human activities;
3. Describe sources, pathways, and loading of pollutants entering the Estuary;
4. Measure pollution exposure and effects on selected parts of the Estuary ecosystem (including humans);
5. Compare monitoring information to relevant benchmarks, such as total maximum daily load (TMDL) targets, tissue screening levels, water quality objectives, and sediment quality objectives; and

6. Effectively communicate information from a range of sources to present a more complete picture of the sources, distribution, fate, and effects of pollutants and beneficial use attainment or impairment in the Estuary ecosystem.

Every five years, an outside group of scientific experts reviews the RMP to assure it is fulfilling its objectives and providing useful and timely information regarding the Estuary. In 2002, the RMP status and trends component was revised to incorporate probabilistic monitoring. The 2002-2004 sample locations shown in **Figure 6-1** were selected according to a probabilistic design. Each year sites are randomly selected and will be in different locations than shown in Figure 6-1. The list of parameters is presented in **Table 6-1**.

~~• Obtain baseline data and continue development of a data set that describes the concentration of toxic and potentially toxic trace elements and organic contaminants in the water and sediment and long-term trends in these concentrations;~~

~~• Determine seasonal and annual trends in chemical and biological water quality;~~

~~• Determine whether water quality and sediment quality in the Estuary at large are in compliance with the Basin Plan; and~~

~~• Provide a data base on water and sediment quality compatible with data being developed in other ongoing studies in the region, such as wasteload allocations, model development, sediment quality objectives, in-bay studies of dredged material disposal, primary productivity studies, local effects biomonitoring programs, and state and federal Mussel Watch programs.~~

The ~~46 federal agencies~~ RMP participants, including dredgers, stormwater agencies, and municipal and industrial dischargers ~~and private companies~~ that hold Water Board permits for waste discharge into the Estuary, fund the RMP as a requirement of their permits.~~Regional Monitoring Program.~~ The **San Francisco Estuary Institute** (SFEI), ~~(formerly the Aquatic Habitat Institute)~~ an independent nonprofit organization, administers and manages the program under a Memorandum of Understanding with the Water Board.

The RMP, through SFEI, produces an **Annual Monitoring Report** that summarizes the current state of the Estuary with regard to pollution, a summary report (**Pulse of the Estuary**), a **quarterly newsletter**, technical reports that document specific studies and synthesize information from diverse sources, and journal publications that disseminate RMP results to the world's scientific community.

~~The design of each study component of the RMP draws directly from results of short-term, intensive pilot studies. Between 1989 and 1992, the Regional Board conducted a number of these studies, including determination of background levels of toxicity and water and sediment chemistry in different basins; critical habitat investigations to determine if high levels of contaminants were present in sensitive areas around the Bay~~

~~margin; an in-depth analysis of sediment toxicity testing along a contaminant gradient; and an assessment of the temporal, spatial, and species-related variability of bivalve pollutant bioaccumulation.~~

~~In 1993, the RMP sampled at 16 locations over three seasons (wet, dry, and spring peak riverine flow) for conventional water quality parameters and chemistry, water toxicity, sediment quality and chemistry, sediment toxicity, and bivalve bioaccumulation (Figure 6-1).~~
~~Table 6-1 lists the trace metal and organic compounds analyzed for in the RMP. Pilot studies conducted in 1993 include plankton community spatial and temporal variability and suspended sediment dynamics.~~

~~To complement the system-wide Regional Monitoring Program, intensive surveys of limited areas are often conducted. This monitoring is typically done to evaluate specific contamination or beneficial use problems, such as cases where receiving water quality objectives have been violated.~~

~~Full implementation of the San Francisco Estuary Project's Comprehensive Conservation and Management Plan and the state Bay Protection and Toxic Cleanup Program will involve two elements:~~

~~• Initiating new monitoring elements in the RMP, such as identifying sediment reference sites, tracking contaminant levels in fish caught for food, and monitoring wetlands; and~~

~~• Ensuring closer coordination between the RMP and other major programs, such as the Interagency Ecological Studies Program (IESP) and the Long Term Management Strategy for Dredging (LTMS), including monitoring conducted by citizen volunteers in ongoing work.~~

6.2 SURFACE WATER AMBIENT MONITORING PROGRAM

In January 2000, the **Surface Water Ambient Monitoring Program** (SWAMP) was proposed in a Report to the Legislature to integrate existing water quality monitoring activities of the State and Regional Water Boards, and to coordinate with other monitoring programs. **Water Code Section 13192** requires the State Water Board to assess and report on the state monitoring programs and prepare a proposal for a comprehensive monitoring program. **Water Code Section 13191** requires the State Water Board to convene an Advisory Group to assist in the evaluation of program structure and effectiveness, as it relates to the implementation of the requirements of Clean Water Act Section 303(d), applicable federal regulation, and monitoring and assessment programs.

Ambient monitoring refers to any activity in which information about the status of the physical, chemical and biological characteristics of the environment is collected to

answer specific questions about the status and trends in those characteristics. For the purposes of SWAMP, ambient monitoring refers to these activities as they relate to the characteristics of water quality.

SWAMP is a statewide monitoring effort designed to assess the conditions of surface waters throughout the state of California. The State Water Board administers the program. Responsibility for implementation of monitoring activities resides with the nine Regional Water Boards that have jurisdiction over their specific geographical areas of the state.

In the Region, SWAMP is targeted to water bodies not monitored by the RMP. The numerous water bodies of the Region are listed in **Table 2-1**. SWAMP includes physical, chemical, and biological monitoring. SWAMP's focus is on water quality assessment in watersheds. SWAMP is intended to fulfill water quality assessment reporting requirements under **Clean Water Act Section 305(b),** and to support **Clean Water Act Section 303(d)** impairment decisions in cases where there is adequate information available to meet data requirements in the **State Water Board's 303(d) Listing Policy**, established in September 2004. The 305b and 303d requirements for the Estuary are met through the RMP, described in **Section 6.1 Regional Monitoring Program**.

~~STATE MUSSEL WATCH AND TOXIC SUBSTANCES MONITORING PROGRAMS~~

In 1976, the state initiated the **State Mussel Watch** and **State Toxic Substances Monitoring Programs** to regularly monitor the concentration of pollutants in the tissue of aquatic organisms. Tissue levels reflect exposure over much longer periods of time than instantaneous water column samples and provide a field-based estimate for exposure of people, fish, and wildlife to pollutants in the food chain.

The Mussel Watch Program use~~s~~d resident and transplanted bivalves to monitor pollutant levels at coastal reference stations and selected sites in bays and estuaries to confirm potential toxic substance pollution. The location ~~and sampling history~~of bivalve sampling ~~Mussel Watch~~stations in the ~~San Francisco Bay~~Region are summarized in **Figure 6-2** and **Table 6-2**. Periodic monitoring of bivalve tissue conducted by the National Mussel Watch administered by the National Oceanic and Atmospheric Association (NOAA) and international surveys complements information from the State Mussel Watch Program.

The Toxic Substances Monitoring Program use~~s~~d~~d~~ resident fish and other aquatic organisms to monitor pollutant levels in freshwater systems throughout the state. The location and sampling history of Toxic Substances Monitoring stations in the Region are summarized in **Figure 6-3** and **Table 6-3**.

The State Mussel Watch and State Toxic Substances Monitoring Programs have been incorporated intoSWAMP. The Toxicity Testing Program and Coastal Fish Contamination Program have also been incorporated into SWAMP.

6.3 SACRAMENTO-SAN JOAQUIN RIVERS AND NORTHERN SAN FRANCISCO BAY ESTUARY WATER QUALITY SURVEILLANCE

6.4 GROUNDWATER MONITORING NETWORKS

Groundwater monitoring networks are established in several basins in the R~~r~~egion. At present, there are monitoring networks in the Livermore-Amador Valley by **Zone 7**, Niles Cone by the **Alameda County Water District** (ACWD), Santa Clara Valley by the **Santa Clara Valley Water District** (SCVWD), Half Moon Bay Terrace by the **Coastside County Water District and the Montara Water and Sanitation District)**, San Francisco's Westside Basin by the **San Francisco Public Utilities District** (SFPUC), and Napa Valley by the **Napa Valley Flood Control and Water Conservation District** . In order to find out the most current status of these networks, local water management agencies should be contacted directly.

In addition, the **U.S. Geological Survey** (USGS) and ~~state~~ the **Department of Water Resources** (DWR) maintain regional monitoring networks. Typically, monitoring is conducted at least annually for general mineral quality and water levels. This well data may be of use to determine the general potability of groundwater and the status of seawater intrusion control.

The **Department of Pesticide Regulation** (DPR) monitors groundwater to determine where and how pesticides are contaminating groundwater, to identify areas sensitive to pesticide contamination and to develop mitigation measures to prevent that contamination. Well inventory reports summarize California groundwater wells sampled for the presence of pesticide residues and reported to DPR. An annual summary of well sampling information is available at DPR's website.

The ~~Regional Board~~Water Board is integrating the locations of monitoring well networks into its groundwater geographic information system. The water quality data generated from the networks will assist ~~Regional Board~~Water Board staff in the refinement of beneficial use designations for groundwater basins.

The State Water Board has contracted the USGS and Lawrence Livermore National Laboratory (LLNL) to implement the **Groundwater Ambient Monitoring and Assessment** (GAMA) Program. The primary objective of the GAMA Program is to comprehensively assess statewide groundwater quality and gain an understanding about contamination risk to specific groundwater resources. The Groundwater Quality Monitoring Act of 2001 (Sections 10780-10782.3 of the Water Code) resulted in a publicly accepted plan to monitor and assess the quality of all priority groundwater basins that account for over 90 percent of all groundwater used in the state. The plan prioritizes groundwater basins assessment based on groundwater use.

The GAMA Program monitors groundwater from public supply wells for a broad suite of chemicals at very low detection limits, including exotic chemicals such as wastewater chemicals and pharmaceuticals. Monitoring and assessments for priority groundwater basins will be completed every ten years, with trend monitoring every three years. Monitoring reports for data collected in the Region are available at the **State Water Board** website.

6.5 COMPLIANCE MONITORING

6.6 COMPLAINT INVESTIGATION

6.7 BIENNIAL WATER QUALITY INVENTORY

6.8 OTHER MONITORING PROGRAMS

CHAPTER 7 WATER QUALITY ATTAINMENT STRATEGIES INCLUDING TOTAL MAXIMUM DAILY LOADS

Water Quality Attainment Strategies (WQAS) including Total Maximum Daily Loads (TMDLs) deemed necessary and appropriate to ensure attainment and maintenance of water quality standards in ~~segments of~~ the ~~San Francisco Estuary~~ Region are presented ~~here~~in this chapter~~section~~.

7.1 A WATER QUALITY ATTAINMENT STRATEGY TO SUPPORT COPPER AND NICKEL SITE-SPECIFIC OBJECTIVES SOUTH OF THE DUMBARTON BRIDGE

The Water Quality Attainment Strategy (WQAS) for copper and nickel in San Francisco Bay south of the Dumbarton Bridge (Lower South Bay) is designed to prevent water quality degradation and ensure the ongoing maintenance of the site-specific objectives both for copper and nickel in Lower South Bay. This section describes the details of the WQAS and how the ~~Regional~~Water Board will use its regulatory authority to implement this strategy.

The four elements of the WQAS for copper and nickel in Lower South Bay are:

- Current control measures/actions to minimize copper and nickel releases (from municipal wastewater treatment plants and urban runoff programs) to Lower South Bay;
- Statistically-based water quality "triggers" and a receiving water monitoring program that would initiate additional control measures/actions if the "triggers" are met;
- A proactive framework for addressing increases to future copper and nickel concentrations in Lower South Bay, if they occur; and
- Metal translators that will be used to compute copper and nickel effluent limits for the municipal wastewater treatment plants discharging to Lower South Bay.

Except for the specification of metal translators, all actions and monitoring obligations described in this section have been required by the National Pollutant Discharge Elimination System (NPDES) permits for the three municipal wastewater dischargers and the municipal urban runoff (stormwater) dischargers in Lower South Bay since October 2000 and March 2001, respectively.

7.1.1 BACKGROUND

Lower South Bay has been listed as impaired due to point source discharges of generic metals since 1990 (~~USEPA~~ **Clean Water Act Section 304(l)** listing) and ~~most recently~~ for copper and nickel from point and urban runoff sources in the State's ~~of California's~~ 1998 list required by **Clean Water Act Section 303(d)** ~~list~~. The primary reason for the copper and nickel impairment listings had been that ambient water concentrations of dissolved copper and nickel exceeded Basin Plan water quality objectives or U.S. EPA national water quality criteria for the protection of aquatic life. Despite significant reductions in wastewater loadings over the past two decades, ambient concentrations at stations monitored through the **San Francisco Estuary Regional Monitoring Program for Trace Substances** (RMP) or the City of San Jose monitoring program still approach or exceed the previously-applicable federal criteria or water quality objectives in Lower South Bay. The ~~Regional~~Water Board has now adopted site-specific water quality objectives. As discussed below, it is likely that these new objectives are being attained.

7.1.1.1 SOURCES

The external sources of copper and nickel to Lower South Bay include a minor contribution from atmospheric deposition and substantial discharges from tributaries/urban runoff and municipal wastewater. The dischargers responsible for the urban runoff discharges are the Santa Clara Valley Water District, County of Santa Clara, City of Campbell, City of Cupertino, City of Los Altos, Town of Los Altos Hills, Town of Los Gatos, City of Milpitas, City of Monte Sereno, City of Mountain View, City of Palo Alto, City of San Jose, City of Santa Clara, City of Saratoga, and City of Sunnyvale. These cities have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program. ~~(SCVURPPP).~~ The municipal wastewater dischargers are the Cities of San Jose and Santa Clara, Sunnyvale, and Palo Alto. Each of these cities owns and operates a wastewater treatment plant (Publicly-Owned Treatment Works or POTW) that discharges into ~~San Francisco Bay South of the Dumbarton Bridge.~~the Lower South Bay.

On an annual basis, about 1100 kilograms (kg) of copper and 1500 kg of nickel enters Lower South Bay from POTWs. From tributaries, roughly 3800 kg copper and 6000 kg nickel enters this Bay segment each year. During the dry season (June-November), POTW loading is dominant, and tributary loading is dominant during the wet season (December-May). Substantial amounts of copper (about 1.9 million kg) and nickel (about 50 million kg) already existing in the sediments of Lower South Bay can also contribute to water concentrations when the sediments are resuspended by waves, winds, tides, and currents. The metals deposited in the sediments consist of those deposited historically (higher than current levels) and those currently deposited metals. The historical and current external loadings have elevated the total copper and possibly the total nickel concentrations of Lower South Bay sediments above what they would be in the absence of anthropogenic sources.

7.1.1.2 STAKEHOLDER INVOLVEMENT

The stakeholder group recognized by the ~~Regional~~Water Board to assist in developing watershed-based programs to address both short and long-term water quality issues in Lower South Bay is the Santa Clara Basin Watershed Management Initiative (SCBWMI). The SCBWMI, formed in 1996, is a collaborative effort of representatives from business and industrial sectors, professional and trade organizations, civic, environmental, resource conservation and agricultural groups, regional and local public agencies, resource agencies, and the general public. These groups have joined forces to address all sources of pollution that threaten the water bodies draining into the Lower South Bay. A major aim of the SCBWMI is to coordinate existing watershed activities on a basin-wide scale, ensuring that environmental protection efforts are addressed efficiently and cost-effectively. The ~~Regional~~Water Board will continue to recognize and rely on the leadership of the SCBWMI to ensure the ongoing success of the WQAS.

A working subgroup of the SCBWMI, the Bay Monitoring and Modeling Subgroup, took the lead to address the water quality issues and to provide the basic strategy and information necessary to address both the water quality technical and related regulatory questions. In 1998, the Copper and Nickel TMDL Work Group (Workgroup) was formed by the SCBWMI to provide guidance for the development of the TMDLs for copper and nickel in Lower South Bay. A broad group of stakeholders was represented on the Workgroup including several environmental groups, local wastewater dischargers, local public agencies responsible for the urban runoff program, state and federal regulators, industry and local business representatives, and national organizations such as the Copper Development Association.

7.1.2 OVERVIEW OF THE TMDL PROJECT FOR COPPER AND NICKEL IN LOWER SOUTH BAY

In 1996, the State ~~of California~~ Water Board included the South San Francisco Bay on the Section 303(d) impaired water body list as a high priority impaired water body. In 1998, the list was updated and specifically identified copper, nickel, mercury and selenium as the metal pollutants of concern. The listing triggered the Clean Water Act Section 303(d) mandate for the State of California, specifically the ~~Regional~~Water Board, to establish TMDLs for these pollutants of concern. To address NPDES permit issues for its wastewater treatment plant, the City of San Jose and other local municipalities took the lead in providing funding for the development of the copper and nickel TMDLs for Lower South Bay, and other Lower South Bay communities contributed to related SCBWMI activities.

The TMDL effort focused on:

1. Conducting an Impairment Assessment to determine if ambient concentrations of copper and nickel were negatively impacting the designated beneficial uses of Lower South Bay;
2. Developing a range of scientifically defensible water quality objectives for copper and nickel;
3. Developing a conceptual model of copper and nickel cycling to evaluate attainment of the range of objectives; and
4. Characterizing sources and identifying pollution prevention and control actions.

The Workgroup oversaw the preparation and review of several technical reports. These reports provide the basis of the conclusions and recommendations of the Workgroup regarding the effects of ambient concentrations of copper and nickel on the beneficial uses of Lower South Bay.

7.1.3 IMPAIRMENT ASSESSMENT AND SITE-SPECIFIC OBJECTIVES

The Impairment Assessment Report was finalized in June 2000 to present new information and to re-evaluate the determination that the beneficial uses of Lower South Bay were impaired due to ambient concentrations of copper and nickel. Specifically, the goals of the assessment were to:

- Compile and evaluate data on ambient concentrations and toxicity information for copper and nickel in Lower South Bay;

- Identify, evaluate and select indicators of beneficial use impairment. The categories of parameters and criteria considered included toxicity (acute and chronic), biological (biota composition, health, abundance, and physical habitat vs. a reference site), chemical (numeric values), and physical (capacity to support uses);

- Develop endpoints for the selected indicators that can be used to assess the existence of impairment and compare these values to ambient concentrations in Lower South Bay. The intent of this assessment was to provide policy makers, regulators, and other stakeholders with the best technical laboratory and ambient information currently available to compare with known threshold impact levels on selected indicators;

- Assess the level of certainty with which it can be shown ambient concentrations of copper and nickel are or are not resulting in beneficial use impairment; and

- Recommend numeric values for site-specific objectives (SSOs) for dissolved copper and nickel in Lower South Bay in lieu of TMDL development upon finding that the Lower South ~~SF~~Bay is not impaired due to these metals.

The final results of the impairment assessment indicated that impairment to beneficial uses of Lower South Bay due to ambient copper and nickel concentrations is unlikely. There are several lines of evidence to support the finding for each metal, and these are discussed at length in the Impairment Assessment Report. One important factor in the impairment decision was the recognition that the chemical features of Lower South Bay reduce the toxicity and bioavailability of copper and nickel. These chemical features include binding of copper and nickel by dissolved organic compounds and the abundance of dissolved metals like manganese and iron that compete with copper and nickel for receptor sites on aquatic organisms.

From the established ranges of acute and chronic values of copper and nickel site-specific objectives, developed through the Impairment Assessment Report, the ~~Regional~~Water Board selected specific values for copper and nickel that it deemed protective of beneficial uses and incorporated them into Chapter 3 of this Basin Plan. The acute and chronic site-specific water quality objectives in Lower South Bay for dissolved copper are 10.8 µg/L and 6.9 µg/L, respectively. The acute and chronic site-specific water quality objectives in Lower South Bay for dissolved nickel are 62.4 µg/L and 11.9 µg/L, respectively.

While the conclusions of the Impairment Assessment Report are scientifically sound, like most statements about complex environmental systems, its conclusions on the lack of impairment have some degree of uncertainty. The existence of these uncertainties underscores the need for continued monitoring and studies that are described below. The four primary areas of uncertainty are the toxicity of copper to phytoplankton, copper and nickel cycling in Lower South Bay, sediment toxicity, and uncertainties in loading estimates.

7.1.4 IMPLEMENTATION PLAN

This section discusses the actions that will be taken to maintain the copper and nickel site-specific objectives. The underlying goal of these actions is to ensure that ambient levels do not increase due to increases in loading of copper and nickel to Lower South Bay. Except for the specification of metal translators, all actions and monitoring obligations described in this section are already required in the NPDES permits for the three municipal wastewater dischargers and the municipal urban runoff (stormwater) dischargers in Lower South Bay. Other non-regulatory, collaborative actions discussed here will be implemented via the SCBWMI and its participants on a voluntary basis.

7.1.4.1 Monitoring Program ~~and Triggers~~

Fundamental to the monitoring program is the concept of a water quality indicator. An indicator is a measurable quantity that is so strongly associated with particular environmental conditions that the value of the measurable quantity can be used to indicate the existence and maintenance of these conditions. The indicators used in the monitoring program to support the site-specific objectives are dissolved copper and nickel concentrations in Lower South Bay. The monitoring program described here has been required by the NPDES permits for the three municipal wastewater dischargers since October 2000 (Order No. 00-108). The monitoring program consists of monthly dissolved copper and nickel measurements at the ten stations shown in **Table ~~4-1a~~7-1**. As of the adoption of this WQAS, the municipal wastewater dischargers defined dissolved metal as those metal constituents that pass through a 0.45 microns (µm) filter prior to chemical analysis. Any changes to this operational definition of dissolved metal or details of the monitoring program will be addressed through amendments to the NPDES permits.

The purpose of the monitoring component of the WQAS is to assess ambient conditions compared to the specific trigger levels described below. The ambient data collected through the WQAS monitoring program may be considered along with other ambient monitoring data to determine whether additional controls are necessary.

7.1.4.2 Trigger Values

The NPDES permits for municipal wastewater and stormwater dischargers contain a series of trigger values and corresponding actions that are required to be taken by the dischargers if the triggers are reached. For copper, an increase in dry season dissolved copper concentration of 0.8 µg/L can be reliably detected despite inherent variability, and this specific increase is used to define the copper trigger levels. The copper Phase I trigger is reached and copper-specific Phase I actions will be conducted if the average dry season dissolved copper concentration at stations SB3, SB4, SB5, SB7, SB8, SB9 increases from 3.2 µg/L (overall dry season mean from indicator stations during the period June 1997 to November 1998) to 4.0 µg/L. The copper Phase II trigger is reached and Phase II actions will be conducted if the dry season mean concentration of the indicator stations increases further to 4.4 µg/L. This 0.4 µg/L change can still be detected with reasonable statistical certainty to justify the more aggressive Phase II actions.

For nickel, an increase in dry season dissolved concentration of 2.0 µg/L can be reliably detected despite inherent variability, and this increase is used to define the trigger levels for nickel. The nickel Phase I trigger is reached and Phase I actions will be conducted if the average dry season dissolved nickel concentration at stations SB3, SB6, SB7, SB8, SB9, SB10 increases from 4.0 µg/L (overall dry season mean from indicator stations during the period June 1997 to November 1998) to 6.0 µg/L. The nickel Phase II trigger is reached and Phase II actions will be conducted if the dry season mean dissolved

concentration from the indicator stations increases another 2.0 µg/L to 8.0 µg/L. Note that the copper and nickel Phase I and Phase II triggers are well below the site-specific objectives for these metals and reaching the triggers indicates a negative trend in water quality but not impairment of beneficial uses.

The Executive Officer will review the monitoring program results annually and determine whether the trigger values have been reached. The Executive Officer will report findings to the ~~Regional~~Water Board and will notify interested agencies and interested persons of these findings and will provide them with an opportunity to submit their views and recommendations concerning the findings either in written form or at a public hearing.

If the trigger values for ambient copper and nickel concentrations have not been exceeded, the monitoring program will continue to provide information for the next review period. The ~~Regional~~Water Board shall evaluate performance of the monitoring program during the annual review to determine if the necessary information is being provided.

7.1.4.3 Baseline Actions

These actions are already being implemented through the NPDES permits and will continue until the ~~Regional~~Water Board directs otherwise through the permitting process. These actions include: 1) pollution prevention and control actions by public agencies; 2) actions to conduct or track special studies that address specific technical areas of uncertainty (the toxicity of copper to phytoplankton, copper and nickel cycling in Lower South Bay, sediment toxicity, and uncertainties in loading estimates); and 3) planning-type studies to track, evaluate, and/or develop additional indicators and associated triggers (i.e., indicators for growth, development, or increased use or discharge of copper and nickel in the watershed).

BASELINE ACTIONS CONDUCTED BY MUNICIPAL WASTEWATER DISCHARGERS

Baseline actions applicable to municipal wastewater dischargers are actions associated with implementation of reasonable treatment, source control, and pollution prevention measures to limit discharges of copper and/or nickel.

In the consideration of the site-specific objectives for copper and nickel, the "**Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California**" (State Implementation Plan, or SIP) requires that dischargers demonstrate that they are implementing reasonable treatment, source control, and pollution prevention measures for these metals. The ~~Regional~~Water Board found that continuation of baseline actions satisfies this requirement as long as the copper and nickel

trigger levels are not reached in Lower South Bay. Pollution prevention and minimization are a significant part of these dischargers' efforts to limit the discharges of copper and nickel. These dischargers have approved Pretreatment Programs and have established Pollution Prevention Programs under the requirements specified by the ~~Regional~~Water Board in their NPDES permits.

These findings and specific baseline actions are already being implemented through the NPDES permits for these dischargers (**Order No. 00-108, October 2000**). The municipal wastewater dischargers are required by their permits to maintain these baseline actions and review and report to the ~~Regional~~Water Board on their implementation on an annual basis. Modifications to the current baseline actions may be considered through the permit process, provided that these dischargers demonstrate to the ~~Regional~~Water Board that such modifications are consistent with maintaining reasonable treatment, source control, and pollution prevention measures.

BASELINE ACTIONS CONDUCTED BY URBAN RUNOFF (MUNICIPAL STORMWATER) DISCHARGERS

The Urban Runoff Management requirements (see ~~later section titled~~ **Section 4.14 Urban Runoff Management**) and specific copper and nickel baseline actions have been required by the NPDES permit for the Santa Clara Valley Urban Runoff Pollution Prevention Program and its dischargers since March 2001 (**Order No. 01-024**). These requirements include actions associated with implementation of controls to reduce copper and/or nickel in discharges to the maximum extent practicable, actions associated with prohibiting discharges other than stormwater to storm drain systems and waterways, and actions associated with monitoring to evaluate effectiveness of controls, identify sources of pollutants, and to measure or estimate pollutant concentrations and loads. On an annual basis, these dischargers are required to describe the controls that they are implementing and any additional controls that will be implemented. These dischargers are required to provide to the ~~Regional~~Water Board detailed descriptions of activities in each fiscal year in annual workplans and associated evaluations and results in annual reports. Modifications to the current baseline actions may be considered through the NPDES permit, provided that the dischargers demonstrate to ~~Regional~~Water Board that such modifications are consistent with maintaining programs that control copper and nickel discharges to the maximum extent practicable in accordance with the requirements of the ~~Regional~~Water Board's **Comprehensive Control Program for Urban Runoff Management** and the Clean Water Act. As long as Lower South Bay ambient concentrations of copper and nickel remain below the established Phase I trigger levels, the ~~Regional~~Water Board has determined that the baseline actions applicable to urban runoff (municipal stormwater) dischargers satisfy the copper- and nickel-specific requirements of the **Comprehensive Control Program for Urban Runoff Management and federal regulations** and federal regulations (**40 CFR 122.26**).

BASELINE ACTIONS CONDUCTED BY SANTA CLARA BASIN WATERSHED MANAGEMENT INITIATIVE

As described above, the SCBWMI is a collaborative, stakeholder-participation forum that seeks integration of regulatory and watershed management actions that affect Lower South Bay and its tributaries. In addition to the actions required in the NPDES permits for the three municipal wastewater dischargers and the municipal urban runoff dischargers, there are other non-regulatory, collaborative actions that the SCBWMI and participants have committed to implement. These collaborative actions are described in attachments to the NPDES permit for the Santa Clara Valley Urban Runoff Pollution Prevention Program ~~SCVURPPP~~ and include: establishing a forum on transportation issues and impervious surfaces and for reviewing the appropriateness of transportation control measures with a view toward reducing traffic congestion; implementing measures to improve classification and assessment of watersheds; establishing an environmental clearinghouse of information related to tracking and disseminating new scientific information related to copper toxicity, loadings, fate and transport, and impairment of aquatic ecosystems; and planning-type studies to track, evaluate, and/or develop additional indicators to use and future potential indicators and triggers (i.e., indicators for growth, development, or increased use or discharge of copper and nickel in the watershed). In addition, the SCBWMI serves as a stakeholder participation forum to track, review, and evaluate the baseline actions required by the NPDES permits.

7.1.4.4 Phase I Actions

Phase I actions are already specified in the NPDES permits for municipal wastewater and stormwater dischargers. These actions are implemented when the mean value of selected monitoring parameters exceeds specified Phase I water quality triggers. The exceedance of the Phase I trigger indicates a negative trend in water quality and not impairment. Phase I actions consist of both specific remedial actions and planning for implementation of future actions if the Phase II triggers are exceeded.

If the Phase I copper or nickel triggers are exceeded, the ~~Regional~~Water Board will consider execution of Phase I and Baseline actions as satisfying both the SIP requirement that municipal wastewater dischargers are implementing reasonable treatment, source control, and pollution prevention measures for copper and nickel and the Basin Plan requirement that municipal stormwater dischargers are implementing controls to reduce copper and/or nickel in discharges to the maximum extent practicable. Within 90 days after the determination of Phase I trigger exceedance, the ~~Regional~~Water Board expects both the municipal wastewater and municipal stormwater dischargers to submit, for Executive Officer concurrence, their proposed Phase I plans with implementation schedules to implement additional measures to limit their relative cause or contribution to the exceedance. This submittal should, at a minimum, include evaluation of the Phase I actions and development of a Phase II plan. If the submittal is not received within 90 days of the determination of Phase I trigger exceedance or is not being implemented in

accordance with the dischargers' implementation schedule following the Executive Officer's concurrence, the ~~Regional~~Water Board may consider enforcement action to enforce the terms of the dischargers' permits.

7.1.4.5 Phase II Actions

Phase II actions are already specified in the NPDES permits for municipal wastewater and stormwater dischargers. Phase II actions are implemented when the mean value of selected monitoring parameters exceeds specified Phase II water quality triggers. Phase II actions are intended to reduce controllable sources further to maintain compliance with the site-specific water quality objectives.

If the Phase II copper or nickel triggers are exceeded, the ~~Regional~~Water Board will consider execution of Phase II, Phase I and Baseline actions as satisfying both the SIP requirement that municipal wastewater dischargers are implementing reasonable treatment, source control, and pollution prevention measures for copper and nickel and the Basin Plan and Clean Water Act requirement that municipal stormwater dischargers are implementing controls to reduce copper and/or nickel in discharges to the maximum extent practicable. Within 90 days after the determination of Phase II trigger exceedance, the ~~Regional~~Water Board expects the dischargers to submit, for Executive Officer concurrence, the proposed Phase II plans with implementation schedules to implement additional measures to limit their relative cause or contribution to the exceedance. If the submittal is not received within 90 days of the determination of Phase II trigger exceedance or is not being implemented in accordance with the dischargers' implementation schedule upon the Executive Officer's concurrence, the ~~Regional~~Water Board may consider enforcement action to enforce the terms of the dischargers' permits.

7.1.4.6 Metal Translators Applicable to Lower South Bay Municipal Wastewater Dischargers

An important regulatory element of the WQAS is the specification of metal translators applicable to the three Lower South Bay municipal wastewater dischargers. When the NPDES permits are re-issued, concentration-based effluent limits for these three facilities will be calculated from the chronic copper and nickel SSOs. Water quality objectives for copper and nickel are expressed as dissolved metal concentrations. Effluent limits for the POTWs are expressed as total metal concentrations and must be calculated according to the procedure outlined in the SIP. Therefore, for metals like copper and nickel, the calculation of the effluent limit requires the use of a ratio of total to dissolved metal called the metal translator.

Analyses of data from 12 monitoring stations in Lower South Bay (Dumbarton to sloughs) collected from February 1997 to August 2000 and including dissolved and total

copper and nickel, total suspended solids (TSS), and tidal data, showed a strong TSS dependence. The statistical analyses explored relationships between translator values and TSS, tide, site, and season. Linear regression with log-transformed dissolved fraction (translator) and TSS data provided the best regression fit. The best-fit regression line and its 95 percent confidence intervals provided the basis for translator values for copper and nickel.

U.S. EPA guidance (**U.S. EPA Office of Water, June 1996, The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion. EPA 823-B-96-007**) states that, when there is a relationship between the translator and TSS, regression equations should be used to develop translator values using representative TSS values the for the site under consideration. There is a fairly wide variation in TSS, and the guidance on translator development suggests using a representative TSS value. In Lower South Bay, a median TSS value may not account for the higher translator values and dissolved metal levels that result during high TSS episodes. For this reason, copper and nickel translators computed from 95 percent confidence interval TSS values were used to develop the POTW effluent limits. A copper translator of 0.53, and a nickel translator of 0.44 resulted from this procedure. Using the 95 percent confidence interval translator provides an additional measure of beneficial use protection in that effluent limits, expressed at total metal, will be lower using a higher value for metal translators. These translators shall be used to compute copper and nickel effluent limits for POTWs discharging to the Lower South Bay when NPDES permits for Lower South Bay municipal wastewater dischargers are reissued.

EXHIBIT A

Proposed Basin Plan Amendment

2005 Basin Plan General Update
With Non-regulatory Revisions

Tables

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->						<----Aquatic Life---->							Wildlife Use
HYDROLOGIC UNIT / COUNTY/ WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAI	SPWN	WARM	WILD
MARIN COASTAL BASIN														
MARIN COUNTY														
Pacific Ocean (Marin)					E		E	E			E	E		E
Abbotts Lagoon											E			E
Drakes Estero							E	E			E	E		E
~~First Valley Creek~~**East Schooner Creek**								E	E			E		E
Limantour Estero							E	E			E	E		E
Coast Creek								E	E			E		E
Alamere Creek									E					E
Crystal Lake									E			E	E	E
~~Bolinas Bay~~														
Bolinas Lagoon							E	E			E	E		E
Pine Gulch Creek		E							E			E	E	E
Easkoot Creek														
McKennan Gulch Creek														
Morses Gulch Creek														
Pike County Gulch Creek														
~~McKennan Gulch Creek~~														
Redwood Creek (Marin)	E	E	E					E	E			E	E	E
Rodeo Lagoon									E					E
Rodeo Creek									E		E	E		E
Tomales Bay							E	E			E	E		E
~~Tomales Bay Estuary~~														
Millerton Gulch														
~~Lagunitas Creek~~	E	E							E			E	E	E
Walker Creek									E			E	E	E
Laguna Lake														
Frink Canyon Creek														
~~Walker Creek~~									E			E	E	E
Verde Canyon Creek														
Salmon Creek														
~~Soule Joule~~ **Soulajule** Reservoir		E	E										E	E
Lagunitas Creek	E	E							E			E	E	E
Haggerty Gulch Creek														
Bear Valley Creek														
Olema Creek									E			E	E	E
Nicasio Reservoir		E	E						P			E	E	E
Nicasio Creek		E	E						E			E		E
Halleck Creek														
Devils Gulch Creek														
Kent Lake		E							E			E	E	E
Big Carson Creek														
Alpine Lake		E							E			E	E	E

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

***HYDROLOGIC UNIT* / COUNTY/** WATER BODY	<-Recreational Uses-> REC-1	REC-2	NAV	Error Type Uses	Name	SOURCE OF ERROR
MARIN COASTAL BASIN						
MARIN COUNTY						
Pacific Ocean (Marin)	E	E	E			
Abbotts Lagoon	E	E				
Drakes Estero	E	E		2		Transcription error between 1986 and 1995 Basin Plans
~~First Valley Creek~~**East Schooner Cree**	~~P~~	E				GGNRA staff indicated that the name of the stream is in error.
Limantour Estero	E	E				
Coast Creek	E	E				
Alamere Creek	P	E				
Crystal Lake	P	P				
~~Bolinas Bay~~						Same as Pacific Ocean (not an enclosed bay)
Bolinas Lagoon	E	E				
Pine Gulch Creek		E			1	Placed in wrong watershed in 1995 Basin Plan
Easkoot Creek						
McKennan Gulch Creek					1	Misspelled in 1995 Basin Plan
Morses Gulch Creek						
Pike County Gulch Creek						
~~McKennan Gulch Creek~~						Duplicative Listing
Redwood Creek (Marin)	E	E				
Rodeo Lagoon	~~E~~	~~E~~		4		1975 Basin Plan designated uses
Rodeo Creek	E	E				
Tomales Bay	~~E~~	~~E~~		9		Transcription error between 1986 and 1995 Basin Plans
~~Tomales Bay Estuary~~					1	
Millerton Gulch						
~~Lagunitas Creek~~	~~E~~	~~E~~			1	Duplicative Listing
Walker Creek	P	P				
Laguna Lake						
Frink Canyon Creek						
~~Walker Creek~~	~~P~~	~~P~~			1	Duplicative Listing
Verde Canyon Creek						
Salmon Creek						
~~Soule Joule~~ **Soulajule** Reservoir	E	E			1	Misspelled in 1995 Basin Plan
Lagunitas Creek	E	E				
Haggerty Gulch Creek					1	Omission error in 1995 Basin Plan
Bear Valley Creek						
Olema Creek	E	~~E~~	~~E~~	2		REC2 designated in 1975, 1986 Basin Plans (NAV = transcription error)
Nicasio Reservoir	E	E				
Nicasio Creek	E	E				
Halleck Creek						
Devils Gulch Creek						
Kent Lake	E	E				
Big Carson Creek						
Alpine Lake	E	E				

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->						<----Aquatic Life Uses---->									Wildlife Use
HYDROLOGIC UNIT / COUNTY/ WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD
Bon Tempe Lake		E							E					E	E	E
Lake Lagunitas		E							E					E	E	E
Pine Gulch Creek		E							E			E		E	E	E
SAN MATEO COASTAL BASIN																
SAN MATEO COUNTY																
Pacific Ocean (San Mateo, San Francisco)					E		E	E			E	E	E	E		E
Lake Merced		P							E					E	E	E
San Pedro Creek		E							E			E		E	E	E
San Vincente Creek	E	E							E			E	E	E		E
Denniston Creek	E	E							E			E	E	E	E	E
Frenchmans Creek	E								E			E	E	E	E	E
Pilarcitos Creek	E	E							E			E	E	E	E	E
Apanolio Creek																
Arroyo Leon Creek																
Mills Creek																
Pilarcitos Lake		E							E				E	E	E	E
Purisima Creek	E								E			E	E	E		E
Lobitas Creek	E								E			E	E	E		E
Tunitas Creek	E								E			E	E	E	E	E
San Gregorio Creek	E								E			E	E	E	E	E
Alpine Creek																
El Corte de Madera Creek									E			P	E	P	E	E
La Honda Creek																
Woodruff Creek																
Clear Creek																
Harrington Creek																
Bogess Creek																
Mindego Creek																
Pomponio Creek	E								E			E		E	E	E
Pomponio Reservoir																
Pescadero Creek	E	E							E			E	E	E	E	E
Butano Creek																
Fall Creek																
Hoffman Creek																
Honsinger Creek																
Jones Gulch Creek																
McCormick Creek																
Oil Creek																
Lambert Creek																
Peters Creek																

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<-Recreational Uses->			Error Type		
***HYDROLOGIC UNIT* / COUNTY/** WATER BODY	REC-1	REC-2	NAV	Uses	Name	SOURCE OF ERROR
Bon Tempe Lake	E	E				
Lake Lagunitas	E	E				
~~Pine Gulch Creek~~		~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
SAN MATEO COASTAL BASIN						
SAN MATEO COUNTY						
Pacific Ocean (San Mateo, San Franc	E	E	E	11	1	Recognize Pacific Ocean in counties other than Marin, with same Beneficial Uses
Lake Merced	E	E		1		Transcription error between 1986 and 1995 Basin Plans, omitting WILD use
San Pedro Creek		E		1		Transcription error between 1986 and 1995 Basin Plans, omitting WILD use
San Vincente Creek	P	P		1	1	Misspelled in 1995 Basin Plan; Transcription error between 1986 and 1995 Basin Plans, omitting WILD use
Denniston Creek	E	E		1		Transcription error between 1986 and 1995 Basin Plans, omitting WILD use
Frenchmans Creek	E	E				
Pilarcitos Creek	P	P				
Apanolio Creek						
Arroyo Leon Creek						
Mills Creek						
Pilarcitos Lake	L	E				
Purisima Creek	E	E				
Lobitas Creek	E	E				
Tunitas Creek	P	P				
San Gregorio Creek	E	E				
Alpine Creek						
El Corte de Madera Creek	P	E				
La Honda Creek						
Woodruff Creek						
Clear Creek						
Harrington Creek						
Bogess Creek						
Mindego Creek						
Pomponio Creek	~~EP~~	E	~~P~~	3		REC2 designated in 1975 Basin Plan, REC1 use was potential in 1975, 1986 Basin Plans, no NAV use in creek
Pomponio Reservoir						
Pescadero Creek	E	E				
Butano Creek						
Fall Creek						
Hoffman Creek						
Honsinger Creek						
Jones Gulch Creek						
McCormick Creek						
Oil Creek						
Lambert Creek						
Peters Creek						

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->						<----Aquatic Life Uses---->									Wildlife Use
***HYDROLOGIC UNIT* / COUNTY/** WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD
Slate Creek																
Tarwater Creek																
Little Boulder Creek																
Waterman Creek																
CENTRAL BASIN																
SAN FRANCISCO COUNTY																
Golden Gate Channel																
San Francisco Bay Central					E	E	E	E		E		E	E	E		E
Golden Gate Park Lakes															E	E
MARIN COUNTY																
San Rafael Creek									E						E	E
Corte Madera Creek									E			P	E	P	E	E
Ross Creek																
Cascade Creek																
San Anselmo Creek																
Sleepy Hollow Creek																
Phoenix Lake		E							E					E	E	E
Phoenix Creek																
Bill Williams Creek																
Richardson Bay					E		E	E		E		E	E	E		E
Arroyo Corte Madera del Presidio								E	E					E		E
Old Mill Creek									E							E
Coyote Creek (Marin)									E						E	E
ALAMEDA COUNTY																
Berkeley Aquatic Park Lagoon										E		E		P		E
Lake Temescal									E					E	E	E
CONTRA COSTA COUNTY																
~~Old Mill Creek~~																
SOUTH BAY BASIN																
SAN FRANCISCO COUNTY																
San Francisco Bay Lower					E		E	E		E		E	E	P		E
SAN MATEO COUNTY																
San Mateo Creek			E						P				E	E		E
Lower Crystal Springs **Reservoir** ~~Lower~~		E							E				E	E	E	E
Upper Crystal Springs **Reservoir** ~~Upper~~		E							E				E	E	E	E
San Andreas Lake		E							E				E	E	E	E
Foster City Lagoon																
Bair Island **Wetlands**																
ALAMEDA COUNTY*																
Lake Merritt										E				E		E
Lower San Leandro Creek			E									P		P	P	E
Lake Chabot (Alameda)		E							E					E	E	E
~~Cull Canyon Reservoir~~									E					E	E	E
Upper San Leandro Reservoir		E							E					E	E	E

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

HYDROLOGIC UNIT / COUNTY/ WATER BODY	<-Recreational Uses-> REC-1	REC-2	NAV	Error Type Uses	Name	SOURCE OF ERROR
Slate Creek						
Tarwater Creek						
Little Boulder Creek						
Waterman Creek						
CENTRAL BASIN						
SAN FRANCISCO COUNTY						
Golden Gate Channel						
San Francisco Bay Central	E	E	E			
Golden Gate Park Lakes		E				
MARIN COUNTY						
San Rafael Creek		E	E			
Corte Madera Creek	P	E				
Ross Creek						
Cascade Creek						
San Anselmo Creek						
Sleepy Hollow Creek						
Phoenix Lake	E	E				
Phoenix Creek						
Bill Williams Creek						
Richardson Bay	E	E	E			
Arroyo Corte Madera del Presidio	P	E				
Old Mill Creek		E		3		COLD, REC2, WILD designated in 1975 Basin Plan
Coyote Creek (Marin)		E				
ALAMEDA COUNTY						
Berkeley Aquatic Park Lagoon	E	E		1		Transcription error between 1986 and 1995 Basin plans
Lake Temescal	E	E				
CONTRA COSTA COUNTY						
~~Old Mill Creek~~						
SOUTH BAY BASIN						
SAN FRANCISCO COUNTY						
San Francisco Bay Lower	E	E	E	1		SPWN potential use in 1975, 1986 Basin plans
SAN MATEO COUNTY						
San Mateo Creek	P	P				
Lower Crystal Springs **Reservoir** ~~Lowe~~		E			1	Mis-labeled water body name in 1995 Basin Plan
Upper Crystal Springs **Reservoir** ~~Uppe~~		E			1	Mis-labeled water body name in 1995 Basin Plan
San Andreas Lake	L	E				
Foster City Lagoon						
Bair Island **Wetlands**					1	Mis-labeled water body name in 1995 Basin Plan
ALAMEDA COUNTY*						
Lake Merritt	E	E		1		Transcription error between 1986 and 1995 Basin plans
Lower San Leandro Creek	P	P				
Lake Chabot (Alameda)	E	E				
~~Cull Canyon Reservoir~~	~~E~~	~~E~~			1	Placed in wrong watershed
Upper San Leandro Reservoir	L	P			1	Mis-labeled water body name in 1995 Basin Plan

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->						<----Aquatic Life Uses---->									Wildlife Use
***HYDROLOGIC UNIT* / COUNTY/** WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD
San Leandro Creek			E						E			P		P	P	E
Kaiser Creek																
Moraga ~~Valley~~ Creek																
San Lorenzo Creek		E	E	E					E			E		E	E	E
Don Castro Reservoir									E					E	E	E
Cull Canyon Reservoir									E					E	E	E
Palomares Creek									**E**			**E**		**E**	**E**	**E**
Crow Creek									**E**			**E**		**E**	**E**	**E**
Alameda Creek Quarry Ponds				E					E						E	
Alameda Creek	E			E					E			E		E	E	E
San Antonio Reservoir		E							E					E	E	E
Lacosta Creek																
Arroyo de la Laguna				E					P			E		E	P	E
Arroyo ~~del~~ Valle		E		E					E			P		E		E
Shadow Cliffs Reservoir									E					E	E	E
Del Valle Reservoir		E							E					E	E	E
Arroyo Mocho				**E**					**P**			**E**		**E**	**P**	**E**
Tassajara Creek				**E**					**P**			**E**		**E**	**P**	**E**
Arroyo ~~de~~ las Positas				**E**					**P**			**E**		**E**	**P**	**E**
Arroyo Seco (Alameda)				**E**					**P**			**E**		**E**	**P**	**E**
Alamo Canal				**E**					**P**			**E**		**E**	**P**	**E**
Alamo Creek				**E**					**P**			**E**		**E**	**P**	**E**
~~Smith Creek~~																
SANTA CLARA COUNTY																
Calaveras Reservoir		E							E					E	E	E
Arroyo Hondo		E	E						E					E	E	E
Isabel Creek		**E**	**E**						**E**					**E**	**E**	**E**
Smith Creek		**E**	**E**						**E**					**E**	**E**	**E**
Sulphur Creek (~~Alameda~~Santa Clara)		**E**	**E**						**E**					**E**	**E**	**E**
SANTA CLARA BASIN																
San Francisco Bay South					E		E	E		E		E	E	P		**E**
ALAMEDA COUNTY																
Lake Elizabeth ~~Lake~~									E					E	E	E

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<-Recreational Uses->			Error Type		
HYDROLOGIC UNIT / COUNTY/ WATER BODY	REC-1	REC-2	NAV	Uses	Name	SOURCE OF ERROR
San Leandro Creek	P	P				
Kaiser Creek						
Moraga ~~Valley~~ Creek					1	Mis-labeled water body name in 1995 Basin Plan
San Lorenzo Creek	E	E				
Don Castro Reservoir	E	E				
Cull Canyon Reservoir	E	E				
Palomares Creek	E	E		7		1975 Basin Plan designated these uses for upstream tributaries of San Lorenzo Creek
Crow Creek	E	E		7		1975 Basin Plan designated these uses for upstream tributaries of San Lorenzo Creek
Alameda Creek Quarry Ponds	E	E				
Alameda Creek	E	E				
San Antonio Reservoir	L	E				
Lacosta Creek						
Arroyo de la Laguna	E	E				
Arroyo ~~del~~ Valle	P	P			1	Misspelled water body name
Shadow Cliffs Reservoir	E	E				
Del Valle Reservoir	E	E				
Arroyo Mocho	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo de la Laguna
Tassajara Creek	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo de la Laguna
Arroyo ~~de~~ las Positas	E	E		8	1	1975 Basin Plan designated these uses for upstream tributaries of Arroyo de la Laguna; Misspelled water body name
Arroyo Seco (Alameda)	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo de la Laguna
Alamo Canal	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo de la Laguna
Alamo Creek	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo de la Laguna
~~Smith Creek~~					1	Placed in wrong watershed in 1995 Basin Plan
SANTA CLARA COUNTY						
Calaveras Reservoir	L	E				
Arroyo Hondo	E	E				
Isabel Creek	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo Hondo
Smith Creek	E	E		8		1975 Basin Plan designated these uses for upstream tributaries of Arroyo Hondo
Sulphur Creek (~~Alameda~~Santa Clara)	E	E		8	1	Mis-labeled water body name in 1995 Basin Plan, 1975 Basin Plan designated these uses for upstream tributaries of Arroyo Hondo
SANTA CLARA BASIN						
San Francisco Bay South	E	E	E	1		Transcription error between 1986 and 1995 Basin Plans, omitting WILD use
ALAMEDA COUNTY						
Lake Elizabeth ~~Lake~~		E			1	Misspelled water body name

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->						<----Aquatic Life Uses---->									Wildlife Use
HYDROLOGIC UNIT / COUNTY/ WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD
SAN MATEO AND SANTA CLARA COUNTIES																
San Francisquito Creek									E			E		E	E	E
Felt Lake	E													E	E	E
Los Trancos Creek																
West Union Creek																
Searsville Lake	E								E					E	E	E
SANTA CLARA COUNTY																
Matadero Creek									E			E		E	E	E
Permanente Creek									E					E		E
Stevens Creek			E						E			E		P	E	E
Stevens Creek Reservoir		E		E					E			E		E	E	E
Calabazas Creek	E			E					E						E	E
Saratoga Creek	E		E	E					E						E	E
Guadalupe River									E			P		P	E	E
Los Gatos Creek		E	E	E					E			P		P	E	E
Vasona Lake				E					E					E	E	E
Lexington Reservoir		E							E					E	E	E
Lake Elsman		E							E							E
~~Los Gatos Creek~~																
Campbell Percolation Pond				E					E					E	E	E
Guadealupe Creek																
Guadalupe Reservoir		E		E					E					E	E	E
Alamitos Creek																
Calero Reservoir		E		E										E	E	E
Almaden Reservoir		E		E					E					E	E	E
Herbert Creek																
~~Anderson Lake~~		E		E					E					E	E	E
Barrett Canyon Creek																
~~Herbert Creek~~																
Coyote Creek				E					E			E	E	E	E	E
~~Elizabeth Lake~~									E					E	E	E
Lower Penitencia Creek																
Berryessa Creek																
Upper Penitencia Creek																
Cherry Flat Reservoir	E	E												E	E	E
Arroyo Agguague Creek																
Halls Valley Reservoir														E	E	E
Silver Creek																
Fremont Lagoon																
Sandy Wool Lake							E		E			E		E	E	E
Cotton Wood Lake									E					E	E	E

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

HYDROLOGIC UNIT / COUNTY/ WATER BODY	<-Recreational Uses-> REC-1	REC-2	NAV	Error Type Uses	Name	SOURCE OF ERROR
SAN MATEO AND SANTA CLARA CO						
San Francisquito Creek	P	P				
Felt Lake	E	E				
Los Trancos Creek						
West Union Creek						
Searsville Lake	E	E				
SANTA CLARA COUNTY						
Matadero Creek	E	E				
Permanente Creek	E	E				
Stevens Creek	E	E				
Stevens Creek Reservoir		E				
Calabazas Creek	E	E	E	1		Transcription error in 1986 Basin Plan propagated in 1995 Basin Plan
Saratoga Creek	E	E				
Guadalupe River	P	E				Transcription error in 1986 Basin Plan propagated in 1995 Basin Plan
Los Gatos Creek		P				
Vasona Lake	E	E				
Lexington Reservoir	E	E				
Lake Elsman		P		2		REC2 was a potential use in 1975 Basin Plan; Transcription error between 1986 and 1995 Basin Plans, omitting WILD use
~~Los Gatos Creek~~						
Campbell Percolation Pond	E	E		7		Transcription error between 1986 and 1995 Basin Plans
Guadealupe Creek					1	Misspelled water body name
Guadalupe Reservoir	E	E				
Alamitos Creek						
Calero Reservoir	E	E				
Almaden Reservoir	E	E				
Herbert Creek						
~~Anderson Lake~~	~~L~~	~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
Barrett Canyon Creek						
~~Herbert Creek~~						
Coyote Creek	P	E				Transcription error between 1986 and 1995 Basin Plans
~~Elizabeth Lake~~		~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
Lower Penitencia Creek					1	Misspelled water body name in 1995 Basin Plan
Berryessa Creek						
Upper Penitencia Creek						
Cherry Flat Reservoir	L	E				
Arroyo Aqguague Creek					1	Misspelled water body name in 1995 Basin Plan
Halls Valley Reservoir	E	E		1		Transcription error between 1986 and 1995 Basin Plans
Silver Creek						
Fremont Lagoon						
Sandy Wool Lake	E	E		6		Transcription error between 1986 and 1995 Basin Plans
Cotton Wood Lake	E	E				

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->								<----Aquatic Life Uses---->							Wildlife Use
HYDROLOGIC UNIT / COUNTY/ WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD
Anderson Lake		E		E					E					E	E	E
San Felipe Creek									P					P	E	E
Otis Canyon Creek																
~~Guadalupe Reservoir~~		~~E~~		~~E~~					~~E~~					~~E~~	~~E~~	~~E~~
Coyote Lake	E	E							E					E	E	E
Soda Springs Canyon Creek																
SAN PABLO BASIN																
San Pablo Bay					E		E	E		E		E	E	E		E
SOLANO COUNTY																
White Slough																
Lake Chabot (Solano)	E	PE							E					E	E	E
~~Coon Island~~																
Dalwick Lake																
~~Miller Creek~~									~~E~~			~~E~~	~~E~~	~~E~~	~~E~~	~~E~~
CONTRA COSTA COUNTY																
Rodeo Creek														E	E	E
Refugio Creek																
Pinole Creek									E			E		E	E	E
San Pablo Creek												E		E	E	E
San Pablo Reservoir		E							E					E	E	E
~~San Pablo Creek~~												~~E~~			~~E~~	~~E~~
Briones Reservoir		E							E					E	E	E
Wildcat Creek												E		E	E	E
Jewel Lake									**E**						**E**	**E**
Lake Anza									**E**						**E**	**E**
MARIN COUNTY																
Novato Creek		E							P			P	E	P	P	E
Stafford Lake		E							E					E	E	E
Pacheco Pond							E		**E**			P		**P**	E	E
Miller Creek									E			E	E	E	E	E
Gallinas Creek									E				E		E	E
SONOMA COUNTY																
Petaluma River									E	**E**	~~E~~	E	E	E	E	E
San Antonio Creek									E			P		P	E	E
Willow Creek																
Adobe Creek (Sonoma)																
Sonoma Creek									E			E	E	E	E	E
~~Adobe Creek (Sonoma)~~																
Fowler Creek																
Schnell Creek																
Arroyo Seco Creek (Sonoma)																
Nathanson Creek																
Agua Caliente Creek (Sonoma)																

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<-Recreational Uses->			Error Type		
HYDROLOGIC UNIT / COUNTY/ WATER BODY	REC-1	REC-2	NAV	Uses	Name	SOURCE OF ERROR
Anderson Lake	L	E				
San Felipe Creek	P	P				
Otis Canyon Creek						
~~Guadalupe Reservoir~~	~~E~~	~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
Coyote Lake	E	E				
Soda Springs Canyon Creek					1	Misspelled water body name in 1995 Basin Plan
SAN PABLO BASIN						
San Pablo Bay	E	E	E			
SOLANO COUNTY						
White Slough						
Lake Chabot (Solano)	E	E		1		MUN existing use in 1975 Basin Plan
~~Coon Island~~						Not a waterbody
Dalwick Lake						
~~Miller Creek~~	~~E~~	~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
CONTRA COSTA COUNTY						
Rodeo Creek	P	E				
Refugio Creek						
Pinole Creek	P	P				
San Pablo Creek		E				
San Pablo Reservoir	E	E				
~~San Pablo Creek~~		~~E~~			1	Redundant Water Body Listing in 1995 Basin Plan
Briones Reservoir	L	P				
Wildcat Creek		E				
Jewel Lake	**E**	**E**		5	1	Transcription error between 1986 and 1995 Basin Plan
Lake Anza	**E**	**E**		5		Transcription error between 1986 and 1995 Basin Plan
MARIN COUNTY						
Novato Creek	P	P				
Stafford Lake	E	E				
Pacheco Pond	P	**P**		3	1	Transcription error between 1986 and 1995 Basin Plan, Placed in wrong watershed
Miller Creek	E	E				
Gallinas Creek		E				
SONOMA COUNTY						
Petaluma River	E	E	E	2		MAR use not in 1975 Basin Plan, misidentified, should be EST
San Antonio Creek	P	P				
Willow Creek						
Adobe Creek (Sonoma)					1	Placed in wrong watershed in 1995 Basin Plan
Sonoma Creek	E	E				
~~Adobe Creek (Sonoma)~~					1	Placed in wrong watershed in 1995 Basin Plan
Fowler Creek						
Schnell Creek					1	Misspelled water body name in 1995 Basin Plan
Arroyo Seco Creek (Sonoma)						
Nathanson Creek						
Agua Caliente Creek (Sonoma)						

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----Human Consumptive Uses---->						<----Aquatic Life Uses---->									Wildlife Use
HYDROLOGIC UNIT / COUNTY/ WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD
Stuart Creek																
Graham Creek																
Yulupa Creek																
NAPA COUNTY																
Napa River	E	E							E			E	E	E	E	E
Huichica Creek																
Carneros Creek																
Suscol Creek																
Tulucay Creek																
Lake Marie	~~P~~E	E							P					E	P	E
Napa Creek																
Browns Valley Creek																
Redwood Creek (Napa)																
Pickle Creek																
Milliken Creek																
Sarco Creek																
Milliken Reservoir		E							E					E	E	E
Soda Creek																
Dry Creek (Napa)	E	E							E			E		E	E	E
Conn Creek		E	E						E			E		E		E
Rector Creek																
Rector Reservoir		E							E					E	E	E
Lake Hennessey Lake		E							E					E	E	E
Sage Creek		E	E						E					E	E	E
Chiles Creek		E	E						E					E	E	E
Bear Canyon Creek																
Sulphur Creek (Napa)																
York Creek									E			E		E		E
Mill Creek (Napa)																
Ritchey Creek																
Bell Canyon Reservoir																
~~Napa River~~	~~E~~	~~E~~							~~E~~			~~E~~	~~E~~	~~E~~	~~E~~	~~E~~
Cyrus Creek																
Garnett Creek																
Hopper Creek																
Jericho Canyon Creek																
Kimball Reservoir		E													E	E
~~Bear Canyon Creek~~																
~~Wildcat Creek~~												~~E~~		~~E~~	~~E~~	~~E~~
~~San Pablo Creek~~												~~E~~		~~E~~	~~E~~	~~E~~
~~Rodeo Creek~~														~~E~~	~~E~~	~~E~~
~~Refugio Creek~~																
SUISUN BASIN																
Carquinez Strait					E		E			E		E	E	E		E

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<-Recreational Uses->			Error Type		
HYDROLOGIC UNIT / COUNTY/ WATER BODY	REC-1	REC-2	NAV	Uses	Name	SOURCE OF ERROR
Stuart Creek						
Graham Creek						
Yulupa Creek						
NAPA COUNTY						
Napa River	E	E	E			
Huichica Creek						
Carneros Creek						
Suscol Creek						
Teuluecay Creek					1	Misspelled water body name in 1995 Basin Plan
Lake Marie	E	E		2		MUN, AGR existing uses in 1975 Basin Plan
Napa Creek						
Browns Valley Creek						
Redwood Creek (Napa)						
Pickle Creek						
Milliken Creek						
Sarco Creek						
Milliken Reservoir	L	P				
Soda Creek						
Dry Creek (Napa)	E	E				
Conn Creek	E	E				
Rector Creek						
Rector Reservoir	L	E		1		REC2 existing use in 1975 Basin Plan
Lake Hennessey ~~Lake~~	E	E			1	Mis-labeled water body in 1995 Basin Plan
Sage Creek	P	P				
Chiles Creek	P	P				
Bear Canyon Creek						
Sulphur Creek (Napa)						
York Creek	P	P				
Mill Creek (Napa)						
Ritch~~eyie~~ Creek					1	Misspelled water body name in 1995 Basin Plan
Bell Canyon Reservoir						
~~Napa River~~	~~E~~	~~E~~	~~E~~		1	Redundant Water Body name in 1995 Basin Plan
Cyrus Creek						
Garnett Creek						
Hopper Creek						
Jericho Canyon Creek						
Kimball Reservoir	E	E				
~~Bear Canyon Creek~~						
~~Wildcat Creek~~		~~E~~			1	Redundant Water Body name in 1995 Basin Plan
~~San Pablo Creek~~		~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
~~Rodeo Creek~~	~~P~~	~~E~~			1	Placed in wrong watershed in 1995 Basin Plan
~~Refugio Creek~~					1	Placed in wrong watershed in 1995 Basin Plan
SUISUN BASIN						
Carquinez Strait	E	E	E			

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

	<----------Human Consumptive Uses---------->						<----------Aquatic Life Uses---------->							e
***HYDROLOGIC UNIT* / COUNTY/** WATER BODY	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHEL	COLD	EST	MAR	MIGR	RARE	SP
Suisun Bay					E	~~E~~	E			E		E	E	
Sacramento-San Joaquin Delta	E	E		E	E	E	E			E		E	E	
SOLANO COUNTY														
Lake Herman ~~Lake~~		~~PE~~			E				E					
Green Valley Creek			E						E					
Lake Frey		E							E					
Lake Madigan	E	E							E					
Suisun Slough														
Suisun Creek			E						E			E		
Suisun Reservoir														
Wooden Valley Creek														
Lake Curry		E												
Ledgewood Creek			E						E			E		
Laurel Creek (Solano)			E						E			E		
Montezuma Slough													E	
CONTRA COSTA COUNTY														
Peyton Slough														
~~Pacheco Pond~~							~~E~~					~~P~~		
Pacheco Creek														
Walnut Creek									E			E		
Pine Creek									E					
Lafayette Creek														
Lafayette **Reservoir** ~~Lake~~		E							E					
Mt. Diablo Creek									E			E		
Mallard Reservoir	E	E			E	E								

* Portions of San Leandro Creek and Alameda Creek watersheds are in Contra Costa County
* Portions of Alameda Creek watershed are in Santa Clara County
* Portions of Coyote Creek watershed are in Alameda County

KEY

Black Text - 1995 Basin Plan

~~Strikeout Text~~ - Proposed Deletions (with justification in far right column)

Blue Bold Text - Proposed Additions based on 1975, 1986 Basin Plans
(accidentally omitted from printed 1995 Basin Plan, due in part to type offset errors in printed 1986 Basin Plan)

E = Existing Beneficial Use

P = Potential Beneficial Use

L = Limited Beneficial Use (e.g., no swimming/fishing in some drinking water reservoirs)

Table 2-1 Existing and Potential Beneficial Uses of Water Bodies
in the San Francisco Bay Region

***HYDROLOGIC UNIT* / COUNTY/** WATER BODY	<-Recreational Uses-> REC-1	REC-2	NAV	Error Type Uses	Name	SOURCE OF ERROR
Suisun Bay	E	E	E	1		PROC designated use in 1975 Basin Plan
Sacramento-San Joaquin Delta	E	E	E		1	"Delta" and Uses placed back in Basin Plan in 1997 Nunc-pro-tunc amendments, add "Sacramento-San Joaquin" for consistency with 303d list
SOLANO COUNTY						
Lake Herman ~~Lake~~	E	E		1	1	MUN existing use in 1975 Basin Plan; Mis-labeled water body in 1995 Basin Plan
Green Valley Creek	E	E				
Lake Frey		~~P~~E		1		REC2 existing use in 1975 Basin Plan
Lake Madigan		~~P~~E		1		REC2 existing use in 1975 Basin Plan
Suisun Slough	E	E	E			
Suisun Creek	P	P				
Suisun Reservoir						
Wooden Valley Creek						
Lake Curry	E	E				
Ledgewood Creek	E	E				
Laurel Creek (Solano)	E	E				
Montezuma Slough	E	E	E			
CONTRA COSTA COUNTY						
Peyton Slough						
~~Pacheco Pond~~	~~P~~				1	Placed in wrong watershed
Pacheco Creek						
Walnut Creek	P	P				
Pine Creek	E	E				
Lafayette Creek						
Lafayette **Reservoir** ~~Lake~~	~~E~~	E		1	1	REC1 Use designated in 1975 Basin Plan; Mis-labeled water body in 1995 Basin Plan
Mt. Diablo Creek	E	E				
Mallard Reservoir	L	P				
		Total changes		**169** Uses	**47** Names	

Delete Table 2-8 in 2005 Basin Plan General Update

TABLE 2-8 GROUNDWATER BASIN CHARACTERISTICS [1]

GROUNDWATER BASIN	COUNTY	DWR BASIN NO.[2]	AREAL EXTENT (SQ. MI.)	DEPTH ZONE (FEET) [3]	STORAGE CAPACITY [4]	PERENNIAL YIELD [5]
Alameda Creek (Niles Cone)	Alameda	2 - 9.01	97.0	40 - >500[a]	1.3 mil[a]	32,600[a]
Castro Valley	Alameda	2 - 8	4.0	NA	NA	NA
East Bay Plain	Alameda	2 - 9.01	114.0	25 - 596[b]	2.77 mil[c]	NA
Livermore Valley	Alameda	2 - 10	170.0	0 - 500[d]	540,000[d]	13,500[e]
Sunol Valley	Alameda	2 - 11	28.0	160 - 500[f]	>2,800[g] ?	140[g] ?
Arroyo Del Hambre Valley	Contra Costa	2 - 31	2.0	NA	NA	NA
Clayton Valley	Contra Costa	2 - 5	30.0	50 - 300[h]	180,000[g] ?	NA
Pittsburg Plain	Contra Costa	2 - 4	30.0	50 - 160[h]	NA	NA
San Ramon Valley	Contra Costa	2 - 7	30.0	300 - 600[i]	NA	NA
Ygnacio Valley	Contra Costa	2 - 6	30.0	20 - 300[h]	50,000[h]	NA
Novato Valley	Marin	2 - 30	17.5	55 - 90[j]	NA	NA
Sand Point Area	Marin	2 - 27	2.0	20 - 300[k]	NA	NA
San Rafael	Marin	2 - 29	NA	NA	NA	NA
Ross Valley	Marin	2 - 28	18.0	10 - 60[l]	1380[l]	350[l]
Napa Valley	Napa	2 - 2 & 2 - 2.01	210.0	50 - 500[m]	240,000[n]	24,000[m]
Islais Valley	San Francisco	2 - 33	NA	NA	NA	NA
Merced Valley (North)	San Francisco	2 - 35	16.0	NA	NA	NA
San Francisco Sands	San Francisco	2 - 34	14.0	NA	NA	NA
Visitation Valley	San Francisco	2 - 32	7.5	NA	NA	NA
Half Moon Bay Terrace	San Mateo	2 - 22	25.0	20 - 15[o]	10,300[o]	2,200[o]
Merced Valley (South)	San Mateo	2 - 35A	16.0	250 - 745[p]	NA	NA
Pescadero Valley	San Mateo	2 - 26	2.0	NA	NA	NA
San Gregorio Valley	San Mateo	2 - 24	2.0	NA	NA	NA
San Mateo Plain	San Mateo	2 - 9A	32.5	100 - 500[q]	NA	NA
San Pedro Valley	San Mateo	2 - 36	2.0	NA	NA	NA
Santa Clara Valley (& Coyote)	Santa Clara	2 - 9B	240.0	10 - 1010[d]	3.0 mil[r]	100,000[r]
Suisun/Fairfield Valley	Solano	2 - 3	203.0	30 - 400[s,t]	40,000[t]	NA
Kenwood Valley	Sonoma	2 - 19	6.0	0 - 1000[d]	460,000[d]	NA
Petaluma Valley	Sonoma/Mrn.	2 - 1	41.0	0 - 900[d]	2.1 mil[d]	NA
Sebastopol-Merced Fm. Highlands	Sonoma	2 - 25	150.0	NA	NA	NA
Sonoma Valley	Sonoma	2 - 2.022	50.0	0 - 1000[d]	2.66 mil[d]	NA

NA - Not Available.

NOTES:

(1) Information compiled from DWR and local water management agencies. (References are listed below.)
(2) DWR Bulletin 118-80 (1980).
(3) Average depth to aquifers below land surface. These depths are provided for information only and cannot be used to characterize site-specific conditions.
(4) Total available storage in acre-feet. (References are listed below.)
(5) The average annual amount of groundwater that can be withdrawn without producing an undesired result. (References are listed below.)

REFERENCES:

a. Alameda County Water District Staff, 1992, Personal Communication.
b. Alameda County Flood Control and Water Conservation District, 1988, Geohydrology and Groundwater Quality Overview, East Bay Plain Area, 205(j) Report.
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Table 2-2 Existing and Potential Beneficial Uses of Groundwater In Idents

County	Groundwater Basin Name (1)	Groundwater Sub-Basin (1)	Basin Number (1)	MUN (2)	PROC (3)	IND (4	FRESH (6)
Alameda	Castro Valley	--	2-8	P	P	P	--
Alameda	Santa Clara Valley	Niles Cone	2-9.01	E	E	E	--
Alameda and Contra Costa	Santa Clara Valley	East Bay Plain	2-9.04	E	E	E	--
Alameda and Contra Costa	Livermore Valley	--	2-10	E	E	E	--
Alameda	Sunol Valley	--	2-11	E	E	E	--
Contra Costa	Pittsburg Plain	--	2-4	P	P	P	--
Contra Costa	Clayton Valley	--	2-5	E	P	P	--
Contra Costa	Ygnacio Valley	--	2-6	P	P	P	--
Contra Costa	San Ramon Valley	--	2-7	E	P	P	--
Contra Costa	Arroyo del Hambre Valley	--	2-31	P	P	P	--
Marin	Sand Point Area	--	2-27	E	P	P	--
Marin	Ross Valley	--	2-28	E	P	P	--
Marin	San Rafael Valley	--	2-29	P	P	P	--
Marin	Novato Valley	--	2-30	P	P	P	--
Napa	Napa-Sonoma Valley	Napa Valley	2-2.01	E	E	E	--
Napa and Solano	Napa-Sonoma Valley	Napa - Sonoma Lowlands	2-2.03	E	E	E	--
San Francisco and San Mateo	Visitacion Valley	--	2-32	P	E	E	--
San Francisco and San Mateo	Islais Valley A (7)	--	2-33 A	P	E	E	--
San Francisco	Islais Valley B (7)	--	2-33 B	P	P	P	--
San Francisco	South San Francisco	--	2-37	P	E	E	--
San Francisco and San Mateo	Westside A (7)	--	2-35 A	E	P	P	--
San Francisco	Lobos (7)	--	2-38	E	P	P	--
San Francisco	Marina (7)	--	2-39	E	P	P	--
San Francisco	Downtown (7)	--	2-40	E	P	P	--
San Francisco	Westside B (7)	--	2-35 B	P	P	P	--
San Mateo	Westside C (7)	--	2-35 C	E	P	P	--
San Mateo	Westside D (7)		2-35 D	E	E	E	--
San Mateo	Santa Clara Valley	San Mateo Plain	2-9.03	E	E	E	--

Table 2-2 Existing and Potential Beneficial Uses of Groundwater In Identified Basins

County	Groundwater Basin Name (1)	Groundwater Sub-Basin (1)	Basin Number (1)	MUN (2)	PROC (3)	IND (4)	AGR (5)	FRESH (6)
San Mateo and Santa Clara	Santa Clara Valley (8)	Santa Clara	2-9.02	E	E	E	E	--
San Mateo	Half Moon Bay Terrace	--	2-22	E	P	P	E	--
San Mateo	San Gregorio Valley	--	2-24	E	P	P	E	--
San Mateo	Pescadero Valley	--	2-26	E	P	P	E	--
San Mateo	San Pedro Valley	--	2-36	P	P	P	P	--
Solano	Suisun-Fairfield Valley	--	2-3	E	E	E	E	--
Sonoma and Marin	Petaluma Valley	--	2-1	E	P	P	E	--
Sonoma	Napa-Sonoma Valley	Sonoma Valley	2-2.02	E	P	P	E	--
Sonoma and Marin	Wilson Grove Formation Highlands A	--	1.59 A	E	P	P	E	--
Sonoma and Marin	Wilson Grove Formation Highlands B	--	1.59 B	See RB1 Basin Plan (9)				
Sonoma	Kenwood Valley	--	2-19	E	P	P	E	--
Sonoma	Napa - Sonoma Volcanic Highlands	--	2-23	X	X	X	X	X
Santa Clara	Gilroy-Hollister Valley	Llagas Area	3-3.01	See RB3 Basin Plan (10)				

Table 2-2 Existing and Potential Beneficial Uses of Groundwater in Identified Basins

County	Groundwater Basin Name (1)	Groundwater Sub-Basin (1)	Basin Number (1)	MUN (2)	PROC (3)	IND (4)	AGR (5)	FRESH (6)

Notes:

1 Department of Water Resources (DWR) Bulletin 118 "California Groundwater", 2003
2 MUN = Municipal and domestic water supply
3 PROC = Industrial process water supply
4 IND = Industrial service water supply
5 AGR - Agricultural water supply

6 FRESH = Freshwater replenishment to surface water; designation will be determined at a later date, for the interim, a site-by-site determination will be made

7 The existing and potential beneficial uses for groundwater basins listed in the 1995 Basin Plan (Table 2-3) were assigned to the new groundwater basins based on the geographic location of the old basins compared to the new basins. The basin names, such as Westside A, Westside B, etc., are informal names assigned by the Water Board to preserve the beneficial use designations in the 1995 Basin Plan and do not represent sub-basins identified by the Department of Water Resources.
8 The Santa Clara Valley groundwater basin/ Santa Clara groundwater sub-basin is also known as Coyote Valley.

9 This groundwater basin is also located in the North Coast Region (RB1); beneficial uses of groundwater are specified in the Basin Plan for RB1

10 This groundwater basin is also located in the Central Coast Region (RB3); beneficial uses of groundwater are specified in the Basin Plan for RB3
E = Existing beneficial uses; based on best available information
P = Potential beneficial uses; based on best available information
X = This groundwater basin was not listed in the 1995 Basin Plan; designation will be determined at a later date, for the interim, a site-by-site determination will be made

See DWR Bulletin 118 (2003) for groundwater basin characteristics.

Table 2-3 Examples of Existing and Potential Beneficial Uses of Selected Wetlands

TABLE 4-17 EXISTING AND POTENTIAL BENEFICIAL USES OF WETLANDS

BENEFICIAL USE	TYPE OF WETLAND				
	MARINE	ESTUARINE	RIVERINE	LACUSTRINE	PALUSTRINE
AGR		○	○	○	○
COLD			○	○	○
COMM	○	○			
EST		○			
FRESH			○	○	○
GWR	○	○	○	○	○
IND		○	●	●	
MAR	○				
MIGR	○	○	○	○	
NAV	○	○	○	○	○
PROC					
REC-1	○	○	○	○	○
REC-2	○	○	○	○	○
SHELL	○	○	○		
SPWN	○	○	○	○	○
WARM			○	○	○
WILD	○	○	○	○	○
RARE	○	○	○	○	○

NOTE:

○ Existing beneficial use
● Potential beneficial use

Table 2-4 Examples of Beneficial Uses of Wetlands Areas

TABLE 2-10 BENEFICIAL USES OF WETLAND AREAS[a]

BASIN/MARSH AREA	WETLAND TYPES		BENEFICIAL USES									
	FRESH	BRACKISH	EST	MAR	MIGR	COMM	RARE	REC 1	REC 2	SALT	SPWN	WILD
ALAMEDA COUNTY												
Arrowhead			●				●	●	●	●	●	●
Coyote Hills			●				●	●	●	●	●	●
Emeryville Crescent			●				●	●	●	●	●	●
Hayward			●					●	●	●	●	●
CONTRA COSTA COUNTY												
North Contra Costa		●	●				●	●	●	●	●	●
Point Edith		●	●				●		●		●	●
San Pablo Creek			●				●	●	●	●	●	●
Wildcat Creek			●				●	●	●		●	●
MARIN COUNTY												
Abbotts Lagoon				●				●	●	●		●
Bolinas Lagoon				●				●	●	●		●
Corte Madera			●				●	●	●	●	●	●
Drakes Estero								●	●	●	●	●
Gallinas Creek		●	●				●	●	●	●	●	●
Limantour Estero				●				●	●	●		●
Corte Madera Ecological Reserve			●					●	●	●		●
Novato Creek		●	●		●		●	●	●	●	●	
Richardson Bay			●				●	●	●	●	●	●
Rodeo Lagoon				●				●	●	●		●
San Pedro		●	●			●	●		●	●	●	●
San Rafael Creek		●	●				●	●	●	●		●
Tomales Bay				●	●			●	●	●	●	●
NAPA COUNTY												
Mare Island			●						●	●		●
Napa		●	●		●	●	●	●	●		●	
San Pablo Bay			●		●	●	●	●	●	●	●	●
SAN MATEO COUNTY												
Bair Island			●				●	●	●	●		●
Belmont Slough			●				●	●	●	●	●	●
Pescadero	●			●	●		●	●	●	●	●	●
Princeton		●						●	●	●		●
Redwood City Area			●				●	●	●			●
SANTA CLARA COUNTY												
South San Francisco Bay			●		●	●	●	●	●	●	●	●
SOLANO COUNTY												
Southhampton Bay			●				●	●	●	●	●	●
Suisun	●	●	●		●		●	●	●		●	●
White Slough			●		●		●	●	●	●	●	●
SONOMA COUNTY												
Petaluma		●	●		●	●	●	●	●		●	●

NOTE:
a. General locations of wetlands areas are depicted in Figure 2-11.

Table 3-1: Water Quality Objectives for Coliform Bacteria[a]

Beneficial Use	Fecal Coliform (MPN/100ml)	Total Coliform (MPN/100ml)
Water Contact Recreation	geometric mean < 200 90th percentile < 400	median < 240 no sample > 10,000
Shellfish Harvesting[b]	median < 14 90th percentile < 43	median < 70 90th percentile < 230[c]
Non-contact Water Recreation[d]	mean < 2000 90th percentile < 4000	
Municipal Supply: - Surface Water[e] - Groundwater	geometric mean < 20	geometric mean < 100 < 1.1[f]

Notes:

a. Based on a minimum of five consecutive samples equally spaced over a 30-day period.

b. Source: National Shellfish Sanitation Program.

c. Based on a five-tube decimal dilution test or 300 MPN/100 ml when a three-tube decimal dilution test is used.

d. Source: Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, 1968.

e. Source: DOHS recommendation.

f. Based on multiple tube fermentation technique; equivalent test results based on other analytical techniques, as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21(f), revised June 10, 1992, are acceptable.

TABLE 3-2 U.S. EPA BACTERIOLOGICAL CRITERIA FOR WATER CONTACT RECREATION[1,2] (IN COLONIES PER 100 ML)

	FRESH WATER		SALT WATER
	ENTEROCOCCI	E. COLI	ENTEROCOCCI
Steady State (all areas)	33	126	35
Maximum at:			
- designated beach	61	235	104
- moderately used area	89	298	124
- lightly used area	108	406	276
- infrequently used area	151	576	500

NOTES:

1. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012 - 8016. The Criteria are based on:
   (a) Cabelli, V.J. 1983. Health Effects Criteria for Marine Recreational Waters. U.S. EPA, EPA 600/1-80-031, Cincinnati, Ohio, and
   (b) Dufour, A.P. 1984. Health Effects Criteria for Fresh Recreational Waters. U.S. EPA, EPA 600/1-84-004, Cincinnati, Ohio.
2. The U.S. 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.

TABLE 3-3 MARINE [a] WATER QUALITY OBJECTIVES FOR TOXIC POLLUTANTS FOR SURFACE WATERS (ALL VALUES IN UG/L)

COMPOUND	4-DAY AVERAGE	1-HR AVERAGE	24-HR AVERAGE
Arsenic [b, c, d]	36	69	
Cadmium [b, c, d]	9.3	42	
Chromium VI [b, c, d, e]	50	1100	
Copper [c, d, f]			
Cyanide [g]			
Lead [b, c, d]	8.1	~~220~~ 210	
Mercury [h]	0.025	2.1	
Nickel [b, c, d]	8.2	74	
Selenium [i]			
Silver [b, c, d]		1.9	
Tributyltin [j]			
Zinc [b, c, d]	81	90	
PAHs [k]			15

NOTES:

a. Marine waters are those in which the salinity is equal to or greater than 10 parts per thousand 95% of the time, as set forth in Chapter 4 of the Basin Plan. Unless a site-specific objective has been adopted, these objectives shall apply to all marine waters except for the South Bay south of Dumbarton Bridge, where the California Toxics Rule (CTR) applies. For waters in which the salinity is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the freshwater (Table 3-4) or marine objectives.

b. Source: 40 CFR Part 131.38 (California Toxics Rule or CTR), May 18, 2000.

c. These objectives for metals are expressed in terms of the dissolved fraction of the metal in the water column.

d. According to the CTR, these objectives are expressed as a function of the water-effect ratio (WER), which is a measure of the toxicity of a pollutant in site water divided by the same measure of the toxicity of the same pollutant in laboratory dilution water. The 1-hr. and 4-day objectives = table value X WER. The table values assume a WER equal to one.

e. This objective may be met as total chromium.

f. Water quality objectives for copper were promulgated by the CTR and may be updated by U.S. EPA without amending the Basin Plan. Note: at the time of writing, the values are 3.1 ug/l (4-day average) and 4.8 ug/l (1-hr. average). The most recent version of the CTR should be consulted before applying these values.

g. Cyanide criteria were promulgated in the National Toxics Rule (NTR). The NTR criteria specifically apply to San Francisco Bay upstream to and including Suisun Bay and Sacramento-San Joaquin Delta. Note: at the time of writing, the values are 1.0 ug/l (4-day average) and 1.0 ug/l (1-hr. average).

h. Source: U.S. EPA Ambient Water Quality Criteria for Mercury (1984). ~~The CTR human health criteria for mercury are also legally applicable to all waters of the San Francisco Bay Region.~~
i. Selenium criteria were promulgated for all San Francisco Bay/Delta waters in the National Toxics Rule (NTR). The NTR criteria specifically apply to San Francisco Bay upstream to and including Suisun Bay and Sacramento-San Joaquin Delta. Note: at the time of writing, the values are 5.0 ug/l (4-day average) and 20 ug/l (1-hr. average).
j. Tributyltin is a compound used as an antifouling ingredient in marine paints and toxic to aquatic life in low concentrations. U.S. EPA has published draft criteria for protection of aquatic life (Federal Register: December 27, 2002, Vol. 67, No. 249, Page 79090-79091). These criteria are cited for advisory purposes. The draft criteria may be revised.
k. The 24-hour average aquatic life protection objective for total PAHs is retained from the 1995 Basin Plan. Source: U.S. EPA 1980.

Table 3-3A: Water Quality Objectives for Copper and Nickel in Lower South San Francisco Bay

Compound	4-day Average (CCC)[1]	1-hr Average (CMC)[2]	Extent of Applicability
Copper	6.9	10.8	Marine and Estuarine Waters Contiguous to SF Bay, South of Dumbarton Bridge
Nickel	11.9	62.4*	Marine and Estuarine Waters Contiguous to SF Bay, South of Dumbarton Bridge

*Handbook of WQS, 2nd ed. 1994 in Section 3.7.6 states that the CMC = Final AcuteValue/2; 62.4 is the Final Acute Value (resident species database)/2; so the site-specific CMC is lower than the California Toxics Rule value because we are using the resident species database instead of the National Species Database.

[1]Criteria Continuous Concentration

[2]Criteria Maximum Concentration

TABLE 3-4. FRESHWATER[a] WATER QUALITY OBJECTIVES FOR TOXIC POLLUTANTS FOR SURFACE WATERS (ALL VALUES IN UG/L)

COMPOUND	4-DAY AVERAGE	1-HR AVERAGE
Arsenic [b, c, d]	150	340
Cadmium [~~b, c,~~ d]	[e]	[e]
Chromium III [c, f]		
Chromium VI [b, c, d, g]	11	16
Copper [b, c, d]	9.0 [h]	13 [h]
Cyanide [i]		
Lead [b, c, d]	2.5 [j]	65 [j]
Mercury [k]	0.025	2.4
Nickel [b, c, d]	52 [l]	470 [l]
Selenium [m]		
Silver [b, c, d]		3.4 [n]
Tributyltin [o]		
Zinc [b, c, d]	120 [p]	120 [p]

NOTES:

a. Freshwaters are those in which the salinity is equal to or less than 1 part per thousand 95% of the time, as set forth in Chapter 4 of the Basin Plan. These objectives shall apply to all freshwaters, unless a site-specific objective has been adopted. For waters in which the salinity is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the marine (Table 3-3) and freshwater objectives.

b. Source: 40 CFR Part 131.38 (California Toxics Rule or CTR), May 18, 2000.

c. These objectives for metals are expressed in terms of the dissolved fraction of the metal in the water column.

d. These objectives are expressed as a function of the water-effect ratio (WER), which is a measure of the toxicity of a pollutant in site water divided by the same measure of the toxicity of the same pollutant in laboratory dilution water. The 1-hr. and 4-day objectives = table value X WER. The table values assume a WER equal to one.

e. The objectives for cadmium and other noted metals are expressed by formulas where H = ln (hardness) as $CaCO_3$ in mg/l: The four-day average objective for cadmium is $e^{(0.7852 H - 3.490)}$. This is 1.1 µg/l at a hardness of 100 mg/l as $CaCO_3$. The one-hour average objective for cadmium is $e^{(1.128 H - 3.828)}$. This is 3.9 µg/l at a hardness of 100 mg/l as $CaCO_3$.

f. Chromium III criteria were promulgated in the National Toxics Rule (NTR). The NTR criteria specifically apply to San Francisco Bay upstream to and including Suisun Bay and

Sacramento-San Joaquin Delta. Note: at the time of writing, the values are 180 ug/l (4-day average) and 550 ug/l (1-hr. average). The objectives for chromium III are based on hardness. The values in this footnote assume a hardness of 100 mg/l $CaCO_3$. At other hardnesses, the objectives must be calculated using the following formulas where H = ln (hardness): The 4-day average objective for chromium III is ~~-~~0.860 X $e^{(0.8190H+1.561)}$. The 1-hour average for chromium III is 0.316 X $e^{(0.8190H+3.688)}$.

g. This objective may be met as total chromium.

h. The objectives for copper are based on hardness. The table values assume a hardness of 100 mg/l $CaCO_3$. At other hardnesses, the objectives must be calculated using the following formulas where H = ln (hardness): The 4-day average objective for copper is 0.960 X $e^{(0.8545H-1.702)}$. The 1-hour average for copper is 0.960 X $e^{(0.9422H-1.700)}$.

i. Cyanide criteria were promulgated in the National Toxics Rule (NTR). The NTR criteria specifically apply to San Francisco Bay upstream to and including Suisun Bay and Sacramento-San Joaquin Delta. Note: at the time of writing, the values are 5.2 ug/l (4-day average) and 22 ug/l (1-hr. average).

j. The objectives for lead are based on hardness. The table values assume a hardness of 100 mg/l $CaCO_3$. At other hardnesses, the objectives must be calculated using the following formulas where H = ln (hardness): The 4-day average objective is (1.46203 – 0.145712H) X $e^{(1.273H-4.705)}$. The 1-hour average for lead is (1.46203 – 0.145712H) X $e^{(1.273H-1.460)}$.

k. Source: U.S. EPA Quality Criteria for Water 1986 (EPA 440/5-86-001), which established a mercury criterion of 0.012 ug/l. The Basin Plan set the objective at 0.025 based on considerations of the level of detection attainable at that time. ~~The CTR human health criteria for mercury are also legally applicable to all waters of the San Francisco Bay Region.~~

l. The objectives for nickel are based on hardness. The table values assume a hardness of 100 mg/l $CaCO_3$. At other hardnesses, the objectives must be calculated using the following formulas where H = ln (hardness): The 4-day average objective is 0.997 X $e^{(0.8460H+0.0584)}$. The 1-hour average objective is 0.998 X $e^{(0.8460H+2.255)}$.

m. Selenium criteria were promulgated for all San Francisco Bay/Delta waters in the National Toxics Rule (NTR). The NTR criteria specifically apply to San Francisco Bay upstream to and including Suisun Bay and Sacramento-San Joaquin Delta. Note: at the time of writing, the values are 5.0 ug/l (4-day average) and 20 ug/l (1-hr. average).

n. The objective for silver is based on hardness. The table value assumes a hardness of 100 mg/l $CaCO_3$. At other hardnesses, the objective must be calculated using the following formula where H = ln (hardness): The 1-hour average objective for silver is $0.85 \times e^{(1.72H - 6.52)}$. U.S. EPA has not developed a 4-day criterion.

o. Tributyltin is a compound used as an antifouling ingredient in marine paints and toxic to aquatic life in low concentrations. U.S. EPA has published draft criteria for protection of aquatic life (Federal Register: December 27, 2002, Vol. 67, No. 249, Page 79090-79091). These criteria are cited for advisory purposes. The draft criteria may be revised.

p. The objectives for zinc are based on hardness. The table values assume a hardness of 100 mg/l $CaCO_3$. At other hardnesses, the objectives must be calculated using the following formulas where H = ln (hardness): The 4-day average objective for zinc is $0.986 \times e^{(0.8473 H+0.884)}$. The 1-hour average for zinc is $0.978 \times e^{(0.8473 H+ 0.884)}$.

Table 3-5 Water Quality Objectives for Municipal Supply

Parameter	Objective (in mg/L)
Physical:	
Color (units)[a]	15.0
Odor (number)[a]	3.0
Turbidity (NTU)a	5.0
pH[a]	6.5 - 8.0
TDS[a]	500.0
EC (mmhos/cm)[a]	900
Corrosivity	non-corrosive
Inorganic Parameters:	
Aluminum[d]	1.0[d]/0.2[e]
Antimony[d]	0.006
Arsenic[c]	0.05
Asbestos[d]	7MFL[e]
Barium[d]	1.0
Beryllium[d]	0.004
Chloride[c]	250.0
Cadmium[d]	0.005
Chromium[d]	0.05
Copper[a]	1.0
Cyanide[d]	0.15
Fluoride[f]	0.6 -1.7
Iron[a]	0.3
Lead[d]	0.05
Manganese[a]	0.05
Mercury[d]	0.002
Nickel[d]	0.1
Nitrate (as NO_3)[d]	45.0
Nitrate + Nitrite (asN)[d]	10.0
Nitrate (as N)[d]	1.0
Selenium[d]	0.05
Silver[b]	0.1
Sulfate[c]	250
Thallium[d]	0.002
Zinc[a]	5.0
Organic Parameters:	
MBAS (Foaming agents)[a]	0.5
Oil and grease[b]	none
Phenols[b]	0.001
Trihalomethanes[b]	0.1
Chlorinated Hydrocarbons:	
Endrin[h]	0.002
Lindane[h]	0.0002
Methoxychlor[h]	0.03
Toxaphene[h]	0.003
2,3,7,8-TCDD (Dioxin)[h]	3×10^{-8}
2,4-D[h]	0.07
2,4,4-TP Silvex[h]	0.05
Synthetic Organic Chemicals:	
Alachlor[h]	0.002
Atrazine[h]	0.001
Bentazon[h]	0.018
Benzo(a)pyrene[h]	0.0002
Carbofuran[h]	0.018
Chlordane[h]	0.0001
Dalapon[h]	0.2
Di (2-ethylhexyl) adipate[h]	0.4
Di(2-ethylhexyl) phthalate[h]	0.004
Dinoseb[h]	0.007
Diquat[h]	0.02
Endothall[h]	0.1
Ethylene dibromide[h]	0.00005
Glyphosate[h]	0.7
Heptachlor[h]	0.00001
Heptachlor epoxide[h]	0.00001
Hexachlorobenzene[h]	0.001
Hexachlorocyclopentadiene[h]	0.05
Molinate[h]	0.02
Oxamyl[h]	0.05
Pentachlorophenol[h]	0.001
Picloram[h]	0.5
Polychlorinated Biphenyls[h]	0.0005
Simazine[h]	0.004
Thiobencarb[h]	0.07/0.001
Volatile Organic Chemicals:	
Benzene[h]	0.001
Carbon Tetrachloride[h]	0.005
1,2-Dibromo-3-chloropropane[h]	0.0002
1,2-Dichlorobenzene[h]	0.6
1,4-Dichlorobenzene[h]	0.005
1,1-Dichloroethane[h]	0.005
1,2-Dichloroethane[h]	0.0005
cis-1,2-Dichloroethlyene[h]	0.006
trans,1,2-Dichloroethylene[h]	0.01
1,1-Dichloroethylene[h]	0.006
Dichloromethane[h]	0.005
1,2-Dichloropropane[h]	0.005
1,3-Dichloropropene[h]	0.0005
Ethylbenzene[h]	0.3
Methyl-tert-butyl ether[h]	0.13/0.005
Monochlorobenzene[h]	0.07
Styrene[h]	0.1
1,1,2,2-Tetrachloroethane[h]	0.001
Tetrachloroethylene[h]	0.005
1,2,4-Trichlorobenzene[h]	0.005
1,1,1-Trichloroethane[h]	0.200
1,1,2-Trichloroethane[h]	0.005
Trichloroethylene[h]	0.005
Trichlorofluoromethane[h]	0.15
Volatile Organic Chemicals (cont'd):	
1,1,2-Trichloro-1,2,2-trifluoromethane[h]	1.2
Toluene[h]	0.15
Vinyl Chloride[h]	0.0005
Xylenes (single or sum of isomers)[h]	1.750

Parameter	Objective (in pCi/L)
Radioactivity:	
Combined Radium-226 and Radium-228[i]	5
Gross Alpha Particle Activity[i]	15i
Tritium[i]	20,000
Strontium-90[i]	8
Gross Beta Particle Activity[i]	50
Uranium[i]	20

Notes:

a. Secondary Maximum Contaminant Levels as specified in Table 64449-A of Section 64449, Title 22 of the California Code of Regulations, as of June 3, 2005.

b. Table III-2, 1986 Basin Plan.

c. Secondary Maximum Contaminant Levels as specified in Table 64449-B of Section 64449, Title 22 of the California Code of Regulations, as of June 3, 2005. (Levels indicated are "recommended" levels. Table 64449-B contains a complete list of upper and short-term ranges.)

d. Maximum Contaminant Levels as specified in Table 64431-A (Inorganic Chemicals) of Section 64431, Title 22 of the California Code of Regulations, as of June 3, 2005.

e. MFL = million fibers per liter; MCL for fibers exceeding 10 µm in length.

f. Fluoride obectives depend on temperature.

g. A complete list of optimum and limiting concentrations is specified in Table 64433.2-A of Section 64433.2, Title 22 of the California Code of Regulations, as of June 3, 2005.

h. Maximim Contaminant Levels as specified in Table 64444-A (Organic Chemicals) of Section 64444, Title 22 of the California Code of Regulations, as of June 3, 2005.

i. Maximum Contaminant Levels as specified in Table 4 (Radioactivity) of Secton 64443, Title 22 of the California Code of Regulations, as of June 3, 2005.

j. Included Radium-226 but excludes Radon and Uranium.

MG/L Milligrams per liter
pCi/L pico Curries per liter

Table 3-6: Water Quality Objectives for Agricultural Supply[a] (in mg/l)

Parameter	Threshold	Limit	Limit for Livestock Watering
Physical:			
pHbounds	5.5-8.3	4.5-9.0	[illegible]
Iron	5.0	20.0	
Lead	5.0	10.0	0.1
Lithium		2.5[b]	
Manganese	0.2	10.0	
Molybdenum	0.01	0.05	0.5
Nickel	0.2	2.0	
NO_3+NO_2 (as N)	5.0	30[c]	100.0
Selenium		0.02	0.05
Sodium adsorption ratio (adjusted)[d]	3.0	9.0	
Vanadium	0.1	1.0	0.1
Zinc	2.0	10.0	25

Notes:

a. For an extensive discussion of water quality for agricultural purposes, see "A Compilation of Water Quality Goals," Central Valley Regional Water Quality Control Board, May 1993.

b. For citrus irrigation, maximum 0.075 mg/l.

c. For sensitive crops. Values are actually for NO_3-N + NH_4-N.

d. Adjusted SAR = $\{ Na /[(Ca + Mg)+2]^{0.5} \}\{1 + [8.4 - pHc]\}$, where pHc is a calculated value based on total cations, Ca + Mg, and CO_3 + HCO_3, 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.

TABLE 3-7 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)

GROUNDWATER QUALITY OBJECTIVES

(Concentration not to be exceeded more than 10 percent of the time during one year.)

Central Basin

TDS:	Ambient or 500 mg/l, whichever is lower
Nitrate (NO_3):	45 mg/l

Fringe Subbasins

TDS:	Ambient or 1000 mg/l, whichever is lower
Nitrate (NO_3):	45 mg/l

Upland and Highland Areas

California domestic water quality standards set forth in California Code of Regulations, 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 Code of Regulations, Title 22, Chapter 15, particularly Tables 64431-A and 64431-B of Section 64431, Table 64444-A of Sectiion 64444, and Table 4 of Section 64443.

TABLE 4-1 DISCHARGE PROHIBITIONS

IT SHALL BE PROHIBITED TO DISCHARGE:	DISCUSSION
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 such as nontidal waters and dead-end sloughs. This prohibition will (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, and (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 1974 Bays & Estuaries Policy. This area is one that has experienced chronic water quality problems.
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.
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 groundwater 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.
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 and of great value for wildlife habitat and as recreational and scientific study areas. 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 Regional 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.

TABLE 4-1 DISCHARGE PROHIBITIONS (CONTINUED)

IT SHALL BE PROHIBITED TO DISCHARGE:	DISCUSSION
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 Regional Board's policy on dredging (see section under nonpoint source control).
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 of a persistent or cumulative form 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 Regional Board. A management plan for the use and control of biocides in these cases must be approved by the Regional 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 oil 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 Regional Board Resolutions (Chapter 5) and sections in this chapter on groundwater protection and on-site wastewater systems.	The intent of this prohibition is to prevent degradation of groundwater from septic systems in these areas.
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.	The intent of this prohibition is to protect the relatively pristine nature of these special 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.
18. Sewage, whether treated or untreated, from any vessel into that portion of Richardson Bay bounded by the shore and by a line bearing 257 degrees from Peninsula Point to the shore at Sausalito, in Marin County.	The intent of this prohibition is to prevent high bacteriological counts in Richardson Bay due to significant sewage discharges from vessels.

TABLE 4-2 EFFLUENT LIMITATIONS FOR CONVENTIONAL POLLUTANTS

(ALL UNITS IN MG/L, EXCEPT AS OTHERWISE NOTED)

PARAMETERS:	30-DAY AVERAGE	7-DAY AVERAGE	DAILY MAXIMUM	INSTANTANEOUS LIMIT	SEVEN-SAMPLE MEDIUM	FIVE-SAMPLE MEDIUM
Biochemical Oxygen Demand (BOD5) [a,b]	30	45				
Suspended Solids (SS) [a]	30	45				
85% removal of BOD5 and SS [a,c]						
Total Coliform Organisms [a,d] (in MPN/100ml)						
- Shallow Water Discharge [e] (in immediate vicinity of public contact or shellfish harvesting)			240		2.2	
- Deep Water Discharge			10,000			240
pH [f] (in pH units)						
- Shallow Water Discharge				6.5-8.5		
- Deep Water Discharge				6.0-9.0		
Residual Chlorine [f] (free chlorine plus chloramines)				0.0		
Settleable Matter [f, g] (in ml/l-hr)	0.1		0.2			
Oil & Grease [f]	10		20			

NOTES:

a. These effluent limitations apply to all sewage treatment facilities that discharge to inland surface waters and enclosed bays and estuaries. The Board may also apply some of these limitations selectively to certain other non-sewage discharges, but they will not be used to preempt 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 NPDES permits for particular industries.)

b. The federal regulation allows the parameter BOD to be substituted with Carbonaceous BOD at levels that shall not exceed 25 mg/l as a 30-day average, nor 40 mg/l as a 7-day 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 simultaneous influent samples

d. (1) The Regional Board may consider substituting total coliform organisms limitations with fecal coliform organisms limitations provided that it can be conclusively demonstrated through a program approved by the Regional Board that such substitution will not result in unacceptable adverse impacts on the beneficial uses of the receiving water.
(2) The Regional Board may consider establishing less stringent requirements for any discharges during wet weather.

e. Exceptions to these requirements may be granted by the Regional 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.

f. These effluent limitations apply to all treatment facilities.

g. Discharges from sedimentation and similar cases should generally not contain more than 1.0 ml/l-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.*

Table 4-3 Acute Toxicity Effluent Limits

TABLE 4-4 ACUTE TOXICITY EFFLUENT LIMITS

Discharge/Monitoring Type	At Least 90% Survival	At Least 70% Survival
Continuous discharge/ weekly or monthly tests	11-sample[a] median	11-sample 90th percentile[b]
Continuous discharge/ quarterly or annual tests	3-sample[c] median	Single-sample maximum
Intermittent discharge	—	Single-sample maximum

NOTES:

a. 11-sample median is defined as follows: If five or more of the past ten or fewer samples show less than 90 percent survival, then survival of less than 90 percent on the next sample represents a violation of the effluent limitation.

b. 90th percentile is defined as follows: If one or more of the past ten or fewer samples show less than 70 percent survival, then survival of less than 70 percent on the next sample represents a violation of the effluent limitation.

c. 3-sample median is defined as follows: If one of the past two or fewer samples shows less than 90 percent survival, then survival of less than 90 percent on the next sample represents a violation of the effluent limitation.

Table 4-4 Critical Life Stage Toxicity Test Species and Protocols

TABLE 4-5 CRITICAL LIFE STAGE TOXICITY TEST SPECIES AND PROTOCOLS [a]

SPECIES	BIOLOGICAL EFFECTS EVALUATED	CALIFORNIA RESIDENT	LAB VS. WILD STOCK
FRESHWATER			
Ceriodaphnia sp. (Crustacean)	survival, reproduction	N	Lab
Pimephales promelas (Fathead minnow)	survival, growth	Y	Lab
Selenastrum capricornutum (unicellular algae)	cell division rate	N	Lab
MARINE			
Mysidopsis bahia (Crustacean)	survival, growth, fecundity	N	Lab
Molluscs Mytilus edulis (mussel) Crassostrea gigas (oyster) Haliotis rufescens (abalone)	embryo development, survival	Y	Wild or Field-cultured
Echinoderms Strongylocentrotus purpuratus, S. franciscanus (urchins) Dendraster excentricus (sand dollar)	fertilization success	Y	Wild
Diatom Plants Skeletonema costatum Thalassiosira pseudonana	cell division rate	Y	Lab
Macrocystis pyrifera (giant kelp)	percent germination, germ tube length	Y	Wild
Champia parvula (red algae)	number of cystocarps	N	Lab
MARINE/ BRACKISH			
Menidia beryllina	survival, larval growth	Y	Lab

NOTES:
a. All technical references and discussion are contained in "Modified Guidelines: Effluent Toxicity Characterization Program," September, 1991, San Francisco Bay Regional Water Quality Control Board.

Table 4-5 Conditions that Require Monthly Monitoring of Toxicity Levels

TABLE 4-6 CONDITIONS THAT REQUIRE MONTHLY MONITORING OF TOXICITY LEVELS

DISCHARGER MONITORING FREQUENCY	SHALLOW WATER DISCHARGERS	DEEP WATER DISCHARGERS
Quarterly		
Three-sample median[a]	> 1 TU_c	> 10 TU_c
Single-sample maximum	> 2 TU_c	> 20 TU_c
Semi-annually or annually		
Single-sample maximum	> 1 TU_c	> 10 TU_c

NOTES:

a. Exceedance of the three-sample median is defined as follows: If one of the past two or fewer samples shows greater than the toxicity threshhold listed above, then a chronic toxicity value greater than the threshhold on the next sample represents an exceedance.

Table 4-6 Controlling Wet-weather Overflows

TABLE 4-8 CONTROLLING WET-WEATHER OVERFLOWS

Levels of Water Quality Protection	Appropriate Level of Treatment
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).	Secondary treatment up to 20-year recurrence interval; above 20-year overflows allowed.
B	
Areas that do not need complete year-round protection, such as shellfish beds for dry-weather harvesting, public beaches, and other water contact areas.	Secondary treatment for all flows up to two-year recurrence interval; primary treatment up to 20-year recurrence interval; above 20-year overflows allowed.
C	
Areas where water quality or aquatic productivity may be limited due to the pollution effects of a dense human population or other urban activities that are largely uncontrollable. Such areas may include some shipyards and harbors.	Secondary treatment to half-year recurrence interval; primary treatment to five-year recurrence interval; above five-year overflows allowed.

2005 update

Table 4-~~9~~7 Publicly Owned Treatment Works (POTWs)

POTW Facility Name	Outfall Location[a]	Flow[b] (MGD)	Treatment Level	Discharge Point Latitude	Discharge Point Longitude	Comment
City of American Canyon	1	2.5	Advanced	38 11 11	122 16 27	
City of Benicia	~~1~~ 2	~~2.30~~ 4.5	Secondary	38 02 30	122 09 03	
City of Burlingame	~~2~~ 3	~~3.30~~ 5.5	Secondary	37 39 55	122 21 41	Discharge through North Bayside outfall
City of Calistoga	~~3~~ 4	~~0.60~~ 0.84	Advanced	38 33 34	122 33 28	W/dry weather reclamation
Central Contra Costa S.D.	~~4~~ 5	~~35.20~~ 53.8	Secondary	38 02 44	122 05 55	
Central Marin Sanitation A.G.	~~5~~ 6	~~8.50~~ 10	Secondary	37 56 54	122 27 23	
Contra Costa Co.S.D. No. 5	~~6~~ 7	~~0.01~~ 0.025	Secondary	38 02 55	122 10 56	
Delta Diablo S. D.	~~7~~ 8	~~9.64~~ 16.5	Secondary	38 01 40	121 50 14	
EBDA, East Bay Dischargers Authority	~~8~~ 9	~~60.00~~ 77.1	Secondary	37 41 40	122 17 42	Common outfall for EBDA & LAVWMA
- City of Hayward			Secondary			EBDA member (~~10.0~~ 16.5 mgd)
- Oro Loma S.D.			Secondary			EBDA member (~~11.3~~ 20 mgd)
- City of San Leandro			Secondary			EBDA member (~~4.41~~ 7.6 mgd)
- Union S. D.			Secondary			EBDA member (~~24.2~~ 33 mgd)
East Bay MUD	~~9~~ 10	~~71.60~~ 120	Secondary	37 49 02	122 20 55	
Fairfield Suisun Sewer Dist.	~~10~~ 11	~~12.80~~ 17.5	Secondary	38 12 33	122 03 24	W/dry weather reclamation
~~City of Hercules~~	~~11~~	~~0.37~~	~~Secondary~~	~~38 03 06~~	~~122 15 55~~	~~Share outfall w/Pinole, Rodeo~~
Las Gallinas Valley S.D.	12	~~1.70~~ 2.92	Secondary	38 01 32	122 30 58	
LAVWMA, Livermore-Amador Valley WMA	~~8~~ 9	~~11.00~~ 20	Secondary			Discharge to EBDA outfall
- Dublin/San Ramon S.D.			Secondary			LAVWMA member (~~7.7~~ 11.5 mgd)
- City of Livermore			Secondary			LAVWMA member (~~3.9~~ 6.25 mgd)
Marin Co. S.D. #6	13	~~0.78~~ 0.98	Secondary	37 52 12	112 27 05	
City of Millbrae	~~2~~ 3	~~2.00~~ 3.0	Secondary	37 39 55	122 21 41	Discharge thru North Bayside outfall
Mountain View S.D.	14	~~1.47~~ 2.4	Secondary	38 01 12	122 05 47	
Napa S.D.	15	~~14.20~~ 15.4	Advanced	38 14 09	122 17 10	W/dry weather reclamation
N. San Mateo Co. S.D.	16	~~8.10~~ 8.0	Secondary	37 42 48	122 30 50	
Novato S.D.	17	~~4.90~~ 6.55	Secondary	39 04 00	122 29 00	
City of Pacifica	18	~~1.40~~ 3.3	Advanced	~~37 37 55~~	~~122 30 30~~	37 36 53 122 29 16
City of Palo Alto	19	~~10.00~~ 39	Advanced	37 27 11	122 06 36	
City of Petaluma	20	~~4.20~~ 5.2	Secondary	38 12 33	122 34 22	W/dry weather reclamation
Cities of Pinole & Hercules	~~11~~ 21	~~2.00~~ 4.06	Secondary	38 03 06	122 15 55	Share outfall w/~~Hercules,~~ Rodeo
Rodeo S.D.	~~11~~ 21	~~0.70~~ 1.14	Secondary	38 03 06	122 15 55	Share outfall w/~~Hercules,~~ Pinole/Hercules
City & Co. of S.F., Southeast	~~21~~ 22	~~67.00~~ 85.4	Secondary	37 44 58	122 22 22	
City & Co. of S.F., Oceanside	~~22~~ 23	~~22.00~~ 43	Secondary	37 42 18	122 34 39	
City & Co. of S.F., Int. Airport	~~2~~ 3	~~0.90~~ 2.2	Secondary	37 39 55	122 21 41	Discharge through North Bayside outfall
San Jose/Santa Clara WPCP	~~23~~ 24	~~120.00~~ 167	Advanced	37 26 06	121 57 08	
City of San Mateo	~~24~~ 25	~~10.20~~ 13.6	Advanced	37 34 50	122 14 45	
Sausalito-Marin City S.D.	~~25~~ 26	~~1.36~~ 1.8	Secondary	37 50 37	122 28 03	
Sewer Authority Mid-Coastside	~~26~~ 27	~~1.50~~ 4.0	Secondary	37 28 23	122 27 00	
Sewerage Agency of So. Marin	~~27~~ 13	~~2.63~~ 3.6	Secondary	37 52 12	112 27 05	
Sonoma Valley County S.D.	28	~~2.80~~ 3.0	Secondary	38 14 14	122 25 51	W/dry weather reclamation
So. Bayside System Authority	29	~~15.00~~ 29	Secondary	37 33 48	122 12 55	
So. S.F./San Bruno WQCP	~~30~~ 3	~~8.70~~ 13	Secondary	37 39 55	122 21 41	
City of St. Helena	~~31~~ 30	~~0.34~~ 0.5	Secondary	30 30 10	122 26 15	W/dry weather reclamation
City of Sunnyvale	~~32~~ 31	~~17.10~~ 29.5	Advanced	37 26 00	122 02 00	
U.S. Navy Treasure Island	32	2.0	Secondary	37 49 50	122 21 25	As part of base closure will be transferred to City & Co. of S.F.
Vallejo Sanitation & Flood Control	33	~~12.50~~ 15.5	Secondary	38 03 53	122 13 42	W/dry weather reclamation
West County Agency, WCA	34	~~13.10~~ 28.5	Secondary	37 54 47	122 25 06	~~Share outfall w/West Co. W.D.~~ WCA common outfall (replaces above)
- City of Richmond			Secondary			WCA member (16mgd)
- West County Wastewater Dist.	~~34~~	~~6.70~~	Secondary	~~37 54 47~~	~~122 25 06~~	~~Share outfall w/West Co. Agency~~ WCA member (12.5 mgd)(replaces above)
Town of Yountville	35	~~0.38~~ 0.55	Advanced	38 24 30	122 20 25	W/dry weather reclamation

Notes:
a. Figure 4-1 shows corresponding outfall locations.
b. Dry weather flow as identified in current permits. MGD is million gallons per day.

Table 4-8 Major Industrial Discharge Outfalls

Industrial Dischargers	Outfall Location	Industrial Category	Treatment	Discharger Latitude	Point Longitude
C & H Sugar Co.	1	Sugar refining	Activated sludge	30 03 30	122 13 28
Chevron Chemical	2	Chemical manufacturing	Pond	37 58 15	122 25 45
Chevron U.S.A.	2	Petroleum refining	Activated sludge/ wetland	38 58 15	123 25 45
ConocoPhillips	3	Petroleum refining	Activated sludge/ pond/carbon	38 03 22	122 15 36
Dow Chemical Co.	4	Chemical manufacturing	Neutralization/ activated carbon	38 01 48	121 51 07
General Chemical Corp. Bay Point Works	5	Chemical manufacturing	Neutralization/ pond	38 02 48	121 59 10
Pittsburg Power Plants	6	Steam electric power	Filtration	38 02 30	121 53 20
Rhodia, Inc.	7	Sulfuric acid regeneration	Neutralization/ pond	38 02 18	122 07 01
San Francisco Int'l Airport	8	Various	Physical/chemical		
Shell Oil Company	9	Petroleum refining	Activated sludge/ carbon	38 01 56	122 07 44
Tesoro Refining	10	Petroleum refining	Pond/RBC/carbon	38 02 54	122 05 22
USS-Posco Industries	11	Steel finishing	Physical/chemical	38 01 48	121 51 32
Valero Refining Co.	12	Petroleum refining	Activated sludge/ carbon	38 03 18	122 07 07

Table 4-9 Status of Urban Runoff Control Programs

TABLE 4.11 STATUS OF URBAN RUNOFF CONTROL PROGRAMS

MUNICIPALITIES CONDUCTING BASELINE CONTROL PROGRAMS

CITIES		COUNTIES
Belvedere	Petaluma	Marin
Benecia	Ross	Napa
Calistoga	San Anselmo	Solano
Corte Madera	San Rafael	Sonoma
Fairfax	Sausalito	
Larkspur	Sonoma	
Mill Valley	St. Helena	
Napa	Tiburon	
Novato	Yountville	

ENTITIES CONDUCTING COMPREHENSIVE CONTROL PROGRAMS

LOCALE	PERMITTED ENTITY	COMPLETED CHARACTERIZATION OF STORMWATER QUALITY AND RUNOFF POLLUTANT LOADING?	DATE PERMITTED
Santa Clara County	Santa Clara Valley Nonpoint Source Pollution Control Program	Yes	1990
Alameda County	Alameda County Urban Runoff Clean Water Program	Yes	1991
San Mateo County	San Mateo County Stormwater Pollution Prevention Program	Yes	1993
Contra Costa County	Contra Costa Clean Water Program	Yes	1993
Vallejo	City of Vallejo	No	Applied in 1994
Suisun City	City of Suisun City	No	Applied in 1994
Fairfield	City of Fairfield	No	Applied in 1994

Table 4-10 Potential Consequences and Impacts of Dredging and Dredged Material Disposal

TABLE 4-12 POTENTIAL CONSEQUENCES AND IMPACTS OF DREDGING AND DREDGED MATERIAL DISPOSAL

Consequences	Impacts
Bottom disturbance	Mastication of sediment-inhabiting organisms; smothering of organisms living in or on the bottom; 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; increased stress on organisms resulting in reduced ability to meet environmental and biological demands
Mobilization of toxicants adsorbed to sediments	Uptake and accumulation by aquatic organisms
Release of biostimulatory substances (nitrogen, phosphorus, ammonia)	Stimulation of algal growth; ammonia toxicity

Table 4-11 Goals of LTMS

TABLE 4-13 GOALS OF LTMS

1) Maintain those channels in the SF Bay Estuary which are necessary for navigation, in an environmentally and economically sound manner and eliminate unnecessary dredging activities in the region

2) Conduct dredged material disposal activities in the most environmentally sound manner

3) Maximize the use of dredged material as a resource

4) Establish a cooperative permitting framework for dredging permit applications

Table 4-12 LTMS Participants

TABLE 4-14 LTMS PARTICIPANTS

EXECUTIVE COMMITTEE

- Corps of Engineers, South Pacific Division, Commander
- U.S. EPA, Region IX, Regional Administrator
- State Dredging Coordinator
- San Francisco Bay Conservation and Development Commission, Chairperson
- San Francisco Bay Regional Water Quality Control Board, Chairperson

MANAGEMENT COMMITTEE

- Corps of Engineers, San Francisco District, District Engineer
- Corps of Engineers, South Pacific Division, LTMS Program Manager
- U.S. EPA, Region IX, Regional Administrator
- San Francisco Bay Conservation and Development Commission, Executive Director
- San Francisco Bay Regional Water Quality Control Board, Executive Officer
- State Water Resources Control Board, Executive Director

POLICY REVIEW COMMITTEE

- Other state and federal agencies with an interest in San Francisco Bay Area dredging (e.g., U.S. Navy, California State Department of Boating and Waterways, State Lands Commission)
- Bay Area ports and marinas
- Environmental and fishing organizations
- Development interests and other interested parties

WORK GROUPS

- Staff of RWQCB Chair of In-bay studies
- Staff of BCDC Chair of Upland/Non-aquatic and Reuse studies
- Staff of U.S. EPA Chair of Ocean studies
- Varying levels of participation by the organizations listed above

IMPLEMENTATION COMMITTEE

Ad-hoc leadership and varying levels of participation by the organizations listed above

TECHNICAL/SCIENCE ADVISORY PANEL

Semi-annual meetings of panel by five experts in the areas of:

- Physical processes,
- Chemistry,
- Benthic community analysis,
- Sediment toxicology, and
- A representative of the Corps of Engineers' national laboratory.

Table 4-13 Dredged Material Volume Targets

TABLE 4-15 DREDGED MATERIAL VOLUME TARGETS

ANNUAL

The following volume targets shall be utilized each calendar year (i.e., January to December) at each aquatic disposal site:

Alcatraz Island (SF-11)	4.0 million cubic yards
San Pablo Bay (SF-10)	0.5 million cubic yards
Carquinez Straits (SF-9)	2.0 million cubic yards (Normal Water Year)[a] 3.0 million cubic yards (Wet Water Year)

MONTHLY

The following volume targets shall be utilized on a monthly basis at each aquatic disposal site:

Alcatraz Island (SF-11)	October - April May - September	1.0 million cubic yards 0.3 million cubic yards
San Pablo Bay (SF-10)	Any month	0.5 million cubic yards
Carquinez Straits (SF-9)	Any month	1.0 million cubic yards

NOTES:

a. Water year classifications are designated by the California Department of Water Resources (DWR). The DWR water year begins on October 1 and is based on unimpaired flows as defined in the State Board's Water Rights Decision 1485.

Table 4-14 Inactive Mine Sites

Number	Mine Name	Associated Material
1	Snowflake	magnesite
2	Palisade	mercury
3	Silverado	mercury
4	La Joya	mercury
5	Hastings	mercury
6	St. John's	mercury
7	Borges	mercury
8	H. Corda	mercury
9	Cycle	mercury
10	Franciscan	mercury
11	Chileno Valley	mercury
12	Gambonini	mercury
13	Union Gulch	copper
14	Leona Heights	pyrite
15	Alma	pyrite
16	Black Diamond	coal
17	Buckhorn	manganese
18	Man Ridge	manganese
19	Section 14	coal
20	Newman	chromite
21	Livermore Coal	coal
22	Pendarin	coal
23	Camp 9	manganese
24	Challenge	mercury

Number	Mine	Associated Material
25	Hillsdale	mercury
26	Silver Creek	mercury
27	Winegar	manganese
28	Fable Manganese	manganese
29	Western	magnesite
30,31	Maltby	magnesite
32	Keller	magnesite
33	Queenbee No. 1	manganese
34	Blackhorse	manganese
35	Black Eagle	manganese
36	Jones Group	manganese
37	Mexican Deposits	manganese
38	Pine Ridge	manganese
39	April	mercury
40	Cristobal	mercury
41	San Francisco	mercury
42	San Pedro Pit	mercury
43	Enriquita	mercury
44	San Mateo	mercury
45	Senator	mercury
46	Guadalupe Mines	mercury
47	Hooker Creek	copper
48	Marine Magnes Div.	magnesium salts

Delete Table 4-18 in 2005 Basin Plan General Update

TABLE 4-18 SUMMARY OF LOCAL AGENCY UNDERGROUND STORAGE TANKS (UST) PROGRAMS (AS OF APRIL 1992)[9]

JURISDICTION/AGENCY	PROGRAM START DATE	STAFF	CASES	COMMENTS
ALAMEDA COUNTY				
County Health Department	10/91	7.5	392	d,e
Alameda County Water District (Fremont, Union City, Newark)	5/88	2.5	286	a,c,e
CONTRA COSTA COUNTY				
County Health Services Department	1988	7	>270	c,e
MARIN COUNTY				
City of San Rafael	2/90	1	98	c,f
NAPA COUNTY				
Department of Environmental Management	5/89	2.3	152	a,e
SAN FRANCISCO COUNTY				
County Public Health Department	6/91	3	90	c
SAN MATEO COUNTY				
County Department of Health Services	1988	5	600	b
SANTA CLARA COUNTY				
Santa Clara Valley Water District	3/87	13	1134	a,b,d,e
SOLANO COUNTY				
County Health Department	1/92	1	30	c
SONOMA COUNTY				
County Health Department	4/88	8.75	360	a,e,d

NOTES:

a. Guidance Document is available, contact agency.
b. Agency may close soil-only pollution cases without review by RWQCB.
c. Program is self-funded; agency does not have LOP contract with State Board.
d. Program is both self-funded and funded through a LOP contract.
e. Agency oversees other related activities, including one or more of the following: tank and pipe line inspections, well permitting and inspection, Hazardous Materials Management Plan review, and groundwater protection program oversight.
f. The City of San Rafael contracts out some of its inspection and oversight work to private consulting firms. Responsible parties are billed for oversight costs.
g. For more up-to-date or detailed information, please contact the local agency directly.

Delete Table 4-19 in 2005 Basin Plan General Update

TABLE 4-19 OPTIONS FOR FUTURE MANAGEMENT STRATEGIES AT GROUNDWATER CLEANUP SITES

CONTINUE EXISTING APPROACH:

Develop site specific cleanup levels utilizing Resolution Nos. 68-16 and 92-49, MCLs, and risk assessment.

ADOPT MORE STRINGENT APPROACH:

Require clean-up levels based exclusively on background or a stringent risk-management requirement (e.g., 10^{-6} excess cancer, etc.).

STREAMLINE EXISTING PROGRAM:

Adopt Basin Plan amendments or a general Regional Board Order with a standardized process for dischargers to identify investigation, remediation, and clean-up level requirements.

Develop a decision process whereby individual site and pollution information could be used to determine specific clean-up levels.

Develop clean-up levels and policies for individual groundwater basins or sub-basins based on designated beneficial uses.

Establish procedures to change clean-up standards, including long-term monitoring and hydraulic controls, when the Regional Board concurs that existing clean-up technology is no longer operating efficiently or will not meet clean-up standards.

Improve access to geographical information system-based data bases to assist in identifying critical groundwater resources.

DEVELOP AND IMPLEMENT REGIONAL OR SUB-REGIONAL MITIGATION PROGRAMS:

Identify conditions under which measures to mitigate the effect of pollution above prescribed clean-up levels should be considered by dischargers.

Identify potential mitigation alternatives such as regional groundwater programs in individual basins that will have a net benefit of protecting groundwaters.

Table 6-1 Parameters Analyzed for in the Regional Monitoring Program

Conventional Water Quality Parameters
Conductivity
Dissolved Ammonia
Dissolved Nitrate
Dissolved Nitrite
Dissolved Organic Carbon
Particulate Organic Carbon
Dissolved Oxygen
Dissolved Phosphates
Dissolved Silicates
Hardness (when salinity is < 5 parts per thousand)
pH
Phaeophytin
Salinity
Temperature
Total Chlorophyll-*a*
Total Suspended Solids
Sediment Quality Parameters
% clay (< 4 µm)
% silt (4 µm–62 µm)
% sand (2 mm > 62 µm)
% gravel (> 2 mm)
% solids
Depth
Hydrogen Sulfide *(QAQC measurements)*
pH (porewater, interstitial sediment)
Total Ammonia *(QAQC measurements)*
Total Organic Carbon
Total Sulfide *(QAQC measurements)*
Total Nitrogen
Bivalve Tissue Parameters
% Lipid
% Moisture
Bivalve Percent Survival
Growth - Change in Internal Shell Volume (mean, std. dev)
Dry Flesh Weight (mean and std error)
Toxicity Tests—Water and Sediment
Episodic Aquatic Toxicity – (*Ceriodaphnia, Menidia,* Mysid) % Survival
Sediment Toxicity – (Amphipod) % Survival
Sediment Toxicity – (Bivalve) % Normal Development

Table 6-1 Parameters Analyzed for in the Regional Monitoring Program continued

Trace elements analyzed in water, sediment, and tissue samples:
Target Method Detection Limits (MDLs) are in parentheses following the reporting units.

	Water (Dissolved and Total)	**Sediment** (dry weight)
Lab(s)	BRL/UCSCDET	BRL/CCSF/ UCSCDET
Aluminum (Al)*	-	mg/kg (200)
Arsenic (As)	µg/L (0.1)	mg/kg (0.2)
Cadmium (Cd)*	µg/L(0.001)	mg/kg (0.001)
Cobalt (Co)*	µg/L(0.001)	
Copper (Cu)*	µg/L (0.01)	mg/kg (2)
Iron (Fe)*	µg/L(10)	mg/kg (200)
Lead (Pb)*	µg/L (0.001)	mg/kg (0.5)
Manganese (Mn)*	µg/L (0.01)	mg/kg (20)
Mercury (Hg)	µg/L (.0001)	mg/kg (0.00001)
Methylmercury (MeHg)	ng/L (0.005)	µg/kg (0.005)
Nickel (Ni)*	µg/L (0.01)	mg/kg (5)
Selenium (Se)	µg/L (0.02)	mg/kg (0.01)
Silver (Ag)*	µg/L (0.0001)	mg/kg (0.001)
Zinc (Zn)*	µg/L (0.005)	mg/kg (5)

- Parameter is not sampled for the matrix.
* Near-total instead of total concentrations are reported for water. Near-total metals are extracted with a weak acid (pH < 2) for a minimum of one month, resulting in measurements that approximate bioavailability of these metals to Estuary organisms.

Table 6-1 Parameters Analyzed for in the Regional Monitoring Program continued

Trace organic parameters (lab; reporting units) – in water (AXYS & CDFG; pg/L), sediment (EBMUD; µg/kg), and bivalve tissue (CDFG-WPCL; µg/kg) samples:
Organochlorines analyzed by GC-ECD will be determined using two columns of differing polarity.

Polynuclear Aromatic Hydrocarbons (PAHs) (Target MDLs: water – 200 pg/L, sediment and tissue – 5 µg/kg; water PAHs reported in ng/L)	**SYNTHETIC BIOCIDES** (Target MDLs: water – 2 pg/L, sediment and tissue – 1 µg/kg)	**OTHER SYNTHETIC COMPOUNDS** [1]New analytes added in 2002. [2]Not required by RMP but are expected to be analyzed in the 2002 RMP samples.
1-Methylnaphthalene	**Cyclopentadienes**	**Polychlorinated Biphenyls (PCB) Congeners (IUPAC numbers)**
2,3,5-Trimethylnaphthalene	Aldrin	(Target MDLs: water – 2 pg/L, sediment and tissue – 1 µg/kg)
2,6-Dimethylnaphthalene	Dieldrin	8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, 105, 110, 118, 128, 132, 138, 141, 149, 151, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, 203
2-Methylnaphthalene	Endrin	
Biphenyl		
Naphthalene	**Chlordanes**	
1-Methylphenanthrene	alpha-Chlordane	
Acenaphthene	cis-Nonachlor	
Acenaphthylene	gamma-Chlordane	
Anthracene	Heptachlor	**Polybrominated Diphenyl Ethers[1]**
Fluorene	Heptachlor Epoxide	(BDE-IUPAC No., Compound Name)
Phenanthrene	Oxychlordane	(Target MDLs: water – 1 pg/L, sediment and tissue – 1 µg/kg).
Benz(a)anthracene	trans-Nonachlor	
Chrysene		
Fluoranthene	**Dichloro-diphenyl-trichloroethane (DDTs)**	BDE 7 [2,4-DiBDE]
Pyrene	o,p'-DDD	BDE 8 [2,4'-DiBDE]
Benzo(a)pyrene	o,p'-DDE	BDE 10 [2,6-DiBDE]
Benzo(b)fluoranthene	o,p'-DDT	BDE 11 [3,3'-DiBDE]
Benzo(e)pyrene	p,p'-DDD	BDE 12 [3,4-DiBDE]
Benzo(k)fluoranthene	p,p'-DDE	BDE 13 [3,4'-DiBDE]
Dibenz(a,h)anthracene	p,p'-DDT	BDE 15 [4,4'-DiBDE]
Perylene		BDE 17 [2,2',4-triBDE]
Benzo(ghi)perylene		BDE 25 [2,3',4-triBDE]
Indeno(1,2,3-cd)pyrene	**Hexachlorcyclohexane (HCH)**	BDE 28 [2,4,4'-triBDE]
Dibenzothiophene	alpha-HCH	BDE 30 [2,4,6-triBDE]
	beta-HCH	BDE 32 [2,4',6-triBDE]
Alkylated PAHs	delta-HCH	BDE 33 [2',3,4-triBDE]
C1-Chrysenes	gamma-HCH	BDE 35 [3,3',4-triBDE]
C2-Chrysenes		BDE 37 [3,4,4'-triBDE]
C3-Chrysenes	**Other Synthetic Biocides**	BDE 47 [2,2',4,4'-tetraBDE]
C4-Chrysenes	Chlorpyrifos (water only; CDFG-WPCL)	BDE 49 [2,2',4,5'-tetraBDE]
C1-Dibenzothiophenes	Dacthal (water only)	BDE 51 [2,2',4,6'-tetraBDE]
C2-Dibenzothiophenes	Diazinon (water only; CDFG-WPCL)	BDE 66 [2,3',4,4'-tetraBDE]
C3-Dibenzothiophenes	Endosulfan I (water only)	BDE 71 [2,3',4',6-tetraBDE]
C1-Fluoranthene/Pyrenes	Endosulfan II (water only)	BDE 75 [2,4,4',6-tetraBDE]
C1-Fluorenes	Endosulfan Sulfate (water only)	BDE 77 [3,3',4,4',-tetraBDE]
C2-Fluorenes	Hexachlorobenzene	BDE 82 [2,2',3,3',4-pentaBDE]
C3-Fluorenes	Mirex	BDE 85 [2,2',3,4,4'-pentaBDE]
C1-Naphthalenes	Oxadiazon (water only)	BDE 99 [2,2',4,4'5-pentaBDE]
C2-Naphthalenes		BDE 100 [2,2',4,4',6-pentaBDE]
C3-Naphthalenes		BDE 105 [2,3,3',4,4',-pentaBDE]
C4-Naphthalenes		BDE 116 [2,3,4,5,6-pentaBDE]
C1-Phenanthrene/Anthracenes		BDE 119 [2,3',4,4',6-pentaBDE]
C2-Phenanthrene/Anthracenes		BDE 120 [2,3',4,5,5'-PeBDE
C3-Phenanthrene/Anthracenes		BDE 126 [3,3',4,4',5-PeBDE]
C4-Phenanthrene/Anthracenes		BDE 128 [2,2',3,3',4,4'-hexaBDE]
		BDE 138 [2,2',3,4,4',5'-hexaBDE]

Trace organic parameters (lab; reporting units) – in water (AXYS & CDFG; pg/L), sediment (EBMUD; µg/kg), and bivalve tissue (CDFG-WPCL; µg/kg) samples:
Organochlorines analyzed by GC-ECD will be determined using two columns of differing polarity.

Polynuclear Aromatic Hydrocarbons (PAHs) (Target MDLs: water – 200 pg/L, sediment and tissue – 5 µg/kg; water PAHs reported in ng/L)	**SYNTHETIC BIOCIDES** (Target MDLs: water – 2 pg/L, sediment and tissue – 1 µg/kg)	**OTHER SYNTHETIC COMPOUNDS** [1]New analytes added in 2002. [2]Not required by RMP but are expected to be analyzed in the 2002 RMP samples.	
		BDE 140	[2,2', 3,4,4',6'-hexaBDE]
		BDE 153	[2,2',4,4',5,5'-hexaBDE]
		BDE 154	[2,2',4,4',5,6'-hexaBDE]
		BDE 155	[2,2',4,4',6,6'-hexaBDE]
		BDE 166	[2,3,4,4',5,6'-hexaBDE]
		BDE 181	[2,2',3,4,4',5,6'-heptaBDE]
		BDE 183	[2,2',3,4,4',5',6-heptaBDE]
		BDE 190	[2,3,3',4,4',5,6-heptaBDE]
		BDE 203	[2,2',3,4,4',5,5',6]
		BDE 206	[2,2',3,3'4,4',5,5',6]
		BDE 209	[2,2',3,3',4,4',5,5',6,6'-decaBDE]

Table 6-2 Mussel Watch Program Monitoring Network

Station Number	Station Name	LATITUDE	LONGITUDE	SAMPLING HISTORY
203.0	Tomales Bay / Shell Beach	38 07 03	122 52 25	1979-1982, 1991-1992, 1997-2000
203.1	Tomales Bay / Vincent Landing	38 13 08	122 56 39	1997-2000
203.2	Tomales Bay / Walker Ck Mouth #5	38 12 34	122 56 08	1999-2000
203.3	Tomales Bay / Walker Ck Mouth #1	38 12 30	122 55 43	1997-2000
203.4	Tomales Bay / Walker Ck Mouth #4	38 12 23	122 55 41	1998-2000
203.5	Tomales Bay / Walker Ck Mouth #2	38 12 22	122 55 51	1997-2000
203.7	Tomales Bay / Walker Ck Mouth #3	38 12 15	122 55 39	1997, 1999-2000
203.8	Tomales Bay / Marshall	38 09 05	122 53 19	1998-2000
203.9	Tomales Bay / Nicks Cove	38 11 57	122 55 16	1997-1998
204.0	Estero De San Antonio	38 16 11	122 58 47	1993
204.1	Tomales Bay / HP	38 12 27	122 56 34	2000
204.2	Tomales Bay / Hog Island	38 11 51	122 56 12	2000
204.3	Tomales Bay / Hamlet	38 12 23	122 55 35	1999-2000
204.4	Tomales Bay / Audubon	38 09 52	122 54 02	1999-2000
204.5	Tomales Bay / McDonald	38 10 48	122 54 33	2000
207.0	Point Reyes	37 59 35	122 59 16	1976-1979, 1991
208.0	Bolinas	37 54 37	122 41 00	1980-1981
210.0	Salmon Creek / Marshall-Petaluma Rd Brid	38 09 52	122 46 32	1999
210.1	Walker Creek / Mine Creek	38 09 47	122 46 57	1997
210.3	Walker Creek / Mid Stream	38 10 08	122 47 35	1997
210.5	Walker Creek / USGS Stream Gauge	38 10 32	122 49 15	1998
210.7	Walker Creek / Hwy 1	38 13 25	122 54 23	1998-1999
211.1	Lagunitas Creek / Bridge #1	38 02 59	122 45 36	1997
211.3	Lagunitas Creek / Bridge #2	38 01 45	122 44 14	1997
220.0	Napa River / Tubbs Ln.	38 28 47	122 24 56	1998
220.1	Napa River / Larkmead Ln.	38 27 20	122 24 23	1998
220.3	Napa River / Pope St.	38 25 31	122 22 25	1998
220.5	Napa River / Yountville Cross Rd.	38 22 46	122 18 37	1998
224.0	Sonoma Creek / Agua Caliente Rd.	38 17 58	122 29 01	1998
224.1	Sonoma Creek / Petaluma Rd.	38 16 49	122 28 23	1998
224.3	Sonoma Creek / Watmaugh Rd.	38 15 46	122 27 53	1998
230.0	Petaluma River / Ely Rd	38 17 06	122 40 02	1999
298.3	Concord Naval Weapons Station / Pier 4	38 03 25	122 00 01	1988
298.4	Concord Naval Weapons Station / Seal Isl	38 03 21	122 02 50	1988
299.1	Selby Slag 4	38 03 25	122 14 52	1988, 1996
299.2	Selby Slag 5	38 03 29	122 14 48	1988
299.3	Selby Slag 6	38 03 31	122 14 19	1988
299.4	Selby Slag 7	38 03 28	122 13 54	1988
300.2	Mare Island	38 04 30	122 14 45	1985-1989
301.0	Davis Point	38 03 09	122 15 36	1980, 1983, 1988
301.4	Union Oil Outfall	38 02 44	122 15 43	1988-1989
302.0	Point Pinole	38 00 60	122 21 48	1980-1993, 1995
302.4	Castro Cove Bridge	37 57 10	122 23 09	1988-1990
302.6	Paradise Cove	37 53 58	122 27 52	1996
303.0	Richmond/San Rafael Bridge	37 55 55	122 26 08	1980-1993
303.1	Santa Fe Channel / Mouth	37 54 30	122 21 40	1986, 1991
303.2	Lauritzen Canal / Mouth	37 55 15	122 21 60	1985-1988
303.3	Lauritzen Canal / End	37 55 26	122 21 58	1986-1988, 1991
303.4	Santa Fe Channel / End	37 55 26	122 22 32	1985-1987, 1991
303.6	Richmond Inner Harbor Basin	37 54 45	122 20 60	1985-1989
304.0	Staufer's	37 54 21	122 20 00	1982
304.4	Serl Intake	37 54 21	122 19 55	1991
304.6	Point Isabel	37 53 54	122 19 31	1988
305.0	San Francisco Bay / Angel Island	37 51 17	122 25 03	1980-1983
306.0	San Francisco Bay / Fort Baker	37 49 51	122 28 26	1981, 1983, 1991-1993, 1999-2000
306.1	Gashouse Cove / Laguna St	37 48 23	122 25 57	1996
306.2	Sansome St. / Pier 31	37 48 23	122 24 10	1996
306.3	Howard St. / Pier 14	37 47 35	122 23 26	1996
306.4	Central Basin / Outer	37 45 47	122 23 05	1996
306.5	Alcatraz Island	37 49 40	122 25 13	1989
307.0	San Francisco Bay / Treasure Island	37 48 42	122 21 33	1979-1993, 1997
307.1	San Leandro Bay / Damon Channel	37 45 03	122 12 49	1999
307.2	Alameda Yacht Harbor	37 46 45	122 15 15	1985-1989
307.3	Oakland Inner Harbor / West	37 47 59	122 19 53	1986-1987
307.4	Oakland Inner Harbor / Embarcadero Cove	37 46 50	122 14 40	1985-1989, 1991-1993
307.5	Lake Merritt	37 47 34	122 15 43	1992-1993
307.6	Oakland Back Harbor	37 45 30	122 13 25	1985-1988, 1999
307.7	San Leandro Bay/Elmhurst Ch	37 44 34	122 12 35	1999
307.8	San Francisco Outfall	37 44 55	122 22 30	1989

Table 6-2 Mussel Watch Program Monitoring Network

307.9	San Francisco / Islais Channel	37 44 51	122 23 05	1987-1988
308.0	San Francisco Bay / Hunter's Point	37 41 42	122 20 27	1981-1983, 1991-1993, 1995, 1997
308.2	Hunter's Point Shipyard	37 42 25	122 23 10	1988-1989
309.0	San Mateo Bridge / 8B	37 36 21	122 17 20	1980-1987, 1991-1993, 1995, 1997
310.0	San Mateo Bridge / 8A	37 35 21	122 16 08	1982
311.0	San Mateo Old Bridge	37 35 52	122 15 08	1982
311.4	North / South Bay	37 34 16	122 08 59	1996
312.0	Belmont Slough	37 32 60	122 14 47	1982
313.0	San Francisco Bay near Redwood Creek	37 33 09	122 11 45	1981-1985, 1991-1993, 1995, 1997
314.0	Redwood Creek / Channel Marker 10	37 31 49	122 11 38	1982
315.0	Redwood Creek / Towers	37 30 55	122 12 22	1982-1983
316.0	Redwood Creek / Tradewinds	37 30 09	122 12 49	1980, 1982-1983
317.0	Redwood City / STP Outfall	37 29 44	122 13 03	1983
318.0	Redwood Creek / Pete's Marina	37 30 00	122 13 24	1983
318.4	Redwood Creek / Bair Island	37 30 02	122 13 23	1987
319.0	Redwood Creek / Pulgas	37 30 30	122 14 37	1983
320.0	San Francisco Airport	37 30 55	122 14 50	1983
321.0	Dumbarton Bridge / Channel Marker 14	37 30 50	122 07 58	1980-1989, 1991-1992, 1995, 1997
323.3	Palo Alto Outfall	37 27 51	122 06 42	1989-1990
324.0	Newark Slough	37 29 36	122 05 11	1982
325.0	Channel Marker 17	37 28 41	122 04 32	1982
326.0	Palo Alto / Channel Marker 8	37 27 38	122 03 06	1982-1983, 1991-1993
327.0	Palo Alto / Yacht Club	37 27 09	122 02 10	1982
328.0	Alviso Slough	37 27 49	122 01 40	1982
329.0	Guadalupe Creek / Almaden Expressway	37 16 31	121 52 33	1997
329.1	Arroyo Calero / Harry Rd.	37 12 42	121 49 41	1998
329.2	Guadalupe Creek / Hicks Road	37 13 22	121 54 16	1997-1998
329.3	Alamitos Creek / Bubbling Well Pl.	37 13 25	121 51 10	1998
329.4	Alamitos Creek / Almanden Road	37 10 44	121 48 57	1997-1998
329.5	Guadalupe River / Capitol Expressway	37 17 53	121 49 25	1998
330.0	Duxbury Reef	37 53 38	122 42 09	1980-1981
331.0	Muir Beach	37 51 28	122 34 50	1980
332.0	Point Bonita	37 49 11	122 31 53	1980
333.0	Farallon Islands	37 41 45	123 00 00	1978-1980
334.0	Cliff House	37 46 57	122 30 46	1980
335.0	Pacifica	37 40 09	122 29 41	1980
336.0	J. Fitzgerald	37 30 45	122 30 30	1978-1981, 1991, 1998-2000
399.2	Pescadero Creek	37 14 57	122 23 40	1988-1989

Table 6-3 Key to Figure 6-3: Toxic Substances Monitoring Network

Station Number	Station Name	LATITUDE	LONGITUDE
204.30.11	Alameda Creek / Niles Canyon Road	37 34 58	121 57 47
204.30.00	Alameda Creek / Shinn Pit	37 34 17	121 59 15
205.40.17	Alamitos Creek d/s Almaden Reservoir	37 10 27	121 49 23
205.40.18	Almaden Reservoir	37 9 45	121 49 48
205.30.30	Anderson Reservoir	37 9 58	121 37 30
205.50.08	Bear Gulch Reservoir	37 26 0	122 13 40
205.50.07	Calabazas Creek d/s Tasman Drive	37 24 10	121 59 10
205.40.16	Calero Reservoir	37 10 50	121 47 10
205.30.08	Coyote Creek / Brokaw Road	37 23 0	121 54 15
205.30.18	Coyote Creek / Percolation Pond	37 13 48	121 45 12
205.30.07	Coyote Creek u/s Montague Expressway	37 23 45	121 54 50
205.30.37	Coyote Reservoir	37 7 15	121 33 5
206.50.24	Dry Creek	38 24 22	122 26 22
204.20.00	Elmhurst Creek / Mouth	37 44 35	122 12 23
205.40.13	Guadalupe Creek d/s Guadalupe Reservoir	37 12 0	121 52 50
205.40.14	Guadalupe Reservoir	37 11 53	121 52 34
205.50.09	Guadalupe River / Howard Street	37 20 20	121 54 5
205.40.08	Guadalupe River / Percolation Pond	37 14 50	121 52 19
206.50.03	Lake Chabot / Solano County	38 8 11	122 14 5
207.21.03	Lake Herman	38 5 45	122 9 20
202.10.01	Lake Merced	37 43 38	122 29 15
205.40.02	Los Gatos Creek	37 14 17	121 58 18
206.50.14	Napa River / Napa	38 22 6	122 18 8
207.10.12	New York Slough	38 2 1	121 52 7
206.30.07	Petaluma River / Lakeville	38 11 59	122 33 0
204.20.01	San Leandro Creek / Highway 880 Bridge	37 43 31	122 10 56
206.60.01	San Pablo Creek	37 58 3	122 21 46
206.40.08	Sonoma Creek	38 16 3	122 28 2
205.50.94	Stevens Creek	37 18 15	122 14 24
205.50.10	Stevens Creek Reservoir	37 17 38	122 4 41
207.10.90	Suisun Bay	38 4 5	122 2 40
205.40.01	Vasona Lake	37 14 45	121 58 0
201.12.01	Walker Creek	38 14 0	122 54 47
207.32.06	Walnut Creek	37 54 3	122 3 33

Table ~~4-1a~~ 7-1: Monitoring Stations for Copper and Nickel in Lower South San Francisco Bay

SBS Site ID	Reference Location	Longitude	Latitude	RMP Site ID
SB01	Channel Marker #14	37° 30.782'	122° 8.036'	BA30
SB02	Channel Marker #16	37° 29.595'	122° 5.243'	BA20
SB03	Channel Marker #20	37° 27.437'	122° 3.033'	BA10
SB04	Coyote Creek Railroad Bridge	37° 27.600'	121° 58.540'	C-3-0
SB05	Coyote Creek at Guadalupe River confluence	37° 27.875'	122° 1.406'	NA
SB06	Between Channel Markers #17 & #18	37° 28.390'	122° 4.180'	NA
SB07	Mouth of Mowry Slough	37° 29.499'	122° 3.110'	NA
SB08	Mouth of Newark Slough	37° 30.066'	122° 5.231'	NA
SB09	North of Cooley Landing	37° 28.959'	122° 7.068'	NA
SB10	Old Palo Alto Yacht Club Channel Mouth	37° 28.087'	122° 5.846'	NA
SB11	Standish Dam in Coyote Creek	37° 27.150'	121° 55.501'	BW10
SB12	Alviso Yacht Club Dock	37° 25.574'	121° 58.778'	BW15