4. STRATEGIC PLANNING AND IMPLEMENTATION

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Introduction

The Regional Board's mission is to achieve and maintain water quality objectives that are necessary to protect all beneficial uses of the waters in the Region. Depending on the nature of the water quality problem, several different strategies, as outlined below, are employed to accomplish this mission.

- ***Control of Point Source Pollutants:*** Pollutants from point sources are transported to waterbodies in controlled flows at well-defined locations. Examples of point sources include discharges from municipal and industrial wastewater treatment facilities.

  Programs that protect water quality from point source pollutants are primarily regulatory in nature. Permitting programs such as California's Waste Discharge Requirements (established in the 1950s) and the federal National Pollutant Discharge Elimination System (established in the 1970s) are examples of key regulatory programs. Significant progress toward the control of point source pollutants has been made through these permitting programs.

- ***Control of Nonpoint Source Pollutants:*** Pollutants from nonpoint sources are diffuse, both in terms of their origin and mode of transport to surface and ground waters. Unlike pollutants from point sources, pollutants from nonpoint sources often enter waters in sudden

pulses and large quantities as rain, irrigation, and other types of runoff that mobilize and transport contaminants into surface and ground waters. Nationwide, pollutants from nonpoint sources represent the greatest threat to water quality. Examples of nonpoint sources in southern California include lawn and garden chemicals that are transported by storm water or water from lawn sprinklers; household and automotive care products that are dumped or drained on streets and into storm drains; fertilizers and pesticides that are washed from agricultural fields by rain or irrigation waters; sediment that erodes from construction sites; and various pollutants deposited by atmospheric deposition.

Nonpoint source pollutants are more difficult to control than point source pollutants, and different control strategies are required. For example, traditional permitting programs are neither a practical nor effective means of protecting water quality from lawn and garden chemicals. Accordingly, the Regional Board is integrating non-regulatory programs with regulatory programs in order to control pollutants from nonpoint sources. Emphasis is placed on pollution prevention through careful management of resources, as opposed to "cleaning up" the waterbody after the fact. Through public outreach – an example of a non-regulatory program – residents are informed of threats to the quality of the waters in their communities and are encouraged to voluntarily implement Best Management Practices (BMPs) that will eliminate or reduce nonpoint sources of pollution. When necessary, local governments are encouraged to develop and implement ordinances that supplement the Regional Board's public outreach efforts. This flexible

Table 4-1. "Threat to Water Quality" and "Complexity" Definitions.

Category	Definition	Example
THREAT TO WATER QUALITY		
Category I (Major threat)	Those discharges which could cause the long-term loss of a designated beneficial use of the receiving water, render unusable a ground water or surface water resource used as a significant drinking water supply, require closure of an area used for contact recreation, result in long-term deleterious effects on shellfish spawning or growth areas of aquatic resources, or directly expose the public to toxic substances.	Loss of a drinking water supply
Category II (Moderate threat)	Those discharges of waste which could impair the designated beneficial uses of the receiving water, cause short-term violations of water quality objective, cause secondary drinking water standards to be violated, or cause a nuisance. The discharge could have a major adverse impact on receiving biota, cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply.	Aesthetic impairment from nuisance from a waste treatment facility.
Category III (Minor threat)	Those discharges of waste which could degrade water quality without violating water quality objectives, or cause a minor impairment of designated beneficial uses compared with Category I and Category II.	Small pulses of water from low volume cooling water discharges.
COMPLEXITY		
Category "a"	Any major NPDES discharger; any discharge of toxic wastes; any small volume discharge containing toxic waste or having numerous discharge points or ground water monitoring; any Class I waste management unit.	Small volume complex discharger with numerous discharge points, leak detection systems or ground water monitoring wells.
Category "b"	Any discharger not included above which has a physical, chemical, or biological treatment systems (except for septic systems with subsurface disposal), or any Class II or Class III waste management units.	Marinas with petroleum products, solid wastes or sewage pump-out facilities.
Category "c"	Any discharger for whom waste discharge requirements have been or would be prescribed pursuant to Section 13263 of the Water Code not included as a Category "a" or Category "b" as described above.	Discharges having no waste treatment systems or that must comply with best management practices, discharges having passive treatment and disposal systems, or dischargers having waste storage system with land disposal such as dairy waste ponds.
NPDES Major or Minor		
Major	Publicly owned treatment works with a yearly average flow of over 0.5 million gallons per day (MGD) or an industrial source with a yearly average flow of over 0.1 MGD and those with lesser flows but with acute or potential adverse environmental impacts.	
Minor	All other dischargers that are not categorized as a Major.	

approach can be an effective means of controlling pollutants from many nonpoint sources.

- ***Remediation of Pollution:*** The Regional Board oversees remediation of both ground and surface waters through the investigation of polluted ground water and enforcement of corrective actions needed to restore water quality. These activities are managed through eight programs, namely: Underground Storage Tanks; Well Investigations; Spills, Leaks, Investigations and Cleanups (SLIC); Aboveground Petroleum Storage Tanks; U.S. Department of Defense (DOD) and Department of Energy (DOE) Sites; Resource Conservation and Recovery Act (RCRA); Toxic Pits Cleanup Act; and Bay Protection and Toxic Cleanup.

These programs are designed to return polluted sites to productive use by identifying and eliminating the sources of pollutants, preventing the spread of pollution, and restoring water quality.

Control of Point Source Pollutants

Introduction – General Information about Regional Board Permitting Programs

All wastewater discharges in the Region – whether to surface or ground waters – are subject to Waste Discharge Requirements (WDRs). Likewise, all reuses of treated wastewaters are subject to Water Reclamation Requirements (WRRs). In addition, because the USEPA has delegated responsibility to the State and Regional Boards for implementation of the federal National Pollutant Discharge Elimination System (NPDES) program, WDRs for discharges to surface waters also serve as NPDES permits. These programs are the legal means to regulate controllable discharges. It is illegal to discharge wastes into any waters of the State and to reuse treated wastewaters without obtaining appropriate WDRs, WRRs, or NPDES permits (all of which are hereinafter referred to as Requirements).

Any facility or person who discharges, or proposes to discharge, wastes or makes a material change to the character, location, or volume of waste discharges to waters in the Los Angeles Region (other than into a community sewer system) must describe the quantity and nature of the proposed discharge in a report of waste discharge (ROWD) or an NPDES application. Upon review of the ROWD or NPDES application and all other pertinent information (including comments received at a public hearing), the Regional Board will consider the issuance of Requirements that incorporate appropriate measures and limitations to protect public health and water quality. The basic components of the Requirements include:

- discharge limitations (including, if required, effluent and receiving water limits);
- standard requirements and provisions outlining the discharger's general discharge requirements and monitoring and reporting responsibilities; and
- a monitoring program in which the discharger is required to collect and analyze samples and submit monitoring reports to the Regional Board on a prescribed schedule.

Discharges are categorized according to their threat to water quality and operational complexity (Table 4-1). In addition, discharges to surface waters are categorized as major or minor discharges. Filing and annual fees are based on these categories. WDRs or WRRs usually do not have an expiration date but are reviewed periodically on a schedule based on the level of threat to water quality. NPDES permits are adopted for a five-year period.

Most Requirements are tailored to specific waste discharges. In some cases, however, discharges can be regulated under general Requirements (Table 4-2), which simplify the permit process for certain types of discharges. These general Requirements are issued administratively to the discharger after a completed ROWD or NPDES application has been filed and the Executive Officer has determined that the discharge meets the conditions specified in the general Requirements.

Point source discharges include wastewaters from municipal sewage treatment plants, industrial and manufacturing facilities, shipyards and power generation stations (see examples in Table 4-3). The Regional Board currently administers approximately 1,200 Requirements for these discharges, including 37 sewage treatment facilities with design flows of over 100,000 gallons per day (Table 4-4; Figure 4-1). Major or significant

Table 4-2. Summary of General WDRs* and NPDES Permits Issued by the State Board and the Regional Board.

General WDRs and NPDES Permits	Examples of eligible dischargers
General WDR for land treatment of petroleum hydrocarbon contaminated soil in Los Angeles and Santa Clara River Basins (Order No. 90-148).	Refineries, leaking underground and above ground tanks, and leaking pipelines.
General NPDES permit and WDR for discharges of ground water to surface waters in Los Angeles River and Santa Clara River Basins (Order No. 91-92).	Construction de-watering discharges and well test waters.
General WDR for discharge of non-hazardous contaminated soils and other wastes in Los Angeles River and Santa Clara River Basins (Order No. 91-93).	Petroleum-contaminated soil, excavation soils.
General WDR for private subsurface sewage disposal systems in areas where ground water is used or may be used for domestic purposes (Order No. 91-94).	New residential developments.
General NPDES permit and WDR for discharges of hydrostatic test water to surface waters in Los Angeles River and Santa Clara River Basins (Order No. 91-111) .	Waste waters from hydrostatic testing of pipe(s), tanks(s), in any storage vessels.
General NPDES permit and WDR for discharges of storm water associated with industrial activities excluding construction activities (Order No. 91-13-DWQ).**	Surface runoff discharges from industrial sites or facilities.
General NPDES permit and WDR for discharges of storm water runoff associated with construction activity (Order No. 92-08-DWQ).**	Surface runoff from construction sites.
General NPDES permit and WDR for discharge of ground water from investigation and/or clean up of petroleum fuel pollution to surface waters in the Los Angeles and Santa Clara River Basins (Order No. 92-91).	Treated ground water to cleanup waters polluted with petroleum fuel, ground water extracted during pump tests, and well development and purging.
General WDR for specified discharges to ground water in Santa Clara River and Los Angeles River Basins (Order No. 93-10).	Hydrostatic testing of tanks, pipes, and storage vessels; construction dewatering; dust control application; water irrigation storage systems; subterranean seepage dewatering; well development and test pumping; aquifer testing; and monitoring well construction.

* General WDRs can be issued by the Executive Officer without formal Board Action.
** State Board Order.

dischargers of the Region, as of February 1994, fall into the categories shown in Table 4-5.

Waste Discharge Requirements (WDRs)

All discharges, whether to land or water, are subject to the California Water Code (§13263) and will be issued WDRs by the Regional Board. Furthermore, discharges to land are also subject to Title 23, California Code of Regulations, either under Chapter 15 (e.g., mining operations and landfills) or under other chapters (e.g., wastewater treatment, erosion control projects, and certain septic systems).

WDRs usually do not have an expiration date (with the exception of dredging WDRs and some Chapter 15 WDRs).

Land and groundwater-related WDRs (i.e., "Non-NPDES" WDRs) are described in this section. WDRs for discharges to surface waters, that also serve as NPDES permits, are described in the National Pollutant Discharge Elimination System Program section. In general, "Non-NPDES" WDRs regulate discharges of privately or publicly treated domestic wastewater, cooling tower bleed off, process and wash-down wastewater, and oil field brines. These WDRs usually protect the beneficial uses of groundwater basins but some WDRs are

Table 4-3. Examples of Industrial and Municipal Point Source Discharges to Surface Waters.

Discrete Discharge	Examples of pollutants*	Examples of Affected Waterbodies
Oil refinery wastewaters	Oil, chemical additives, dissolved mineral salts, VOCs (BTEX**), BOD, suspended solids, metals, temperature	Santa Monica Bay, Dominguez Channel, Long Beach and Los Angeles Harbors
Oil field drilling brine disposal *Regulated by the California Department of Conservation, Division of Oil and Gas*	BOD, COD, TDS, chloride, settleable solids, suspended solids, oil and grease, sulfur, heavy metals	Re-injection in groundwater basins
Zoo wastewaters	Suspended solids, BOD, bacteria	Los Angeles River
Municipal wastewater treatment plants (See Table 4-4 for more information)	BOD, COD, TDS, chloride, sulfate, nutrients, NH3, residual chlorine, metals, organic chemicals	Most inland waters, Pacific Ocean
Cooling tower water (contact and non-contact), boiler blowdown	Suspended solids, oil and grease, dissolved minerals, settleable solids, chemical additives, temperature	Most inland rivers and streams
Power generation plants	Temperature, chemical additives, minerals	Los Angeles River, Los Cerritos Channel, Santa Monica Bay, Los Angeles Harbor, San Gabriel River Estuary, Pacific Ocean
Ground water from remediation or from construction de-watering	TDS, chloride, sulfate, VOC's, (BTEX), and other petroleum hydrocarbons	Region-wide
Manufacturing (process/wash) waste water	Temperature, residual chlorine	Most inland rivers and streams
Aquaculture wastewater	Suspended solids and nutrients	Pacific Ocean
Shipyard, boatyard wastes	Oil and grease, metals (Pb, Cr), suspended solids, settleable solids, TBT, temperature, chemical additives	Long Beach Harbor, Los Angeles Harbor, Pacific Ocean

* These examples are possible pollutants. Actual presence in all discharges is not implied.
** BTEX is benzene-toluene-ethylbenzene-xylene

issued to protect surface waters in areas where ground water is known to exfiltrate from groundwater basins to surface waters.

Types of waste discharge that require WDRs under these laws and regulations include:

- On-site disposal systems (septic systems)
- Holding/equalization tanks
- Evaporation ponds
- Percolation ponds and leachfields
- Landfills
- Land treatment units (bioremediation)
- Dredging
- Oil field brines

Land Disposal

The Regional Board issues WDRs for wastewaters originating from landfills, surface impoundments, waste piles and land treatment units, mines, and confined animal feedlots. These WDRs can be issued in cooperation with other state agencies (Table 4-6). The Regional Board also administers the Solid Waste Assessment Test (SWAT) Program to identify any landfills that have "leaked" wastes.

The Regional Board can also direct responsible parties to abate any condition of nuisance or pollution from closed, illegal, or abandoned disposal sites.

Table 4-4. Sewage Treatment Facilites with Design Flow Greater than 100,000 Gallons per Day.

Facility Name	1993 Average flow/Peak flow-MGD	Design flow 1993/ Projected 2000-MGD	Receiving waterbody	Reclamation/ percolation ponds	Treatment level	Future plans
Avalon, City of: Avalon Wastewater Treatment Facility	0.65/ 2.00	1.2/ 2.0	Pacific Ocean		Secondary	Plant expansion plan (1994) with biological secondary treatment
Burbank, City of: Burbank Water Reclamation Plant	7.37/ 16.00	9/ 15	Burbank Western Channel	Plans to increase sales for irrigation	Tertiary	Plant expansion plan (1994-1996)
Camarillo Sanitation District: Water Reclamation Plant	3.9/ 7.0	6.75/ same	Conejo Creek	Future plans	Secondary	Plan to construct phase II by 2004 with possible filtration
County Sanitation Districts of Los Angeles County: Joint Water Pollution Control Plant	340/ 460 * (200 secondary)	385 advanced primary (200 secondary)/ same	Pacific Ocean	N/A	Advanced primary/ secondary	Plan for full secondary
County Sanitation Districts of Los Angeles County: La Canada Water Reclamation Plant	0.124/ NA	0.2/ same	none	Irrigation	Secondary	Plan to connect to District's Joint Outfall
County Sanitation Districts of Los Angeles County: Long Beach Water Reclamation Plant	17.3/ 24.9 *	25/ same	Coyote Creek	Plans to increase reclaimed use by ground water injection and other by 1995	Tertiary	Plan to expand capacity by 2010
County Sanitation Districts of Los Angeles County: Los Coyotes Water Reclamation Plant	37.8/ 45.0 *	37.5/ same	San Gabriel River	Reclaimed use	Tertiary	Plan for increased volume
County Sanitation Districts of Los Angeles County: Pomona Water Reclamation Plant	13.2/ 21.3 *	15/ same	San Jose Creek	Industrial, agriculturdal and irrigation use	Tertiary	Plan for increased volume
County Sanitation Districts of Los Angeles County: San Jose Creek Water Reclamation Plant	71.7/ 116.1 *	100/ same	San Gabriel River and San Jose Creek	Groundwater recharge and irrigation	Tertiary	Plan for increased volume
County Sanitation Districts of Los Angeles County: Saugus Water Reclamation Plant	6.3/ 10.5 * (excess is diverted to Valencia)	5.6/ 7.0	Santa Clara River	Plans for reclaimed use	Tertiary	Plan for increased volume
County Sanitation Districts of Los Angeles County: Valencia Water Reclamation Plant	8.8/ 14.6 *	7.5/ 13.5	Santa Clara River	Plans for reclaimed use	Tertiary	Plan for expansion
County Sanitation Districts of Los Angeles County: Whittier Narrows Water Reclamation Plant	12.5/ 18.0 *	15.0/ same	San Gabriel River and Rio Hondo	Groundwater recharge and plans for other reuse	Tertiary	Plan for increased volume

Table 4-4. Sewage Treatment Facilites with Design Flow Greater than 100,000 Gallons per Day (continued).

Facility Name	1993 Average flow/Peak flow-MGD	Design flow 1993/ Projected 2000-MGD	Receiving waterbody	Reclamation/ percolation ponds	Treatment level	Future plans
Las Virgenes Municipal Water District: Tapia Water Reclamation Facility	8/ 13	16/ same	Malibu Creek	Plans increased sales of reclaimed water (Current: 90% of effluent from June-Sept.)	Tertiary	Anaerobic sludge digestion, centrifuge dewatering, in-vessel composting and beneficial reuse
Los Angeles, City of, Department of Public Works: Donald C. Tillman Water Reclamation Plant	75/ 100	80/ same	Los Angeles River	Japanese garden, Wildlife Lake, Lake Balboa. Irrigation. Future groundwater recharge.	Tertiary	Possible increase in capacity
Los Angeles, City of, Department of Public Works: Hyperion Treatment Plant	350/ 476	420/ 450	Santa Monica Bay	West Basin Municipal District plans to reclaim 70 MGD by 1995 at new facility. Other reuse.	Primary/ secondary	Upgrade (1998) to full secondary pure oxygen, two stage anaerobic digestion
Los Angeles, City of, Department of Public Works: Los Angeles-Glendale Water Reclamation Plant	20/ 27	20/ 50	Los Angeles River	Plans to increase reclaimed water sales. Industrial use.	Tertiary	Plan expansion project
Los Angeles, City of, Department of Public Works: Terminal Island Treatment Plant	18/ 26 (dry) 40 (wet)	30/ same	Los Angeles Harbor	Plans for reclaimed use (5 MGD) in 1996	Secondary	Full effluent filtration
Los Angeles, City of, Department of Recreation and Parks: LA Zoo Wastewater Treatment Plant	4.0/ 0.5	2.5/ 8.0	Los Angeles River (over flow) otherwise City sanitary sewer	N/A	Primary/chlori nated	New facility under construction
Los Angeles, County of, Department of Public Works: Malibu Mesa Wastewater Treatment Plant	0.175/ 0.20	0.20/ same	Winter and Marie Canyons	Landscape spray irrigation	Tertiary	No changes anticipated
Los Angeles, County of, Department of Public Works: Trancas Sewage Treatment Plant	0.058/ 0.15	0.12/ same	N/A	Leaching fields	Tertiary	No changes anticipated
Los Angeles, County of, Mech Dept.: Acton Rehabilitation Center	0.026/ ?	0.15/	N/A	N/A	Secondary	No changes anticipated
Ojai Valley Sanitary District: Ojai Valley Wastewater Treatment Plant	2.26/ 3.24	3.0/ same	Ventura River	Plans for reclaimed water	Secondary	New facility plan (1996) for Tertiary treatment
Oxnard, City of, Department of Public Works: Oxnard Wastewater Treatment Plant	18/ 25	37.1/ same	Pacific Ocean	Plans for reclaimed water	Secondary	Plan for tertiary treatment
San Buenaventura, City of: Ventura Water Reclamation Plant	7.6/ 15.0	14/ 16	Santa Clara River Tidal Prism	Plan to increase use of reclaimed water	Tertiary	Plan to update electrical systems.
Simi Valley County Sanitation District: Simi Valley Water Quality Control Plant	9.0/ 22.5	12.5/ same	Arroyo Simi	?	Tertiary	Depends on outcome of study

Table 4-4. Sewage Treatment Facilites with Design Flow Greater than 100,000 Gallons per Day (continued).

Facility Name	1993 Average flow/Peak flow-MGD	Design flow 1993/ Projected 2000-MGD	Receiving waterbody	Reclamation/ percolation ponds	Treatment level	Future plans
Thousand Oaks, City of, Utility Department: Hill Canyon Wastewater Treatment Plant	8.6/ 18.0	10.8/ 14.0	Arroyo Conejo	Future irrigation plans	Tertiary	Advanced treatment using nitrification/denitrification processes
Thousand Oaks, City of, Utility Department: Olsen Road Water Reclamation Plant	0.175/ 0.225	0.75/ same**	Arroyo Conejo	Future irrigation plans	Secondary	Tertiary treatment by filtration
US Navy: NALF San Clemente Island	0.015/ 0.029	0.030/ same	Pacific Ocean	Plan to use reclaimed water for dust control	Secondary	Additional flow equalization capacity, increased drying bed, change to new chemical treatment and aeration
Ventura, County of, Water Works District: Moorpark Wastewater Treatment Plant	1.92/ 2.12	3.0/ 3.5	Calleguas Creek	Reclaimed use and percolation ponds	Tertiary/ Secondary	New tertiary facility. Plans to construct a reclaimed distribution system
Ventura, County of, Water Works District: Nyeland Acres Wastewater Treatment Plant	0.107/ 0.128	0.22/ same	Revolon Slough	no	Secondary	Conversion of STEP system to a gravity collection system
Ventura, County of, Water Works District: Piru Treatment Facility	0.12/ 0.147	0.20/ same	Santa Clara River	Percolation ponds	Secondary	No changes anticipated
Ventura Regional Sanitation District and Camrosa CWD: Camrosa Wastewater Treatment Plant	1.2/ 1.4	1.5/ same	Calleguas Creek	Reclamation reservoir and irrigation	Secondary	Plans to upgrade plant
Ventura Regional Sanitation District: City of Fillmore Wastewater Treatment Plant	1.0/ 1.3	1.3/ 1.6	Santa Clara River	Percolation ponds	Secondary	Currently under expansion
Ventura Regional Sanitation District: Liquid Waste Treatment Fac. #1, sludge treatment	0.04/ 0.06	0.15/ same	N/A	No	Primary	No changes anticipated
Ventura Regional Sanitation District: Montalvo Treatment Plant	0.25/ 0.35	0.36/ same	N/A	Percolation Ponds	Secondary	No changes anticipated
Ventura Regional Sanitation District: Santa Paula Wastewater Treatment Plant	2.04/ 2.6	2.5/ same	Santa Clara River	Groundwater recharge	Tertiary	No changes anticipated
Ventura Regional Sanitation District: Saticoy Sanitation District	0.12/ 0.32	0.30/ same	N/A	Percolation ponds	Primary	No changes anticipated

* Partial 1993 data (first 4 to 6 months).
** The actual flow is not expected to exceed 0.3 MGD

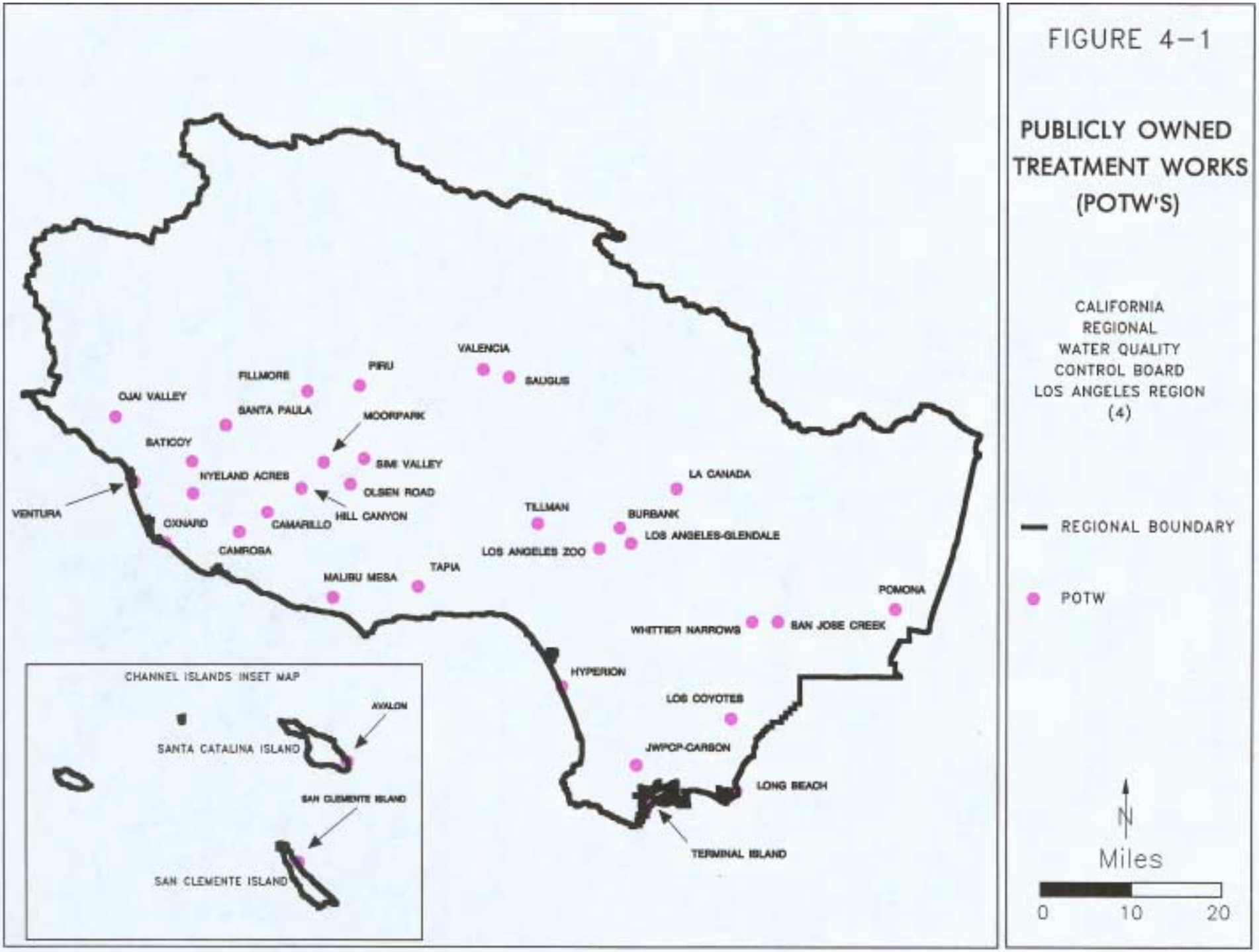
FIGURE 4-1
PUBLICLY OWNED TREATMENT WORKS (POTW'S)
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD LOS ANGELES REGION (4)
REGIONAL BOUNDARY
POTW
VALENCIA
SAUGUS
PIRU
FILLMORE
OJAI VALLEY
SANTA PAULA
MOORPARK
SIMI VALLEY
SATICOY
HYELAND ACRES
OLSEN ROAD
VENTURA
HILL CANYON
OXNARD
CAMARILLO
CAMROSA
LA CANADA
TILLMAN
BURBANK
LOS ANGELES-GLENDALE
LOS ANGELES ZOO
TAPIA
MALIBU MESA
POMONA
WHITTIER NARROWS
SAN JOSE CREEK
HYPERION
LOS COYOTES
JWPCP-CARSON
LONG BEACH
TERMINAL ISLAND
CHANNEL ISLANDS INSET MAP
AVALON
SANTA CATALINA ISLAND
SAN CLEMENTE ISLAND
SAN CLEMENTE ISLAND
N
Miles
0
10
20

Table 4-5. Major or Significant NPDES and WDR Discharge Categories, Numbers of Permits and Total Design Flow#.

Category	Number of permits (Major or Significant Dischargers)	Total design flow from facilities † (MGD approximate)
Domestic sewage	13	35.5
Domestic sewage mixed with industrial waste	26	1255.9
Solid Waste	25	1.0 *
Wash water (industrial/ manufacturing)	1	0.03
Contact & non-contact cooling waters and process waste (industrial/ manufacturing)**	16	6700.4
Storm water runoff ***	14	361
Miscellaneous ****	5	21.1

Numbers as of February 1994.
† Total design flow numbers includes secondary discharges (other categories) from some facilities. The Requirements listed include multiple permits for some major dischargers, particularly municipal sewage treatment plants.
* All landfills are permitted for "no discharge;" not including storm runoff. The 1.0 MGD shown on table is for a sludge farm.
** Includes powerplants.
*** These numbers indicate some process or other wastes.
**** Includes refineries, shipyards, aquaculture, and others.

Landfills

There are over 700 landfills in the Los Angeles Region, of which approximately 30 are active; the remainder are inactive or closed. The Regional Board issues WDRs to landfills that accept at least one of the following types of waste (Table 4-7): hazardous waste (Class I), designated waste (Class II), non-hazardous solid waste (Class III) and inert solid waste (Unclassified). One significant issue in the regulation of solid waste disposal is the definition of designated wastes. Many wastes which are classified as non-hazardous contain constituents of water quality concern that could become soluble in a non-hazardous solid waste landfill. Because of the need for greater containment requirements for this type of designated waste, disposal in a Class III landfill can pose a threat to the beneficial uses of State waters and therefore a more secure site (Class II) is necessary.

Landfill applicants must demonstrate to the Regional Board that the proposed disposal will be in a manner and setting such that wastes will not adversely affect any waters. Criteria for evaluating waste disposal sites include:

- Geologic features of site area
- Liners
- Leachate collection and removal systems
- Subsurface barriers

WDRs for active landfills include mandatory detection and evaluation monitoring programs and prescribed corrective actions for leakages. Landfills that close must be monitored for 30 years (40 CFR Parts 257 and 258) or longer if wastes pose a threat to water quality (Title 23, California Code of Regulations, Chapter 15, §2580).

The Regional Board has regulated landfills since the 1950s. Many of the small older sites have been closed and waste is now being handled at large regional landfills (see Table 4-8 for status of all landfills with ongoing groundwater monitoring programs; Figure 4-2 for locations). The Regional Board reviews and revises WDRs for active Class III sites (there are no active Class I or Class II sites in the Region) to ensure consistency with revised State requirements (Title 23, California Code of Regulations, Chapter 15), requires upgrading of groundwater monitoring systems in order to identify water quality degradation, and reviews and oversees the development and implementation of proper closure plans. Article 5 of Chapter 15, adopted in 1991, specifies new guidelines for the siting of groundwater monitoring wells around all active landfills. In addition, USEPA promulgated regulations (40 CFR Parts 257 and 258, "Subtitle D" [Solid Waste Disposal Facility Criteria]) in 1991, that uniformly apply additional requirements to dischargers of municipal solid waste. The Regional Board adopted Order No. 93-062 (September 27, 1993) which requires that all applicable regional landfills comply with these federal regulations.

Class III landfills in the Los Angeles Region are listed in Table 4-9. Former active Class I landfills include Calabasas, BKK, Palos Verdes, and Simi Valley. There are approximately 15 active inert

Table 4-6. Cooperating Agencies for the Land Disposal Programs.

Waste Disposal Category	Cooperating Agency
Mining Waste (Article 7 of Chapter 15)	California Division of Mines and Geology
Nonhazardous solid waste landfills (also regulated by the Federal Resource Conservation and Recovery Act [RCRA], Subtitle D)	California Integrated Waste Management Board
Hazardous Wastes (also regulated by the Federal Resource Conservation and Recovery Act [RCRA], Subtitle C)	California Department of Toxic Substances Control

Table 4-7. Landfill Classifications.

Disposal Site classification	Definitions of Waste Types (California Code of Regulations,Title 23, Division 3, Chapter 15, Sections 2521 et seq.)	Examples
Class I - Hazardous Waste	a) Hazardous waste is any waste which, under Section 66300 of Title 22, is required to be managed according to Chapter 30 of Division 4 of Title 22. b) Hazardous waste shall be discharged only at Class I waste management units which comply with the applicable provisions unless wastes qualify for a variance under Section 66310 of Title 22. c) Waste which have been designated as restricted wastes by California Department of Health Services (DHS) pursuant to Section 66900, of Title 22 shall not be discharged to waste management units after the restriction dates established by Section 66905 of Title 23 unless: 1) such discharge is for retrievable storage, and 2) DHS has determined that processes to treat or recycle substantially all of the waste are not available, or 3) DHS has granted a variance from restrictions against land disposal of the waste under Section 66930 of Title 22.	Materials that contain high concentrations of pesticides, certain solvents, and PCBs are examples of hazardous wastes.
Class II - Designated Waste	a) Designated waste is defined as: 1) nonhazardous waste which consists of or contains pollutants which, under ambient environmental conditions at the waste management unit, could be released at concentrations in excess of applicable water quality objectives, or which could cause degradation of waters of the State. 2) hazardous waste which has been granted a variance from hazardous waste management requirements pursuant to Section 66310 of Title 22. b) Wastes in this category shall be discharged only at Class I waste management units or at Class II waste management units which comply with the applicable provisions of Chapter 15 and have been approved for containment of the particular kind of waste to be discharged. Decomposable wastes in this category may be discharged to Class I or II land treatment waste management units.	Materials with high concentrations of BOD, hardness, or chloride. Inorganic salts and heavy metals are "manageable" hazardous wastes.
Class III-Nonhazardous Solid Waste	a) Nonhazardous solid waste means all putrescible and nonputrescible solid, semi-solid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded solid or semi-solid waste; provided that such wastes do not contain wastes which must be managed as hazardous wastes, or wastes which contain soluble pollutants in concentrations which exceed applicable water quality objectives, or could cause degradation of waters of the State (i.e., designated waste). b) Except as provided in Subsection 2520(d) of Chapter 15, nonhazardous solid waste may be discharged at any classified landfill which is authorized to accent such waste, provided that: 1) the discharger shall demonstrate that co-disposal of nonhazardous solid waste with other waste shall not create conditions which could impair the integrity of containment features and shall not render designated waste hazardous (e.g., by mobilizing hazardous constituents); 2) a periodic load-checking program approved by DHS and regional boards shall be implemented to ensure that hazardous materials are not discharged at Class III landfills. c) Dewatered sewage or water treatment sludge may be discharged at a Class III landfill under the following conditions, unless DHS determines that the waste must be managed as hazardous waste: 1) The landfill is equipped with a leachate collection and removal system; 2) The sludge contains at least 20 percent solids by weight if primary sludge, or at least 15 percent solids if secondary sludge, mixtures of primary and secondary sludges, or water treatment sludge; and 3) A minimum solids-to-liquid ratio of 5:1 by weight shall be maintained to ensure that the co-disposal will not exceed the initial moisture-holding capacity of the nonhazardous solid waste. The actual ratio required by the regional board shall be based on site-specific conditions. d) Incinerator ash may be discharged at a Class III landfill unless DHS determines that the waste must be managed as hazardous waste.	Garbage, trash, refuse, paper, demolition and construction wastes, manure, vegetable or animal solid and semisolid wastes.
Unclassified/Inert	a) Inert waste does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives. It does not contain significant quantities of decomposable waste. b) Inert wastes do not need to be discharged to classified management units. c) Regional boards may prescribe individual or general waste discharge requirements for discharges of inert wastes.	Concrete, rock, plaster, brick, uncontaminated soils.

Table 4-8. Status of Landfills (Active and Inactive) in Region that have Ongoing Groundwater Monitoring Programs.

Landfill	Constituents detected in monitoring wells	Current activities
Azusa Landfill (Azusa Land Reclamation Co., Inc.)	Volatile organic compounds (VOCs)	Ongoing continuous detection monitoring includes gas control.
Bailard Landfill (Ventura Regional Sanitation District)	Vinyl chloride	Increased gas extraction wells as well as groundwater extraction wells at Bailard and one well at a coastal site are reducing vinyl chloride exceedances.
BKK Landfill West Covina* (BKK Corporation)	Class I area: VOCs, heavy metals, semi-VOCs, general minerals Class III area: no detectable contaminants	The groundwater monitoring system surrounding the landfill consists of over 200 wells. Offsite well clusters are currently being installed to determine the extent of the contaminant plume from the landfill. Corrective action program ongoing.
Bradley Landfill (Valley Reclamation Co.)	VOCs	Site undergoing evaluation monitoring.
Brand Park Disposal Site (City of Glendale)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Calabasas Landfill* (Sanitation Districts of Los Angeles County)	Heavy metals, VOCs, semi-VOCs	Site undergoing evaluation monitoring.
Calmat Sun Valley (Calmat Properties Co.)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Chandler Sand and Gravel (Chandler's Sand and Gravel)	General minerals	Inert landfill. Site undergoing detection monitoring.
Chiquita Canyon Landfill (Laidlaw Waste System Chiquita)	VOCs, inorganic compounds	Corrective action program will be implemented.
Coastal Landfill (Ventura Regional Sanitation District) [closed]	VOCs	Increased gas extraction wells as well as groundwater extraction wells at Bailard and one well at coastal site are reducing VOCs exceedances.
Getty Oil Site (Texaco Producing, Inc.)	No detected contamination	Site undergoing detection monitoring.
Irwindale Dike Build-up (Livingston-Graham Inc.)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Lopez Canyon Landfill (City of Los Angeles Department of Public Works)	No detected contamination	Additional up and down gradient wells installed as part of required program. Site undergoing detection monitoring.
Manning Pit South [Former] (Los Angeles County DPW WMD)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Manning Pit North (City of Irwindale)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Montebello Land and Water (Montebello Land and Water Co.)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Nu-Way Owl Rock Landfill	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Nu-Way Industries Landfill [closed]	Detectable VOCs up- and down-gradient	No statistically significant exceedences.

Table 4-8. Status of Landfills (Active and Inactive) in Region that have Ongoing Groundwater Monitoring Programs (continued).

Landfill	Constituents detected in monitoring wells	Current activities
Operating Industries Landfill*** (Operating Industries, Inc.) [closed-Superfund site]	VOCs, semi-VOCs, metals, inorganic compounds	A leachate treatment plant has been constructed for on-site treatment, with a remedial investigation ongoing.
Owl Rock Quarry Site (Nu-Way Industries, Inc.)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Palos Verdes** (Sanitation Districts of Los Angeles County) [closed]	VOCs	Department of Toxic Substances Control is lead agency. Districts have submitted remedial investigation report.
Puente Hills Landfill (Sanitation Districts of Los Angeles County)	VOCs, metals	In August 1993, the Districts installed a replacement barrier and additional gas wells to control landfill gas, the probable source of the VOC's. Site undergoing detection monitoring.
San Marino City Dump (City of San Marino)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Santa Clara Disposal Site, Oxnard (Ventura Regional Sanitation District) [closed]	VOCs	Increased gas extraction wells and groundwater extraction wells at Bailard and one well at a coastal site are reducing VOCs exceedances.
Savage Canyon Disposal Site (City of Whittier)	No detected contamination	Site undergoing detection monitoring.
Scholl Canyon Landfill (Sanitation Districts of Los Angeles County)	VOCs, chloride	Site undergoing evaluation monitoring.
Simi Valley Landfill* (Waste Management of California)	VOCs	Site undergoing evaluation monitoring.
Spadra Landfill (Sanitation Districts of Los Angeles County)	VOCs	An evaluation monitoring program will be implemented.
Stough Park Landfill (City of Burbank)	VOCs	An evaluation monitoring program will be implemented.
Strathern (LA By-Products Co.)	No detected contamination	Inert landfill. Site undergoing detection monitoring.
Sunshine Canyon Landfill - City of Los Angeles portion (Browning-Ferris Industries, Inc.) [closed]	Chloride above Water Quality Protection Standard	The operator has been asked to do additional background/site characterization to determine sources of elevated chloride levels downgradient of the landfill.
Toland Road Disposal Site (Ventura Regional Sanitation District)	No detected contamination	Additional downgradient well to be installed. Site undergoing detection monitoring.
Toyon Canyon Landfill (City of Los Angeles Department of Public Works) [closed]	Organic and inorganic constituents	A monitoring and reporting program was revised in December 1991. An evaluation monitoring program has also been submitted.

* Former Class I landfill that is now an operating Class III landfill and has an ongoing ground water monitoring program.
** Former Class I landfill that is now closed and has an ongoing ground water monitoring program.
*** Former Class II landfill that is now closed but has an ongoing ground water monitoring program.

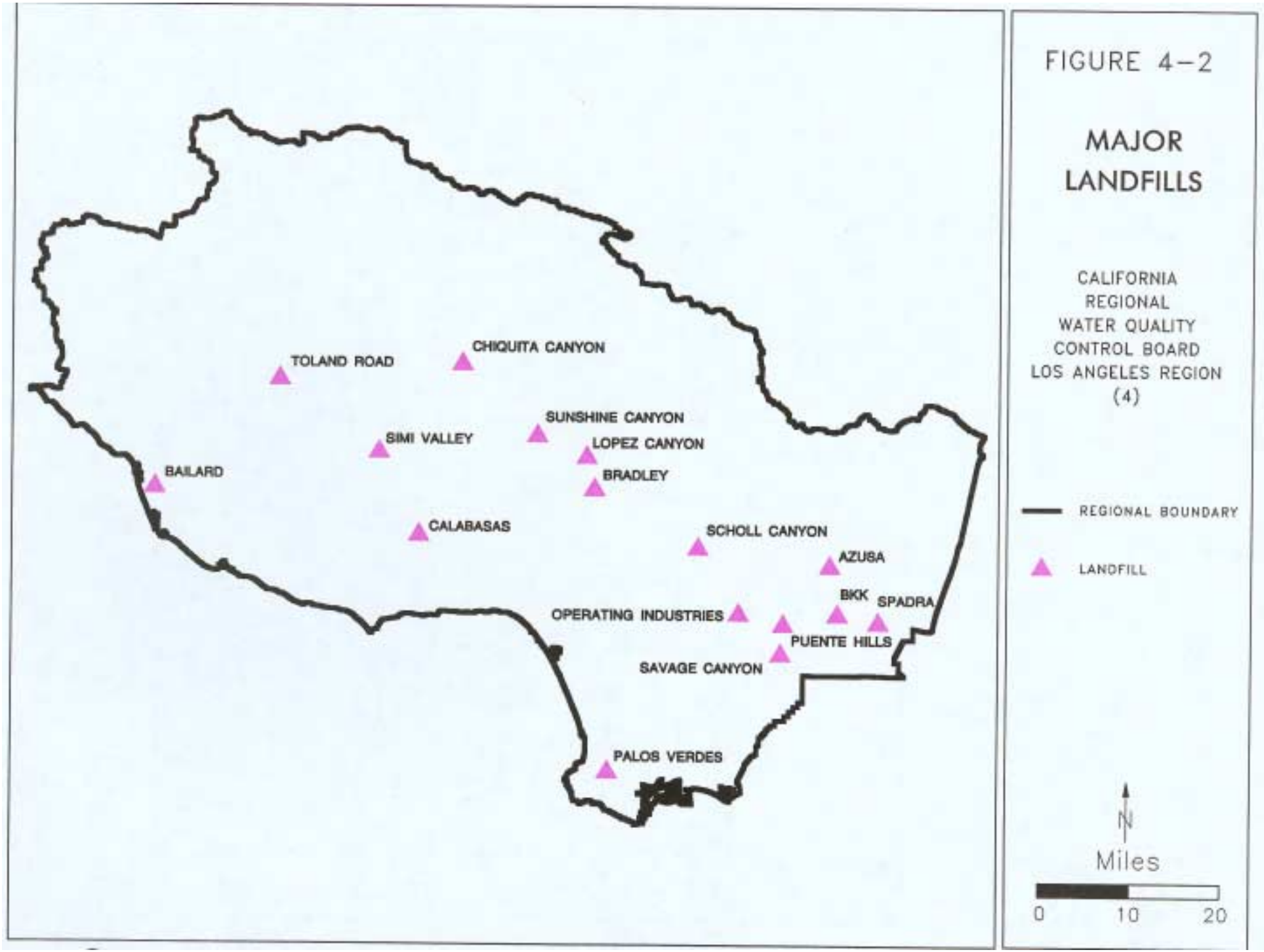
FIGURE 4-2
MAJOR LANDFILLS
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD LOS ANGELES REGION (4)
REGIONAL BOUNDARY
LANDFILL
TOLAND ROAD
CHIQUITA CANYON
SUNSHINE CANYON
SIMI VALLEY
LOPEZ CANYON
BAILARD
BRADLEY
CALABASAS
SCHOLL CANYON
AZUSA
BKK
SPADRA
OPERATING INDUSTRIES
PUENTE HILLS
SAVAGE CANYON
PALOS VERDES
N
Miles
0
10
20

Table 4-9. Active Regional Class III Landfills.

County	Agency/Owner	Landfills
Ventura County	Ventura Regional Sanitation District	Bailard Toland Road
	Waste Management Disposal Services of California, Inc.	Simi Valley
Los Angeles County	Azusa Land Reclamation/BFI *	Azusa
	BFI	Sunshine Canyon
	BKK	BKK-West Covina
	City of Burbank	Stough Park
	Laidlaw Waste System	Chiquita Canyon
	City of Los Angeles Department of Public Works	Lopez Canyon
	Sanitation Districts of Los Angeles County	Calabasas Puente Hills Scholl Canyon Spadra
	Valley Reclamation Company/Waste Management Disposal Services of California, Inc.	Bradley
	City of Whittier	Savage Canyon
	Consolidated Disposal	Pebbly Beach
	Doug Bombard Enterprises	Two Harbors

* The Azusa Landfill Reclamation site is currently accepting inert wastes. A ruling from State Board will determine whether the original 80-acre portion of the site will continue to operate as a Class III landfill pursuant to Regional Board Order WQ 86-59 and State Board Order 91-01.

landfills; see Table 4-10 for Regional Board procedures for siting inert landfills. In addition, there are several hundred inactive landfills in the Region, for which information about the nature of wastes and possible impacts to ground water are unknown at this time.

The Regional Board also administers the Solid Waste Water Quality Assessment Test (SWAT) Program in the Region, pursuant to the California Water Code (§13273). Section 13273, added in 1985, requires owners of active or inactive non-hazardous landfills to evaluate the possible migration of hazardous wastes or leachate from their landfill.

In addition to requiring site evaluations, the SWAT Program also:

- provides deadlines for implementation of water quality monitoring systems at active solid waste disposal sites;
- requires water quality monitoring systems at many closed solid waste disposal sites which previously had none; and
- requires identification of leaking solid waste disposal sites for verification monitoring and/or remedial actions to be taken under the Chapter 15 Program.

In 1986, the Regional Board began to require that landfill operator/owners prepare SWAT proposals to show how they would meet the requirements of Section 13273. Upon approval of proposals by the Regional Board, the operators must collect groundwater monitoring data during four consecutive quarters and submit the combined data in a SWAT report. To date, the Regional Board has received approximately 75 reports. Several of the landfills that detected problems underwent, or are undergoing, verification monitoring. SWAT reports submitted by owner/operators must include an analysis of the surface and ground water on, under, and within one mile of the solid waste disposal site in order to provide a reliable indication of whether there is any leakage of hazardous waste. Reports must also contain a chemical characterization of the soil-pore liquid of those areas which are likely to be affected if the solid waste disposal site is leaking and compare that area to geologically similar areas near the solid waste disposal site which have not been affected by the leakage of waste.

Table 4-10. Procedures for Siting Inert Landfills.

Regional Board procedures for siting inert landfills
A monitoring program approved by the Executive Officer must be in place and operating prior to disposal of any inert waste. This will include ground water monitoring and waste disposal reporting. In the event that possible leakage from the landfill is observed during routine detection monitoring, an evaluation monitoring, and if necessary, a corrective action program similar to those included in Chapter 15 will be implemented.
Disposal must be restricted to inert wastes. Organic material is allowed only in insignificant quantities, with the exception of a maximum of 5% by volume of organic material from debris basins. Friable asbestos, asphaltic material*, and rubber tires are specifically prohibited unless allowed by Waste Discharge Requirements from the Regional Water Quality Control Board.
A waste load checking program similar to those approved for Class III landfills must be carried out.
Installation of precipitation and drainage controls is required to accommodate runon and runoff.
Inspection of facility by Regional Board staff should be conducted at least once per year.
Submittal of a closure plan is required for review and approval by the Executive Officer. Such plan to include ground water monitoring for a minimum period of five years.

* Asphaltic material that contains less than 50% solids is not allowed (i.e., asphalt). Asphaltic concrete (as defined by the Joint Cooperative Committee of the Southern California Chapter, American Public Works Association, and Southern California Districts, and Associated General contractors: *Standard Specifications for Public Works Construction*) is allowed.

Under Public Resources Code Section 45700, the State Board is required to rank all solid waste facilities throughout the State based on the threat to water quality. Other State Board reports prepared under this section detail the extent of hazardous waste at each solid waste disposal site, the potential effects these hazardous wastes can have upon the quality of waters of the State, and recommended actions needed to protect the quality of water.

Sludge Use and Disposal

Biosolids, or sludge, are residual byproducts of sewage treatment, water treatment, and certain industrial processes. Heavy metals and volatile organic chemicals tend to concentrate in sludge. For this reason, USEPA and the Regional Board do not allow the direct discharge of sludge to the ocean or any other surface waters. Discharge to land must be carefully controlled because of potential impacts on ground and surface water quality. If sludge is disposed at a landfill, it must be non-hazardous, and meet the moisture and liquid-solid ratio requirements of the receiving landfill.

Under the NPDES program, sludge disposal is regulated (40 CFR Part 503) as a self-implementing program enforced by USEPA; the state does not have delegated authority for implementing the sludge program. Sludge reporting requirements (i.e., haulage information) for sewage treatment plants are included in their NPDES permits and WDRs.

The Regional Board encourages the use of sludge or by-products thereof. Some ways that sludge can be disposed include the following:

- dehydrated sludge as fuel in gas boilers to generate electricity (ash can be recovered for use as a fluxing agent in copper smelting or in cement production);
- sludge digester methane gas as fuel in gas boilers to generate electricity;
- chemically fixated sludge as landfill daily cover: adding chemical additives which fix heavy metals, reduce pathogens, and reduce free water to form a clay-like soil for use as daily landfill cover;
- sludge as a soil amendment: composting dewatered sludge (pathogens are killed at composting temperatures);
- sludge as a nutrient source for non-edible crops: direct application to agricultural crops not meant for direct human consumption (mixing, tilling, or injecting sludge into soil);
- sludge disposal directly in certain landfills; and
- sludge disposal in-situ.

Soil and Hazardous Waste Disposal

Contaminated soil and other material must be treated or properly disposed in order to minimize threat to the quality of surface or ground waters. Dischargers are required to submit an initial analysis of the material by a State-certified laboratory. If the material is deemed hazardous, the discharger is referred to the California Department of Toxic Substances Control. For non-hazardous materials, general WDRs can be issued on a case-by-case basis. All permitted treatment or disposal includes monitoring and reporting requirements.

General WDRs (Table 4-2) for discharge of non-hazardous contaminated soils or other wastes (good for 90 days) are issued for disposal of up to 100,000 cubic yards of contaminated material. If the material contains acceptable levels of total petroleum hydrocarbons (TPH) or other contaminants, then it can be disposed in a Class III landfill at the discretion of the site operator. For discharges over 100,000 cubic yards, individual WDRs are required.

General WDRs (Table 4-2) for in-situ treatment are issued for materials that meet guidelines for land treatment of petroleum hydrocarbon-contaminated soils. Up to 100,000 cubic yards of contaminated soil can be remediated, by land treatment, to acceptable levels usually not exceeding 1000 mg/kg total petroleum hydrocarbons, within one year. For discharges over 100,000 cubic yards, individual WDRs are necessary.

Remediation treatment includes biodegradation (by a land treatment process) for hydrocarbon contaminated soil found on site and a fixation process for metals contaminated soils. In-situ disposal (without treatment) can be allowed, on a case-by-case basis, for material that is not considered to be a threat to surface or ground water.

Dredging Requirements

The Regional Board issues WDRs for dredging projects to control potential water quality impacts associated with removal and disposal of bottom sediments. In the Los Angeles Region, most dredging activities take place within the Ports of Los Angeles and Long Beach to maintain navigation channels at the proper depth or to accommodate new development. Dredging projects periodically occur in other partially or fully enclosed water bodies (e.g., marinas and lagoons), ocean waters, and inland lakes and reservoirs. Applicants must demonstrate that dredging activities will not cause adverse water quality impacts and that disposal will be managed such that beneficial uses will not be affected. Dredging requirements usually have an expiration date.

Septic Systems

The California Water Code, Chapter 4, Article 5, sets forth criteria for regulating individual disposal systems (i.e., residential septic tanks). In the past, the Regional Board placed certain types of septic tank systems under individual WDRs. The Regional Board has delegated local health or public works departments jurisdiction to permit and regulate most single-family dwellings septic tank disposal systems. However, the Regional Board retains jurisdiction over multiple-dwelling units, some non-domestic septic tank systems, and large developments in certain problem areas, as well as in any situation where septic systems are creating or have the potential to create a water quality problem.

The Regional Board has adopted general WDRs (Table 4-2) for certain private residential subsurface sewage disposal systems in areas where ground water is an important source of drinking water. These general WDRs apply to areas greater than 1 acre and less than five acres in size and in general require either a hydrogeologic study or mitigation measures. WDRs are not issued for lots less than 1 acre in size and are not required for lot sizes greater than five acres.

Waivers from WDRs

The Regional Board can waive WDRs pursuant to the California Water Code (§13269) provided that such action is not against the public interest. Discharges eligible for such waivers (see Table 4-11 for examples) must comply with all applicable Water Quality Control Plans, and:

- have minimal adverse water quality impact;
- be adequately regulated by another State or local agency; or
- be a category of discharge covered by State or Regional Board regulations, guidelines, or Best Management Practices where the Regional Board has obtained voluntary compliance.

Table 4-11. Waiver Conditions from WDRs.

Regional Board waivers
Single family dwelling subsurface sewage disposal systems which are installed and operated in compliance with local ordinances *(as modified by General Permit Order No. 91-94).*
Single family dwelling swimming pool waste disposal installations which are constructed and operated in compliance with local ordinances (Resolution No. 53-5).
The on-site disposal of uncontaminated and unpolluted rotary mud resulting from the drilling of one oil well in such a manner that it will not be dumped or allowed to drain into any waters of the State.
State Board Waivers
Temporary construction dewatering discharge when end-of-pipe treatment is not feasible and the quality of the discharge is acceptable.
Discharges from private and public recreational impoundments caused by: a) continuous addition of domestic water and no additives are used to maintain the lake quality b) wet weather conditions and herbicides are used on a seasonal basis for maintenance of the aesthetic conditions in the impoundment c) water spilled from an impoundment through the addition of new water, wind action, or rainfall, or over a spillway.

Waivers of WDRs are conditional and can be terminated at any time by the Regional Board. NPDES permits, described below, can not be waived.

Water Reclamation Requirements (WRRs)

The State and Regional Board adopted the *Policy With Respect to Water Reclamation in California.* This policy, summarized and reprinted in Chapter 5, directs the Regional Boards to encourage reclamation of wastewaters and to promote water reclamation projects that preserve, restore, or enhance in-stream beneficial uses. The Regional Board waives fees for WRRs.

Projects that reuse treated wastewaters and thereby lessen the demand for higher quality fresh waters are subject to Water Reclamation Requirements (WRRs). Title 22, California Code of Regulations, Division 4, Chapter 3, describes the applicable reclamation criteria (Table 4-12). Requirements from the California Department of Health Services are incorporated into WRRs. Treated wastewaters subject to WRRs in the Los Angeles Region are used for landscape irrigation, recreational impoundments, and to recharge ground water. WRRs are not needed for process waters that are completely recycled during plant operations.

National Pollutant Discharge Elimination System Program (NPDES)

The CWA authorized the USEPA to regulate point source pollutants to the waters of the United States under the NPDES permitting program. The goal of this program was to eliminate all discharges of pollutants to surface waters by 1985. In 1974, California became a "delegated state" for issuing NPDES permits. As noted above, the state issues NPDES permits as WDRs in accordance with a Memorandum of Agreement (MOA) between the USEPA and the State Board, and as codified in the California Water Code, Chapter 5.

A standard NPDES permit generally includes the following components:

- Findings: *official description of the facility, processes, type and quantity of wastes, existing requirements, enforcement actions, public notice and applicable Water Quality Control Plans.*
- Effluent limitations: *narrative and numerical limits for effluent; discharge prohibitions.*
- Receiving water limitations: *narrative and numerical objectives for the receiving waters.*
- Provisions: *standard provisions required by the Regional Board and by Federal law; expiration date of permit.*
- Compliance/task schedules: *time schedules and interim reporting deadlines for compliance.*
- Pretreatment requirements: *standard pretreatment requirements for municipal facilities (see below).*

Table 4-12. Reclaimed Water: Uses and California Title 22 Health Requirements.

Permitted use of reclaimed water	Summary of Title 22 (Sections 60303 et. seq.) Health Requirements
Spray irrigation of food crops	Reclaimed water used for spray irrigation of food crops shall be at all times adequately disinfected, oxidized, coagulated, clarified, filtered wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process, the median number of coliform organisms does not exceed 2.2 per 100 ml and the number of coliform organisms does not exceed 23 per 100 ml in more than one sample within any 30-day period. The median value shall be determined from the bacteriological results of the last 7 days for which analyses have been completed.
Surface irrigation of food crops	Reclaimed water used for surface irrigation of food crops shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process, the median number of coliform organisms does not exceed 2.2 per 100 ml as determined from the bacteriological results of the last 7 days for which analyses have been completed. Orchards and vineyards may be surface irrigated with reclaimed water that has the quality at least equivalent to that of primary effluent provided that no fruit is harvested that has come in contact with the irrigating water or the ground. Exceptions to the quality requirements for reclaimed water used for irrigation of food crops may be considered by the State Department of Health on an individual basis where the reclaimed water is to be used to irrigate a food crop which must undergo extensive commercial, physical or chemical processing sufficient to destroy pathogenic agents before it is suitable for human consumption.
Irrigation of fodder, fiber and seed crops	Reclaimed water used for the surface or spray irrigation of fodder, fiber, and seed crops shall have a level of quality no less than that of primary effluent.
Irrigation of pasture for milking animals	Reclaimed water used for the irrigation of pasture to which milking cows or goats have access shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 23 per 100 ml, as determined from the bacteriological results of the last 7 days for which analyses have been completed.
Landscape irrigation of golf courses, cemeteries, freeway landscapes and similar areas	Reclaimed water used for the irrigation of golf courses, cemeteries, freeway landscapes, and landscapes in other areas where the public has similar access or exposure shall be at all times an adequately disinfected oxidized wastewater. The wastewater shall be considered adequately disinfected if the median number of coliform organisms in the effluent does not exceed 23 per 100 ml as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of coliform organisms does not exceed 240 per 100 ml in any two consecutive samples.

Table 4-12. Reclaimed Water: Uses and California Title 22 Health Requirements (continued).

Permitted use of reclaimed water	Summary of Title 22 (Sections 60303 et. seq.) Health Requirements
Irrigation of parks, playgrounds, schoolyards and similar areas	Reclaimed water used for the irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater or a wastewater treated by sequence of unit processes that will assure an equivalent degree of treatment and reliability. The wastewater shall be considered adequately disinfected if the medium number of coliform organisms in the effluent does not exceed 2.2 per 100 ml, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of coliform organisms does not exceed 23 per 100 ml in any sample.
Nonrestricted recreational impoundment (no limitations are imposed on body-contact sport activities)	Reclaimed water used as a source of supply in a nonrestricted recreational impoundment shall be at all times adequately disinfected, oxidized, coagulated, clarified, filtered wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process, the median number of coliform organisms does not exceed 2.2 per 100 ml and the number of coliform organisms does not exceed 23 per 100 ml in more than one sample within any 30-day period. The median value shall be determined from the bacteriological results of the last 7 days for which analyses have been completed.
Restricted recreation impoundment (recreation is limited to fishing, boating, and other non-body-contact water recreation activities)	Reclaimed water used as a source of supply in a restricted recreational impoundment shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 ml, as determined from the bacteriological results of the last 7 days for which analyses have been completed.
Landscape impoundment (aesthetic enjoyment or other function but no body-contact is allowed)	Reclaimed water used as a source of supply in a landscape impoundment shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 23 per 100 ml, as determined from the bacteriological results of the last 7 days for which analyses have been completed.
Groundwater recharge of domestic water supply aquifers	Recharge water requirements are made on a case-by-case basis to ensure that the water is of such quality that fully protects public health at all times. Factors considered include treatment provided, effluent quality and quantity, spreading operations, soil characteristics, hydrogeology, residence time, receiving water quality and distance to withdrawal.
Other uses (toilet flush, industrial cooling water, process water, seawater intrusion barrier)	User must demonstrate that methods of treatment and reliability features will assure an equal degree of treatment and reliability.

- Sludge requirements: *sludge monitoring and control requirements, if necessary and not regulated under separate WDRs.*

- Monitoring program: *specific locations of monitoring stations and sampling frequency for all parameters limited in permit, including flow.*

Pretreatment

The 1972 amendments to the CWA established a separate regulatory program, called the National Pretreatment Program, that requires removal of toxic and other non-conventional pollutants at their sources before the wastewater enters publicly-owned treatment works (POTWs). The USEPA has developed pretreatment regulations for certain industries.

In addition, agencies operating one or more POTWs with a total design flow greater than five-million gallons per day are required to implement pretreatment programs. Smaller POTWs that have significant industrial influent, treatment process problems, or violations of effluent limitations, also can be required to pretreat influent. The pretreatment programs are designed to reduce pollutants that: interfere with biological treatment processes, contaminate sludge, and violate water quality objectives of receiving waters. POTWs are responsible for implementing and enforcing their own pretreatment programs, but are subject to USEPA and Regional Board approval and oversight.

Storm Water Permits

Storm water runoff is runoff from land surfaces that flows into storm drains or directly into natural waterbodies during rainfall. Storm water discharges include flow through pipes and channels or sheet flow over a surface. Storm water runoff was not regulated by the NPDES program until after the 1987 amendments to the CWA. Historically, many large manufacturers or industrial operators collected runoff (non-process wastewater) within their properties and discharged it to storm drains or sent it to a sewage treatment plant. However, most small industries and construction sites did not collect or monitor their runoff. The NPDES program now requires that this runoff be eliminated or regulated under a storm water permit. For more information about storm water, see the Urban Runoff in the Nonpoint Source section of this Chapter.

Table 4-13. Storm Water General NPDES Categories (General Permit Major Categories are Italic).

Industrial Facility Categories
i. Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR subchapter N)
ii. Certain manufacturing facilities
iii. Oil and Gas/Mining facilities
iv. Hazardous waste treatment, storage, or disposal facility
v. Landfills, land application sites, and open dumps that receive or have received any industrial wastes from facilities listed herein
vi. Recycling facilities, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards
vii. Steam electric power generating facilities
viii. Transportation facilities which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations
ix. Sewage or Wastewater treatment facilities with design flows greater than 1.0 mgd or plants required to have pretreatment program
xi. Other manufacturing facilities where materials, machinery, or products are exposed to storm water
Construction Activities of five acres or more, including clearing, grading and excavation. Construction which results in soil disturbances of less than 5 acres requires a permit if the construction activity is part of a larger common plan of development.

In November 1990, USEPA published initial permit application requirements for certain categories of storm water discharges associated with industrial activity and for discharges from separate municipal storm sewer systems located in municipalities with populations of 100,000 or more (55 FR 47990). These NPDES storm water discharge permits provide a mechanism for monitoring the discharge of pollutants to "waters of the United States" and for establishing appropriate controls to the maximum extent practicable.

In cases where there are existing NPDES permits for wastewater discharges, the Regional Board incorporates storm water discharge provisions into the same permit. Currently two types of NPDES storm water permits have been promulgated by the State and Regional Boards:

- Municipal permits for separate storm sewer systems located in urban areas with populations of 100,000 or more.

- Statewide general permits (Table 4-2):

  (i) for *industrial activities*, excluding construction. This permit covers 10 of the 11 industrial classifications described in the federal storm water regulations (Table 4-13); and

  (ii) for all *construction projects* impacting five acres or more, or smaller areas that are part of a larger common plan, including excavation, demolition, grading and clearing. (USEPA is considering making this permit applicable to all construction sites as part of Phase 2 of the storm water program).

Municipal storm water runoff is covered under municipal permits for a single city, county, or groups of cities and counties. The County of Los Angeles requested and received an "early" permit in 1990, prior to the promulgation of the USEPA storm water regulations. This permit covers the drainage basins contained within Los Angeles County with cities being brought into compliance under the program in three phases (Table 4-14; Figure 4-3). The Regional Board is currently developing a similar municipal permit that will cover most of Ventura County (Table 4-15), including the cities of Oxnard, Simi Valley and Thousand Oaks which have populations of greater than 100,000. The City of Thousand Oaks will be issued a separate storm water NPDES permit for drainage areas tributary to Santa Monica Bay. Each phase of the storm water program in Los Angeles County is being implemented over three years:

Table 4-14. Drainage Areas and Associated Co-permittees of Los Angeles County Municipal Storm Water NPDES Permit

Phase or Drainage Area 1: Santa Monica Bay Drainage Basin
Agoura Hills, Beverly Hills, Calabasas, Caltrans, Culver City, El Segundo, Hermosa Beach, Inglewood, Los Angeles (City and County), Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Torrance, Ventura County (portions of Ventura County are included within the Los Angeles permit area), West Hollywood, Westlake Village
Phase or Drainage Area 2: Upper Los Angeles River and Upper San Gabriel River Drainage Basins
Alhambra, Arcadia, Azusa, Baldwin Park, Bradbury, Burbank, Calabasas, Caltrans, Claremont, Covina, Diamond Bar, Duarte, El Monte, Glendale, Glendora, Hidden Hills, Industry, Irwindale, La Cañada Flintridge, La Habra Heights, La Puente, La Verne, Los Angeles (City and County), Monrovia, Montebello, Monterey Park, Pasadena, Pomona, Rosemead, San Dimas, San Fernando, San Gabriel, San Marino, Sierra Madre, South El Monte, South Pasadena, Temple City, Walnut, West Covina
Phase or Drainage Area 3: Lower Los Angeles River, Lower San Gabriel River and Santa Clara River Drainage Basins
Alhambra, Artesia, Bell, Bellflower, Bell Gardens, Caltrans, Carson, Cerritos, Commerce, Compton, Cudahy, Downey, El Segundo, Gardena, Glendale, Hawaiian Gardens, Hawthorne, Huntington Park, Inglewood, La Cañada Flintridge, La Habra Heights, Lakewood, La Mirada, Lawndale, Lomita, Long Beach, Los Angeles (City and County), Lynwood, Maywood, Montebello, Norwalk, Palos Verdes Estates, Paramount, Pasadena, Pico Rivera, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Clarita, Santa Fe Springs, Signal Hill, South Gate, South Pasadena, Torrance, Vernon, Whittier

- Year I: compilation of existing data on the storm drain system and identification of existing Best Management Practices.

- Year II: implementation of early action Best Management Practices for cities, and regional

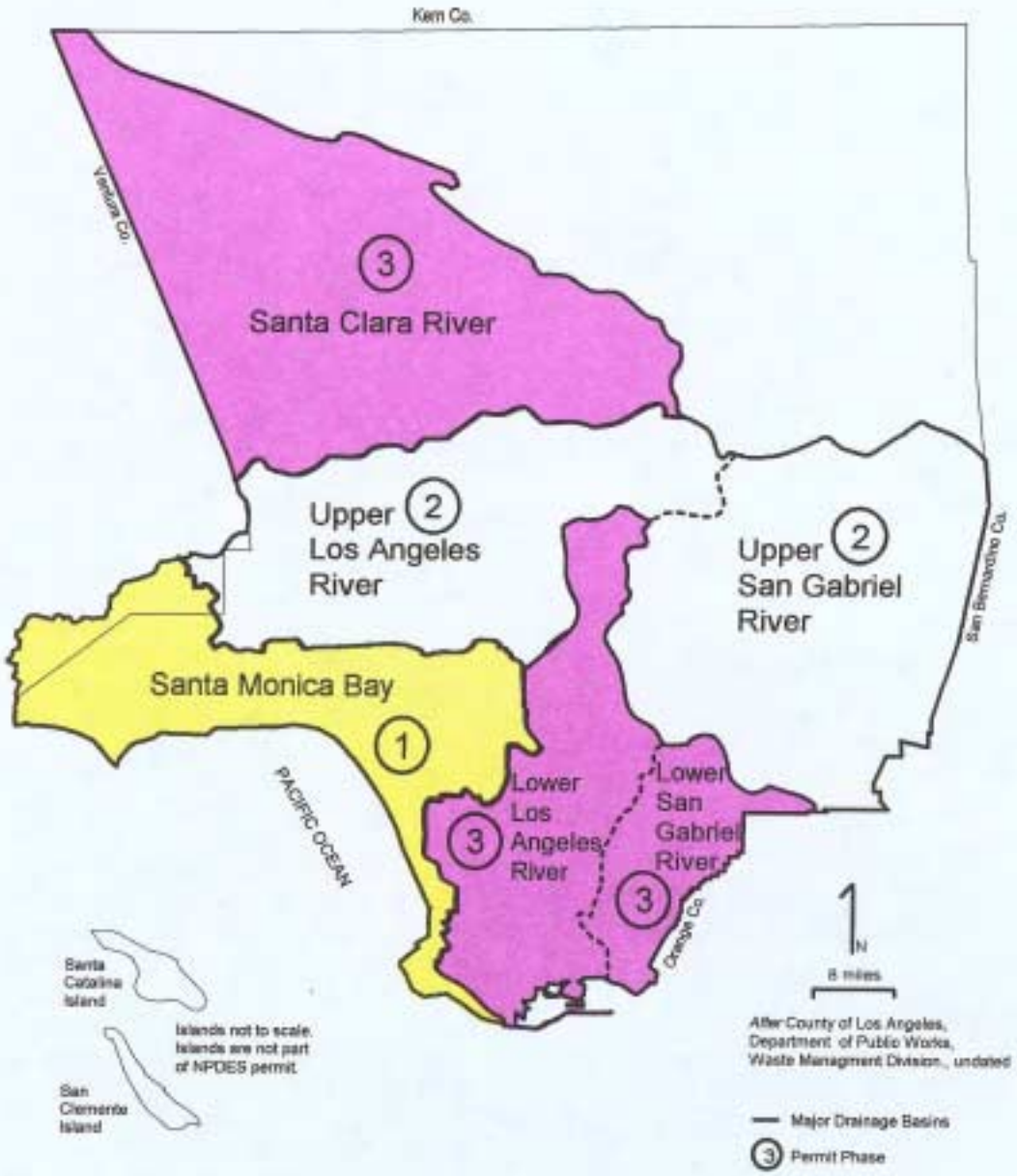

Figure 4-3. Drainage basins and phases of the Los Angeles County Municipal storm water NPDES permit.

monitoring programs for nonpoint source pollutants.

- Year III: implementation of additional Best Management Practices that are city-specific based on existing land use patterns and local concerns.

Industrial general storm water NPDES permits require that any owner/operator of a site that falls into one of the regulated categories and that discharges storm water to waters of the United States file a Notice of Intent (NOI) with the State Board. As detailed in the general permit, these dischargers are required to eliminate most non-storm water discharges, including illicit connections, to storm water drainage systems.

An industrial owner/operator must prepare a *Storm Water Pollution Prevention Plan* and a *Monitoring and Reporting Program* if storm water leaves, or has the potential to leave, an industrial site. Industries can monitor individually, or apply for a "group monitoring" program for like industries. Group monitoring is based on the assumption that similar industries have similar types of discharges. Industries under this program must sample a minimum of 20% or a minimum number of four, whichever is higher, of the facilities covered under an approved group program.

Table 4-15. Drainage Areas and Co-permittee Cities and Agencies of the Ventura County Municipal Storm Water NPDES Permit.

Drainage Area 1: Ventura River Drainage Basin
Ojai, San Buenaventura, Unincorporated Ventura County
Drainage Area 2: Santa Clara River Drainage Basin
Fillmore, Oxnard, San Buena Ventura, Santa Paula, Unincorporated Ventura County
Drainage Area 3: Calleguas Creek Drainage Basin
Camarillo, Moorpark, Simi Valley, Thousand Oaks, Unincorporated Ventura County
Drainage Area 4: Malibu Creek
Thousand Oaks, Unincorporated Ventura County
Drainage Area 5: Bays/Estuaries
Oxnard, Port Hueneme, San Buenaventura

The Regional Board's permitting strategy for industrial facilities is based on four-tiers of priorities: baseline permitting, watershed permitting, industry-specific permitting and facility-specific permitting (Table 4-16). General permits for industrial facilities will not be less stringent than individual permits. Rather, the use of general permits is intended to alleviate the administrative burden of issuing storm water permits to all industrial facilities. All permits, whether general or individual, will also require compliance with all local agency requirements. In addition, industrial facilities must eliminate all non-storm water discharges from storm drain systems unless they are authorized by an NPDES permit or determined not to be a source of pollutants and thus do not need an NPDES permit for discharge. General permits for other classes of non-storm water discharges will be considered as the need arises. Other industrial facilities not regulated at this time are expected to identify "hot areas" at their facilities where runoff can contact pollutants or activities can release pollutants to runoff. Examples of potential "hot areas" are storage areas for raw materials, sites used for the storage and maintenance of equipment, and shipping and receiving areas. In addition, industrial facilities are expected to segregate storm water discharges from these "hot areas;" and identify and implement control measures in these and other areas at the facility consistent with local agency comprehensive storm water control programs.

Dischargers are required to control pollutant discharges through use of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to reduce pollutants and to use more stringent controls, if necessary, to meet water quality standards. To date, the USEPA has established technology-based numerical effluent limitations for storm water discharges from ten industrial activities (40 CFR Subchapter N, examples in Table 4-17).

For construction activities, landowners are required to develop and implement a *Storm Water Pollution Prevention Plan* and assess the effectiveness of their pollution prevention measures (control practices). The NPDES permit establishes requirements for the Notice of Intent (NOI) and the

Table 4-16. Four-tier Priority Strategy for Permitting Industrial Storm Water Dischargers.

Tier 1 - Baseline Permitting: The State Board issued a general permit in November 1991 for storm water discharges associated with industrial activities. The majority of storm water discharges associated with industrial activities in the Region will be allowed coverage under this State Board general permit. Requirements for the Notification of Intent to be covered under the general permit and the schedule for submittal and compliance are established in the permit.
Tier II - Watershed Permitting: Facilities within watersheds determined to be affected by industrial storm water discharges will be targeted for individual or watershed-specific general permits. The Regional Board will consider watershed-specific permits, on an as needed basis, for high resource or water-quality impaired watersheds in the Region.
Tier III - Industry-Specific Permitting: Specific industrial categories will be targeted for individual or industry-specific general permits. Storm water discharges from primary-metal industries, automobile salvage yards, boat yards, U.S. Department of Defense facilities in the Region may be significant sources of pollutants, and as such, the Regional Board will consider issuing general permit(s) or individual permit(s) specific to these facilities.
Tier IV - Facility-Specific Permitting: The targeting of individual facilities for facility-specific permitting will be dependent on several factors including special characteristics, complexity of operations, pollution threat, and others. Such facilities will also include those that have been found to be unsuitable for the other three tiers of permitting. In general, facility-specific permits are intended to be more restrictive than other tiers of permitting.

schedule for submittal and compliance. Discharges addressed by the permit include (i) pollutant discharges that occur during construction activities, (ii) discharges of construction waste material, and (iii) pollutant discharges in runoff after construction is completed. Permit conditions must be consistent with local agency ordinances and regulatory programs; the intent of the permit is not to supersede local programs, but rather to complement them. Under the municipal permits described above, local agencies are required to effectively address construction activities through their early planning and CEQA processes, as well as implement and develop control measures as part of their comprehensive control programs.

Criteria for WDRs, WRRs, and NPDES Permit Limit and Provisions

The Regional Board refers to several guidance documents or policies in developing effluent limits, including: USEPA's *Quality Criteria for Water* (USEPA, 1986) and a series of industry-specific USEPA Effluent Guideline Volumes (*Development Documents for Effluent Limitations Guidelines and Standards*). Site-specific effluent and receiving water limits are developed to comply with narrative and numerical objectives in the *California Ocean Plan* (1990), the *California Thermal Plan* (1975), the objectives and beneficial uses in this *Regional Water Quality Control Plan*, and other State and Regional Board plans and policies. Other nearby waste discharges, and the need to prevent nuisance, are also considered. In addition, all discharges must comply with Federal and State anti-degradation (see Chapters 3 and 5) and anti-backsliding (CWA §404) policies.

Municipal Effluent Limits (NPDES)

Effluent limitations for municipal NPDES permits require (i) at least secondary treatment, (ii) non-ocean disposal or recycling of sludge, (iii) compliance with health standards for coliform and fecal bacteria, and (iv) conformance with water contact or fish habitat standards, if necessary. Since 1977, all ocean dischargers have been required by USEPA to have secondary treatment. Some dischargers are not yet fully in compliance with this requirement; however, USEPA has denied all applications from POTWs in the Los Angeles Region for federal 301(h) waivers which would allow modified water quality criteria for ocean discharges. Those POTWs that submitted applications are now in the process of constructing secondary treatment facilities.

Specific Criteria for Site-specific Determination of Effluent Limits

The Regional Board prescribes effluent limits after assessing the nature of the waste, treatment level,

Table 4-17. Selected Point Source Categories Subject to Storm Water Effluent Limitation Guidelines (see 40 CFR 411-443).

BAT is Best Available Technology Economically Achievable.
BPT is Best Practicable Control Technology Currently Available.

Category	Legal Standard	Design storm	Parameter	Concentration (mg/L unless noted)	
				Max for any 1 day	30-day average
Cement manufacturing	BPT	10 yr. 24 hr.	TSS pH	< 50 6.0-9.0	
Feedlots (all subcategories except ducks)	BPT	10 yr. 24 hr.		No discharge of process wastewater pollutants	
	BAT	25 yr. 24 hr.		No discharge	
Feedlots (Ducks)	BPT	*	BOD5	1.66	0.91
			fecal coliform (kg/1000 ducks)	< 400/100 mpn/ml	
Fertilizer Manufacturing (Phosphate)	BPT	*	Total phosphorus Fluoride	105 75	35 25
Fertilizer Manufacturing (Ammonia)	BPT	*	Ammonia	0.1875	0.0625
			pH (kg/1000kg of product)	6.0-9.0	
Fertilizer Manufacturing (Ammonium sulfate production)	BPT	*		No discharge	
Fertilizer Manufacturing (Urea produced as a solution)	BPT	*	Ammonia Organic Nitrogen (kg/1000kg of product)	0.95 0.61	0.48 0.33
	BAT	*	Ammonia Organic Nitrogen (kg/1000kg of product)	0.53 0.45	0.27 0.24
Fertilizer Manufacturing (Urea grilled or granulated)	BPT	*	Ammonia Organic Nitrogen (kg/1000kg of product)	1.18 1.48	0.59 0.80
	BAT	*	Ammonia Organic Nitrogen (kg/1000kg of product)	0.53 0.86	0.27 0.46
Fertilizer Manufacturing (Ammonium Nitrate)	BPT	*	Ammonia Nitrate (kg/1000kg of product)	0.73 0.67	0.39 0.37
	BAT	*	Ammonia Nitrate (kg/1000kg of product)	0.08 0.12	0.04 0.07
Petroleum Refining (For discharges composed entirely of contaminated *runoff*)	BPT	*	Oil and Grease TOC	15 110	

Table 4-17. Selected Point Source Categories Subject to Storm Water Effluent Limitation Guidelines (see 40 CFR 411-443) (continued).

BAT is Best Available Technology Economically Achievable.
BPT is Best Practicable Control Technology Currently Available.

Category	Legal Standard	Design storm	Parameter	Concentration (mg/L unless noted)	
				Max for any 1 day	30-day average
Petroleum Refining (For discharges of a] contaminated runoff that is commingled or treated with process wastewater or b] wastewater consisting solely of contaminated runoff which exceeds 15 mg/L oil and grease or 110 mg/L TOC and is not commingled or treated with any other type of wastewater) *Multiply the flow of contaminated runoff (as determined by the permit writer) by the concentrations listed.*	BPT	*	BOD5 TSS COD Oil & grease Phenolic compounds (4AAP) Total chromium Hexavalent chromium	48 33 360 15 0.35 0.73 0.062	26 21 180 8 0.17 0.43 0.028
			pH (kg/1000m^3 of flow)	6.0-9.5	
	BAT	*	Phenolic compounds (4AAP) Total chromium Hexavalent chromium COD (kg/1000m^3 of flow)	0.35 0.60 0.062 360	0.17 0.21 0.028 180
Phosphate Manufacturing (Defluorinated phosphate rock and defluorinated phosphoric acid)	BPT	*	Total phosphorus Fluoride	105 75	35 25
			pH	6.0 -9.5	
Phosphate Manufacturing (Sodium phosphates)	BPT	*	TSS Total phosphorus Fluoride	0.50 0.80 0.30	0.25 0.40 0.15
			pH (kg/1000kg of product)	6.0-9.5	
Steam Electric Power Generating (Runoff from coal piles)	BPT	10 yr. 24 hr.	TSS pH PCBs	50 (max at any time) 6.0-9.0 No discharge	
Mineral Mining (Crushed stone and construction sand and gravel)	BPT	10 yr. 24 hr.	pH	6.0-9.0***	
Mineral Mining (Industrial sand: Discharge of process-generated wastewater from facilities that recycle waste except from those employing HF flotation)	BPT	10 yr. 24 hr.	TSS	45	25
			pH	6.0-9.0***	
Mineral Mining (Industrial sand: Discharges of process generated wastewater from facilities that recycle wastewater and employ HF flotation)	BPT	10 yr. 24 hr.	TSS Total fluoride	0.046 0.006	0.023 0.003
			pH (kg/1000kg final product)	6.0-9.0***	
Mineral Mining (Industrial sand: All other discharges of process generated wastewater)	BPT	10 yr. 24 hr.		No discharge	

Table 4-17. Selected Point Source Categories Subject to Storm Water Effluent Limitation Guidelines (see 40 CFR 411-443) (continued).

BAT is Best Available Technology Economically Achievable.
BPT is Best Practicable Control Technology Currently Available.

Category	Legal Standard	Design storm	Parameter	Concentration (mg/L unless noted)	
				Max for any 1 day	30-day average
Mineral Mining (Industrial sand: Mine dewatering discharges)	BPT	10 yr. 24 hr.	TSS	45	25
			pH	6.0-9.0***	
Mineral Mining (Gypsum, asphaltic mineral, asbestos and wollastonite, borax, potash, sodium sulfate, frasch sulfur, magnesite, diatomite, jade, novaculite, barite, fluorspar, salines from brine lakes, bentonite, and tripoli)	BPT	10 yr. 24 hr.		No discharge	
Ore mining and dressing (Iron ore: runoff from the drainage area of facility)	BPT	10 yr. 24 hr.	TSS Iron (dissolved)	30 2.0	20 1.0
			pH	6.0-9.0	
Ore Mining and Dressing (Copper, lead, zinc, gold, silver, and molybdenum ores: runoff from the drainage area of facility)	BPT	10 yr. 24 hr.	TSS Copper Zinc Lead Mercury	30 0.30 1.5 0.6 0.002	20 0.15 0.75 0.3 0.001
			pH	6.0-9.0	
	BAT	10 yr. 24 hr.	Copper Zinc Lead Mercury Cadmium	0.30 1.5 0.6 0.002 0.10	0.15 0.75 0.3 0.001 0.05
Ore Mining and Dressing (Gold placer mine: surface runoff which has commingled with mine drainage or waters resulting from the beneficiation process)	BPT	10 yr. 24 hr.	Settleable solids	0.2 ml/L (instantaneous max)	
Ore Mining and Dressing (Titanium ore: surface water incorporated into mine drainage)	BPT	10 yr. 24 hr.	All mine drainages: TSS Iron	 30 2.0	 20 1.0
			pH	6.0-9.0	
			Discharges from Mills: TSS Zinc Nickel	 30 1.0 0.2	 20 0.5 0.1
			pH	6.0-9.0	

Table 4-17. Selected Point Source Categories Subject to Storm Water Effluent Limitation Guidelines (see 40 CFR 411-443) (continued).

BAT is Best Available Technology Economically Achievable.
BPT is Best Practicable Control Technology Currently Available.

Category	Legal Standard	Design storm	Parameter	Concentration (mg/L unless noted)	
				Max for any 1 day	30-day average
Ore Mining and Dressing (Tungsten, Nickel and Vanadium ores: surface runoff incorporated into mine drainage)	BPT	10 yr. 24 hr.	Mines producing ≥5000 metric tons:		
			TSS	30	20
			Cadmium	0.10	0.05
			Copper	0.3	0.15
			Zinc	1.0	0.5
			Lead	0.6	0.3
			Arsenic	1.0	0.5
			pH	6.0-9.0	
			Mills producing ≥5000 metric tons:		
			TSS	30	20
			Cadmium	0.10	0.05
			Copper	0.3	0.15
			Zinc	1.0	0.5
			Arsenic	1.0	0.5
			pH	6.0-9.0	
			Mines and Mills producing < 5000 metric tons:		
			TSS	50	30
			pH	6.0-9.0	
Paving and Roofing Materials (Asphalt emulsion)	BPT	*	Oil and grease	0.020	0.015
			pH (kg/m³ of runoff)	6.0-9.0	
	BAT	*	TSS	0.023	0.015
			oil and grease	0.015	0.010
			pH (kg/m³ of runoff)	6.0-9.0	
Paving and Roofing Materials** (Asphalt concrete)	BPT	*		No discharge	
Paving and Roofing Materials** (Asphalt roofing)	BPT	*	TSS	0.056	0.038
			pH (kg/1000kg of product)	6.0-9.0	
	BAT	*	TSS	0.028	0.019
			pH (kg/1000kg of product)	6.0-9.0	

Table 4-17. Selected Point Source Categories Subject to Storm Water Effluent Limitation Guidelines (see 40 CFR 411-443) (continued).

BAT is Best Available Technology Economically Achievable.
BPT is Best Practicable Control Technology Currently Available.

Category	Legal Standard	Design storm	Parameter	Concentration (mg/L unless noted)	
				Max for any 1 day	30-day average
Paving and Roofing Materials ** (Linoleum and printed asphalt felt)	BPT	*	TSS	0.038	0.025
			pH	6.0-9.0	
			(kg/1000kg of product)		
	BAT	*	TSS	0.019	0.013
			pH	6.0-9.0	
			(kg/1000kg of product)		

* not specified

** Any water which comes into direct contact with any raw material, intermediate product, by product, or product used in or resulting from production.

*** or lower but not less than 5.0 if water quality standards authorize lower pH; and if discharge, unaltered by human activity, would have a pH lower than 6.0.

dilution or mixing zone, other discharges in the area, beneficial uses and objectives for the receiving waters, and relevant State and Federal guidelines and regulations.

On a case-by-case basis, the Regional Board can allow a mixing zone for compliance with receiving water objectives. In rivers and streams an approved mixing zone can not extend more than 250 feet from the point of discharge or be located less than 500 feet from an adjacent mixing zone. Since many of the streams in the Region have minimal upstream flows, mixing zones are usually not appropriate. In lakes or reservoirs, it may not extend 25 feet in any direction from the discharge point, and the sum of mixing zones may not be more than 5% of the volume of the waterbody. As detailed in the States' *Ocean Plan*, ocean dilution zones are determined using standard models.

Water quality-based effluent limitations for discharges to inland surface waters (SWRCB, 1991a and SWRCB, 1991b) are developed in a number of ways including:

- assignment of a portion of the loading capacity of the receiving water to each of the sources of waste, point and nonpoint;
- determination of limitations based on a formula that considers the water quality objective and ambient background concentrations of each substance and allowed dilution ratio;
- determination of limitations using statistically-based calculations and information about the effluent and receiving water, where sufficient information exists to adequately characterize effluent and receiving water;
- using discharge prohibitions to implement water quality objectives for a particular area; or
- for power plant discharges, determination of limitations based on a formula that incorporates cooling water flow and combined in-plant waste streams.

Effluent limits for ocean discharges are based on objectives in the *Ocean Plan.*

Standard Provisions in WDRs and NPDES Permits

Standard provisions are included in most Non-Chapter 15 WDRs and in all NPDES permits and outline specific restrictions and requirements imposed by the Regional Board. Selected provisions which relate to prohibited discharges are listed below. A full copy of the standard provisions for either WDRs or NPDES permits can be obtained at the Regional Board office. NPDES standard provisions are different from WDRs standard provisions.

Selected Standard Provisions Applicable to Non-Chapter 15 Waste Discharge Requirements

General Prohibition: Neither the treatment nor the discharge of waste shall create pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code.

Hazardous Releases: Except for a discharge which is in compliance with waste discharge requirements, any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall, as soon as (i) that person has knowledge of the discharge, (ii) notification is possible, and (iii) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the State Toxic Disaster Contingency Plan adopted pursuant to Article 3.7 of Chapter 7 of Division 1 of Title 2 of the Government Code, and immediately notify the State Board or the appropriate Regional Board of the discharge. This provision does not require reporting of any discharge of less than a reportable quantity as provided for under Subdivisions (f) and (g) of Section 13271 of the Water Code unless the discharger is in violation of a prohibition in the applicable Water Quality Control Plan.

Petroleum Releases: Except for a discharge which is in compliance with waste discharge requirements, any person who without regard to intent or negligence, causes or permits any oil or petroleum product to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall, as soon as (i) such person has knowledge of the discharge, (ii) notification is possible, and (iii) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the State Oil Spill Contingency Plan adopted pursuant to Article 3.5 (commencing with Section 8574.1) of Chapter 7 of Division 1 of Title 2 of the Government Code. This provision does not require reporting of any discharge of less than 42 gallons unless the discharge is also required to be reported pursuant to Section 311 of the Clean Water Act or the discharge is in violation of a prohibition in the applicable Water Quality Control Plan.

Selected General Requirements and Standard Provisions Applicable for NPDES Permits

- Neither the disposal nor any handling of wastes shall cause pollution or nuisance.
- Wastes discharged shall not contain any substances in concentrations toxic to human, animal, plant or aquatic life.
- Wastes discharged shall not contain visible oil or grease, and shall not cause the appearance of grease, oil or oily slick, or persistent foam in the receiving waters or on channel banks, wall, inverts or other structures.
- Wastes discharged shall not increase the natural turbidity of the receiving waters at the time of discharge.
- Wastes discharged shall not damage flood control structures or facilities.
- The temperature of wastes discharged shall not exceed 100 °F.
- The discharge of any radiological, chemical, or biological warfare agent or high level radiological waste is prohibited.
- Bypass (the intentional diversion of waste streams from any portion of a treatment facility) is prohibited (with certain exceptions).

Self Monitoring, Compliance Monitoring and Inspections

Permits and requirements issued by the Regional Board are generally self-monitored by each individual discharger, with oversight by the Regional Board. The Regional Board conducts periodic inspections and compliance monitoring and, as necessary, will take enforcement actions to ensure compliance.

Self Monitoring Program: Dischargers are required to regularly collect samples of their waste stream(s) and, in some cases, receiving waters and submit results to the Regional Board. If the discharger discovers that they are not in compliance with their Requirements, they are required to take measures, including change of operations, in order to come into compliance. The monitoring and reporting schedule is determined for each discharger on a case-by-case basis.

Compliance Monitoring and Inspections: Regional Board staff conduct unannounced inspections (including collection of samples) to determine the status of compliance with Requirements. All major dischargers are inspected at least once a year.

Enforcement

Regional Boards are authorized to implement a variety of enforcement actions to obtain compliance with Requirements. Enforcement procedures can be informal, such as a letter informing the discharger of non-compliance and requesting the discharger to comply with terms of its Requirements, or they can be more formal, such as an order prescribing needed changes and a time schedule. Generally, instances of noncompliance are first addressed by discussions at the site, via telephone, or by letter with a request to correct the problem within a given period of time.

The California Water Code (§13267) authorizes the Regional Board to require any discharger to submit technical or monitoring reports. Failure to supply the required reports is a misdemeanor. Section 13268 permits the Regional Board to levy administrative civil liabilities (e.g., fine) not exceeding five thousand dollars ($5,000) for each day that the discharger fails to comply with the Section 13267 request. Civil liability may also be imposed by the superior court in an amount that shall not exceed twenty-five thousand dollars ($25,000) for each day in which the violation occurs. If warranted, the Executive Officer will issue a *Notice of Violation* that is sent to the discharger for failure to comply with a predetermined compliance action/schedule.

Under the California Water Code, the Regional Board has several enforcement options available to compel compliance with a Board order. The following is a brief overview of the enforcement actions available to the Regional Board (statutory references are to the California Water Code).

Time Schedule Orders *(§13300):* Dischargers operating under Regional Board orders who are not able to meet requirements, or whose actions threaten to violate requirements prescribed by the Regional Board, can be administratively issued (by the Executive Officer) an order specifying a time schedule for the discharger to take specific actions which will correct or prevent the violation. The time schedule order may also include interim limits with which the discharger must comply during the time schedule until full compliance is achieved.

Cease and Desist Orders *(§13301):* The Regional Board may issue a Cease and Desist Order when a discharger:

- fails to comply with requirements or discharge prohibitions contained in an NPDES permit or in WDRs/WRRs;
- fails to comply with a time schedule set by the Board in a time schedule order; or
- fails to take preventive or remedial action in the event of a threatened violation of a Board order.

The order requires the discharger to comply with established requirements or prohibitions, to comply with a time schedule, or, if the violation is threatening, to take appropriate remedial or preventative action. The order may also restrict or prohibit the discharge of new sources of waste to a community sewer system.

Cleanup and Abatement Orders *(§13304):* The Regional Board may issue a cleanup and abatement order to any discharger who has discharged wastes without a valid Board order or who has caused, or threatens to cause, a condition of pollution. The order requires the discharger to clean up waste or

abate its effects or, in the case of a threatened pollution or discharge, take other necessary remedial or preventive actions. If the discharger fails to take action, the State Attorney General, at the request of the Board, may file a petition for issuance of an injunction requiring compliance. Alternatively, the Executive Officer is authorized to issue a Cleanup and Abatement Order administratively.

Administrative Civil Liability: A Civil Liability (e.g., fine) may be administratively imposed by the Regional Board against dischargers who violate §13350 or §13385 or any other Regional Board order.

Assessments imposed for §13350 violations shall not exceed five thousand dollars ($5,000), but shall not be less than five hundred dollars ($500), for each day the discharger is deemed to be in violation. Section 13350 violations include:

- failure to comply with a Cleanup and Abatement Order or a Cease and Desist Order;
- violation of any Requirements which creates a nuisance or causes pollution; and
- deposition of oil or petroleum residue in or on any State waters.

The Regional Board can impose sanctions up to ten thousand dollars ($10,000) for each day in which the discharger violates §13385. Section 13385 violations include:

- failure to furnish a report, filing a false report of waste discharge or a false technical report, or failure to pay a fee when so requested;
- discharging warfare (radiological, chemical or biological) agents into State waters;
- violating dredge and fill material permits; and
- refusing to provide technical or monitoring reports as requested by the Regional Board.

The Executive Officer is authorized to impose an Administrative Civil Liability administratively. If the discharger so requests, a hearing will be held by the Regional Board on the violation and the amount of the civil liability. Funds collected from civil penalties go directly to the State Water Pollution Cleanup and Abatement Account which is administered by the State Board. In lieu of a civil liability payment, the Regional Board may require that the violator fund a cleanup or enhancement activity within the area of the discharge violation or for other environmentally beneficial projects in the Region.

Judicial Civil Liability: The State Attorney General, upon a request from the Regional Board, may petition the superior court to seek penalties in excess of the fines that the Regional Board is authorized to impose. For §13350 violations (see criteria listed in Administrative Civil Liabilities section above), the court may impose civil liabilities up to fifteen thousand dollars ($15,000) for each day. For §13385 violations, the court-imposed fines cannot exceed twenty-five thousand dollars ($25,000) for each day of violation.

Injunctive Relief: The State Attorney General or the appropriate county or District Attorney or City Attorney may, at the request of the Regional Board, petition the Superior Court for injunctive relief for any person not complying with submittal of required reports and fees (§13360) or discharging wastes in violation of the California Water Code (§13386), or where there is evidence of irreparable damage (§13361).

Control of Nonpoint Source Pollutants

Introduction

Despite California's significant achievements in controlling point source discharges from municipal sewage treatment plants and industrial facilities, pollutants from nonpoint sources continue to degrade many of our water resources. Approximately two-thirds of California's waterbodies assessed in the State's *Water Quality Assessment Report* (1992) are threatened or impaired by nonpoint sources of pollution.

Nonpoint source (NPS) pollution, as opposed to "point source" pollution (a discharge at a specific location or pipe with the exception of irrigation return flows), generally consists of diffuse runoff of pollutant-laden water from adjacent land. These pollutants are transported to waters by precipitation, irrigation, and atmospheric deposition. Nonpoint sources have been grouped by the USEPA into categories that include agriculture, urban runoff,

construction, hydromodification, resource extraction, silviculture, and land disposal. These categories, however, are not exclusive. For example, agricultural operations contain both point (concentrated animals) and nonpoint source (irrigation return flow) categories.

Nonpoint source pollution has been studied for several decades. Many of the earlier nonpoint source planning efforts generated excellent studies and reports; unfortunately, many of the recommendations have yet to be implemented. Due to new requirements mandated as a result of the 1987 amendments to the CWA, a more focused, results-oriented approach is being implemented nationwide.

Early Nonpoint Source Pollution Planning Efforts

The CWA (§208) required State and local agencies to identify water quality problems from both point and nonpoint sources as part of their water quality planning efforts. From 1974 to 1981, federal grants under this program provided funds to states and local agencies for identification of nonpoint source problems and development of control strategies. Although many of these plans were never implemented, this early work helped establish the framework for existing state nonpoint source programs currently being implemented under the CWA (§319).

Recognizing the need to assess the water quality effects of storm water runoff, the USEPA initiated the Nationwide Urban Runoff Program (NURP) in 1978. This five-year program collected data on the quality of urban runoff and its impact on receiving waters. Objectives of NURP included the development of a national database and analytical methodologies to examine the quality characteristics of urban runoff, a determination of the extent to which urban runoff contributes to water quality problems, and an evaluation of best management practices to control pollutants from urban runoff. Data from 28 projects around the country confirmed that significant levels of pollutants such as nutrients, heavy metals, and bacteria result from urban runoff. These studies also showed that the most significant effects of urban storm water runoff on aquatic life were due to hydrologic changes related to urbanization and construction activities.

Development of the State Nonpoint Source Program

The CWA (§101(a)(7)) states:

"it is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution."

With the addition of specific nonpoint source language in the 1987 amendments to the CWA (particularly §319), new direction focusing on implementation of state nonpoint source management programs have been authorized.

Section 319 requires that states complete two documents by August 4, 1988, in order to be eligible for federal nonpoint source funding: an Assessment Report describing the state's nonpoint source water quality problems and a Management Plan describing plans to address the state's nonpoint source problems.

The State Board is responsible for implementing the requirements of §319 and reporting to the USEPA. In addition to authority under the CWA, the State Board has independent authority to implement requirements of §319 by means of Division 7 of the California Water Code, commencing with §13000.

The State Water Resources Control Board completed its *Nonpoint Source Assessment Report* and *Nonpoint Source Management Plan* in 1988. The *Assessment Report* summarizes water quality impairments due to nonpoint source and describes regional, State, and Federal programs in California that addressed nonpoint source pollution. The *Management Plan* outlines the legal and institutional framework, objectives, and implementation plan for the State's program.

The State's *Nonpoint Source Management Plan* describes a three-tiered management approach to address nonpoint source problems. Each Regional Board will decide which management option(s) will be required for individual situations. Generally, the least stringent option (in terms of regulation) that will protect or restore water quality will be employed, followed by more formal regulatory measures if timely improvements in water quality are not achieved. Regional Boards usually will not impose

effluent limits on nonpoint source dischargers who are implementing Best Management Practices in accordance with a State or Regional Board formal action. The three tiers (in order of increasing regulatory control) are outlined below:

(i) Voluntary implementation of Best Management Practices

Land managers or property owners voluntarily or cooperatively implement Best Management Practices.

(ii) Regulatory-based enforcement of Best Management Practices

The Regional Board can encourage the use of Best Management Practices by waiving WDRs on the condition that the dischargers implement effective Best Management Practices .

The Regional Board can enforce Best Management Practices indirectly by entering into Management Agency Agreements (MAAs) with other agencies that have the authority to enforce Best Management Practices .

(iii) Effluent limitations

The Regional Board can adopt and enforce WDRs on any proposed or existing waste discharge, including discharges from nonpoint sources.

Following the adoption of the *Nonpoint Source Management Plan*, the State and Regional Boards have focused on the following objectives in developing the program elements:

- Initiate and institutionalize activities for the control of nonpoint source pollution from urban runoff, agriculture, silviculture, mining, construction, hydromodification, grazing, and septic tanks.

- Encourage, develop, and manage contracts for projects funded under CWA (§319) funding.

- Develop a program to implement the requirements of the 1990 re-authorization of the Coastal Zone Management Act (CZMA) which requires the State Board and the Coastal Commission to develop and implement an enforceable nonpoint source program in the coastal zone.

- Initiate pilot watershed programs across the State.

- Implement a public outreach and educational program.

During the preparation of the California *Nonpoint Source Management Plan,* the State Board formed an Interagency Advisory Committee (IAC). IAC meetings are held quarterly and serve as a forum for discussion of Nonpoint Source Program development and direction, funding, and the exchange of new ideas in nonpoint source related activities implemented by the various agencies.

The IAC consists of State and Regional Board staff, other State agencies, the California Association of Resource Conservation Districts, federal agencies, and other interested parties. Active member agencies of the IAC are listed below:

State Agencies:
Coastal Commission
Department of Conservation
Department of Fish and Game
Department of Food and Agriculture
Department of Pesticide Regulation
Department of Transportation
Department of Water Resources
Association of Resource Conservation Districts
Water Resources Control Board
Regional Water Quality Control Boards

Federal Agencies:
Agricultural Stabilization and Conservation Service
Army Corps of Engineers
Bureau of Land Management
Bureau of Reclamation
Environmental Protection Agency
Forest Service
Fish and Wildlife Service
Soil Conservation Service

The State Board has entered into agreements with other agencies (Table 4-18) which have the authority to implement, or require the implementation of, Best Management Practices under the State's Nonpoint Source Program. These agreements capitalize on the expertise and authorities of other agencies with responsibilities related directly or indirectly to water quality. Memorandums of Understanding (MOUs) and Management Agency Agreements (MAAs) are the two types of agreements used for this purpose. The format and end-result of both agreements are

Table 4-18. Nonpoint Source-related Memorandums of Understanding (MOUs) and Management Agency Agreements (MAAs) between the State Water Resources Control Board and Other Agencies.

Effective Date	Title of Agreement
May 26, 1981	Management Agency Agreement between the State Water Resources Control Board and the Forest Service, United States Department of Agriculture.
February 3, 1988	Management Agency Agreement between the State Water Resources Control Board, the State Board of Forestry, and the State Department of Forestry and Fire Protection.
July 30, 1990	Memorandum of Understanding between the State Water Resources Control Board, the Soil Conservation Service, and U.S. Department of Agriculture for Planning and Technical Assistance Related to Water Quality Policies and Activities.
December 23, 1991	Memorandum of Understanding between the State Water Resources Control Board and the California Department of Pesticide Regulation for the Protection of Water Quality (Surface and Ground Water) from Potentially Adverse Effects of Pesticides.
February 3, 1993	Memorandum of Understanding between the California State Water Resources Control Board, the Bureau of Land Management, and U.S. Department of the Interior for Planning and Coordination of Nonpoint Source Water Quality Policies and Activities.

basically the same. These agreements outline the responsibilities of one agency, then the other, followed by the joint responsibilities of both agencies.

Nonpoint Source Funding

Because the Nonpoint Source Program is different from most other water quality programs, innovative ways of financing and implementing nonpoint source projects have been developed. Prior to the CWA 1987 amendments, states used §106 and §205(j) monies (as described below) to fund limited nonpoint source activities. The primary federal funding for current nonpoint source program development and implementation includes §205(j)(5), §319(h), §201(g)(1)(b), §603(c)(2), and §604(b) monies as described below.

Section 205(j)(5): Section 205(j)(5) established a set-aside of construction grant funds for the purposes of carrying out activities under Section 319, including program development and the preparation of state Assessment Reports and Management Plans. These funds were used for assessment and development activities for California's program through fiscal year 1989.

Section 319(h): Grant funds authorized by Section 319(h) can be used for the implementation of nonpoint source management programs but cannot be used for assessment activities. States must have a USEPA-approved Assessment and Management Plan before qualifying for these monies. This grant program funds both State and Regional Board programs and provides competitive grants for other agencies to use in implementing nonpoint source measures around the State. These grants include a "non-federal" match of 40%, illustrating the intent of Congress and USEPA to encourage states to make a substantial financial commitment to implement nonpoint source programs.

Section 201(g)(1)(b): The CWA 1987 amendments added subsection 210(g)(1)(b) that expanded the use of 201 funds to "...any purpose for which a grant can be made under Section 319(h) and (i)." These funds can be used for either nonpoint source development or implementation projects. The Regional Board has recently received funding under this program to provide resources to coordinate a multi-agency study in the Malibu Creek Watershed (see description in the Future Direction section for more detail).

Section 603(c)(2): The CWA 1987 amendments added Title VI establishing a State Water Pollution Control Revolving Fund Program (SRF). This program provides funding in the form of loans, refinancing, and bond insurance which can be used for (i) construction of publicly owned treatment works, (ii) the implementation of state nonpoint source management programs, and (iii) the

development and implementation of state estuary conservation and management plans. The State and Regional Boards encourage local agencies to apply for these low-interest loans to implement nonpoint source demonstration projects and programs in the Region.

Section 604(b): States must set aside one percent of their Title VI allotments or $100,000, whichever is greater, to carry out planning programs under 205(j) and 303(e) of the CWA. These funds can be used under 205(j) planning for nonpoint source related activities. This can become an important source of funding for nonpoint source planning and assessment tasks since these types of activities cannot be carried out under Section 319.

Nonpoint Source Categories

The following sections describe the major sources of nonpoint pollution, the extent of the problem in the Region, and the main regulatory and non-regulatory approaches available to control runoff from these nonpoint sources of pollution.

Agriculture

Agriculture is a major industry in California and will continue to be important to the State's economy. Agricultural activities, however, can generate pollutants such as sediment, pesticides, nutrients, and oxygen-demanding organic matter. Upon discharge to a receiving water, these pollutants can degrade water quality and impair beneficial uses, as explained below.

Sediment: Eroded soil materials, along with other chemicals (nutrients, pesticides, and other organic chemicals) that adsorb to the sediment particles, are transported from land surfaces into adjacent waterbodies. Excess sediment can interfere with photosynthesis by reducing light penetration, smother benthic organisms, destroy important spawning habitats, and fill in waterways hindering navigation or groundwater percolation and increasing flooding.

Pesticides: Nationwide, pesticide use has changed in recent years. Although there is now a greater number of pesticides available for use, the current trend seems to be toward a decreased use of chemicals. There is also a dramatic decrease in the use of persistent (long-lived) pesticides, many of which were banned in the late 1970s. Many currently-used chemicals, however short-lived, can be highly toxic to fish and other aquatic life (especially at critical life stages), so that even very low levels of these pesticides in runoff can be a significant environmental concern.

Nutrients: In general, runoff from agricultural lands has significantly higher nutrient concentrations than drainage waters from forested or other "covered" lands. These increased nutrient levels result from fertilizer application and animal waste. Eutrophication of lakes, streams, and coastal waters, as well as groundwater degradation, are often attributed to runoff from agricultural lands. Nutrients are necessary for plant growth in a waterbody, but excess nutrients can lead to excessive algal growth, an imbalance in natural nutrient cycles, changes in water quality (such as demand for dissolved oxygen), and a decline in the number of fish species.

Organic Material: Crop debris and animal wastes are major sources of organic matter which can be transported into streams from agricultural lands. As these materials decompose, they tend to deplete dissolved oxygen in receiving waters. Fish and other aquatic life cannot survive in waters with low levels of oxygen.

Agriculture in the Los Angeles Region is concentrated in Ventura County, which has over 95,000 acres under cultivation (Figure 4-4). Agriculture is Ventura County's largest industry and accounts for 11% of total employment in the county. Approximately 70% of the farms are between 40 and 50 acres in size, and only about 5% of the farms are greater than 500 acres. Major crops in Ventura County include fruit, nuts, vegetables, nursery stock, Christmas trees, and sod (Ventura County, 1990).

While rich soils and a mild climate have contributed to the success of Ventura County's agricultural industry, water supplies are limited. The agricultural community pumps over 270,000 acre-feet of ground water per year. This accounts for 86% of water consumption in the County (Ventura County, 1993). With groundwater pumping rates far exceeding recharge rates, some groundwater basins have been, and continue to be, overdrafted. These overdraft conditions accelerate the existing seawater intrusion problem, as discussed in the Seawater Intrusion Section below.

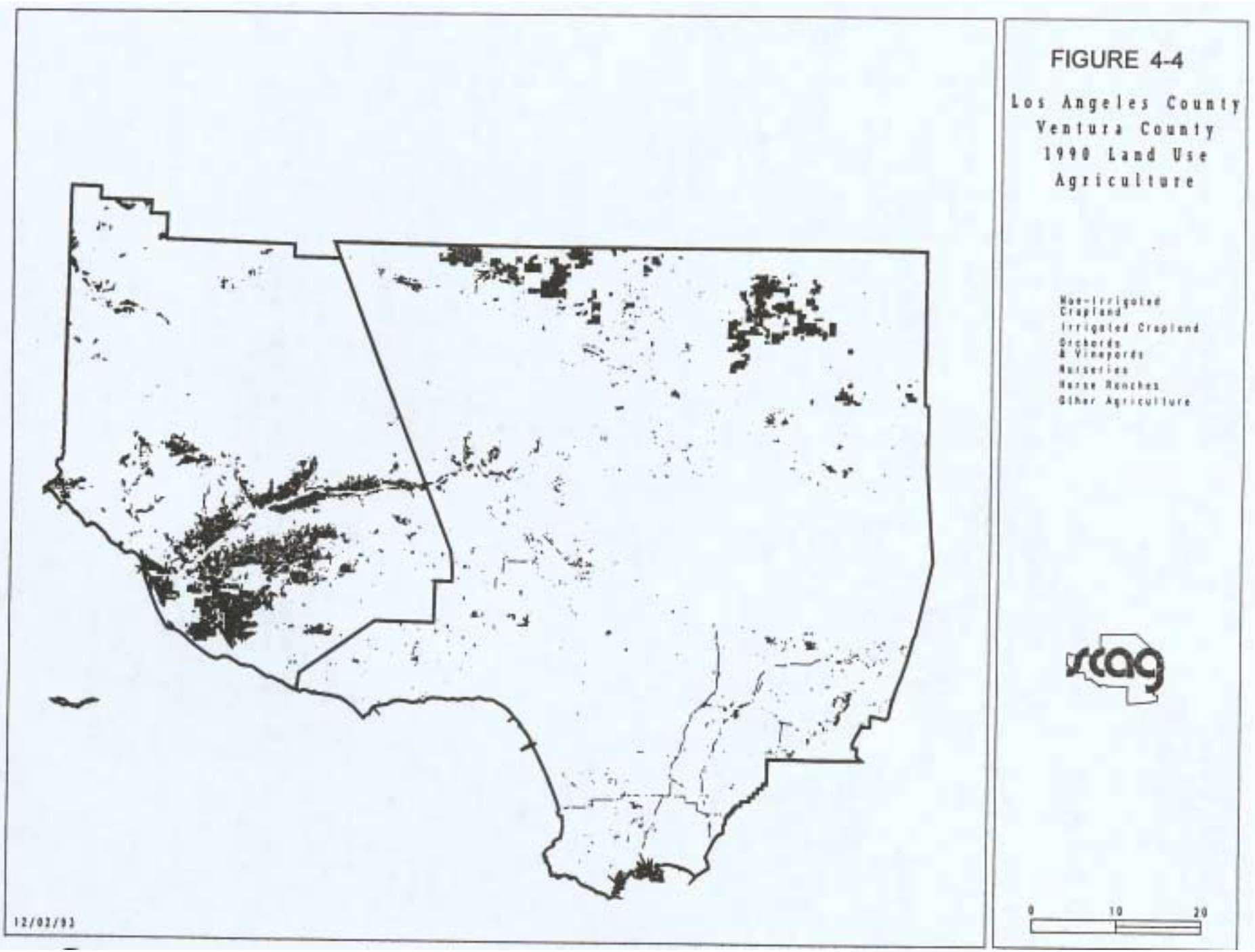
FIGURE 4-4
Los Angeles County
Ventura County
1990 Land Use
Agriculture
Non-Irrigated Cropland
Irrigated Cropland
Orchards & Vineyards
Nurseries
Horse Ranches
Other Agriculture
scag
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The State and Regional Boards have the authority to regulate any discharge, including agriculture. Such a regulatory program could supplement the Department of Pesticide Regulation's pesticide regulatory program. To date, however, the State and Regional Boards have not chosen to control pollutants from agricultural sources through regulations such as WDRs. Rather, the Boards expect that significant improvement to water quality can be achieved through voluntary implementation of management measures (i.e., Best Management Practices) that reduce or eliminate pollutants from agricultural sources. The U.S. Department of Agriculture, Soil Conservation Service and the Resource Conservation Districts provide information on, and assistance in, implementing these types of management measures.

In addition to encouraging the implementation of Best Management Practices identified in the USEPA's *Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Waters* (known as the *(g) guidance*), the Regional Board and USEPA have undertaken outreach programs. One such example is a 319(h) grant made to the Ventura County Resource Conservation District (RCD) in 1992 to fund a project that will demonstrate improved irrigation techniques to growers on the Oxnard Plain. These irrigation techniques will reduce runoff and deep percolation of pesticides, sediment, and nutrients, thereby improving water quality. Through the RCD's efforts, the Regional Board and USEPA hope to encourage other growers on the Oxnard Plain to switch to irrigation technologies and practices that will both improve water quality and conserve water.

The Regional Board is also an active participant on the Mugu Lagoon Task Force, which is comprised of local, regional, and State agencies, as well as U.S. Navy (which occupies land surrounding Mugu Lagoon). The objective of this Task Force is to foster cooperation between agencies in developing a comprehensive plan that will improve water quality in Calleguas Creek, Revolon Slough, and Mugu Lagoon, which is one of the Region's few remaining wetlands. The Task Force is focusing, in particular, on ways in which to reduce sources of sediment and pesticides.

Confined Animal Operations

Confined animals are those that are raised or sheltered in high densities. Examples of confined animal operations include kennels, horse stables, poultry ranches, dairies, stockyards, and feedlots. Wastes from such facilities can contain significant amounts of pathogens, oxygen-depleting organic matter, nitrogen compounds, and other suspended and dissolved solids. As a result, runoff of storm or wash waters from confined animal areas can degrade receiving surface waters. Furthermore, percolation of storm or wash waters into ground water can degrade the water quality. The risk of degradation increases during the rainy season when animal waste containment and treatment ponds are often overloaded.

Minimum design and management standards for the protection of water quality from confined animals are promulgated in the Title 23, California Code of Regulations, Chapter 15, Article 6. These regulations prohibit the discharge of facility wash water, animal wastes, and storm water runoff from animal confinement areas, into the waters of the State, and specify minimum design and waste management standards such as: the collection of all wastewaters; the retention of wastewaters and storm waters in manured areas during a 25-year, 24-hour storm; the use of paving or impermeable soils at manure storage areas; and the application of manures and wastewaters on land at reasonable rates for minimal percolation. The Regional Board has the authority to enforce these regulations through WDRs, described in the section of this chapter entitled Control of Point Source Contamination. In addition to the State's Title 23 regulations, many local agencies have enacted ordinances and zoning restrictions that require additional waste management practices.

While large confined animal facilities (e.g., dairies and poultry farms) sometimes threaten water quality in other Regions of the State, large confined animal facilities do not constitute a widespread threat to water quality in the Los Angeles Region, since there are only a few of such facilities in the Region. However, localized threats can result from smaller facilities, such as horse stables where runoff from manured areas can degrade the quality of receiving waterbodies. In such cases, the Regional Board has the authority to protect water quality through WDRs.

Urban Runoff

Urbanization disturbs natural land cover, alters natural drainage patterns, and increases impervious areas (e.g., rooftops, streets, parking lots) where water can not infiltrate into the ground. While

concerns about urban runoff were focussed primarily on flood control in the past, urban runoff has now been proven to be a significant source of pollutants that degrade regional waters. Pollutants in urban runoff include urban debris, suspended solids, bacteria, viruses, heavy metals, pesticides, petroleum hydrocarbons, and other organic compounds. These pollutants threaten the quality of receiving waters in numerous and varied ways. Suspended solids (such as soil particles) can, upon settling, destroy spawning grounds and other habitats. Urban debris is unsightly and can present health risks such as cuts, punctures, and disease. High levels of bacteria occasionally necessitate beach closures. Heavy metals and organic compounds contaminate sediment near harbors and other recreational areas and can bioaccumulate in aquatic organisms.

More than 1,000 miles of storm drains beneath the streets of Los Angeles collect runoff from city streets, eventually dumping this flow into streams and coastal waters. High concentrations of pollutants that have accumulated on streets and other impervious surfaces during southern California's long dry summers are flushed into the storm drains and into surface waters during major storms that typically occur in winter.

The Southern California Coastal Water Research Project (SCCWRP), the Santa Monica Bay Restoration Project (SMBRP), and the University of Southern California (USC) Institute for Ocean and Coastal Studies have evaluated the characteristics of urban runoff, including pollutant loads, impacts, and toxicity, to coastal waters. The pollutant load and toxicity of urban runoff in the Region were found to be comparable to that of sewage effluent. The USEPA performed a nationwide evaluation of the environmental hazards posed by priority pollutants in urban runoff and found that cadmium, copper, lead, and zinc exceeded freshwater acute aquatic criteria in up to 50% of the samples analyzed (USEPA, 1983). In addition, these pollutants, along with cyanide, mercury, and silver, exceeded freshwater chronic criteria in at least 10% of the samples.

The Regional Board's urban runoff management program (through both the Storm Water and nonpoint source programs) continues to assess specific urban runoff problems and control strategies to remediate those problems. Program elements include:

- Supporting research by SCCWRP, SMBRP, USC, USEPA, and others to better define regional impacts of urban runoff discharges.

- Developing cooperative investigation and control strategies utilizing the expertise and resources of point source dischargers in receiving water segments.

- Organizing local ad hoc task forces for hydrologic watersheds/sub-watersheds with representation from point source discharges, local industries, local agencies, public interest groups, the Regional Board, and the USEPA to facilitate investigations and the development of control strategies.

- Participation on the State Board Coordinating Committee and Technical Advisory Committees formed to address urban runoff management measures developed under mandates of the Coastal Zone Management Act Re-authorization Amendments (CZARA) of 1990.

- Participating on the State Board Storm Water Quality Task Force in the development and implementation of statewide urban storm water management guidance and strategies.

- Working with other agencies such as the South Coast Air Quality Management District, Southern California Association of Governments, and the Metropolitan Transit Authority to ensure that transportation related strategies and plans will reduce the impact on receiving waters from transportation system runoff discharges.

Progress to date in this program includes a survey of basic information from flood control districts, Caltrans and local agencies which own or have maintenance responsibility for storm drain systems. The survey indicated that, with few exceptions, agencies have little information on the storm drain systems that they own or manage. Flow and water quality data describing discharges from storm drain systems are very limited. Few programs existed to control urban runoff from a water quality perspective. Existing maintenance programs include cleaning storm drainage inlets, catch basins, and storm drainage lines on an annual, or as-needed basis for flood control purposes only, not for water quality improvement.

The USEPA promulgated regulations (40 CFR Parts 122, 123, and 124) for storm water discharges in

November 1990. The regulations list the types of storm water discharges for which NPDES permits are required. These include discharges from separate municipal storm drain systems serving populations of 100,000 or more, discharges associated with industrial activities, discharges from construction activities, and discharges that contribute to violations of water quality standards or are significant contributors of pollutants to the receiving waters. The regulations authorize the issuance of system-wide or jurisdiction-wide permits and effectively prohibit non-storm water discharges to storm drains. They also require designated municipalities to implement control measures to reduce pollutants to the maximum extent practicable. Industrial storm water discharges are subject to standards based on best available technology (BAT) which is economically achievable. The Regional Board can, where necessary, require storm water discharge permits for dischargers not specifically cited in the regulations but who are a significant contributor of pollutants to waters of the Region (See Point Source section above for more details about the Storm Water Regulatory Program).

Local municipalities and the County of Los Angeles are working together to implement an Urban Runoff and Storm Water Management Program. The Regional Board issued a municipal storm water NPDES permit to Los Angeles County and co-permittees (cities and agencies) in June 1990. The permit implements a program which includes the development, assignment, and implementation of control strategies to reduce pollutants in urban runoff discharges in Los Angeles County. Table 4-19 lists the minimum required Best Management Practices (BMPs) to be implemented county-wide. The County of Ventura and local municipalities in Ventura County have joined together to develop and implement a Ventura County Storm Water Management Program, and the Regional Board is considering issuance of an NPDES storm water permit to Ventura County and associated cities. The County will then be required to implement a storm water management program that will include the development and implementation of urban runoff control strategies and county-wide storm water monitoring. The program will include the cities of Oxnard, Simi Valley and Thousand Oaks which have populations greater than 100,000 and are federally mandated to implement strategies to control pollutants in urban runoff. The city of Thousand Oaks, for areas that drain into Los Angeles County, will be regulated under a separate storm water NPDES permit.

The Regional Board conducts surveillance activities and provides overall direction to oversee, verify, and ensure implementation of urban runoff control programs. Technical guidance for prevention activities, as well as the identification, assignment, and implementation of control measures, and monitoring will be developed. Numerical limitations for selected pollutants, or pollutant indicator parameters, for urban runoff discharges in high resource watersheds, or impaired stream segments, will be developed in consultation with the USEPA and the State Board.

The Regional Board's continuing strategy for urban runoff management will include: (i) a comprehensive control program, (ii) a highway runoff control program, (iii) an industrial activity control program, and (iv) a construction activity control program. These programs are described below.

Comprehensive Control Program

All cities and counties in the Region are required to develop and implement comprehensive urban runoff control programs which focus on the prevention of future water quality problems and remediation of existing problems. The requirements of the municipal control program are intended to be consistent with NPDES regulations for municipal storm water discharges. In addition to baseline elements such as implementation of Best Management Practices (Table 4-19) and monitoring of runoff, these programs will include pilot projects or other investigations which will:

- implement measures to reduce pollutants in runoff to the maximum extent practicable from commercial, residential, industrial, and roadway areas;

- implement measures to identify and eliminate illicit connections and illegal dumping into storm drain systems;

- implement measures for operating and maintaining public highways to reduce pollutants in runoff; and

- implement measures to reduce pollutants in discharges associated with the application of pesticides, herbicides, and fertilizer. These will include, as appropriate, controls such as educational activities and other measures for commercial applicators and distributors, and

Table 4-19. Los Angeles County Municipal Storm Water Permit: Minimum Required Best Management Practices (BMPs) to be Implemented County-wide.

Establish or improve an area-wide catch basin stenciling program with a universal stencil to discourage dumping, discarding, and/or discharge of pollutants, carriers, and/or debris into storm drainage systems county-wide.
Develop programs to promote, publicize and facilitate public reporting of illegal discharges and/or dumping.
Adopt a runoff control ordinance requiring the use of BMPs during and after construction and at selected commercial and industrial establishments.
Augment public education and outreach programs with regard to catch basins and storm drainage systems and their intended purpose.
Provide regular catch basin cleaning when and where needed.
Increase cleaning frequency of and number of roadside trash receptacles in areas where needed.
Increase street sweeping in areas where needed.
Discourage the improper disposal of litter, lawn/garden clippings, and pet feces into the street or area where runoff may carry these pollutants to the storm drainage system.
Implement facility inspections of auto repair shops, auto body shops, auto parts and accessory shops, gasoline stations, and restaurants as the accumulation of pollutants, garbage, and /or debris tends to concentrate in these areas.
Encourage owners and persons in control of homes or businesses to remove dirt, rubbish, and debris from their sidewalks and alleys which may contribute pollutants to urban runoff.
Encourage recycling of oil, glass, plastic, and other materials to prevent their improper disposal into the storm drainage system.
Encourage the proper disposal of Household Hazardous Wastes to prevent the improper disposal of such materials to the storm drainage system.
Encourage the proper use and conservation of water.

controls for application in public right-of-ways and at municipal facilities.

On an annual basis, each city or county is required to conduct an evaluation of the effectiveness of its Comprehensive Control Program.

Highway Runoff Control Program

An essential component of a municipal comprehensive control program is the implementation of practices for maintaining public highways that reduce impacts on receiving waters from highway runoff. However, cities and counties (permittees) do not have jurisdiction over public highways controlled by the California Department of Transportation (Caltrans). In order to ensure the effectiveness of the comprehensive control programs, Caltrans must either actively participate as an entity in the County Storm Water Program, or will be required to obtain a separate NPDES permit for storm water discharges for highways under its jurisdiction. Such a program for Caltrans shall include a *Storm Water Management Plan* which addresses the design, construction, and maintenance of highway facilities relative to reducing pollutants in highway discharges to the maximum extent practicable. The Plan shall include:

- a characterization of Caltrans highway systems, including pollutants, highway layout, and drainage control system in the area;
- a description of existing highway runoff control measures;
- a description of additional highway runoff control measures to enhance pollutant removal; and

- a plan for monitoring the effectiveness of control measures and highway runoff water quality and pollutant loads.

The Highway Runoff Management Plan shall specifically address litter control, proper pesticide/herbicide management, reduction of direct discharges, reduction of runoff velocity, landscape over-watering, use of grassed channels, curb elimination, catch basin maintenance, appropriate street cleaning, establishing and maintaining vegetation, infiltration practices, and detention/retention practices. Caltrans shall coordinate its urban runoff program with local agencies and existing programs related to the reduction of pollutants in highway runoff.

Industrial Activity Control Program

The Regional Board will require, pursuant to NPDES storm water regulations, an NPDES permit for the discharge of storm water from specified facilities associated with industrial activities. The industrial activity control program applies to any discharge from specified conveyance or engineered surface which is used for concentrating, collecting, and conveying storm water and which is directly related to manufacturing, processing, or raw material storage areas at an industrial facility. The program applies to all facilities identified by 40 CFR Part 122.26(b)(14) and include both privately and publicly (federal, state, and municipal) owned facilities (see Tables 4-13, 4-16 and 4-17).

The Regional Board considers storm water discharges from automotive operations, including gas stations, auto repair shops, auto body shops, dealerships, battery shops, wrecking yards, radiator shops and mobile car washing businesses, significant sources of pollutants in the Region. It is intended that these discharges and similar discharges from commercial establishments be addressed initially at the local level through ordinances and industrial waste inspections as part of the municipal comprehensive control program. The Regional Board will assess the success of these local programs before including such discharges in the NPDES permit program.

Construction Activity Control Program

Major construction activities include the development, or redevelopment, of residential, commercial, and industrial areas, as well as transportation facilities. The major pollutant associated with construction activities is sediment. Additional pollutants include fuel, oil, paints, glues, pesticides, fertilizers, metals, and sanitary and solid wastes. The impact of these pollutants is dependant on the activities on site, as well as the duration of construction, rainfall, topography, soil characteristics, distance to the receiving waterbody, and Best Management Practices used on the site.

The Regional Board requires, pursuant to NPDES storm water regulations, an NPDES permit for the discharge of storm water from all construction activities, including demolition, clearing and excavation, and grading. The State Board issued a general permit (Table 4-2) in August 1992, for construction activity discharges. The majority of construction activity discharges in the Los Angeles Region will be covered under the State Board general permit. This program regulates construction sites that are five acres or more; USEPA, however, is considering making this program applicable to <u>all</u> construction sites as part of phase two of the Storm Water Program.

Hydrologic Modification

In light of the extensive development that has occurred on many of the floodplains throughout the Region, flood control in the Los Angeles Region is accomplished primarily through hydrologic modification.

Hydrologic modifications are activities that are designed to control natural streamflow. These include bank stabilization, channelization, in-stream construction, dredging, dams, levees, spillways, drop structures, weirs, and impoundments. Activities such as straightening, widening, deepening, or relocating existing stream channels, and clearing or snagging operations also fall into this category. Some specific examples of hydrologic modifications are described below.

Channelization: Channelization usually involves the straightening of channels and hardening of banks (e.g, concrete and rip-rap) along waterways undertaken for the purpose of flood control, navigation, and/or drainage improvement. These hydrologic modifications can disturb vegetative cover, increase scour as a result of increased velocities, and increase water temperatures when overhanging or streamside vegetation is removed. Channel modification activities can also deprive wetlands and estuarine shorelines of enriching

sediments, change the ability of natural systems to both absorb hydraulic energy and filter pollutants from surface waters, and cause interruptions of critical life stages of aquatic organisms. Hardening of banks along waterways results in permanent elimination of habitat, decreased quantities of organic matter entering aquatic systems and increased movement of nonpoint source pollutants from the upper reaches of watersheds into coastal waters. Channel modification projects undertaken in streams or rivers usually require regularly-scheduled maintenance activities to preserve and maintain completed projects. These frequently result in a continual disturbance of in-stream and riparian habitats.

Dredging: Dredging is the removal of sediment buildup from stream channels or other waterbodies. Dredging is often needed to remove excess silt and coarse sediments which diminish some recreational and other beneficial uses. This can result in improved circulation and long-term improvements; however, many short-term impacts occur during and after dredging occurs. Dredging destroys aquatic habitats and associated organisms. Dredging can also introduce pollutant loadings to the waterbody by disturbing sediments that have accumulated contaminants over an extended period of time. This disturbance often re-suspends and redissolves pollutants back into the aquatic environment.

Impoundments and Reservoirs: Impoundments range from small dams constructed for soil and water conservation purposes to large drinking water reservoirs with volumes in excess of several hundred thousand acre feet. Impoundments cause problems during and after the construction phase. Some of the impacts during construction include high erosion rates, washings from the preparation of the dam structure, and clearing operations of the area to be inundated. Long-term problems due to the impoundment itself can affect habitats in the reservoir and impact downstream river quality by diverting waters needed in downstream areas to support the localized aquatic life. Periodic maintenance of sediment buildup in reservoirs (which involves draining, dredging, or sluicing), termed "cleanout," has the potential to degrade downstream water quality and limits groundwater recharge capabilities. Sediment removal in reservoirs must be carefully managed so as not to transport sediment loads downstream which can impair beneficial uses (i.e., sealing spreading grounds and smothering aquatic habitat and organisms). The Regional Board strongly opposes sluicing of sediment from reservoirs for maintenance purposes when this activity has the potential to impair downstream uses. Cleanout is currently a controversial issue with respect to the reservoirs in the Upper San Gabriel River watershed.

The Los Angeles County Department of Public Works maintains a series of debris basins in canyon mouths and upstream stabilization structures in selected watersheds to trap debris flows from canyons. There are currently 114 debris basins in the watershed of the Los Angeles and San Gabriel River systems. In addition, the County maintains 225 stabilization structures in 47 major watersheds, which serve as erosion control structures.

The Los Angeles County Department of Public Works also operates 14 dams as part of their Flood Control Program (refer to Figure 1-3 for the locations of major lakes and reservoirs). Table 4-20 lists the major reservoirs in the Region, their function and capacity, and the agencies that operate and maintain them.

401 Certification Program

The most effective tool the State has for regulating hydrologic modification projects is the 401 Certification Program.

The CWA (§401(a)(1)) gives states the authority to issue, deny, or waive water quality 401 certifications to applicants applying for federal permits or licenses for activities that can result in discharge to any water of the United States. The issuance of a 401 certification ensures that the project will comply with the State's Water Quality Standards as designated in the Basin Plan. The 401 certification process is commonly used by the Regional Board when reviewing projects from applicants who are requesting a Section 404 permit from the U.S. Army Corps of Engineers. The State Board can provide 401 certification upon the recommendation of the Regional Board and Executive Officer.

The CWA (§404) establishes a permit program, administered by the Secretary of the Army, acting through the Corps of Engineers, to regulate the discharge of fill or dredged material into the watersof the United States. Section 404(c) gives the Administrator of the USEPA further authority to restrict or prohibit the discharge of any dredged or fill material that can cause an unacceptable adverse effect on municipal water supplies, shellfish beds, fisheries, wildlife, or recreational areas.

Table 4-20. Selected Reservoirs in the Region: Ownership, Capacity and Function.

Name of Dam/Reservoir	Function	Capacity (acre-feet)	Ownership & Maintenance
Bard	CONS	10,500†	CAMWD
Big Dalton	FC, CONS	938*	LACDPW
Big Tujunga	FC, CONS	5,319*	LACDPW
Bouquet	CONS	36,505†	CITY of LA
Castaic	CONS, REC	323,702†	DWR
Casitas	CONS, REC	254,000†	USBR/CASITAS MWD
Chatsworth	CONS	9,886†	CITY OF LA
Cogswell	FC, CONS, REC	8,871*	LACDPW
Devil's Gate	FC, CONS	2,817*	LACDPW
Eagle Rock	CONS	254†	CITY OF LA
Eaton Wash	DS, CONS	852*	LACDPW
Hollywood/Mulhulland Dam	CONS	4,036†	CITY OF LA
Los Angeles	CONS	10,000†	CITY OF LA
Live Oak	FC, CONS	2,500†	MWD
Live Oak	FC, CONS	230†	LACDPW
Matilija	CONS	1800†	VCFCD
Morris	FC, CONS	21,343*	MWD/LACDPW
Pacoima	FC, CONS	3,383*	LACDPW
Piru/Santa Felicia Dam	CONS, REC	88,300†	UWCD
Puddingstone	FC, REC	16,342*	LACDPW
Puddingstone Diversion	FC, DIV, CONS	205*	LACDPW
Pyramid	CONS, REC	171,200†	DWR
San Dimas	FC, CONS	1,056*	LACDPW
San Gabriel	FC, CONS	45,883*	LACDPW
Santa Anita	FC, CONS	905*	LACDPW
Santa Fe	FC, CONS	32,109†	COE/LACFCD
Sawpit	FC, CONS	406*	LACDPW
Silver Lake	CONS	2,020†	CITY OF LA
Stone Canyon	CONS	10,372†	CITY OF LA
Thompson Creek	FC, CONS	533*	LACDPW
Whittier Narrows	FC, CONS	67,060†	COE/LACDPW

CONS	Conservation (domestic water supply)
DIV	Diversion
DS	Debris Storage
FC	Flood Control
REC	Recreation

CAMWD	Calleguas Municipal Water District
COE	United States Army Corps. of Engineers
DWR	Department of Water Resources (State of California)
LACDPW	Los Angeles County Department of Public Works
MWD	Metropolitan Water District of Southern California
USBR	United States Bureau of Reclamation
UWCD	United Water Conservation District
VCFCD	Ventura County Flood Control District

† 1994 Capacity
* 1993 Capacity

Streambed Alteration Agreements

In addition to the CWA (§401 and §404), Sections 1601-1605 of the Fish and Game Code (Chapter 6, Fish and Wildlife Protection and Conservation) apply to any governmental agency, state or local, or any public utility that proposes to divert, obstruct or change the natural flow or bed, channel or bank of any river, stream, or lake. It is unlawful for any person to engage in such a project or activity without first notifying the California Department of Fish and Game of such activity, and one can not commence such operations until the Department has found such operations will not substantially adversely affect existing fish or wildlife resources. Agencies must submit proposed plans to the Department of Fish and Game. The Department will then review the proposal, conduct field investigations, if warranted, and notify the Agency of any potentially adverse impacts to the existing fish and wildlife resource due to the proposed activity. The Department of Fish and Game can propose mitigation measures necessary to protect the fish and wildlife.

Recreational Impacts

Water contact and non-contact recreational activities range from swimming, surfing, and sunbathing at coastal beaches to hiking along some of the pristine stretches of streams in the canyons of the Transverse Mountain Ranges. With the intense residential, commercial, and industrial development throughout much of the Region, however, relatively few natural environments remain for the enjoyment of urban residents. Many of those environments that do remain are threatened by overuse as well as disregard for the sensitivity of natural ecosystems. Many of the streams and banks in the parks and campgrounds of the Region are littered with trash and debris.

Water quality impacts from recreational use are not restricted to litter. Other ways in which water quality is affected include discharges from overloaded sewage containment and septic systems and erosion of dunes and stream banks from trampling and off-road vehicles. In addition to degrading riparian, estuarine, and coastal habitats, these impacts leave sites in unsightly and unhealthy conditions, limiting future recreational opportunities. Golf courses are kept green by applications of pesticides and fertilizers. Over watering allows these chemicals to runoff into surface waters. In some cases, the extra irrigation water itself causes a disruption of the hydrologic balance of surface waters.

The Regional Board encourages mitigation of recreational impacts through planning efforts at a local level. Planning efforts should address maintenance of parks, campgrounds, beaches, and other open spaces. Public outreach and education measures, while long term, are nonetheless considered to be the most effective way of controlling this type of pollution and maintaining these resources.

Septic Systems

Many areas in the Region rely on septic systems for disposal of domestic household waste. Septic systems "treat" household wastes by first removing organic solids through settling and decomposition in the tank portion of the system. Further treatment of organic chemicals, nutrients, and bacteria occurs as the effluent released from the tank percolates through the soil. Proper construction of septic systems is imperative. Poorly designed and constructed systems will not function properly and can result in pollution of surface and/or ground waters (Figure 4-5). Septic systems used in undersized lots or unsuitable soils are also subject to malfunction and can lead to untreated or poorly treated sewage seeping into yards, roadside ditches, streams, lagoons, or into ground water -- creating a public nuisance and health hazard. Even well-functioning septic systems can pollute ground water under adverse conditions (e.g., unsuitable sites.)

Nitrogen compounds, which are typically present in effluent from septic systems, are highly soluble and stable in aqueous environments. When not denitrified by bacteria or assimilated into organic growth (plants) in the unsaturated zone, these nitrogen compounds are easily transported to ground water. Examples of this problem occur in developed areas along the coast and in rural areas undergoing rapid urbanization (such as Ventura County or northern Los Angeles County).

Although there is controversy about the possible health effects of nitrate on adults, it has been shown that high levels of nitrate cause methemoglobinemia (blue-baby syndrome) in infants. The federal drinking water standard of 10 mg/L nitrate plus nitrite (expressed as nitrogen) is based on this relationship. Furthermore, high levels of nitrates have economic impacts on supplies of potable

water, requiring well closure and relocation, well deepening, wellhead treatment, or blending. In addition, new developments may be restricted due to the presence of water supply with nitrogen concentrations that exceed drinking water standards.

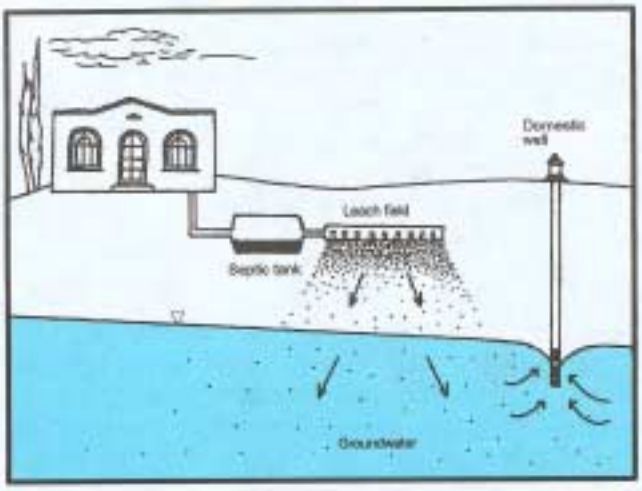

Figure 4-5. Septic System. In a properly designed septic system, pollutants in the septic tank effluent are naturally degraded in the leach field before reaching the water table. This diagram, however, illustrates how pollution of ground water can result from a septic system that is not properly located or maintained.

The Regional Board discourages the prolonged use of septic systems, except in isolated areas where connection to a wastewater collection system is not feasible and there is no threat to groundwater quality. Septic systems are not acceptable in areas where there are unsuitable soils, inadequate lot sizes, or other factors that can lead to contamination of either surface or ground water. In assessing areas of concern, high priority is given to rapidly developing areas where local ground water is the sole or primary source of drinking water. One such area is the Aqua Dulce area of the Sierra Pelona Valley in northern Los Angeles County. Ground water is the primary source of drinking water for residents in this unsewered area. High concentrations of nitrate, however, have been found in some of the wells in the area. In response, the Regional Board has contracted with the University of California at Riverside to use isotope techniques to trace the source (or sources) of nitrogen in ground water in the area.

In addition, in response to other concerns that ground water was not sufficiently protected from the effects of new developments that rely on septic systems, the Regional Board developed an Interim Policy for septic systems in areas that rely on ground water for domestic purposes. Under this Interim Policy, the Regional Board adopted *General Waste Discharge Requirements for Residential Subsurface Sewage Disposal Systems in Areas Where Ground Water is Used For Domestic Purposes* (Order No. 91-94, adopted July 22, 1991). These requirements are intended to simplify and expedite the application process and processing of requests for use of septic systems in residential areas while assuring the protection of water quality. As part of the requirements, the Regional Board requires either a hydrogeologic study or certain mitigation measures.

Recommendations for future steps for control of problems from septic systems include:

- evaluate the adequacy of existing local regulations for installation and maintenance of septic systems;
- continue to discourage or limit the use of septic systems in new developments;
- encourage alternative waste treatment systems; and
- encourage and support funding for wastewater treatment plants in outlying areas where water quality problems and/or population density require wastewater collection and treatment.

Seawater Intrusion

Ground water supplied most of the water in the Region until the 1940s. By World War II, however, increasing demands for ground water escalated to such an extent that groundwater pumping far exceeded freshwater recharge (i.e., replenishment) in many aquifers (Fossette, 1986). As a result, degradation of ground water occurred as seawater seeped inland to replace ground water in freshwater aquifers that had been overpumped. Referred to as seawater intrusion, this condition is accelerated when coastal aquifers are overdrafted (i.e., when groundwater pumping exceeds recharge).

Seawater intrusion can be controlled through pumping restrictions and artificial recharge of aquifers. Artificial recharge is especially important in urban areas where paved surfaces and buildings have eliminated natural recharge areas and drastically reduced recharge rates. Figure 4-6

illustrates two forms of artificial recharge used to combat seawater intrusion: spreading basins and injection wells. Spreading basins are constructed in permeable zones where water can seep into the subsurface. Spreading basins in the Los Angeles Region typically were created by modifying existing terrain with dikes or low head dams within, or adjacent to, stream channels. Such devices divert excess supplies of surface waters into spreading basins, thus recharging aquifers and creating a seaward gradient that will help prevent seawater intrusion. Injection wells along coastal areas create a freshwater barrier that can halt seawater intrusion, recharge aquifers, and allow groundwater pumping from elevations below sea level. In addition, artificial recharge is often supplemented through in-lieu recharge programs, wherein excess supplies of surface water (when available) are discounted and sold to groundwater pumpers. In exchange for this discounted surface water, groundwater pumpers agree that they will not exercise pumping rights on an equivalent amount of ground water.

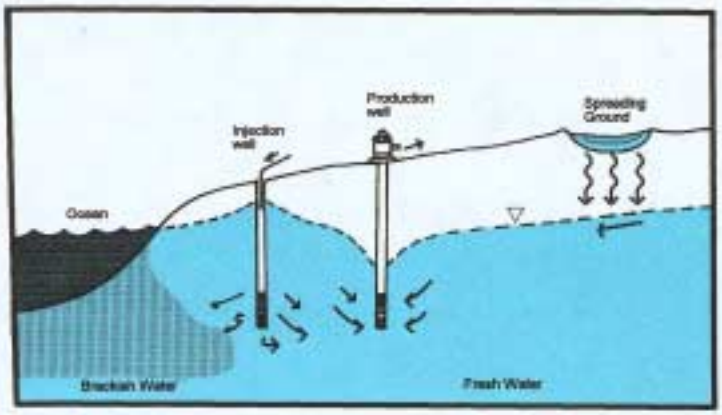

Figure 4-6. Artificial recharge through spreading grounds and injection wells. Use of artificial recharge in this coastal aquifer helps to (i) maintain groundwater levels through use of spreading grounds and (ii) prevent saltwater intrusion using injection wells. Arrows in figure indicate direction of groundwater flow. (Hatched lines indicate the water table.)

On the Los Angeles Coastal Plain, three rows of injection wells (the Alamitos Barrier along the Central Basin, and the Dominguez Gap and West Coast Barriers along the West Coast Basin) protect aquifers from seawater intrusion. In addition, spreading grounds along the San Gabriel and Rio Hondo Rivers in the northern part of the Central Basin provide further recharge of the coastal aquifers under the Los Angeles Coastal Plain. These artificial recharge projects are supplemented by an aggressive in-lieu recharge program. Finally, enforcement of adjudicated groundwater rights in these basins ensures that groundwater production will not exceed recharge.

While groundwater overdraft and seawater intrusion are under control on the Los Angeles Coastal Plain, they continue to be serious problems within the Oxnard Plain portion of the Ventura Central Groundwater Basin. Aquifers underlying the Oxnard Plain are the primary source of agricultural supply water. Although spreading grounds along the lower Santa Clara River and an in-lieu recharge program have somewhat lessened overdraft conditions, groundwater pumping continues to greatly exceed freshwater recharge.

Ground water in the San Gabriel and San Fernando Valley Basins is also artificially recharged through spreading basins. While these inland basins are not intruded by seawater, they have been overdrafted in the past. Recharge through spreading basins, coupled with court enforcement of adjudicated water rights, protects these inland basins from overdraft.

The Regional Board supports artificial recharge projects through regulatory and financial assistance programs. Water Reclamation Requirements (WRRs) – in lieu of WDRs – regulate groundwater recharge with treated wastewaters.

Resource Extraction

Resource extraction includes mining, drilling, and pumping for mineral petroleum products. Impacts to water quality can be significant, even for small operations. Surface mining operations alter the natural landscape, resulting in accelerated erosion and sedimentation. In addition, high concentrations of chemicals that are leached from exposed soils, ores, and waste rocks can pollute ground or surface waters. Oil production activities also disturb surrounding lands; brines and drilling fluids from drilling operations have a potential for degrading the environment if spilled. Water quality impacts from resource extraction are not limited to operating mines and petroleum wells (Ventura County, 1990). Water quality can be threatened by abandoned mining operations (and associated tailings) and petroleum drilling sites if not properly reclaimed.

Mines

Most active mines in the Los Angeles Region are sand and gravel operations located along the San Gabriel and Santa Clara Rivers. Gypsum, borax,

and titanium (and associated heavy minerals) mines operate in the area along with small-scale gold prospecting. In 1988-89, the number of mines in Los Angeles and Ventura Counties totaled 53, as shown below and as shown on Figure 4-7 (DMG, 1990):

Sand and gravel	41
Clay	3
Stone (including dimension, decorative)	8
Tungsten	1

There are three types of sand and gravel operations: in-stream, wet, and dry. Discharges of washwaters from all types of sand and gravel operations contain suspended sediments that can degrade downstream waters. In-stream operations divert the sand and gravel load of a stream, thereby altering natural rates of sedimentation in downstream areas. Modification of stream channels during in-stream operations results in excessive scouring and increased sedimentation during floods, possible loss of riparian vegetation due to lowering of the water table and potential loss of aquifer storage capacity. In addition, oil, grease, and turbidity from in-stream operations degrade the quality of surface waters; off channel diversion helps to minimize these problems. Wet operations, which occur below the seasonal high water table, can directly pollute ground water and otherwise degrade water quality by evaporative loss, and silting. Approximately 10% of the operations in the Region are wet. Dry sand and gravel operations, on the other hand, are conducted entirely above the water table and result in less severe impacts to water quality. Suspended sediments in runoff from dry operations, however, can degrade water quality, especially during wet weather (Division of Oil, Gas & Geothermal Resources, 1989).

Ore mining operations often generate acidic runoff (i.e., water with a pH below 6) and dissolved metals that are toxic to aquatic life in downstream surface waters. In addition, this contaminated runoff can seep into ground water. Contaminated runoff often can be neutralized with chemicals, or reduced to acceptable levels with Best Management Practices (BMPs).

Surface mining and subsequent reclamation are governed by California's Surface Mining and Reclamation Act (SMARA) of 1975 and the federal Surface Mining Control and Reclamation Act (SMCRA) of 1977 which require operations to minimize erosion and sedimentation (some operations are specifically exempted). In addition, any chemicals used in the operations must meet current discharge requirements from both their operations and stock piles. Federal mining law controls mining on Department of Defense lands, Native-American lands, Bureau of Land Management lands and Forest Service lands.

The Regional Board issues WDRs for mining operations on a case-by-case basis. Under the California Water Code (§13263.1) the Regional Board must "determine that the proposed mining waste is consistent with a waste management strategy that prevents the pollution or contamination of the waters of the State, particularly after closure of any waste management unit for mining waste." California Code of Regulations, Title 23, Chapter 15, Article 7 also applies to mining wastes. In addition, industrial storm water runoff (NPDES) permits are required for each site.

Ventura and Los Angeles Counties impose restrictions on mining operations that are consistent with Regional, State, and Federal laws. In Ventura County, stringent conditions are placed on mining operations in order to protect water quality and associated resources, preserve wildlife habitat, and enhance reclamation and aesthetics (Ventura County General Plan, 1990). In Los Angeles County, surface mining operators (including oil and gas production) are required to control slope excavations, erosion and sedimentation, runoff and flooding, etc.

Oil and Gas Extraction

Southern California has a large number of oil and gas fields (Figure 4-8). District 1 of the California Division of Oil, Gas & Geothermal Resources (DOG&G) includes Los Angeles, San Bernardino, Orange, Riverside, San Diego, and Imperial Counties; District 2 covers Ventura County. In 1991, oil production in District 1 and District 2 included 46.6 (48 active fields) and 15.8 (52 active fields) million barrels respectively. Gas production was 15.8 and 18.4 billion cubic feet, respectively. The primary method of enhanced oil recovery is waterflooding in which water is injected into oil reservoirs through injection wells. In both Districts, 102 wells had active water disposal programs totalling 20.3 million barrels of produced water (DOG&G, 1991).

While many of the discharges associated with oil and gas production (such as disposal of produced

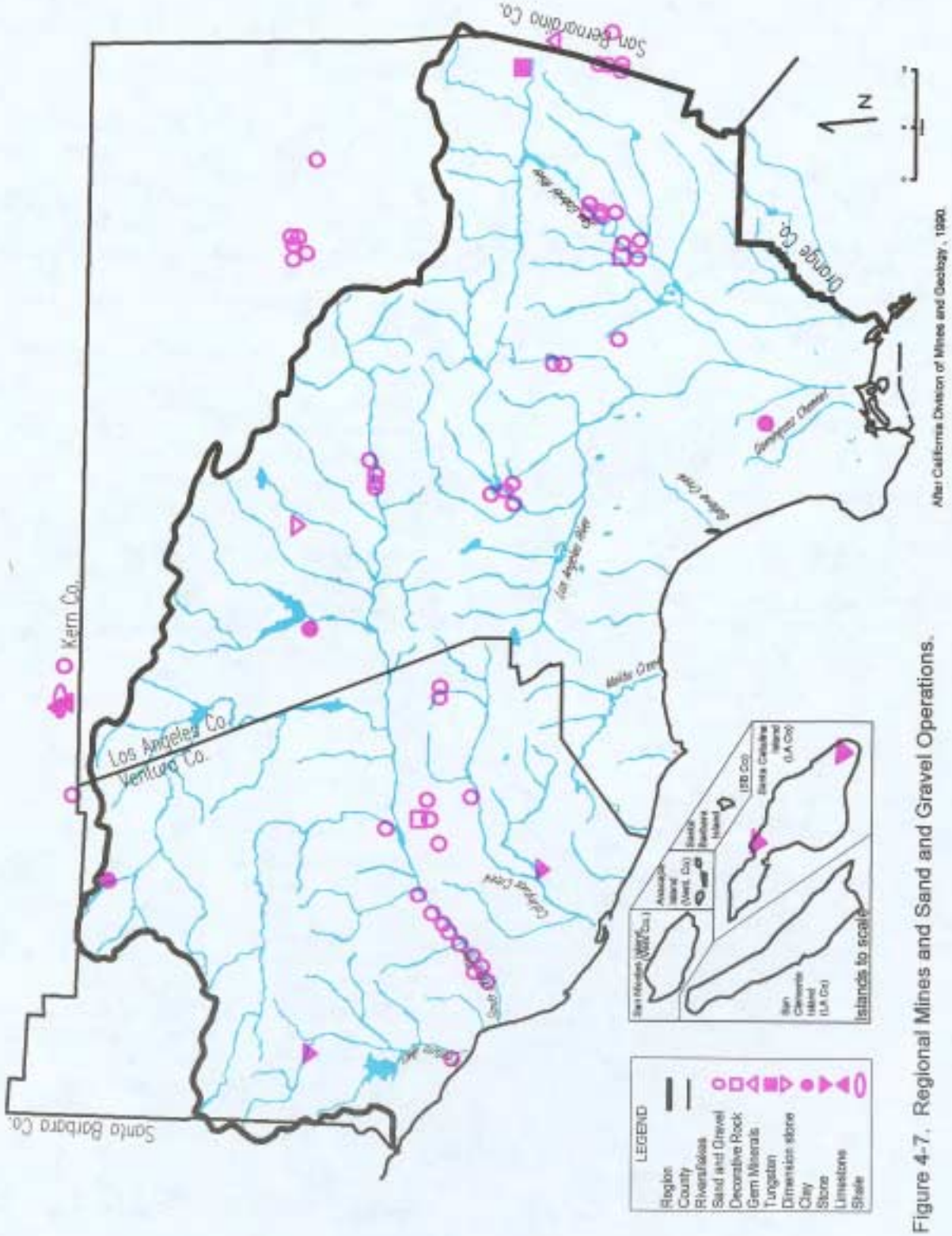

Figure 4-7. Regional Mines and Sand and Gravel Operations.

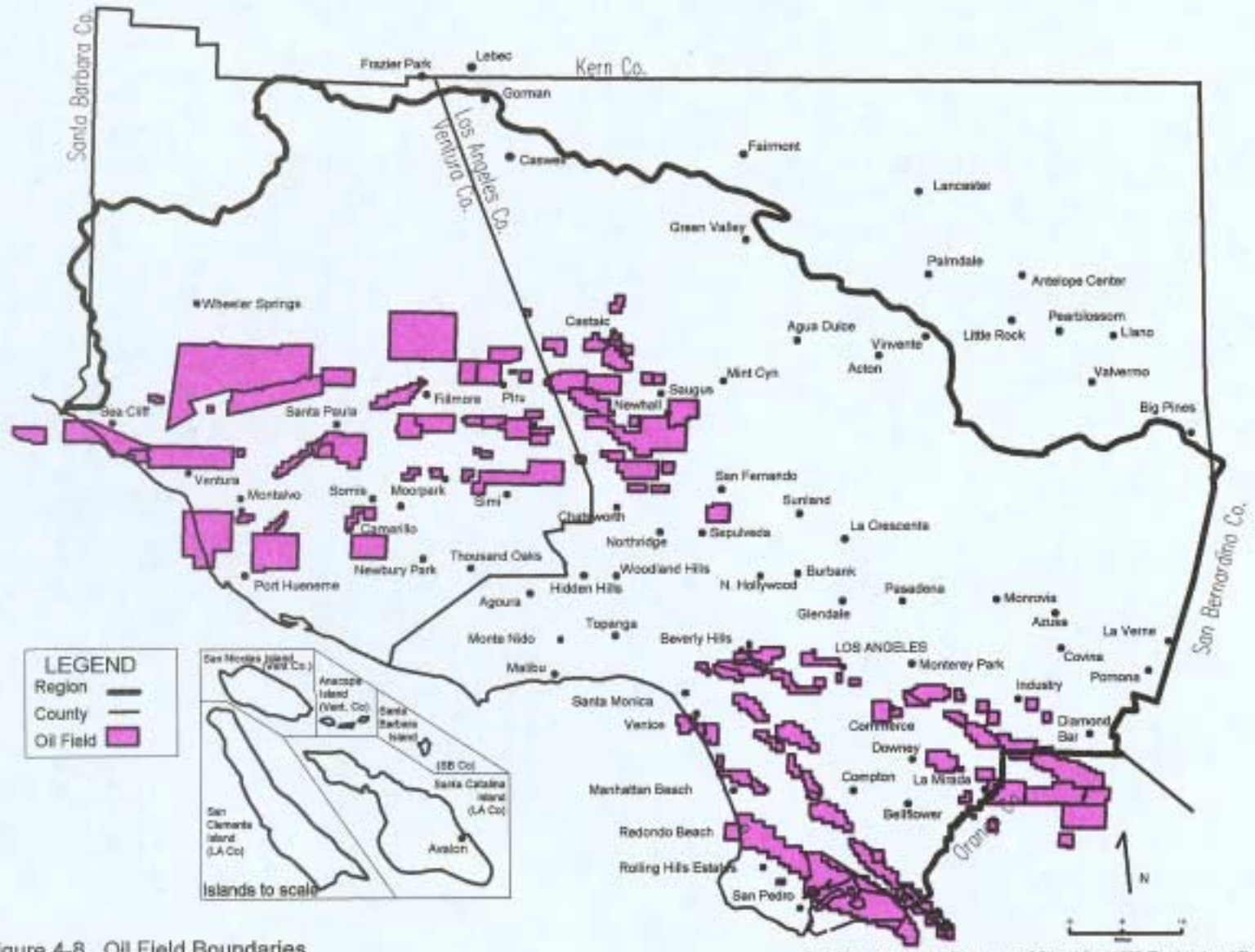

Figure 4-8. Oil Field Boundaries.

Oil field boundaries after Department of Oil and Gas, 1992 (Districts 1 and 2)

water and cuttings) are considered point sources, pollutants from nonpoint sources are also significant threats to water quality. Such nonpoint sources can include seeping and overflowing reserve pits containing drilling fluids and production pits containing hydrocarbons and radium, polluted storm water runoff from drilling and production sites, and spills during transportation. Water associated with oil, gas, or geothermal resource extraction frequently contains high levels of sodium, calcium, chloride, sulfate, carbonate, boron, and iodine, as well as trace metals and hydrocarbons. There also are significant sources of pollutants from natural oil seeps in the Region, which often surface on the ocean floor, along streams such as Santa Paula, Tapo, and Sisar Creeks in Ventura County, and in the vicinity of the La Brea Tarpits in Los Angeles County.

Oil production on federal lands, including National Forest lands, is regulated by the U.S. Bureau of Land Management. Offshore production within three miles of the coast is under state jurisdiction, while that beyond three miles is under federal jurisdiction. The California Division of Oil, Gas & Geothermal Resources conducts environmental inspections of active and inactive off shore and on shore wells, including injection wells for re-injection of produced water associated with oil wells. The Department of Toxic Substances Control regulates hazardous wastes stored, used, or generated on-site. As a result of a Memorandum of Understanding between the State Board and the Division of Oil, Gas & Geothermal Resources, the Regional Board no longer issues WDRs for brine injection wells but does issue WDRs for land disposal at oil and gas sites, including landfills and spreading operations. The USEPA issues permits for injection wells (40 CFR Chapter 1, Subchapter D); DOG&G regulates Class II brine injection wells.

The Regional Board requires NPDES storm water permits for oil production facilities.

Silviculture

Silviculture is the process of managing trees in a forest and includes activities such as site preparation, cultivation, timber harvest, and transport. Such activities are significant sources of nonpoint pollutants unless properly managed. The major type of pollution associated with silvicultural operations is increased sedimentation from the erosion of harvest sites, log landings, logging and skid trails. Other pollutants include pesticides, fertilizers, fire-retardant chemicals, organic matter, woody debris, and increased water temperature along streams where trees have been removed. Logging roads on forest lands, which normally provide access for timber management, recreation, fire protection and other activities, can impact wildlife habitat by increasing erosion and sedimentation in streams and thus destroying aquatic habitats.

In 1897, the federal Organic Administration Act first addressed the management of National Forests. In 1905, Congress transferred all forest reserves to the U.S. Department of Agriculture from the U.S. Department of Interior. This established the U.S. Forest Service as the land management agency in charge of National Forests. The National Environmental Policy Act (NEPA) of 1969 required evaluation of potential impacts on the environment before activities such as timber harvesting could occur on federal lands.

In 1973, mounting concern over forest management and its impacts led to the Z'berg-Nejedley Forest Practice Act. This Act regulates forest practices on state, county, and private lands. It encourages timber production but requires consideration of fish, wildlife and other forest resources. Similar concerns for other federally-owned lands led to the National Forest Management Act of 1976, which outlines even more precise management guidelines requiring long-range planning process and encouraging public participation.

Best Management Practices in Forest Management: The U.S. Forest Service water quality maintenance and improvement measures, or Best Management Practices (BMPs), were developed in compliance with CWA (§208). Practices developed by the Forest Service were certified by the State Water Resources Control Board and approved by the USEPA in 1979. The signing of the 1981 Management Agency Agreement (MAA) between the U.S. Forest Service and the State Board resulted in the formal designation of the Forest Service as a water quality management agency. BMPs are the measures both the State and Federal water quality regulatory agencies expect the Forest Service to implement in order to meet water quality objectives and to maintain and improve water quality. There are currently 98 certified practices being implemented. These 98 practices have been identified under 8 different resource categories (Table 4-21). Twenty-seven of the 98 practices are specifically related to

Table 4-21. Best Management Practices in Forest Management – Angeles and Los Padres National Forests.

Resource Category	Practice *
Timber	Protection of Unstable Areas
	Streamcourse Protection
	Erosion Control on Skid Trails
Road and Building Site Construction	Road Slope Stabilization
	Controlling In-channel excavation
	Water Source Development Consistent with Water Quality Protection
Mining	Administering U.S. Mining Laws
Recreation	Documentation of Water Quality Data
	Protection of Water Quality within Developed and Dispersed Recreation Areas
Vegetative Manipulation	Pesticide Application Monitoring and Evaluation
	Untreated Buffer Strips for Riparian Area and Streamside Management
Fire Suppression & Fuels Management	Protecting of Water Quality from Prescribed Burning Effects
	Repair or Stabilization of fire Suppression Related Watershed Damage
Watershed Management	Watershed Restoration
	Water Quality Monitoring
Grazing	Controlling Livestock Numbers and Season of Use
	Rangeland Improvements

* This list is not complete, but illustrates examples for each of the 8 Resource Categories.

Source: United States Department of Agriculture, 1987 and 1991

silvicultural activities. The most current reference for BMPs is a Soil and Water Conservation Handbook titled *Water Quality Management for National Forest System Lands in California* (USFS, 1986). In addition to the 98 certified practices, two additional practices are currently being reviewed prior to state and federal certification (USFS, 1987).

Within the Region, water quality management is administered in both the Angeles National Forest and the Los Padres National Forest through the continued implementation of the BMPs and through the guidance of the 1981 Management Agency Agreement between the State Board and the U.S. Forest Service. In both the Angeles and the Los Padres National Forests, management activities are limited to a broad-based "selection management," where selective cutting leads to, or maintains, a small even-aged groups of trees similar to those that occur under natural conditions.

Within the forest, wildfire poses one of the greatest threats to water quality. This is especially true of the Los Padres National Forest. Between 1912 and 1985, wildfires burned 1,844,150 acres of the forest, making it one of the most fire-prone in the National Forest System. Wildfires in the Angeles National Forest burn an average of 18,500 acres annually. In addition to the ash and debris resulting from wildfires, destruction of vegetation results in elevated levels of erosion and sedimentation in streams and increased levels of nutrients in the aquatic systems. Removal of streamside cover results in increased water temperature and reduced dissolved oxygen levels. In addition, flooding results in stream bank erosion and loss of riparian habitat.

Current vegetative management practices focus on fire prevention, suppression, and a program of fuel management. The U.S. Forest Service thins overstocked chaparral stands each year. This thinning is accomplished by hand or mechanical methods, use of silvicides, or by low-intensity prescribed burning. This greatly reduces the potential for wildfire by limiting exposure of residual stands to potential wildfires.

In the Angeles National forest, there are approximately 240 miles of perennial rivers and streams, numerous miles of intermittent streams, five natural lakes, and 14 reservoirs. The net yield in this forest is approximately 226,000 acre-feet of water. The Los Padres National Forest has 37

reservoirs and provides about 715,000 acre-feet net yield of water (USFS, 1987).

The major water quality problem in the forest lands is sedimentation and its effect on aquatic habitat and reservoir storage life. As an example, about six million tons of sediment are estimated to be produced on the Los Padres Forest each year; roughly 50% of this sedimentation results from erosion and flooding after wildfires (USFS,1987).

Coastal Nonpoint Source Pollution Program

The Coastal Zone Act Re-authorization Amendments (CZARA) of 1990 include Section 6217, "Protecting Coastal Waters," and requires states with approved coastal zone management programs to develop a Coastal Nonpoint Pollution Control Program (CNPCP). This program will be implemented through existing State coastal zone management programs (California Coastal Commission) and nonpoint source management programs (State Water Resources Control Board). At the federal level, the USEPA and the National Oceanic and Atmospheric Administration (NOAA) will jointly administer the new requirements.

The *Program Development and Approval Guidance* was released by USEPA and NOAA in January, 1993. States have 30 months (by July, 1995) to submit their Coastal Nonpoint Pollution Control Program for approval. Once the plan is approved, states have three years (until January, 1999) to implement the technology-based management measures. USEPA and NOAA will then have a two-year monitoring period (until January, 2001) to assess the effectiveness of the measures. States will then have an additional three years (until January, 2004) to implement any additional measure necessary to attain water quality standards.

Future nonpoint source funding allocations are contingent upon the completion of an approvable program. If the state does not submit an approvable program, financial penalties will be assessed in the form of progressively decreasing Section 319 grants to the state.

The *Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Waters* (commonly called the *(g) guidance*) was released by the USEPA in January, 1993. This *(g) Guidance* contains management measures for five major categories of nonpoint source pollution: agriculture, forestry, urban (including septic tanks), marinas and recreational boating, and hydromodification (Table 4-22). States will be expected to implement all of the measures specified in the *(g) Guidance* with some limited exceptions. These exceptions include (i) sources that are not present, nor reasonably anticipated in an area; or (ii) sources that do not individually or cumulatively present significant adverse effects to living resources or human health. States will also have some flexibility in adopting the exact measures specified in the *(g) Guidance* or alternative measures which are demonstrated to be as effective as USEPA measures in controlling nonpoint source pollution.

The State Board and Coastal Commission have assembled a Coordinating Committee and several Technical Advisory Committees to review the *(g) Guidance* management measures and develop strategies to implement them in California. A key feature of this program is that the State must develop *enforceable* management measures. This differs from most of the State's existing nonpoint source efforts which for the most part are voluntary. There are also some components of the program that the Regional and State Boards do not usually regulate, such as issues relating to land use. Therefore, it will be critical to coordinate State and Regional Boards programs with those of the Coastal Commission and appropriate local agencies in order to develop a successful coastal nonpoint source program. This program will be closely integrated with the Regional Board's storm water permitting program and others, such as the Santa Monica Bay Restoration Project.

Future Direction: Watershed-Based Water Quality Control

The concept of comprehensive watershed level management of water resources is currently being incorporated into various elements of the State's Nonpoint Source Management Program. The watershed protection approach is an integrated strategy for more effectively protecting and restoring beneficial uses of State waters. By looking at an entire watershed, one can more clearly identify critical areas and practices which need to be targeted for pollution prevention and corrective actions. This approach not only addresses the waterbody itself, but the geographic area which drains to the watercourse. This strategy also

Table 4-22. Management Measures in the *Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Waters* ["(g) Guidance"].

Categories	Subcategories
Agriculture	Erosion and sediment control Confined animal facility control Nutrient management Pesticide management Livestock grazing Irrigation water management
Forestry	Pre-harvest planning Streamside management areas Road construction/reconstruction Road management Timber harvesting Site preparation and forest regeneration Fire managment Revegetation of disturbed areas Forest chemical managment Wetlands forest managment
Urban	New development management Watershed protection/site development Construction erosion and sediment control Construction site chemical control Existing development managment New and operating onsite disposal systems (septic tanks) managment
Marinas	Siting and design Marina flushing managment Water quality assessment Habitat assessment Shoreline stabilization management Storm water runoff management Fueling station design management Sewage facility managment Marina and boat Operation and Maintenance Solid waste management Fish waste managment Liquid material managment Petroleum control managment Boat cleaning management Public education managment Maintenance of sewage facilities management Boat operation management
Hydromodification	Channelization and channel modification Physical and chemical characteristics of surface waters Instream and riparian habitat restoration management Dams Erosion and sediment control Chemical and pollutant control Protection of surface water quality and instream and riparian habitat Stream bank and shoreline erosion management
Wetlands	Protection of wetlands and riparian areas Restoration of wetlands and riparian areas Vegetated treatment systems

integrates both surface and ground waters, inland and coastal waters, and point and nonpoint sources of pollution. Point sources have received most of the regulatory attention in the past, however, significant improvements in point sources, coupled with continued water quality impairments, have necessitated the water resources community to look at a more integrated approach which considers impacts from both point and nonpoint sources of pollutants.

The Watershed Protection Approach is built on three main principles. *First,* targeted watersheds should be those where pollution poses the greatest risk to human health, ecological resources, other beneficial uses of the water, or combinations of these. *Second,* all parties with a stake in the specific local situation should participate in the analysis of the problems and the creation of solutions. *Third,* the actions undertaken should draw on the full range of methods and tools available, integrating them into a coordinated, multi-organizational effort to solve the identified problems.

Many agencies and organizations concerned with water resources have come to recognize that this type of approach can be very effective in realistically assessing cumulative impacts and formulating workable mitigation strategies. The Coastal Zone Management Act Re-authorization Amendments, USEPA guidance, and various legislative proposals clearly state the need to consider the implications of land use on water quality. The USEPA and State Board encourage the Watershed Protection Approach at all levels of government. USEPA program managers are re-thinking their approach to the allocation of resources (especially within the Nonpoint Source Program) and will be primarily funding studies that are part of a watershed planning and implementation effort. Recently, the State Board has formed a work group to investigate options for watershed management in California. The Water Quality Task Force, created by the Los Angeles Regional Water Quality Control Board in December, 1992, included a watershed management issue in the list of recommended actions to be implemented at the regional level.

The traditional approach to managing pollutant discharges into streams, lakes, and the ocean has evolved over time – often with separate programs to address various aspects of an overall water quality problem. Some of these programs can have different, overlapping, or conflicting priorities. A transition to watershed-based management can require some programs to be reoriented and integrated. Other programs can not be amenable to the watershed approach. However, this new perspective, even with a limited application, could produce more benefits than a strict program-based approach and provide improved communication and

Malibu Creek Watershed Nonpoint Source Pilot Project

The Malibu Creek watershed, a drainage area of approximately 105 square miles, has changed rapidly in recent years from a predominantly rural area to a steadily developing area. Impacts from human activities are degrading beneficial uses and potentially contributing to long-term environmental problems. The Malibu Lagoon is listed as an impaired waterbody, and sections of the Malibu Creek are listed as threatened waterbodies (WQA, 1992). For these reasons, the Malibu Creek watershed has been chosen by the Regional Board for a pilot watershed nonpoint source project which is funded by USEPA Title II grant monies. This project is being undertaken in cooperation with the United States Soil Conservation Service, the California Coastal Conservancy, the California Department of Fish and Game, the California Department of Parks and Recreation, and others.

Watershed stakeholders, including local activists, politicians, agency representatives, local residents and members of the regulated community, participated in a series of discussion and consensus building groups, dating back to 1991, that resulted in the identification of several areas of environmental concern. Pollutants of concern, many of which are contributed by nonpoint sources, include excess nutrients, sediment, and disease-causing organisms. Increased flows, due to imported water to support the growing population base, as well as channelization and urbanization, have caused an imbalance in the natural regime of dry weather low-flows in the summer.

A comprehensive management plan is being developed to restore biological and recreational resources and to prevent further environmental degradation. The Regional Board has taken the lead in coordinating a comprehensive approach to controlling the nonpoint source pollution aspects of the effort. The Regional Board provides technical assistance including:

- coordination of and participation in watershed-wide water quality monitoring efforts;
- development of a model to determine waste loads into the creek and lagoon system to determine where reductions are needed;
- development of a plan to minimize water quality impacts on Malibu Lagoon from surface discharge of current and future groundwater pollution abatement programs;
- assistance in the implementation of Best Management Practices for the Municipal Storm water NPDES permit; and
- initiation of a nonpoint source public education campaign.

coordination among all levels of government, private organizations, and citizens.

The Region has been divided into six watershed management areas (see Figure 1-5) for planning purposes.

Projects in the Los Angeles Region which are already successfully utilizing the watershed approach include the Malibu Creek Watershed Study (see description on previous page) and the Santa Monica Bay Restoration Project. Regional Board staff are also participating on the Santa Clara River Project Steering Committee and the Los Angeles River Master Plan Environmental Quality Subcommittee, both of which are developing flood plain or watershed plans for these rivers.

The Regional Board plans to implement more watershed-based projects in the future. These will increase the coordination of planning, monitoring, assessment, permitting, and enforcement elements of the various surface and groundwater programs with activities/jurisdiction in each watershed.

Remediation of Pollution

The Regional Board allocates substantial resources to the investigation of polluted waters and enforcement of corrective actions needed to restore water quality. Specific remediation programs include:

- Underground Storage Tanks
- Well Investigations
- Spills, Leaks, Investigations and Cleanups (SLIC)
- Aboveground Petroleum Storage Tanks
- U.S. Department of Defense (DOD) and Department of Energy (DOE) Sites
- Resource Conservation and Recovery Act (RCRA)
- Toxic Pits Cleanup Act
- Bay Protection and Toxic Cleanup

The relatively recent discovery of pollutants in ground water has jeopardized an important source of water for municipal, agricultural, industrial process, and industrial supply uses in the Los Angeles Region. As a result, reliance on imported supplies of water to this semiarid region has increased.

The Regional Board sets cleanup goals based on the State's *Antidegradation Policy* as set forth in State Board Resolution No. 68-16. Under the *Antidegradation Policy*, whenever the existing quality of water is better than that needed to protect present and potential beneficial uses, such existing quality will be maintained (see Chapter 5, Plans and Policies). Accordingly, the Regional Board prescribes cleanup goals that are based upon background concentrations. For those cases wherein dischargers have demonstrated that cleanup goals based on background concentrations cannot be attained due to technological and economic limitations, State Board Resolution No. 92-49 sets forth policy for cleanup and abatement based on the protection of beneficial uses. Under this policy, the Regional Board can – on a case-by-case basis – set cleanup levels as close to background as technologically and economically feasible. Such levels must, at a minimum, consider all beneficial uses of the waters. Furthermore, cleanup levels must be established in a manner consistent with California Code of Regulations, Title 23, Chapter 15, Article 5; cannot result in water quality less than that prescribed in the Basin Plans and policies adopted by the State and Regional Board; and must be consistent with maximum benefit to the people of the State.

The amended State Board Resolution No. 92-49 has been adopted by the State Board. Upon approval from the Office of Administrative Law (OAL), the amended policy will become effective.

Underground Storage Tanks

Approximately 18,000 underground storage tanks have been identified in the Region, accounting for 15% of the 120,000 underground storage tanks that have been identified throughout the State. Most of these tanks contain, or contained, gasoline and diesel fuel products. Over 4,500 sites in the Los Angeles Region are known to have leaking tanks. These leaks can result in pollution of soil, ground water, surface water, and air, and can also constitute fire or explosion hazards (Figure 4-9).

To protect ground and surface waters from petroleum hydrocarbons from leaking underground storage tanks, the State of California enacted legislation in 1983 (Health and Safety Code, Division 20, Chapter 6.7). Underground tank regulations promulgated under this legislation are designed to (i) ensure the integrity of all underground storage tanks, and (ii) detect any leaks. These regulations can be found in Title 23, California Code of Regulations, Division 3, Chapter 16.

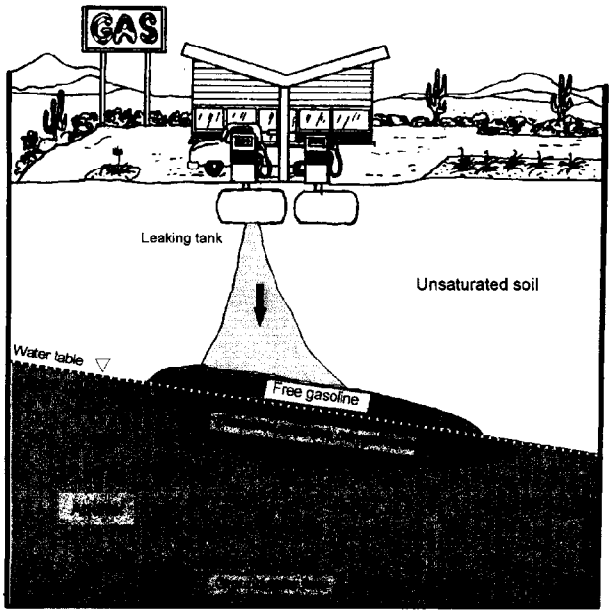

Figure 4-9. Leaking underground storage tank. This diagram illustrates how contamination of the vadose zone and pollution of ground water can result from leaks of gasoline from an underground storage tank (Adapted from Fetter, 1988).

To ensure the integrity of all underground storage tanks, the State's regulations require all counties in California to implement an underground tank permitting program. The counties have the flexibility to shift responsibility to local governments (known as Local Implementing Agencies), provided that the Local Implementing Agencies (LIAs) adopted appropriate ordinances before July, 1990 for implementing underground tank permitting programs that are at least as stringent as the Chapter 16 regulations. Under the permitting programs, a tank owner or operator must obtain an operating permit from the county or LIA in which the tank is located. Permit conditions include tank construction standards, monitoring requirements, unauthorized release reporting, initial abatement procedures, and closure requirements. Furthermore, permitting procedures undertaken by LIAs include initial assessments of sites where pollution can have occurred. LIAs within the Los Angeles Region include: the Counties of Ventura and Los Angeles, and the Cities of Burbank, Glendale, Long Beach, Los Angeles (including the City of San Fernando), Pasadena, Santa Monica, San Buenaventura, Torrance, and Vernon.

Responsibility for overseeing investigations of groundwater pollution and corrective actions rests with the Regional Board. However, given the magnitude of the problems from leaking underground storage tanks in the Los Angeles Region, the Counties of Los Angeles and Ventura joined the State Board's Local Oversight Program (LOP), through which they share regulatory responsibility with the State. (Note that, in addition to their role in the LOP program, the Counties of Los Angeles and Ventura are also LIAs.) In order to provide practical guidance to regulatory agencies overseeing site investigations and corrective actions, the State Board has issued the *Leaking Underground Fuel Tank (LUFT) Field Manual.* This manual is not a policy or regulation; rather, it establishes procedures for verifying the occurrence of a leak from an underground fuel storage tank and for assessing the impact to soil and ground water.

To expedite the permitting process for sites requiring groundwater remediation, the Regional Board has adopted a general permit for the discharge of treated ground water, *Discharge of Ground Water from Investigation and/or Cleanup of Petroleum Fuel Pollution to Surface Waters* (Table 4-2). This general permit regulates the discharge of treated ground water, from petroleum fuel contamination sites, to surface waters, provided that the discharge meets the limitations and conditions of the general permit and does not exceed water quality objectives or impair beneficial uses of the receiving waters.

Leaks from underground storage tanks are not limited to petroleum fuels. Other hazardous substances, such as solvents, also leak and pollute ground and surface waters. Although remediation of such pollution is a high priority, limited funding is available for the investigation and cleanup of such sites. Accordingly, the current scope of the Underground Storage Tank Program is somewhat restricted to pollution from petroleum fuels.

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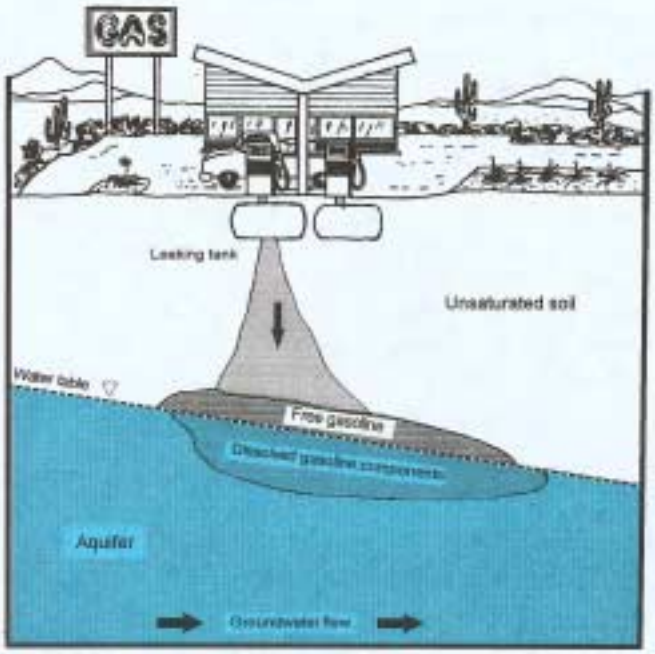

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Well Investigations

By 1980, volatile organic compounds (VOCs) had been discovered in a number of public water supply wells in the San Gabriel Valley and San Fernando Valley Groundwater Basins. These discoveries, along with the discovery of dibromochloropropane (DBCP) in several hundred wells in the San Joaquin Valley and in the Riverside-San Bernardino area, prompted passage of legislation (Assembly Bill 1803) in 1983 which mandated statewide sampling for contamination in public water systems. This legislation is codified in the California Health and Safety Code, Section 4026.3.

The California Department of Health Services and county Health Departments completed sampling of public wells in 1985. Organic pollution was detected in over 640 public water supply wells in the Los Angeles Region. The Regional Board, under authority of the California Water Code (§13304) locates and abates the sources of pollutants affecting these wells and oversees the remediation of the pollution. These investigations, conducted through the Well Investigation Program (WIP), are designed to:

- identify and eliminate sources of pollutants in public water supply wells;
- identify dischargers, by establishing a cause-and-effect relationship between the discharge of a pollutant and a polluted well. When necessary, take enforcement action against dischargers in order to force them to undertake site investigations and corrective actions; and
- oversee remediation of soils and ground waters.

All WIP activities are directed to pollution of ground water in the San Gabriel Valley and San Fernando Valley Groundwater Basins. These valleys are synclinal basins at the base of the San Gabriel Mountains. The two basins, which are separated by the San Raphael Hills, are largely filled with alluvial sediments eroded from the surrounding mountains and hills. Large volumes of groundwater flow through these alluvial sediments, and both basins are important sources of water for more than one million people. In addition to meeting a large part of the demand for potable water, the San Gabriel and San Fernando Valley Groundwater Basins store large volumes of ground water that can be pumped during droughts and recharged during years of surplus surface water supplies. The discovery of significant pollution in these basins, however, has significantly reduced groundwater production as well as the potential for conjunctive use, thereby increasing dependence on imported supplies of water.

Groundwater pollution can often be traced to historic and current land uses. Primary organic pollutants in public water supply wells in the San Gabriel and San Fernando Valley Basins include tetrachloroethylene (PCE) and trichloroethylene (TCE). These compounds, both of which are volatile organic compounds (VOCs), have been widely used as solvents in manufacturing and dry cleaning processes. Soil pollution and subsequent groundwater pollution can result from inadequate handling, storage, and disposal practices of such substances at industrial facilities. In addition to volatile organic compounds, high concentrations of nitrates in the upper 160 feet of the San Fernando Valley Basin have polluted many wells. Nitrates often originate in agricultural areas where fertilizers have been excessively applied to crops, in stockyards and feedlots where nitrates from manure leaches into ground water, and in unsewered areas where nitrates from septic tank systems leach into ground water. With few continuous confining layers of less permeable sediments, groundwater recharge – and the infiltration of pollutants – can occur throughout much of the San Gabriel and San Fernando Valleys.

The Regional Board identifies sources of pollutants by inspecting facilities to check their chemical handling, storage, and disposal practices. Information from these inspections assists in identifying those responsible for releases of pollutants. Under the direction of the Regional Board, parties thus identified are required to conduct subsurface investigations of soil and ground water to confirm the presence or absence of pollutants, quantify the extent of pollution, and plan corrective actions. The Regional Board is committed to working closely with those responsible for releases of pollutants to find cost effective ways in which to investigate and remediate pollution in a timely manner. Whenever appropriate, the Regional Board promotes innovative remediation options and encourages phased, cooperative remediation plans involving multiple sites.

Additionally, in order to minimize the spread of pollution caused by groundwater pumping and recharge activities, the Regional Board oversees a

comprehensive groundwater quantity and quality management program in the San Gabriel Valley. This management program, implemented by the Main San Gabriel Basin Watermaster and about 45 private and municipal water purveyors, has the following objectives:

- Prevent public exposure to contamination.
- Maintain adequate water supply.
- Protect natural resources.
- Control the migration of pollutants.
- Remove polluted ground water.

Oversight of this management program is authorized by Regional Board Resolution No. 91-6, entitled *Amendment to the Water Quality Control Plan for the Los Angeles River Basin and Implementation Plan Concerning the Extraction of Ground Water Within the San Gabriel Valley Basin.* In the San Fernando Valley Groundwater Basin, the Watermaster for the Upper Los Angeles River Area (i.e., the San Fernando Valley Groundwater Basin) cooperates with the Regional Board to achieve similar objectives (Upper Los Angeles River Area Watermaster, 1993c).

In light of the extent of pollution in the San Gabriel Valley and San Fernando Valley Groundwater Basins (Figures 4-10 and 4-11) and the dependence on this important source of ground water, the State of California designated large areas of these basins as high priority Hazardous Substances Cleanup sites. The USEPA also designated these same areas as sites eligible for funding under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) legislation (i.e., as Superfund sites). The USEPA, as lead agency for enforcement in these areas, is responsible for strategy, case development, determination of responsible parties, and settlement negotiations. The Regional Board, on behalf of the USEPA, identifies dischargers as described above.

Spills, Leaks, Investigation and Cleanup (SLIC)

With a skilled work force, well-developed infrastructure and large-scale production capacity, the Los Angeles Region is an important industrial and manufacturing center. With 20 major refineries and hundreds of smaller facilities, the Region has the greatest concentration of petroleum production and storage facilities along the West Coast. Although these activities are an important part of the Region's economic base, they have often severely degraded the environment.

Reports of unauthorized discharges, such as spills and leaks from above-ground storage tanks, are investigated through the Regional Board's Spills, Leaks, Investigation and Cleanup (SLIC) Program. This program is not restricted to particular pollutants or environments; rather, the program covers all types of pollutants (such as solvents, petroleum fuels, and heavy metals) and all environments (including surface and water, ground water, and the vadose zone). Upon confirming that an unauthorized discharge is polluting or threatens to pollute regional waterbodies, the Regional Board oversees site investigation and corrective action. Statutory authority for the program is derived from the California Water Code, Division 7, Section 13304. Guidelines for site investigation and remediation are promulgated in State Board Resolution No. 92-49 entitled *Policies and Procedures For Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304*, described at the beginning this Chapter, in section entitled Remediation of Pollution. Pollutants in the SLIC Program are typically petroleum fuel products which, in addition to existing in liquid form as pure compounds (i.e., "free product"), can dissolve in water, adsorb to soils, and vaporize. Site investigations to delineate the extent of pollution caused by such substances are therefore very complex. Cases range from small leaks of fuel products stored in metal drums to large spills at tank farms and refineries, where tens of millions of gallons of free product are floating on the surface of ground waters in important aquifers. Over 350 cases of pollution have been investigated since 1986. Approximately 50 of these sites have been remediated and closed. State of the art remediation techniques, such as bioremediation of soils, have successfully been employed to remediate pollution. Approximately 100 cases are presently undergoing investigation or corrective action. New cases of pollution are reported at a rate of about 2 to 3 per month.

Department of Defense and Department of Energy

Decades of defense and energy activities have degraded water quality on and around federally-owned facilities. Working with other agencies, the Regional Board is involved with remedial investigation and clean up action on over 16 U.S.

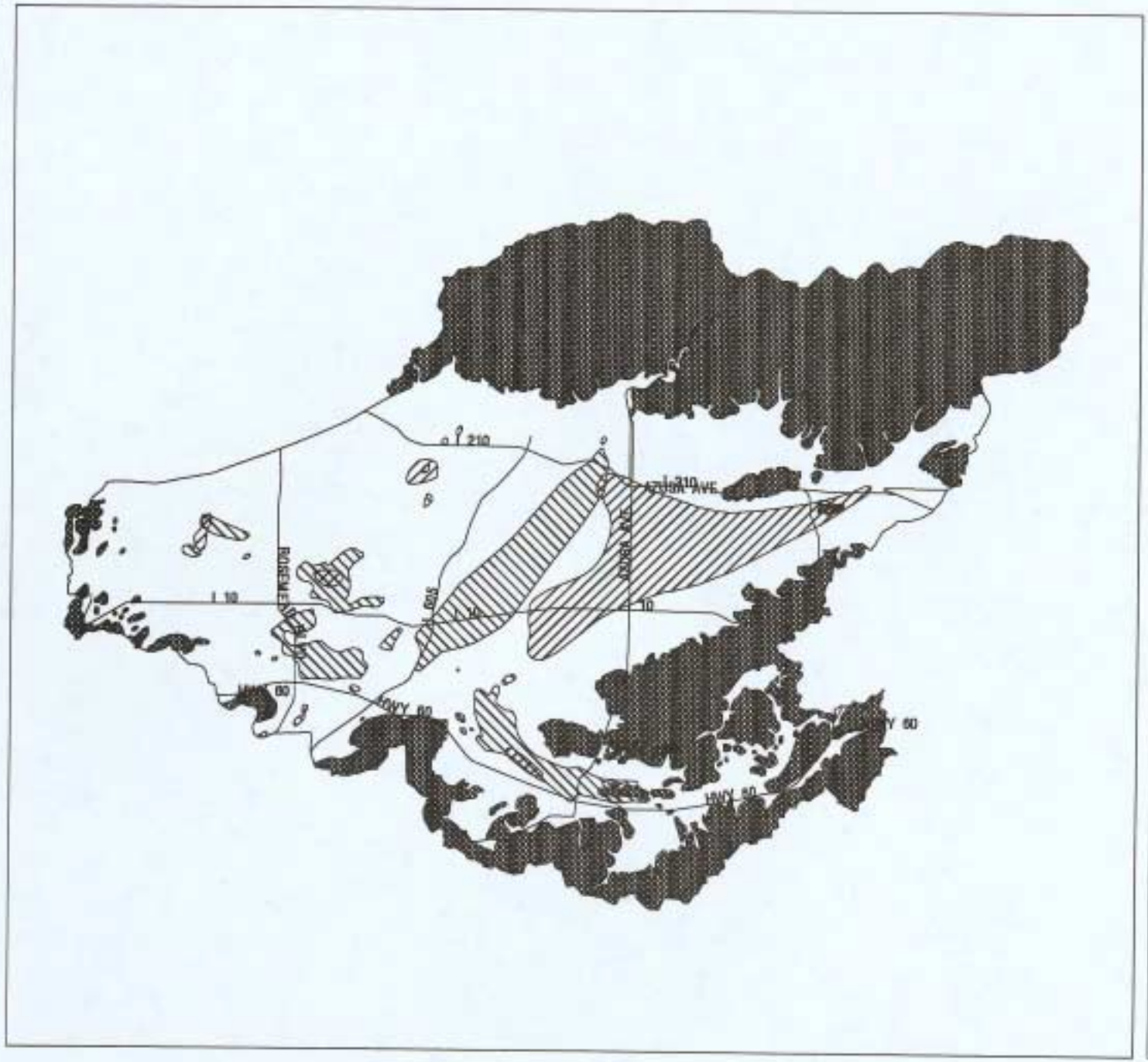

FIGURE 4-10

SAN GABRIEL VALLEY

GROUNDWATER BASIN

CONTAMINATION PLUMES

CALIFORNIA REGIONAL
WATER QUALITY
CONTROL BOARD
LOS ANGELES REGION
(4)

VOC'S ABOVE MCL

NITRATES ABOVE MCL

BEDROCK OUTCROP

N

MILES

0 1 2 3 4

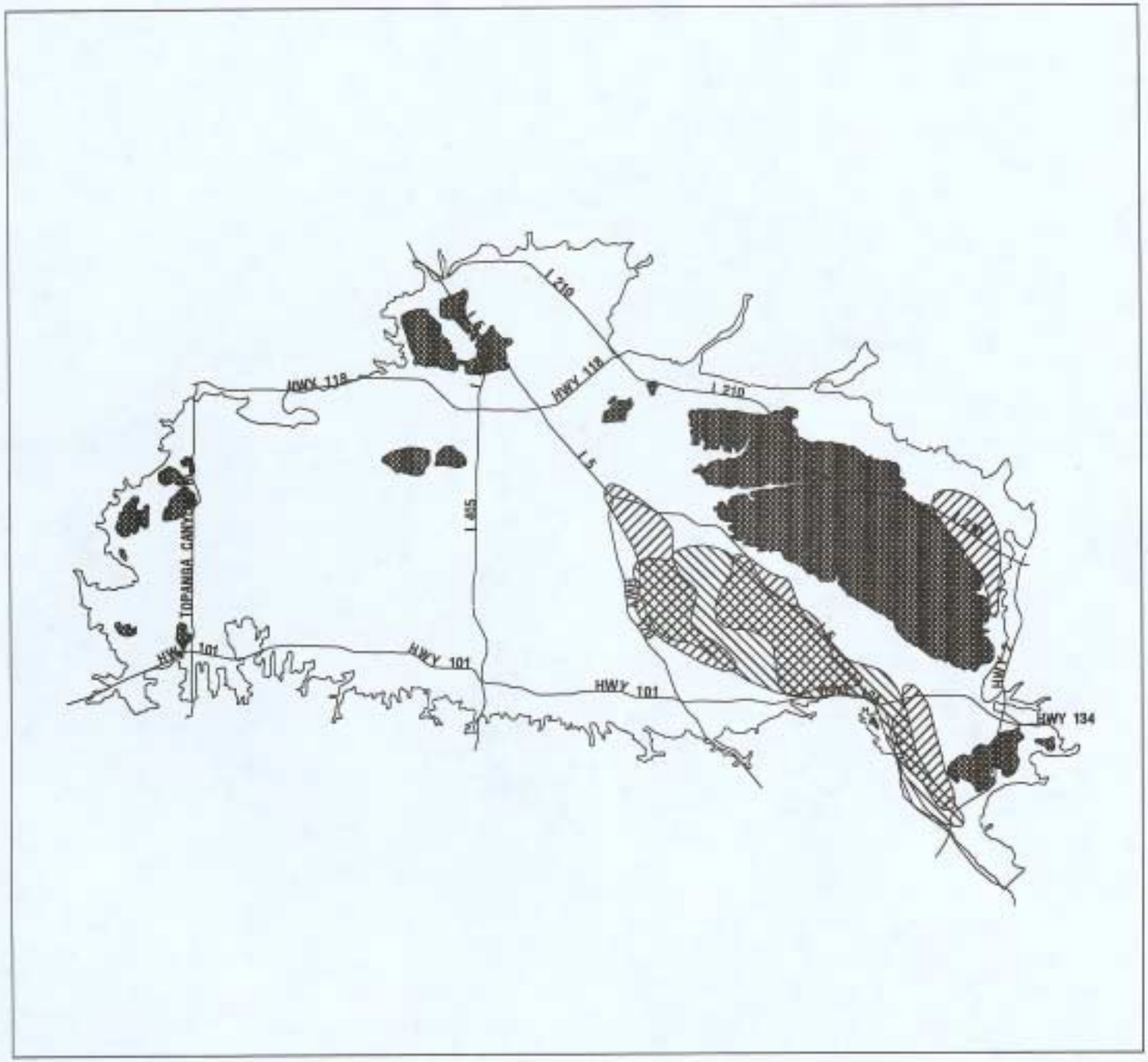

FIGURE 4-11

SAN FERNANDO VALLEY

GROUNDWATER BASIN

CONTAMINATION PLUMES

CALIFORNIA REGIONAL
WATER QUALITY
CONTROL BOARD
LOS ANGELES REGION
(4)

VOC'S ABOVE MCL

NITRATES ABOVE MCL

BEDROCK OUTCROP

N

MILES

0 1 2 3 4

Department of Defense (DOD) sites and one U.S. Department of Energy (DOE) site. Agreements with the DOD and DOE provide for accelerated cleanups at military bases and other Defense sites that are scheduled for closing. Site investigation and clean up procedures are consistent with State laws and regulations as well as applicable provisions of CERCLA.

Aboveground Petroleum Storage Tanks

In order to prevent unauthorized discharges from aboveground petroleum storage tanks, the State of California has enacted legislation designed to lower the risk of spills and leaks. The California Health & Safety Code (§25270 et seq.) requires owners or operators of above-ground petroleum storage tanks to file a storage statement with the State Board and implement spill prevention measures. Examples of such measures include daily visual inspections of any storage crude oil or its fractions, the installation of secondary containment for all tanks with sufficient capacity to hold the content of the largest tank at the facility plus sufficient volume for rainfall to avoid overflow, and development of a *Spill Prevention Control and Countermeasure Plan*. In the event of an unauthorized release, the owner or operator must notify State officials and undertake appropriate monitoring and corrective action. In addition, annual fees are levied on tank owners. The Regional Board uses these fees to fund aboveground petroleum tank inspections and enforcement. There are over 10,000 aboveground petroleum storage tanks in the Los Angeles Region.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) is federal legislation (42 U.S.C.A. 6901 et seq.) designed to ensure that hazardous substances are managed in an environmentally-sound manner. Regulations promulgated under this legislation are in 40 CFR 264 and Title 22 of the California Code of Regulations and include comprehensive requirements for hazardous waste generators, transporters, and facilities that treat, store and dispose of hazardous wastes.

The State of California Department of Toxic Substances Control (DTSC) administers the RCRA Program in California. When requested, the Regional Board reviews on water-quality issues related to RCRA sites.

Toxic Pits Cleanup Act

The State's Toxic Pits Cleanup Act of 1984 (TPCA) regulates impoundments containing liquid hazardous wastes. Regulations promulgated under the TPCA legislation are in the Health & Safety Code, Division 20, Chapter 6.5, Article 9, and are administered by the State and Regional Boards. Major provisions in these regulations include:

- Requirements that all impoundments containing liquid hazardous wastes be retrofitted with liners and laced collection systems, and performance standards for these systems.
- Groundwater monitoring in accordance with the federal Resource Conservation and Recovery Act.
- A prohibition on the discharge of liquid hazardous wastes within 1/2 mile upgradient of a drinking water well.
- A Hydrogeologic Assessment Report.

Seventeen known impoundments containing liquid hazardous waste were operating in the Los Angeles Region when TPCA legislation was enacted. The Regional Board has overseen closure of all of these impoundments.

Bay Protection and Toxic Cleanup Program

In 1989, State legislation added Sections 13390 through 13396 to the California Water Code which established the Bay Protection and Toxic Cleanup Program (BPTCP). The program has four main goals: (i) to provide protection of existing and future beneficial uses of bays and estuarine waters, (ii) to identify and characterize toxic hot spots, (iii) to plan for the cleanup or other remedial or mitigating actions, and (iv) to contribute to the development of effective strategies to control toxic pollutants and prevent creation of new hot spots or the perpetuation of existing hot spots.

The Water Code requires that each Regional Board complete a toxic hot spot cleanup plan and that the State Board prepare a consolidated cleanup plan for

submittal to the Legislature. Each cleanup plan must include a description of each toxic hot spot with its priority listing, an assessment of the most likely source(s) of pollutants, an estimate of the total costs to implement the cleanup plan, an estimate of costs which can be recoverable from responsible parties, a preliminary assessment of the actions required to remedy or restore a toxic hot spot, and a two-year expenditure schedule identifying State funds needed to implement the plan. It is required that a State-wide consolidated cleanup plan will be completed by June 30, 1999.

The Santa Monica Bay Restoration Project

Introduction

In recognition of the need to protect the Bay and associated watersheds, in May 1988, the State of California and the U.S. Environmental Protection Agency nominated and included Santa Monica Bay in the National Estuary Program (NEP). Established under the Water Quality Act of 1987 and managed by the U.S. EPA, the NEP currently includes 21 significant estuaries and coastal water bodies nationwide. The NEP was created to pioneer a broader focus for coastal protection, and to demonstrate practical, innovative approaches for protecting coastal areas and their living resources.

As an NEP, the Santa Monica Bay Restoration Project (SMBRP) is charged with assessing the Bay's pollution and degradation problems and producing a Bay Restoration Plan (BRP) to serve as a blueprint for the Bay's recovery. To fulfill its responsibility, the SMBRP convened a Management Conference. Organized into three groups (the Management, Technical Advisory, and Public Advisory Committees), the Management Conference is a unique and diverse coalition of government, environmentalists, scientists, industry, and the public committed to restoring the Bay. Over the last five years, this coalition has been successfully breaking many interagency barriers, and building consensus to solve problems.

For the purposes of the NEP, the borders of Santa Monica Bay are defined as reaching from the Ventura County line to Point Fermin on the south end of the Palos Verdes Peninsula.

Assessment of Problems in Santa Monica Bay

Santa Monica Bay is an important natural resource which provides significant environmental, recreational and economic benefits for Southern California. However, the Bay's living resources, water quality, and natural beauty have been affected by years of development and other human uses.

The creation of the SMBRP in 1988 has brought about much progress in understanding the problems facing the Bay. Above all, the SMBRP Management Conference has focused on assessing problems associated with four fundamental issues: swimming safety, seafood safety, fisheries and living resources protection, and ecosystem health.

Environmental Issues

Public concern about the safety of *swimming* in, and consuming *seafood* from Santa Monica Bay has been high for the past decade. Studies have shown that some local seafood species contain elevated concentrations of potentially toxic chemicals, primarily DDT and PCBs. As a result, responsible State agencies have published advisories to anglers regarding consumption of these species. With regard to the safety of swimming in Bay waters, some Santa Monica Bay beaches are occasionally closed due to storm water contaminated with minimally-treated sewage overflows. Studies have also found evidence of human fecal waste in dry-weather urban runoff. As a result, warning signs have been posted near outlets of flowing storm drains on beaches to discourage swimming near storm drains.

Despite the relative abundance of aquatic and terrestrial life in and around Santa Monica Bay (including several endangered species), the Bay's *habitats* have been significantly altered and degraded. For example, only about 5% of the area's historical wetlands acreage still exists. Pollution of coastal waters has led to a decline in species and a commercial fishing ban on white croaker in certain areas. In addition, although the use of DDT was banned in 1971, residues of this pesticide still bio-accumulate in the tissues of invertebrates, fish, birds, and marine mammals.

Pollutant loading has been identified as the most important contributor to the problems associated with beneficial use impairment in the Bay. The

SMBRP identified 19 pollutants of concern based on the serious impacts they have had or may have on the Bay. These 19 pollutants of concerns are: DDT, PCBs, PAHs, chlordane, TBT, cadmium, chromium, copper, lead, nickel, silver, zinc, pathogenic bacteria and viruses, total suspended solids, nutrients, trash and debris, chlorine, oxygen demands, and oil and grease.

Pollutants of concern reach Santa Monica Bay through a number of routes. Major pathways include wastewater carried by the region's sewage system and released into the Bay after treatment; urban runoff/storm water carried into the Bay through the region's storm drain system; treated wastewater directly discharged into the Bay from industrial facilities; oil and hazardous waste spilled directly into the Bay or into the storm drain system, and resuspension of contaminated sediments. Overall, sewer systems are the largest source of pollutant loading to the Bay. However, as the quality of sewage discharges from treatment plants has improved, the relative contribution of storm water and urban runoff to the total pollutant load to the Bay has increased.

The condition of the Bay and its watershed, with an emphasis on the effects of pollution on human health and the marine environment is documented in detail in the Santa Monica Bay Characterization Report published by the SMBRP in April 1993.

Management Issues

The Santa Monica Bay "watershed" is bordered on the north by the Santa Monica Mountains divide, on the east by Griffith Park, on the south by Point Fermin, and on the west by the eastern portion of Ventura County. Hydrologically, the Bay watershed is divided into 28 drainage basins, each of which has unique topographical and land use characteristics. The northern portion of the Bay watershed has steep topography and contains large undeveloped areas. The central and southern portions have a mixture of residential and industrial/commercial land use. The Palos Verdes Peninsula segment of the watershed contains residential development along with open space and a rocky shoreline.

Management of water pollution and habitat protection in Santa Monica Bay is currently based on jurisdictional rather than hydrologic or watershed boundaries. There are more than 50 Federal, State, and local agencies or jurisdictions whose management decisions directly or indirectly affect water quality, natural resources, and recreational activities in the Santa Monica Bay watershed and the near-coastal area. To make planning, forecasting, and implementation of actions more cost effective and successful, they should be coordinated on a watershed basis.

Historically, water quality management in the Santa Monica Bay area targeted the most visible pollution problems such as individual municipal and industrial "point" sources of pollution. This approach has solved the worst pollution problems, but it may have neglected the less obvious, but potentially more damaging impact of "nonpoint" pollution such as storm water/urban runoff and atmospheric deposition. There is an urgent need to address all these pathways/sources in a coordinated rather than a fragmented manner.

Currently, most of these pollutants are primarily managed by applying concentration-based water quality standards. However, such an approach may not always be appropriate to protect against impacts that result from long-term accumulation of these pollutants in marine environments. A new mass emissions approach is being considered. Under this approach, an allowable "no impact" cumulative loading of a pollutant would be determined on a watershed basis, coupled with a set of useful "end points" by which to measure the adequacy of management actions.

Recommended Actions

Supported by extensive problem research and assessment, the Bay Restoration Plan sets forth actions that need to be taken to achieve a clean and healthy Bay. The BRP not only identifies actions, but also implementors, timelines, and potential funding sources.

Described below are some of the high priority actions presented in the Draft BRP which the Los Angeles Regional Water Quality Control Board has been designated to serve as either the lead, regulatory lead, or as an important participant in their implementation.

- Improve management framework for water quality regulation and enforcement

  Specific actions to be led by the Regional Board include revising and incorporating new program

elements into the NPDES permits, especially storm water NPDES permits, as needed; ensuring adequate staffing, resources, and legal support at the Regional Board for storm water NPDES permits, other NPDES permits, and pretreatment permit compliance and enforcement; and developing new, effective enforcement tools, if necessary.

Led by EPA and the post-SMBRP organization, and with the involvement of the Regional Board, specific actions are also recommended to investigate the necessity for and feasibility of developing numeric effluent limits for storm water runoff.

- Coordinate Bay water pollution management on a watershed basis

  A key action under the leadership of the Regional Board is to develop tools for coordinating all components of the NPDES program (urban, municipal, industrial and cooling water discharges) with other permitting and regulatory functions on a watershed/sub-watershed basis. One recommended mechanism for management on a watershed basis is the adoption of a mass emissions approach, with the Regional Board serving as the lead in overseeing its development and implementation.

  In order to carry out the watershed management approach, the BRP prescribes a Malibu Creek Pilot Watershed Management Plan. It is recommended that the post-SMBRP organization, with participation of the Regional Board, use applicable elements of the Malibu Creek Pilot Plan to develop management plans for other priority watersheds.

- Implement control measures for pollutants associated with storm water/urban runoff

  Specific actions include ensuring adequate staff and training in local municipalities and agencies for storm water/urban runoff management; evaluating and developing effective processes to address small discharges of non-storm or contaminated storm runoff; developing and implementing land use tools for storm water/urban runoff management; developing and enforcing land use ordinances; developing and implementing a five-year urban runoff education strategy; implementing a set of mandatory short-term Best Management Practices (BMPs); conducting pilot projects for medium and long term BMP implementation; and promoting implementation of general good housekeeping practices by commercial and industrial facilities and construction activities.

  It is recommended that most actions in this category be implemented by co-permittees of the municipal storm water NPDES permit, led by the Los Angeles County Department of Public Works, and that the Regional Board act as regulatory lead.

- Upgrade all direct municipal discharges to Santa Monica bay to secondary treatment levels

  Two specific actions are included: (i) the City of Los Angeles should complete construction of full secondary facilities at the Hyperion treatment plant and remedy storm-related sewage overflow problems; (ii) the County of Los Angeles should install full secondary treatment facilities at the Joint Water Pollution Control Plant. It is recommended that Regional Board act as regulatory lead for implementation of these actions.

- Control pathogens in surfzone to ensure the safety of swimmers

  Specific actions include developing and conducting a sanitary survey; conducting on-site inspections and repairing malfunctioning septic tanks; developing inspection systems; conducting focused inspection of illegal and illicit sewage connections to storm drains; inspecting and correcting leaks from sewer lines and sewage treatment plants; treating and/or diverting dry-weather urban runoff if feasible

  Implementation of these actions will be carried out by various agencies/organizations including Los Angeles County Department of Public Works, Los Angeles County Department of Health Services, POTWs, and local cities, as well as the SMBRP. The Regional Board is recommended to serve as regulatory lead for implementation of these actions.

- Assess health risks associated with swimming and revise water quality standards

  The key action is to conduct an epidemiological study to assess the possible health risks of recreational exposure to storm drain runoff in

Santa Monica Bay. It is recommended that this action be led by the State Water Resources Control Board with the participation of the Regional Board and other State and local health service agencies.

- Develop and implement comprehensive monitoring program

  It is recommended that NPDES permittees as well as the Regional Board participate in a "retooled" Santa Monica Bay and watershed monitoring program focusing on compliance monitoring aspects. As part of the monitoring program, a user-friendly SMB data management system would be designed and maintained by the post-SMBRP organization with the participation of the Regional Board.

  The Santa Monica Bay Restoration Plan was presented to the public in April 28, 1994. Its implementation is slated to begin in January, 1995.