CHAPTER 4

IMPLEMENTATION

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4. IMPLEMENTATION

INTRODUCTION

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The purpose of this chapter is to describe actions that are necessary to protect the beneficial uses described in Chapter 2 and achieve the water quality objectives specified in Chapter 3. One of the elements in a Water Quality Control Plan as defined in California Water Code (Water Code) section 13050(j) is the implementation program for achieving water quality objectives. This chapter describes the Regional Board's implementation program.

Water Code section 13242 requires that the implementation program have the following elements:

- A description of the actions which are necessary to achieve water quality objectives. (This may include recommendations for appropriate action directed to any entity, public or private);
- A time schedule for the actions to be taken; and
- A description of surveillance to be undertaken to determine compliance with the water quality objectives.

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.

This Chapter is divided into four sections, Control of Point Source Pollutants, Control of Nonpoint Source Pollutants, Remediation of Pollution, and Other Programs as shown below. Areas of overlap between the point and nonpoint source categories are described later in this Chapter.

★ *Control of Point Source Pollutants*

Pollutants from point sources are discharged to waterbodies from discrete conveyance systems (e.g., pipes and channels) in controlled flows at well-defined locations. Examples of point sources include waste discharges from municipal and industrial wastewater treatment facilities.

Programs that protect water quality from point source pollutants are primarily regulatory in nature. Waste discharge permitting programs such as California's Waste Discharge Requirements (WDRs) and the federal National Pollutant Discharge Elimination System (NPDES) are examples of key regulatory point source control 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, nonpoint source pollutants often enter waters in sudden episodic surges and large quantities. This occurs as rain, irrigation, and other types of runoff mobilizes and transports 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 transported by storm water or water from irrigation sprinklers; household and automotive care products dumped or drained on streets and into storm drains; fertilizers and pesticides 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 require different control strategies. For example, traditional permitting programs are neither a practical nor effective means of water quality protection from lawn and garden chemicals. Accordingly, the Regional Board integrates non-regulatory programs with

regulatory programs in order to control pollutants from nonpoint sources. 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 eliminate or reduce nonpoint sources of pollution. Emphasis is placed on pollution prevention though careful management of resources, as opposed to cleaning up the waterbody after the fact. Local governments play a key role in the control of nonpoint sources by adopting and enforcing ordinances and by supplementing the Regional Board's public outreach efforts. This flexible 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 waters and enforcement of corrective actions needed to restore water quality. These activities are managed through the following programs, namely: Underground Storage Tanks; Site Cleanup Program (which includes above ground petroleum storage tanks); NPDES Program; Land Disposal and Waste Discharge Requirements (WDR) Regulatory Programs; and U.S. Department of Defense (DOD) and Department of Energy (DOE) Sites.

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.

★ *Other Programs*

The Regional Board is involved with the investigation, assessment and protection of water quality through other programs which are discussed in this Basin Plan. These include California's Clean Water Act section 303(d) process and California's water quality assessment program.

CONTROL OF POINT SOURCE POLLUTANTS

DEFINITION OF POINT SOURCE

Waste loads from point sources are those that are generally associated with pollutant discharges from an identifiable location to waters of the state. A point source is any discernable, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. Point source wastes can be generated by residential, commercial, industrial, agricultural, certain recreational and solid waste disposal activities and/or practices. Other wastes are considered under the category of nonpoint source waste loads and are discussed in appropriate sections of this chapter. Many of the water quality problems in the San Diego region have been attributable to point source discharges.

The Regional Board regulates most point source discharges of waste through the issuance of waste discharge requirements and NPDES permits. Certain surface water discharges of waste described in 40 Code of Federal Regulations (CFR) 122.3 do not require NPDES permits. The need to obtain waste discharge requirements for certain categories of waste discharges to land may be waived by the Regional Board where such waiver is not against the public interest. The waste discharge requirements and the NPDES permits establish terms and conditions such as effluent limitations to ensure that point source waste discharges comply with applicable water quality objectives and ensure protection of beneficial uses.

EFFLUENT LIMITATIONS

Effluent limitations for discharge of treated point source wastes are developed for individual point sources and are included in the waste discharge requirements or NPDES permits. The effluent limitations are placed on the quality and quantity of the waste discharge or effluent and can be either numeric and/or narrative limitations. Effluent limitations are based on applicable water quality objectives, United States Environmental Protection Agency (USEPA) effluent guidelines and standards, beneficial uses for the area of effluent disposal, and applicable state and federal regulations and policies.

POINT SOURCE CONTROL CATEGORIES

Waste discharge requirements for waste discharges to land are issued for reclaimed water discharges, sanitary landfills, subsurface waste disposal by septic tank systems, dredge spoil disposal projects, sewage treatment plants and a variety of other activities which can affect ground water quality. NPDES permits are issued for waste discharges to surface waters from facilities such as power plants, sewage treatment plants, shipyards, boatyards, dewatering operations, ground water cleanups and a variety of other activities which can affect surface water quality.

Table 4-1(a) contains a summary listing of facility types regulated under NPDES permits as of July 1994. Table 4-1(b) contains a summary listing of facility types regulated under waste discharge requirements as of November 2014.

Table 4-2 contains examples of pollutants found in industrial and municipal point source discharges to surface and ground waters.

REGIONAL BOARD PERMITTING PROGRAMS

The Regional Board's primary means of protecting the Region's water resources is through the issuance of WDRs, Water Reclamation Requirements (WRRs), and Master Reclamation Permits (MRPs) for each individual discharger. The WDRs impose conditions which protect water quality, implement the Water Quality Control Plan, and when the discharge is to waters of the United States, meet the requirements of the Clean Water Act. The WDRs impose limits on the quality and quantity of waste discharges and specify conditions to be maintained in the receiving waters. WRRs impose conditions for all reuses of treated wastewater. In addition, because the USEPA has delegated responsibility to the State and regional boards for implementation of the federal 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 wastewater without obtaining appropriate WDRs, WRRs, or NPDES permits.

Any person who discharges or proposes to discharge wastes to waters in the Region (other than into a community sanitary sewage system) must describe the quantity and nature of the proposed discharge in a report of waste discharge (RWD) or an NPDES permit application. The RWD must contain information required by the Regional Board. The filing of the RWD with the Regional Board is mandatory unless waived by the Board on the grounds that the waiver is not against the public interest. Such waivers are conditional and can be revoked by the Regional Board at any time. Upon review of the RWD or NPDES permit application and all other pertinent information (including comments received at a public hearing), the Regional Board will hold a public hearing to consider issuance of WDRs containing appropriate measures and limitations to protect public health and water quality. The basic elements of WDRs or NPDES permits include:

Table 4-1(a). National Pollutant Discharge Elimination System Permitted Facilities In the San Diego Region (as of July 28, 1994)[1]

Facility Type	Number Regulated
Above Ground Tanks	2
Boatyards	7
Ground Water Cleanup	7
Ground Water Dewatering	9
Industrial	8
Military	13
Power Plants	7
Sewage Treatment Plants	24
Shipyards	4
Storm Water (Construction)	542
Storm Water (Industrial)	619
Storm Water (Municipal)	34
Water Softener / Brine Treatment	6
Total	**1283**

Table 4-1(b). Waste Discharge Requirement Permitted Facilities in the San Diego Region (as of November 2014)[2]

Facility Type	Number Regulated
Campgrounds	59
Dairy	4
Dredging	5
Ground Water Cleanup	3
Industrial	4
Landfills	51
Miscellaneous	5
Nursery	1
Private Sewage Treatment Plants	7
Sand and Gravel	14
Sewage Treatment Plants	42
Sludge Treatment	1
Water Reclamation Requirements	22
Water Softener / Brine Treatment	1
Winery	3
Total	**227**

[1] The list of regulated facilities under NPDES permits is updated periodically and is available at the Regional Board office.
[2] The list of regulated facilities under WDR permits is updated periodically and is available at the Regional Board office.

Table 4-2. Examples of Industrial and Municipal Point Source Discharges to Surface and Ground Waters.

Discrete Discharge	Examples of Pollutants	Examples of Affected Waterbodies
Municipal wastewater treatment plants	Biological oxygen demand (BOD), chemical oxygen demand (COD), TDS, chlorides, sulfates, nutrients, ammonia ($NH_{3)}$, residual chlorine, metals, organic chemicals	Most inland waters, Pacific Ocean, various ground water basins
Power generation plants	Temperature, chemical additives, minerals	San Diego Bay, Pacific Ocean
Waste water discharge from remediation or construction de-watering projects	TDS; chlorides; sulfates; volatile organic chemicals (VOCs); BTEX (e.g., benzene, toulene, ethylbenzene, xylene) and other petroleum hydrocarbons	Surface waters region-wide
Underground Storage Tanks	TDS; chlorides; sulfates; VOC's; BTEX and other petroleum hydrocarbons	Ground waters region-wide
Shipyard, boatyard wastes	Oil and grease, metals [lead (Pb), chromium (Cr), copper (Cu) and zinc (Zn)], suspended solids, settleable solids, tributyltin (TBT), temperature, chemical additives	San Diego Bay, Mission Bay, Dana Point, Oceanside Harbor
Sand and gravel	TDS, turbidity, sedimentation	San Diego River, Otay River, San Luis Rey River, Temecula Creek, San Dieguito River, Aliso Creek, San Clemente Canyon Creek, San Vicente Creek, Trabuco Canyon Creek, El Toro Creek, Carroll Canyon Creek or their tributaries.
Dairies	BOD, TDS, bacteria, nutrients	Various ground water basins
Dredging	Suspended solids, turbidity	San Diego Bay, Mission Bay, Oceanside Harbor, Dana Point
Landfills	Metals; TDS; chlorides; sulfates; VOC's; BTEX and other petroleum hydrocarbons	Various ground water basins
Recreational Vehicle (RV) Campgrounds	Formaldehyde, phenols, zinc, chlorides, aluminum sulfates	Various ground water basins

- Effluent limitations on the quality and quantity of the waste discharge. The effluent standards or limitations are designed to implement water quality control plans, protect beneficial uses, and prevent nuisance;

- Standard terms and conditions and discharge prohibitions to ensure compliance with applicable provisions of state and federal law; and

- A monitoring and reporting program requiring the discharger to collect and analyze samples and submit monitoring reports to the Regional Board on a prescribed schedule.

Water Code section 13263 provides that in prescribing WDRs the Regional Board need not authorize the utilization of the waste assimilation capacities of the receiving waters. No discharge of waste into waters of the state creates a vested right to continue the discharge. All discharges of waste into waters of the state are privileges, not rights.

Waste discharges are categorized according to their threat to water quality and operational complexity (Table 4-3). Additionally, discharges to surface waters are categorized as major or minor discharges. Filing and annual fees are based on these categories. WDRs or WRRs 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 WDRs and NPDES permits establish conditions tailored to specific discharges. In some cases, discharges can be regulated under general WDRs or NPDES permits (General Permits) which simplify the permit process for certain types of discharges. These General Permits are issued administratively to the discharger after a completed Notice of Intent or appropriate application has been filed and, if necessary, the Regional Board Executive Officer has determined that the discharger meets the conditions specified in the General Permit. The Regional Board plans to increase the use of General Permits for regulating similar categories of waste discharges in the future. The use of General Permits is a step towards permit streamlining and the reduction of permitting delays. The Regional Board will use the following principles in issuing or reviewing General Permits:

- The General Permit will have a streamlined process for obtaining coverage with adequate protective measures to assure compliance.

- The General Permit will focus on constituents of environmental concern for which there is a reasonable likelihood the constituent is, or may be, present in the discharge.

- The General Permits should be flexible to the extent practicable, and should allow for different testing, monitoring, and reporting requirements recognizing various significance levels of discharges.

- Duration, volume, and dilution of discharge should be considered in determining the significance of a discharge.

WASTE DISCHARGE REQUIREMENTS

WDRs are permits for waste discharges to land which could primarily affect ground water quality and beneficial uses. All waste discharges, whether to land or water, are subject to Water Code section 13263. Furthermore unless exempt, discharges to land (e.g., landfills) are also subject to requirements of California Code of Regulations (CCR) Title 27 and Title 23, Chapter 15. Examples of such waste discharges include:

- Sewage treatment plants with discharges to land;

- On-site wastewater treatment systems, or “OWTS” (septic tanks and advanced treatment systems);

- Class III (nonhazardous waste) and Class I (hazardous waste) landfills;

- Industrial discharges;

- Land treatment units (bioremediation);

Table 4-3. "Threat to Water Quality" and "Complexity" Definition.

CATEGORY & THREAT TO WATER QUALITY	DEFINITION	EXAMPLE
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 to 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 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 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 discharges.
COMPLEXITY		
Category "a"	Any major NPDES discharger, and 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 include above which has a physical, chemical, or biological treatment system (except for septic systems with subsurface disposal), or any Class II or Class III waste management unit.	Marinas with petroleum products, solid wastes or sewage pump-out facilities.
Category "c"	Any discharger for whom WDRs 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 BMPs, discharges having passive treatment and disposal systems, or discharges having waste storage system with land disposal such as dairy waste ponds.
NPDES		
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.	

- Dairies; and

- A variety of other activities which can affect ground water quality.

Some types of dredging operations in surface waters are also regulated under WDRs. WDRs may also protect surface waters in those instances where surfacing ground water may adversely affect surface water quality or beneficial uses. As discussed in the following subsection, operations that contribute nitrate loading to ground water are of particular concern for interconnected surface water. This is because the water quality objective for nitrate in ground water is an order of magnitude higher than the biostimulatory substances water quality objective for total nitrogen in surface water.

A standard WDR permit typically includes the following elements:

Findings
Official description of the facility, processes, type and quantity of wastes, existing WDRs, enforcement actions, public notice and applicable Water Quality Control Plans, beneficial uses and water quality objectives;

Effluent Limitations
Narrative and numerical limits for effluent and discharge prohibitions;

Receiving Water Limitations
Narrative and numerical objectives for the receiving waters;

Provisions
Standard provisions required by the Regional Board and by state and federal law;

Compliance Schedules
Time schedules for completion of activities to achieve compliance with permit conditions;

Sludge Requirements
Sludge monitoring and control requirements, if necessary; and a

Monitoring and Reporting Program
Specific locations of monitoring stations and sampling frequency for all constituents limited in the permit, including flow, and other constituents that may be required by the Board.

Any person proposing to discharge waste, other than to a community sanitary sewage system, must file a report of waste discharge (application) to obtain WDRs at least 120-days prior to commencing the discharge.

The Water Code, Division 7, Chapter 4, Article 4 authorizes the Regional Board to issue WDRs, review self-monitoring reports submitted by the discharger, and perform independent compliance checking. The Regional Board is authorized to take a variety of enforcement actions to obtain compliance with WDRs. Enforcement of WDRs is done through the issuance of cleanup and abatement orders, cease and desist orders, administrative civil liability orders and court action. The Regional Board is also authorized to update and review WDRs periodically.

NITROGEN IN INTERCONNECTED GROUND WATERS AND SURFACE WATERS

Ground water and surface waters interact with one another, thus, discharges to one may result in impacts to the other (USGS, 1998). Understanding this interaction is important in establishing appropriate discharge specifications for total nitrogen in WDRs because ground water can be a significant source of the total nitrogen load in interconnected surface water bodies. High total nitrogen loads in surface water bodies can cause nuisance algal blooms and low dissolved oxygen leading to fish kills.

Nitrogen is not present in waste streams in its elemental form. It typically occurs in one or more of the following compounds: nitrate (NO_3), nitrite (NO_2), ammonia (NH_3), ammonium (NH_4), and organic nitrogen.

The term “total nitrogen” refers to the sum of all forms of nitrogen compounds. The majority of the total nitrogen load in both surface waters and ground waters is in the form of nitrate (NO_3).

The USGS (2010) concluded that, nationwide 66 percent of streams evaluated had more than 37 percent of their total nitrate load contributed by base flow from ground water seepage (Figure 4-1). The USGS report also stated that the proportion of the nitrate load in streams attributed to nitrate in base flow was significantly higher in areas with permeable soils or bedrock similar to conditions found in the San Diego Region.

For discharges of waste with significant total nitrogen loads, the biostimulatory substances surface water quality objective may limit the discharge specification for total nitrogen in WDRs for projects or facilities that discharge to land near surface water bodies. Discharges with significant total nitrogen loads include:

- Discharges to land from Onsite Wastewater Treatment Systems (OWTS) and wastewater treatment plants.

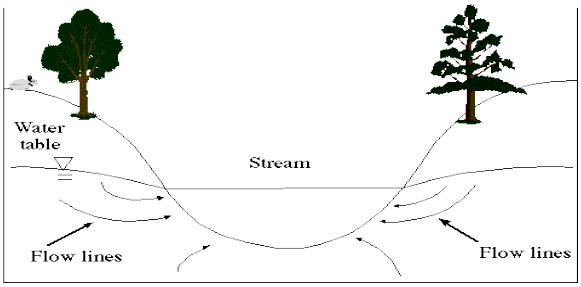
- Deep percolation of rainfall or irrigation water from agricultural and nursery operations where nitrogen fertilizers have been applied.

- Deep percolation of rainfall or irrigation water from urban landscapes where nitrogen fertilizers have been applied.

- Deep percolation of recycled water applied for irrigation of agricultural and nursery lands, and urban landscapes.

Natural processes, including physical, chemical, and biological, can affect nitrogen exchanges between ground water and surface water bodies. Total nitrogen concentrations in effluent plumes discharged from OWTS will lose strength through dispersion and dilution as the plumes migrate along ground-water flow paths through an aquifer. In stream settings containing organic-rich sediments and low dissolved-oxygen concentrations, bacteria convert dissolved nitrate in ground water to innocuous nitrogen gas through the process of denitrification and reduce the total nitrogen load entering the stream. Nitrate can also be removed from the ground water as it moves through streamside riparian zones. Nitrate can be removed from stream water that flows through sediments in the streambed. Vegetation in riparian buffer zones can also take up nitrate. All of these processes could be very effective at reducing total nitrogen concentrations in some settings and not in others.

Figure 4-1. Interconnected Surface and Groundwater



Loading of nitrogen through the groundwater pathway includes transport through the unsaturated (or vadose) zone, into a shallow water table and through a deeper saturated zone, which may include confined and unconfined aquifer systems.

Discharges of wastes with significant total nitrogen loads to ground waters that are located in proximity to surface waters, or where ground water is connected to surface waters require additional evaluation to ensure the protection of water quality and beneficial uses.

Where potential discharges of total nitrogen to surface waters are determined to exist via the ground water pathway, the Regional Board may and most likely will adopt WDRs that require a reduced concentration in the proposed discharge effluents, reduction in total nitrogen loads, and or compliance with more stringent water quality objectives in receiving surface waters for the protection of beneficial uses of water resources.

Discharges to Land from Wastewater Treatment Systems

Discharges from wastewater treatment systems that are located in ground water basins interconnected with surface waters could adversely affect surface water quality. The State *Water Quality Control Policy for Siting, Design, and Maintenance of Onsite Wastewater Treatment Systems* (OWTS Policy) includes a waiver of WDRs for smaller systems that meet design and siting conditions specified in the Policy. The OWTS Policy includes setback distances that are to be maintained from various types of surface water bodies. Setbacks allow for diffusion, dilution, and dispersion of an effluent plume before the affected ground water discharges to a surface stream. Denitrification of the effluent plume can also occur along the flow path between the wastewater treatment system disposal area to the surface-water body. Denitrification can occur due to site specific processes including: plant uptake of nutrients within the dispersal area, denitrification in the soil column as the effluent percolates to the water table, and denitrification in the riparian zone bordering the surface-water body.

Systems that do not qualify for the waiver must be regulated with WDRs. These systems are typically located at rural parks, schools, campgrounds, mobile home parks, roadside rest stops, small commercial or residential subdivisions, restaurants, resort hotels/lodges, small correctional facilities, temporary fire-fighting camps, and recreational vehicle (RV) dump locations, including RV parks. WDRs for these systems require some combination of setbacks from surface waters, higher levels of treatment, or dispersal systems with nitrogen uptake to protect interconnected surface water quality.

For systems that pose a potential threat to surface water quality due to their size or proximity to a surface water body, the Regional Board can and most likely will require the Report of Waste Discharge (RWD) to include a nitrate study. The purpose of the nitrate study is to provide the Regional Board with the information needed to establish discharge specifications for total nitrogen in effluent that will not cause the water quality objective for total nitrogen to be exceeded in any surface water body interconnected with receiving ground water. The nitrate study must utilize an acceptable mass balance method to evaluate if the proposed discharge will cause the water quality objectives for nitrate to be exceeded in ground water, and determine if the proposed discharge will adversely affect surface water quality. The nitrate study may also include, but not be limited to, an evaluation of following nitrogen fate and transport factors.

- Nitrogen uptake, if any, in the discharge area.
- Denitrification in the soil column of the discharge area.
- Concentration of nitrogen in the effluent when it reaches the ground water table.
- Effects of dilution of the effluent along the flow path to the surface water body.
- Effects of diffusion of the effluent along the flow path to the surface water body.
- Effects of nitrogen uptake/reduction by vegetation (e.g., within the root zone and by riparian vegetation) along the flow path to the surface water body.
- Travel time and distance from the point of discharge to the surface water body and riparian zone.
- Assimilative capacity, if any, in the ground water and surface water body.

Discharges to Ground Water from Agricultural and Nursery Operations

Use of fertilizer at agricultural operations can be a significant contributor of total nitrogen to surface waters via both shallow and deep groundwater pathways. The State Water Board convened an Agricultural Expert Panel to assess agricultural nitrate control programs and develop recommendations for its Irrigated Lands Regulatory Program to ensure protection of ground water quality. The Agricultural Expert Panel proposed a comprehensive regulatory program that focuses on minimizing loads of nitrates to ground water (ITRC, 2014). Key elements of the Agricultural Expert Panel's recommendations include: creation and

implementation of customized nitrogen/water management plans; trend monitoring of ground water nitrate concentrations; and development of a comprehensive educational and outreach program for different audiences (such as individuals who may need certification, managers of irrigation/nutrient plans, irrigators, and farmers/managers, etc).

WDRs for agricultural and nursery operations in the San Diego Region should require dischargers to implement appropriate management measures to ensure that their operations do not adversely affect ground water or surface water quality. Management measures may include but are not limited to the following:

- Develop and implement an effective irrigation water and nitrogen management plan that includes: an estimate of nitrogen required, agronomic rate of fertilizer application considering soil properties and crops nutrient requirements, estimate of nitrogen uptake/removal, the distribution and uniformity of the irrigation system, volume of water infiltration in a field, and actions taken to periodically assess and improve performance of the system. Increasing the water use efficiency will typically reduce the discharge volume and the total pollutant discharge loading to ground water. Discharges need to regularly inspect irrigation systems for leaks to ensure that excessive infiltration of runoff is not occurring.

- Convert paved or bare soil areas to vegetation that will retard runoff and increase storm water infiltration (wherever possible). The increased infiltration will help dilute total nitrogen concentrations in ground water.

- Group plants with similar water needs together to improve irrigation efficiency.

- Establish plant buffer zones between production areas and surface water bodies to effectively reduce nitrate in interconnected surface water.

- Install and use moisture sensors and automatic sprinklers for more accurate scheduling of irrigation.

- Improve efficiency of irrigation return flow conveyance systems and prevent leaks.

- Train employees on management measures, stormwater discharge prohibitions, WDR requirements, and appropriate irrigation and fertilizer application practices.

Discharges to Ground Water from Animal Feeding Operations

Discharges from animal feeding operations contain nitrogen compounds and other pollutants that can percolate to ground water and affect interconnected surface waters. Discharges from animal feeding operations may include wash water and waste from animal activities, and storm water runoff which can also transport pollutants from animal operations to ground water.

There are statewide minimum standards for discharges of animal wastes established in the California Code of Regulations[3]. These minimum standards are included in waivers and WDRs for animal feeding operation. If needed, the Regional Board will also prescribe more stringent requirements in individual WDRs for discharges from animal feeding operations that potentially pose a higher threat to surface water quality.

Landscape Irrigation with Recycled Water

Irrigating landscapes with recycled water is critical to developing a local, sustainable water supply for the Region. Recycled water that percolates past the landscape root zone, however, can be a source of nitrate to ground water and interconnected surface water. Applying recycled water and fertilizer in amounts and at rates needed by the landscape in end use areas will protect groundwater and interconnected surface water from excessive nitrogen loading.

Permits issued by the Regional Board for projects that include landscape irrigation with recycled water typically require the recycled water producer to develop rules and

[3] Title 27, Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1.

regulations that must be implemented in the end use areas for the protection of public health and the environment. The permits also stipulate minimum requirements for the rules and regulations. Practices to ensure that recycled water and fertilizer are applied at agronomic rates in end use areas should be included in these minimum requirements for the rules and regulations. Below are some example practices that lead to the application of recycled water and fertilizer at agronomic rates.

- Monitor nutrient levels in recycled water supplies and notify end users of the nutrient value of recycled water.
- Use fertilizers appropriately taking into account the nutrient levels in the recycled water.
- Avoid overwatering of landscapes and runoff.
- Educate and train site supervisors on how to (1) minimize the potential for runoff or over-irrigation; and (2) take into account the nutrient value of the recycled water.
- Conduct periodic inspections of end use areas.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Waste Discharge Requirements that implement federal National Pollutant Discharge Elimination System (NPDES) regulations ("NPDES requirements" or "NPDES permits") are issued to regulate discharges of "pollutants" from point sources to "waters of the United States" to ensure that the quality and quantity of such discharges does not adversely affect surface water quality or beneficial uses. The phrase "waters of the United States" is defined in Title 40, CFR, Parts 122.2, 230.3 and 232.3. The definition of "waters of the United States" emphasizes protection of a broad range of surface waters, including interstate and intrastate lakes, creeks, streams, wetlands, rivers, bays, and ocean waters. Ephemeral creeks, and streams are considered to be "waters of the United States" for the purpose of issuing NPDES permits. In this Basin Plan the term "waters of the United States" is used interchangeably with the term "surface waters".

NPDES permits are authorized by section 402 of the Clean Water Act and section 13370 of the Water Code. Permit conditions and the issuance process are described in Title 40, CFR, Part 122 (40 CFR 122) and CCR, Title 23, Chapters 3 and 4. The responsibility for issuing NPDES permits in California has been delegated to the regional boards, subject to review and approval by the Regional Administrator (USEPA Region IX, San Francisco). NPDES permits issued by the Regional Board are also "waste discharge requirements" issued under the authority of the Water Code, Chapter 5.5.

A standard NPDES permit typically includes the following elements:

Findings
Official description of the facility, processes, type and quantity of wastes, existing NPDES permits, enforcement actions, public notice and applicable USEPA effluent guidelines and standards, Water Quality Control Plans, beneficial uses and water quality objectives;

Effluent Limitations
Narrative and numerical limits for effluent and discharge prohibitions;

Receiving Water Limitations
Narrative and numerical objectives for the receiving waters;

Provisions
Standard provisions required by the Regional Board and by state and federal law, expiration date of permit;

Compliance Schedules
Time schedules for completion of activities to achieve compliance with permit conditions;

Pretreatment Requirements
Standard pretreatment requirements for municipal facilities (see below);

Sludge Requirements
Sludge monitoring and control requirements, if necessary; and a

Monitoring and Reporting Program
Specific locations of monitoring stations and sampling frequency for all constituents limited in the permit, including flow, and other constituents that may be required by the Regional Board.

The NPDES permit regulates discharges of wastes for the purpose of limiting the quantity of pollutants and volume of waste discharged to surface waters. NPDES permits contain prerequisite conditions which must be met by dischargers to ensure protection of beneficial uses of the receiving water as described in the Regional Board's Water Quality Control Plan, Statewide Water Quality Control Plans, and other water quality control policies.

Any person proposing to discharge pollutants into surface waters must submit a report of waste discharge in application for an NPDES permit at least 180-days in advance of the date on which it is desired to commence the proposed discharge. Certain discharges do not require an NPDES permit. The following discharges are exempt from the requirements for NPDES coverage pursuant to 40 CFR 122.3:

- Any discharge of sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes, or any other discharge incidental to the normal operation of a vessel;

- Discharges of dredged or fill material into waters of the United States which are regulated under the Clean Water Act, section 404;

- The introduction of sewage, industrial wastes, or other pollutants into publicly owned treatment, any discharge in compliance with the instructions of an On-Scene Coordinator pursuant to 40 CFR 300 (The National Oil and Hazardous Substances Pollution Contingency Plan) or 33 CFR 153.10(e) (Pollution by Oil and Hazardous Substances);

- Any introduction of pollutants from nonpoint source agricultural and silvicultural activities, including storm water runoff from orchards, cultivated crops, pastures, range lands, and forest lands;

- Return flows from irrigated agriculture; and

- Discharges into a privately owned treatment works.

NPDES permits are issued for a term of five years or less. The terms and conditions of the permit are regularly updated as necessary. NPDES permits can be revoked for cause by the Regional Board.

The Water Code, Division 7, Chapter 5.5, Article 6 authorizes the Regional Board to issue NPDES permits, review self-monitoring reports submitted by the discharger, and perform independent compliance checking. The Regional Board is authorized to take a variety of enforcement actions to obtain compliance with an NPDES permit. Enforcement of NPDES permits is done through the issuance of cleanup and abatement orders, cease and desist orders, administrative civil liability orders, and court action.

The Regional Board will consider the establishment of mixing zones for inland surface waters and enclosed bays and estuaries on a case-by-case basis. Criteria to be established for mixing zones will be specified in the waste discharge requirements established for the discharge.

In addition to regulating discharges of wastewater to surface waters, NPDES permits also require municipal sewage treatment plants having a design capacity greater than 5 MGD to conduct pretreatment programs. Smaller municipal treatment systems may be required to conduct pretreatment programs if there are significant industrial users of their systems. Pretreatment is discussed in more detail later in this chapter.

COMPLIANCE TIME SCHEDULES

The Regional Board may establish compliance time schedules in NPDES requirements where the Regional Board determines that, for an existing discharger[4], achieving immediate compliance in a discharge with new or more stringent water quality based effluent limitations or receiving water limitations that implement new, revised, or newly interpreted water quality objectives[5], and/or that resulted from new knowledge on the characteristics and impacts of the discharge is infeasible[6]. New knowledge about the characteristics and impacts of the discharge that can result in new or more stringent WQBELs or receiving water limitations include, but are not limited to, the following situations:

- Pollutants previously unregulated in an existing discharge are newly regulated because the new information indicates a reasonable potential for the discharge to exceed an applicable water quality objective in the receiving water;

- Pollutants are newly detected in an existing discharge due to improved analytical techniques;

- The point of compliance for a receiving water limitation is changed; and

- The dilution allowance for an existing discharge is changed.

Compliance time schedules are authorized by this provision only for new or more stringent effluent and/or receiving water limitations that implement water quality objectives issued, revised, or newly interpreted after November 9, 2005, or that resulted from new knowledge on the characteristics and impacts of the discharge for any pollutant for which a water quality objective was issued, revised, or newly interpreted after July 1, 1977.

The compliance time schedule shall include a time schedule for completing or achieving specific actions (including interim effluent limitations) that demonstrate reasonable progress toward compliance with water quality based effluent limitations or receiving water limitations and, thereby, attainment of water quality objectives. The compliance time schedule shall contain a final compliance date, based on the shortest practicable time (determined by the Regional Board at a public hearing after considering the factors identified below) required to achieve compliance. In addition, in all cases, the findings of the NPDES requirements shall specify the final effluent limitations.

Compliance time schedules in NPDES requirements shall be as short as practicable but in no case exceed five years from the date of order issuance, reissuance, or modification. The Regional Board may grant an additional extension of up to five years, but only where the discharger has demonstrated satisfactory progress toward achieving compliance with applicable water quality based effluent limitations and receiving water limitations and the Regional Board concurs with the demonstration. In no case, shall a compliance time schedule for these discharges exceed ten years from the date of adoption, revision, or interpretation of the applicable water quality objective, whichever is the shorter period of time.

Nothing in this provision limits the Regional Board's authority (1) to develop alternate implementation provisions for water quality objectives adopted or revised in the future, or (2) to rely on alternate implementation provisions authorized pursuant to State Board policies for water quality control, State

[4] "Existing discharger" means any discharger that is not a new discharger. An existing discharger includes an increasing discharger (i.e., an existing facility with treatment systems in place for its current discharge that is or will be expanding, upgrading, or modifying its existing permitted discharge after a new, revised, or newly interpreted water quality objective becomes applicable). A "new discharger" is defined as any building, structure, facility or installation from which there is or may be a "discharge of pollutants" (as defined in 40 CFR section 122.2) to surface water of the San Diego Region, the construction of which commences after a new, revised, or newly interpreted water quality objective becomes applicable.

[5] "New, revised, or newly interpreted water quality objectives" means objectives as defined in section 13050(h) of Porter-Cologne, issued, revised or newly interpreted after November 9, 2005. Objectives may be narrative or numeric.

[6] "Infeasible" means that discharger compliance cannot be accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors.

regulations, or federal regulations. Compliance time schedules to meet WQBELs and receiving water limitations that implement California Toxics Rule criteria will be limited by the provisions of the State Board "*Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*."

To document the need for and justify the duration of any such compliance time schedule, a discharger must submit the following information, at a minimum: (1) the results of a diligent effort to quantify pollutant levels in the discharge and the sources of the pollutant(s) in the waste stream; (2) identification of the sources of the pollutant in the waste stream, documentation of source control efforts currently underway or completed, including compliance with any pollution prevention programs that have been established, and a proposed schedule for additional source control measures or waste treatment needed to meet the WQBELs and/or receiving water limitations; (3) evidence that the discharge quality is the highest that can reasonably be achieved until final compliance is attained; and (4) a demonstration that the proposed schedule is as short as practicable, taking into account economic, technical and other relevant factors. The need for additional information and analyses will be determined by the Regional Board on a case-by-case basis. The need for and justification of the duration of any such compliance time schedule will be subject to Regional Board review and approval.

CONDITIONAL WAIVERS OF WASTE DISCHARGE REQUIREMENTS

The Regional Board may waive issuance of waste discharge requirements and/or the requirement to file reports of waste discharge for a specific discharge or specific types of discharge pursuant to Water Code section 13269 if such waiver is determined to be consistent with the Basin Plan and in the public interest.

The waiver of adoption of waste discharge requirements is not applicable to discharges subject to federal NPDES regulations. The federal Clean Water Act does not provide for a waiver of the need to obtain an NPDES permit for point source discharges of pollutants to surface waters.

Amendments to Water Code section 13269, effective January 1, 2003 provided that waivers may not exceed five years duration and must be conditional. Under these amendments the Regional Boards were required to:

- Renew waivers every five years;
- Review the terms, conditions, and effectiveness of each waiver at a public hearing;
- Determine if general or individual waste discharge requirements should be issued for ongoing discharges where waivers have been terminated; and
- Require compliance with waiver conditions.

A waiver of waste discharge requirements is conditional and may be terminated at any time by the Regional Board for any specific discharge or any specific type of discharge. A conditional waiver is not required to be used by the Regional Board. Even if a discharger complies with all the conditions of a conditional waiver, the Regional Board may still choose to regulate any specific discharge with waste discharge requirements.

The Regional Board has determined that a waiver of adoption of waste discharge requirements for a specific type of discharge would not be against the public interest under one or more of the following circumstances:

- The type of discharge is effectively regulated by other public agencies; or
- The type of discharge does not adversely affect the quality or the beneficial uses of the waters of the state; or

- The type of discharge is not readily amenable to regulation through adoption of waste discharge requirements but warrants Regional Board oversight to insure compliance with mandated conditions.

The Regional Board conditionally waives the adoption of waste discharge requirements for certain specific types of discharges through the issuance of an Order. The Waiver Order describes the specific types of discharges subject to a waiver, and the conditions the discharge must meet to be eligible for the waiver. The Regional Board's current Waiver Order may be viewed or downloaded by visiting the conditional waiver website (http://www.waterboards.ca.gov/sandiego/), or contacting Regional Board Staff.

In general the discharges eligible for a waiver must comply with the following conditions:

- The discharge shall not create a nuisance or pollution as defined in the Water Code; and

- The discharge shall not cause a violation of any applicable water quality standard for the receiving waters adopted by the Regional Board, or the State Water Resources Control Board, as required by the Clean Water Act; and

- The discharge of any substance in concentrations toxic to animal or plant life is prohibited.

In addition, the discharges must satisfy the general and specific conditions described in each conditional waiver.

WATER RECLAMATION REQUIREMENTS

Reclaimed water is water that, as a result of treatment, is suitable for a direct beneficial use or a controlled use that would otherwise not occur. Reclaimed water uses in the Region include, but are not limited to, landscape irrigation, crop irrigation, freeway landscape irrigation, ground water recharge, soil compaction at construction sites, and for recreational lakes.

The Regional Board may prescribe water reclamation requirements to reclaimed water producers and those governing the use of reclaimed water, which the Regional Board has determined are necessary to protect public health, safety, and welfare pursuant to Water Code, Division 7, Chapter 7, sections 13500-13556 "Water Reclamation Law". Water Reclamation Law provides that no person shall reclaim water or use reclaimed water for any purpose subject to Title 22 criteria until water reclamation requirements have been established or the Regional Board determines no requirements are necessary. The Regional Board may not deny issuance of water reclamation requirements to a project which violates only a salinity standard in the Basin Plan.

In lieu of issuing water reclamation requirements pursuant to Water Code, section 13523, for each user of reclaimed water, the Regional Board establishes master reclamation requirements as part of the waste discharge requirements which are issued to a supplier or distributor, or both, of reclaimed water. Reclamation requirements must include the following components:

- A requirement that the permittee comply with the uniform statewide reclamation criteria established pursuant to section 13521. Permit conditions for a use of reclaimed water not addressed by the uniform statewide reclamation criteria shall be considered on a case-by-case basis;

- A requirement that the permittee establish and enforce rules or regulations for reclaimed water users, governing the design and construction of reclaimed water use facilities and the use of reclaimed water, in accordance with the uniform statewide reclamation criteria established pursuant to section 13521;

- A requirement that the permittee submit a quarterly report summarizing reclaimed water use, including the total amount of reclaimed water supplied, the total number of reclaimed water use sites, and the locations of those sites, including the names of the hydrologic areas underlying the reclaimed water use sites;

- A requirement that the permittee conduct periodic inspections of the facilities of the reclaimed water users to monitor compliance by users with the uniform statewide reclamation criteria and the requirements of the master reclamation permit; and

- Any other requirements determined to be appropriate by the Regional Board.

The "Rules and Regulations for Reclaimed Water Users" that must be issued and enforced by the permittee govern the design and construction of reclaimed water use facilities and the use of reclaimed water. The rules and regulations must have the following elements:

- Provisions implementing Title 22, Division 4, Chapter 3, Wastewater Reclamation Criteria; and Title 17, Division 1, Chapter 5, Group 4, Articles 1 & 2, of the CCR;

- Provisions implementing the State Board Division of Drinking Water (State Board DDW) "Guidelines For Use of Reclaimed Water and Guidelines for Use of Reclaimed Water for Construction Purposes" and measures that are deemed necessary for protection of public health, such as the "American Water Works Association (AWWA) California/Nevada Section, Guidelines for the Distribution of Non-Potable Water" or alternate measures, acceptable to State Board DDW, providing equivalent protection of public health;

- Provisions authorizing the Regional Board, the discharger/producer, or an authorized representative of these parties, upon presentation of proper credentials, to inspect the facilities of any reclaimed water user to ascertain whether the user is complying with the discharger/producer's rules and regulations;

- Provision for written notification, in a timely manner, to the discharger/producer by the reclaimed water user of any material change or proposed change in the character of the use of reclaimed water;

- Provision for submission of a preconstruction report to the discharger/producer by the reclaimed water user in order to enable the discharger/producer to determine whether the user will be in compliance with the discharger/producer's rules and regulations;

- Provision requiring reclaimed water users to designate a reclaimed water supervisor responsible for the reclaimed water system at each use area under the user's control. Reclaimed water supervisors should be responsible for the installation, operation, and maintenance of the irrigation system, enforcement of the discharger/producer's reclaimed water user rules and regulations, prevention of potential hazards, and maintenance of the reclaimed water distribution system plans in "as built" form;

- Provision authorizing the discharger/producer to cease supplying reclaimed water to any person who uses, transports, or stores such water in violation of the discharger/producer's rules and regulations;

- Provision requiring notification and concurrence of the State Board DDW and the local county health department for new reclaimed water users. The notification of the county health department shall include a site distribution plan for new and retrofit facilities and a cross-connection control inspection plan for sites containing both potable and reclaimed water distribution lines;

- Provision requiring all windblown spray and surface runoff of reclaimed water applied for irrigation onto property not owned or controlled by the discharger or reclaimed water user to be prevented by implementation of BMPs;

- Provision requiring all reclaimed water storage facilities owned and/or operated by reclaimed water users to be protected against erosion, overland runoff, and other impacts resulting from a 100-year frequency storm, 24 hour storm. This requirement may be waived if the discharger submits information demonstrating that releases from the storage facilities caused by storm events of less than 100-year frequency will not cause violation of the Basin Plan water quality standards;

- Provision requiring all reclaimed water storage facilities owned and/or operated by reclaimed water users to be protected against 100-year frequency peak stream flows as defined by the local flood control agency. However, if information is made available to the Regional Board which shows that a reclaimed water storage facility presents no potential impairment to the beneficial uses, the Regional Board may exempt requirements for 100-year flood protection on a case-by-case basis;

- Provision for notification to reclaimed water users that the Regional Board may initiate enforcement action against any reclaimed water user who discharges reclaimed water in violation of any applicable discharge prohibitions prescribed by the Regional Board or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in Water Code section 13050; and

- Provision for notification to reclaimed water users that the Regional Board may initiate enforcement action against the discharger/producer, which may result in the termination of the reclaimed water supply, if any person uses, transports, or stores such water in violation of the discharger/ producer's rules and regulations or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in Water Code section 13050.

WASTE DISCHARGE PROHIBITIONS

Water Code section 13243 provides that a Regional Board, in a water quality control plan, may specify certain conditions or areas where the discharge of waste, or certain types of waste is not permitted. The following discharge prohibitions are applicable to any person, as defined by section 13050(c) of the Water Code, who is a citizen, domiciliary, or political agency or entity of California whose activities in California could affect the quality of waters of the state within the boundaries of the San Diego Region.

(1) The discharge of waste to waters of the state in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in Water Code section 13050, is prohibited.

(2) The discharge of waste to land, except as authorized by WDRs or the terms described in Water Code section 13264 is prohibited.

(3) The discharge of pollutants or dredged or fill material to waters of the United States except as authorized by an NPDES permit or a dredged or fill material permit (subject to the exemption described in Water Code section 13376) is prohibited.

(4) Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this Regional Board issues a NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State Board DDW and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.

(5) The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the Regional Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.

(6) The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the Regional Board.

(7) The dumping, deposition, or discharge of waste directly into waters of the state, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the Regional Board.

(8) Any discharge to a storm water conveyance system that is not composed entirely of "storm water" is prohibited unless authorized by the Regional Board. [The federal regulations, 40 CFR 122.26 (b) (13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR 122.26 (b) (2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities.] [Section 122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].

(9) The unauthorized discharge of treated or untreated sewage to waters of the state or to a storm water conveyance system is prohibited.

(10) The discharge of industrial wastes to conventional septic tank/subsurface disposal systems, except as authorized by the terms described in Water Code section 13264, is prohibited.

(11) The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the state is prohibited.

(12) The discharge of any radiological, chemical, or biological warfare agent into waters of the state is prohibited.

(13) The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the Regional Board.

(14) The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the state or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

(15) The discharge of treated or untreated sewage from vessels to Mission Bay, Oceanside Harbor, Dana Point Harbor, or other small boat harbors is prohibited.

(16) The discharge of untreated sewage from vessels to San Diego Bay is prohibited.

(17) The discharge of treated sewage from vessels to portions of San Diego Bay that are less than 30 feet deep at MLLW is prohibited.

(18) The discharge of treated sewage from vessels, which do not have a properly functioning USCG certified Type I or Type II marine sanitation device, to portions of San Diego Bay that are greater than 30 feet deep at MLLW is prohibited.

WATER QUALITY CERTIFICATION (SECTION 401)

In addition to the issuance of NPDES permits or WDRs, the Regional Board acts to protect the quality of surface waters through water quality certification pursuant to section 401 of the Clean Water Act. Section 401 requires that any person applying for a federal permit or license which may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions.

No license or permit may be issued by a federal agency until certification required by section 401 has been granted or waived by the state. Further, no license or permit may be issued if certification has been denied by the state. The activity must also meet the requirements of the Coastal Nonpoint Pollution Control Program required under the Coastal Zone Act Reauthorization Amendments (CZARA).

The following permits or licenses are subject to section 401 of the Clean Water Act:

- NPDES permits issued by the USEPA under section 402 of the Clean Water Act;
- Clean Water Act, section 404 permits issued by the United States Army Corps of Engineers (USACOE);
- Permits issued under sections 9 and 10 of the Rivers and Harbors Act (for activities which may affect navigation);
- Licenses for hydroelectric power plants issued by the federal Energy Regulatory Commission under the Federal Power Act; and
- Licenses issued by the Nuclear Regulatory Commission.

The Regional Board's water quality certification activities have focused on applications for permits for the discharge of dredged or fill material to surface waters. These permits are issued by the USACOE (Clean Water Act, section 404 permits) subject to any conditions imposed by the Regional Board pursuant to section 401.

The section 404 program is administered at the federal level by the USACOE and the USEPA. The US Fish and Wildlife Service and the National Marine Fisheries Service have important advisory roles. The USACOE has the primary responsibility for the permit program and is authorized, after notice and opportunity for a public hearing, to issue permits for the discharge of dredged or fill material. USEPA develops the regulations under which permits may be granted.

The Regional Board evaluates the projects for which section 404 permits are requested and determines whether to deny water quality certification, issue a certification with or without conditions, or waive the certification pursuant to regulations in Article 4, Title 23. Regional Board certification is dependent upon assurance that the project will not reduce water quality below applicable standards as defined in the Clean Water Act (i.e., the water quality objectives established and the beneficial uses which have been designated for the surface waters). A certification is usually denied if the proposed activity does not meet water quality standards. If the activity may violate standards, a conditional certification is given. If the activity does not violate any standards, a section 401 waiver may be given. The Executive Director of the State Board may issue a water quality certification after review of the application, all relevant data, and taking into consideration any recommendations from the Regional Board.

SELF MONITORING, COMPLIANCE MONITORING, AND INSPECTIONS

Compliance with NPDES permits and WDRs is generally self-monitored by each individual discharger, with oversight by the Regional Board. Dischargers are required to report and take necessary corrective actions when they discover that they are not in compliance with the permit effluent limits. The Regional Board conducts periodic inspections and compliance monitoring and, as necessary, will take enforcement actions to ensure compliance.

Self Monitoring Program

WDRs and NPDES permits issued by the Regional Board include requirements for the discharger to collect samples of the waste discharge. In some cases, the receiving waters must also be monitored by the dischargers. The results of the "self monitoring" programs are reported to the Board and are used to determine compliance with the WDRs. (Additional information on this topic is presented in Chapter 6, Surveillance and Monitoring).

Compliance Monitoring and Inspections

Regional Board staff can conduct unannounced inspections (including collection of samples) to determine the status of compliance with NPDES permit or WDRs / WRRs requirements. All major dischargers are inspected at least once a year. (Additional information on this topic is presented in Chapter 6, Surveillance and Monitoring).

ENFORCEMENT

The Regional Board is committed to the maintenance of a strong and uniform enforcement program. Appropriate and timely response to instances of noncompliance with Regional Board NPDES permits, WDRs, waste discharge prohibitions and enforcement orders is necessary to ensure protection of the quality of surface and ground waters in the Region.

Regional Board response to noncompliance incidents include the establishment of a specific time frame for compliance and or correction. All dischargers are expected to correct violations in the shortest time frame possible. With the exception of special circumstances, failure to terminate, comply, or complete corrective actions on a noncompliance incident in a specified time frame will result in the escalation of the matter to a higher level enforcement action.

Regional Board responses to instances of violation correspond to the following enforcement action level sequence, unless circumstances warrant a more expeditious escalation to a higher level.

LEVEL A ENFORCEMENT ACTION

In this action level the Regional Board staff requests the discharger, by telephone or letter, to correct the problem and prevent recurrence. Regional Board staff may also request the discharger to correct the problem during routine compliance inspections.

LEVEL B ENFORCEMENT ACTION

In this action level the Regional Board Executive Officer issues a notice of violation to the discharger for failure to comply with a compliance schedule for corrective action.

LEVEL C ENFORCEMENT ACTION

In this action level the Regional Board may take a variety of formal higher level enforcement actions. The Water Code provides the Regional Board with a number of enforcement remedies for violations of requirements. These remedies include time schedules, cease and desist orders, cleanup and abatement orders, and administrative civil liability orders.

Time Schedule Orders

When a discharge is taking place or threatening to occur that will cause a violation of a Regional or State Board requirement, a discharger may be required to submit a detailed list of specific actions the discharger will take to correct or prevent the violation. (Water Code section 13300). These schedules may also be required when the waste collection, treatment, or disposal facility of a discharger are approaching capacity. Time schedule orders are adopted by the Board after a public hearing or issued by the Executive Officer pursuant to authority delegated by the Regional Board.

Cleanup and Abatement Orders

The Regional Board may issue a cleanup and abatement order to any person who has discharged, is discharging or is threatening to discharge wastes that will result in a violation of WDRs or other order or prohibition of the State or Regional Board. The Regional Board may also issue a cleanup and abatement order to any person who discharges or has discharged waste to waters of the state and causes, or threatens to cause, a condition of pollution or nuisance. The cleanup and abatement order may require the waste discharger(s) to cleanup and abate the effects of the discharge or to take other appropriate remedial action (Water Code section 13304). A cleanup and abatement order is issued if a pollutant can actually be cleaned up or the pollutant effects abated. The Regional Board has delegated issuance of these orders to the Executive Officer. Cleanup and abatement orders do not require Board adoption, but may be brought before the Regional Board for consideration at the request of the discharger.

Cease and Desist Orders

If discharge prohibitions or requirements of the State Board or Regional Board are violated or threatened, the Regional Board may adopt a cease and desist order (Water Code section 13301) requiring the discharger to comply forthwith, to comply in accordance with a time schedule, or if the violation is threatened, to take appropriate remedial or preventive action. Cease and desist orders may restrict or prohibit the volume, type or concentration of waste added to community sewer systems, if existing or threatened violations of waste discharge requirements occur. Cease and desist orders may specify interim time schedules as well as limitations that must be complied with until full compliance is achieved. Cease and desist orders are adopted by the Regional Board after a public hearing.

Administrative Civil Liability

Administrative civil liability complaints and orders may be issued by the Regional Board for certain categories of violations. In this process the Regional Board may impose monetary penalties on dischargers. The Regional Board (or the Executive Officer) may issue Administrative Civil Liability complaints (ACLs) to persons who intentionally or negligently violate enforcement orders of the Board, or who intentionally or negligently discharge wastes in violation of any order, prohibition, or requirement of the Board where the discharge causes conditions of pollution or nuisance (Water Code section 13350). ACLs may also be issued in cases where a person fails to submit reports requested by the Board (Water Code sections 13261 and 13268) or when a person discharges waste without first having filed the appropriate RWD (Water Code section 13265). ACLs may be issued pursuant to Water Code section 13385 for violations of any Regional Board prohibition or requirement implementing specified sections of the Clean Water Act, or any requirement in an approved pretreatment program. Amounts of administrative civil liability that the Board can impose range up to $10,000 per day of violation. The Water Code also provides that a superior court may impose civil liability assessments in substantially higher amounts. The Regional Board may conduct a hearing if a discharger contests the imposition of the Administrative Civil Liability.

LEVEL D ENFORCEMENT ACTION

Referral to the Attorney General or District Attorney

Judicial Civil Liability
The Water Code provides that a Regional Board may request the State Attorney General to petition a superior court to enforce orders and complaints issued by the Board and impose civil monetary remedies. The monetary remedies may be in excess of the administrative civil liability penalties that the Regional Board is authorized to impose. The court imposed fines and or imprisonment vary depending upon the seriousness of the violation.

Injunctive Relief
The Regional Board may also request that the Attorney General seek injunctive relief in specific situations, such as violations of cease and desist orders or discharges which cause or threaten to cause a nuisance or pollution that could result in a public health emergency (Water Code section 13331 and section 13340).

Criminal Penalties
The Regional Board may also refer violations to the District Attorney to seek criminal penalties by judicial action in the county where the discharge occurred. The court imposed fines and or imprisonment vary depending upon the seriousness of the violation.

SELECTION OF APPROPRIATE ENFORCEMENT ACTION

The following criteria are considered by the Regional Board in selecting the appropriate enforcement action in response to an incident of noncompliance:

- Degree of water quality impairment and/or threat to the public health including the degree of toxicity of the discharge;
- Past history of discharge violations;
- Degree of cooperation or recalcitrance shown by the discharger;
- Culpability of the discharger;
- Financial resources of the discharger;
- Whether the circumstances leading to the noncompliance have been corrected;
- Whether the discharge violations are likely to continue in the future;
- Whether the discharge can be cleaned up;
- The need to take immediate cleanup action;
- Any economic benefit realized by the discharger as a result of the noncompliance; and
- Other actions as justice may require.

STATE WATER RESOURCES CONTROL BOARD PLANS AND POLICIES

The State Water Resources Control Board (State Board) has adopted a number of plans and policies for statewide water quality management. The Regional Board implements these plans through WDRs, NPDES permits, and any necessary enforcement actions. These policies are explained in more detail in Chapter 5, Plans and Policies.

HAZARDOUS WASTE SOURCE REDUCTION

The Department of Toxic Substance Control (DTSC) has adopted regulations regarding hazardous waste source reduction pursuant to the Hazardous Waste Source Reduction and Management Review Act of 1989 (Article 11.9, starting with section 25244.12 of the Health and Safety Code). These regulations are contained in sections 67100.1 through sections 67100.14 of Title 22 of the CCR. These regulations require that each generator of hazardous or extremely hazardous waste within the limits set by the regulations conduct a source reduction evaluation review and plan, plan summary, hazardous waste management performance report, and report summary on or before September 1, 1991 and every four

years thereafter. Every generator is required to retain a copy of the current review and plan, plan summary, report, report summary, progress report, and compliance checklist at each site, at a public library, or at a local governmental agency. The Regional Board supports these efforts of hazardous waste source reduction because any successes achieved will mean less hazardous waste which could pollute California's waters.

MUNICIPAL AND DOMESTIC WASTEWATER

Municipal wastewater in the San Diego Region consists primarily of domestic sewage and minor quantities of industrial wastes in some of the more highly urbanized and industrialized areas. Facilities to control municipal wastewater include wastewater collection systems, pumping stations, transport pipelines, treatment plants, storage ponds and ocean outfalls. These facilities are sometimes collectively referred to by the term Publicly Owned Treatment Works (POTW).

Municipal wastewater treatment in the San Diego Region is generally at the secondary treatment level. Secondary treatment results in the removal of more than 85 percent of the biochemical oxygen demand and suspended solids found in municipal wastewater. Tertiary (advanced) wastewater treatment is used at some treatment plants for additional removal of pollutants to reclaim wastewater for beneficial reuse. Effluent from the wastewater treatment plants is disposed of by various means including:

- Discharge to the Pacific Ocean via long deep ocean outfalls;
- Percolation into the soil; and
- Reclamation and reuse in conformance with uniform reclamation criteria (CCR, Title 22, Division 4, Chapter 3).

Sludge disposal at most major municipal wastewater treatment plants in the Region consists of aerobic or anaerobic digestion and land disposal. Dried sludge is either disposed of at landfills or made available to the public as a soil conditioner. Some treatment plants, located upstream of major regional wastewater treatment plants discharge sludge to the sewage collection system for treatment at a "downstream" regional wastewater plant. The term municipal sewage treatment plant and Publicly Owned Treatment Works are used interchangeably in the Basin Plan.

The Regional Board regulates wastewater discharges from municipal wastewater treatment plants through either the issuance of NPDES permits where the discharge is to surface waters or through WDRs where the discharge is to land.

Discharges of wastewater to surface water must meet the effluent limitations prescribed in the NPDES permit issued by the Regional Board. Effluent limitations are based on the following criteria:

- Secondary treatment effluent limitations defined by USEPA contained in 40 CFR 133, unless a waiver to the secondary treatment standards is obtained (more stringent effluent limitations than secondary treatment may be imposed by the Regional Board if necessary);
- Applicable water quality objectives and beneficial uses contained in the Basin Plan and State Board Water Quality Control Plans;
- Applicable public health protection standards for total and fecal coliform;
- Assimilative capacity of the receiving water;
- The terms and conditions of the federal Antidegradation Policy (40 CFR 131.12) and the State Antidegradation Policy (Resolution No. 68-16) (See Chapter 3);
- Anti-backsliding provisions described in Clean Water Act section 404; and
- Land disposal or recycling of sludge as a soil amendment.

Discharges of wastewater onto land must meet the effluent limitations in the waste discharge requirements prescribed by the Regional Board through the issuance of WDRs. The WDRs contain effluent limitations based on the following criteria:

- The treatment capability of the treatment process employed by the dischargers;
- Applicable water quality objectives and beneficial uses contained in the Basin Plan;
- Applicable public health protection standards for total and fecal coliform;
- Assimilative capacity of the receiving water;
- The terms and conditions of the State Antidegradation Policy - Resolution No. 68-16 (See Chapter 3); and
- Land disposal or recycling of sludge as a soil amendment.

CLEAN WATER GRANTS AND LOANS

From 1972 until 1988 the State Board assisted the USEPA in administering the multibillion dollar Clean Water Grants Program in California to finance the construction of municipal wastewater treatment facilities. This program ended in 1988. The Clean Water Act provides for the creation of a State Revolving Fund (SRF) Loan Program capitalized in part by federal funds. The Clean Water Act authorizes loan funding for construction of Publicly Owned Treatment Works (POTWs), for implementation of a nonpoint source pollution control management program, and for the development and implementation of an estuary conservation and management program. The State Board converted the Clean Water Grant Program to a Grants and Loans program on October 1, 1988, and ultimately replaced this completely with the State Revolving Fund Loan Program on June 30, 1989.

ONSITE WASTEWATER TREATMENT SYSTEMS

Some areas in the Region rely on onsite wastewater treatment systems (OWTS) for subsurface disposal of domestic sewage. OWTS are used to treat domestic wastewater from residences and commercial and industrial establishments that are not connected to community sewer systems or municipal wastewater treatment plants. Although, OWTS typically serve individual residences, larger systems are suitable for commercial facilities or communities. When properly designed, sited, operated, and maintained, OWTS treat domestic wastewater to reduce its polluting impacts on the environment and to protect public health. The most common type of OWTS is the septic tank-leach field disposal system. Seepage pits are sometimes used when site conditions are not suitable for leachfields.

The purpose of a septic tank system is to treat household wastes so that the treated effluent will readily percolate into the soil for final treatment. Treatment of the waste is initially achieved by the removal of solids through settling and decomposition of some of the soluble organic chemicals 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 septic systems will not function properly and can result in pollution of surface or ground waters. Septic tank systems used in undersized lots or unsuitable soils are subject to failure, and can lead to untreated or poorly treated sewage surfacing into yards, roadside ditches, and surface waters, or seeping into ground water, thus creating a public nuisance and health hazard. Even well-functioning septic systems can pollute ground water under adverse conditions.

Conventional septic tank-leach field or seepage pit systems may be infeasible in some sites due to unfavorable site-specific soil or ground water conditions, such as, shallow soils, high ground water elevation, steep slopes, rocky soils, etc. In such instances, advanced or alternative OWTS may be appropriate. Examples of advanced or

alternative OWTS include mound systems, evapotranspiration systems, evapotranspiration/infiltration systems, small in-house package treatment facilities, media filters, aerobic treatment units, disinfection units, and other innovative approaches.

Advanced or alternative OWTS provide additional removal of pollutants such as pathogens, organics, suspended solids, oil and grease, and nitrogen found in wastewater. Several of these treatment systems have been certified by the National Science Foundation as being able to achieve federal treatment standards for removal of biodegradable organics and total suspended solids. Some have also been certified to achieve at least a fifty percent removal rate for nitrogen. Subsurface drip dispersal systems are often used for dispersal of effluent from advanced or alternative OWTS. Subsurface drip dispersal systems are a pressure-dosed method of effluent dispersal capable of delivering small, precise volumes of wastewater effluent to the soil. The drip lines are normally flexible polyethylene tubes that are about one-half inch in diameter. The drip lines are typically installed in shallow trenches about 2 feet apart and buried 6-12 inches beneath the soil. Because of the unique construction of subsurface drip dispersal systems, they may cause less site disruption during installation, and are adaptable to irregularly shaped lots, or lots with other difficult site constraints. Subsurface drip dispersal systems apply wastewater at the root zone of the soil, which allows for maximum uptake of nutrients in the treated wastewater by vegetation in the disposal area.

Nitrogen compounds, which are typically present in treated effluent from septic systems, are highly soluble and stable in aqueous environments. When not denitrified by bacteria or assimilated into organic growth in the unsaturated zone, these nitrogen compounds are easily transported to ground water. 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. Both the federal drinking water standard of 10 mg/l nitrogen (or nitrate + nitrite) and the equivalent state drinking water standard of 45 mg/l nitrate (expressed as NO_3) is based on this relationship.

Management Principles for OWTS

The following management principles are designed to ensure that the goals of the Basin Plan are implemented.

- OWTS must be designed, constructed, and installed so as to be capable of preventing pollution or contamination of the waters of the State or creating nuisance for the duration of the development.

- OWTS must be operated, maintained and monitored so as to continually prevent pollution or contamination of the waters of the State and the creation of a nuisance.

- The responsibility for both of the above must be clearly and legally assumed by an entity with the financial and legal capability to assure that the system provides protection to the quality of the waters of the State for the duration of the development.

Guidelines for New or Replacement OWTS

The purpose of the guidelines below is to provide guidance to proponents of projects involving new discharges of waste from community or individual OWTS. However, the Regional Board may exercise discretion and approve exceptions to these guidelines if it is demonstrated that conformance with the above principles will be achieved. The Regional Board recognizes that there are certain actions which are best undertaken by local agencies to minimize the potential water quality problems resulting from new OWTS. The guidelines are based on the assumption that it is desirable that local agencies:

- Prohibit the use of new community and individual OWTS where existing community sewerage collection systems are reasonably available. The determination of whether or not existing systems are reasonably available should be the responsibility of the local agency or agencies having jurisdiction over the project.

- Prohibit the use of new individual OWTS for any subdivision of land unless the governing body having jurisdiction determines that the use of individual disposal systems will be in the best public interest.

- Assure that individual OWTS are maintained to the satisfaction of the responsible health officer. This could be accomplished through establishment of special maintenance districts, by the amendment of existing ordinances to assure adequate maintenance documented through periodic inspections, or other alternatives as deemed appropriate by the local health officer.

- Consider the cumulative impacts of individual OWTS discharges as a part of the approval process for development.

Community Sewerage Systems

The Regional Board will regulate all discharges of wastes from community sewerage systems. The Regional Board will require a RWD to be filed for all proposed waste discharges which involve the use of new community sewerage systems.

The RWD must include the following:

- A final Environmental Impact Report or Negative Declaration covering the total project, unless categorically exempt, prepared and approved by the local lead agency pursuant to the California Environmental Quality Act (CEQA) of 1970 (as amended) and Chapter 3, Division 6, Title 14, of the CCR (as amended). In the approval process the Environmental Impact Report or Negative Declaration must be circulated through the State Clearinghouse; and

- Operation, maintenance, revenue and contingency plans for the wastewater treatment and disposal facilities or a commitment by the project proponent to prepare such plans and submit them to the Regional Board at least 60-days prior to the initiation of discharge.

The Regional Board strongly prefers that a public entity assume legal authority and responsibility for the ownership, operation, and maintenance of the proposed wastewater treatment and disposal system. This is because public entities provide permanency, expertise, and financial solvency.

In the absence of a satisfactory RWD, the discharge will be prohibited.

State OWTS Policy

The purpose of the State Water Quality Control Policy for Siting, Design, and Maintenance of Onsite Wastewater Treatment Systems[7] (OWTS Policy) is to allow the continued use of OWTS, while protecting water quality and public health. The State Board adopted the OWTS Policy on June 19, 2012. The OWTS Policy recognizes that responsible local agencies can provide the most effective means to routinely manage OWTS. Therefore, it is the intent of the OWTS Policy to efficiently utilize and improve upon where necessary existing local programs through coordination between the State and local agencies. For this purpose, the OWTS Policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements, and establishes the level of performance and protection expected from OWTS.

Waiver of Waste Discharge Requirements for Qualifying OWTS

The OWTS Policy also waives the Water Code requirement that dischargers obtain Waste Discharge Requirements (WDRs) for OWTS that meet requirements specified in the OWTS Policy.

The Policy organizes OWTS into five separate implementation tiers (as outlined below). An OWTS that meets the criteria of one of the five tiers is eligible for the conditional waiver of WDRs, with regulation of the qualifying OWTS deferred to the approved local agency. In addition, to qualify for the waiver, owners of OWTS must comply with conditions specified in Section 12.0 of the OWTS Policy.

[7] The OWTS Policy can be found at http://www.waterboards.ca.gov/

Tier 0

This tier applies to existing OWTS that are functioning as designed without surfacing effluent, and not located near surface water bodies known to be impaired for nitrogen or pathogens. These OWTS are automatically included in Tier 0, provided they meet requirements specified in Section 6.0 of the OWTS Policy. No action is required on the part of the owner, except maintaining the OWTS in good operating condition. An OWTS must have a projected flow of 10,000 gallons per day (gpd) or less to be included in Tier 0 of the OWTS Policy.

Tier 1

This tier applies to new and replacement OWTS that meet the siting and design criteria specified in Sections 7.0 and 8.0 of the OWTS Policy. An OWTS must have a projected flow of 3,500 gpd or less to be included in Tier 1.

Tier 2

This tier applies to new and replacement OWTS operating under an approved Local Agency Management Plan (LAMP). LAMPs allow local agencies to establish jurisdiction specific requirements and alternative design and siting criteria that may differ from those specified in the Tier 1 section of the OWTS Policy, and manage the installation of new and replacement OWTS under the LAMP. The alternative criteria can include local modifications of: system design requirements, siting controls such as system density and setback requirements, additional monitoring and maintenance requirements, design criteria for use of alternative or advanced OWTS, etc. Local agencies must consider the factors listed in Section 9.1 of the Policy in developing their LAMPs. OWTS meeting the requirements of a LAMP need not be regulated under WDRs issued by the Regional Board.

The OWTS Policy identifies the Regional Board designated to review and approve LAMPs for each County in the State, and requires the designated Regional Board to coordinate with other Regional Boards that have overlapping jurisdiction within the County[8]. San Diego County falls within the jurisdiction of both the San Diego Regional Board (Region 9) and the Colorado River Basin Regional Water Board (Region 7). The OWTS Policy designates the San Diego Regional Board as being responsible for review and approval of the LAMP for San Diego County. Riverside County falls within the jurisdiction of the San Diego (Region 9), Colorado River Basin (Region 7), and Santa Ana (Region 8) Regional Boards, while Orange County falls within the jurisdiction of the San Diego and Santa Ana Regional Boards. The OWTS Policy designates the Colorado River Basin and the Santa Ana Regional Boards as the lead Regional Water Boards responsible for review and approval of the LAMPs for Riverside and Orange Counties, respectively.

The San Diego Water Board authorizes the Executive Officer to review and administratively approve future modifications to the San Diego Department of Environmental Health (DEH) LAMP or decide to schedule an agenda item for further consideration of the San Diego DEH LAMP by the San Diego Water Board.

Tier 3

This tier applies to existing, new, and replacement OWTS located within 600 feet of surface water bodies identified as impaired for nitrogen or pathogens due to possible contributions from OWTS discharges. The specific impaired water bodies are identified in Attachment 2 of the OWTS Policy. New or replacement OWTS near impaired water bodies must comply with any applicable TMDL or special provisions identified in a LAMP. New or replacement OWTS not located within 600 feet of water bodies listed in the OWTS Policy must meet the standards for supplemental treatment and other requirements specified in Tier 3. The OWTS Policy does not identify any qualifying impaired water bodies in the San Diego Region.

[8] See Attachment 3 of the OWTS Policy.

Tier 4

This tier applies to any OWTS that require corrective action. OWTS included under Tier 4 are failing systems with:

- Surfacing effluent, failing septic tank systems or structural failure of septic tank leading to infiltrating ground water or exfiltrating wastewater; and

- Any OWTS that has affected or affects surface or ground water to a degree that creates a condition of pollution, makes surface or ground water unfit for drinking or other beneficial uses, or creates a condition of public nuisance.

These OWTS are required to be replaced or repaired to bring them under compliance with the OWTS Policy in a timely manner.

Report of Waste Discharge Submission for OWTS not Meeting Waiver Conditions

The Regional Board will review specific proposals for OWTS that do not meet waiver conditions specified in the OWTS Policy or conditions specified in the applicable LAMP at the request of the appropriate local agency. For such proposals, a RWD must be filed with the Regional Board and WDRs must be obtained or waived by the Regional Board prior to recordation of the final map and/or issuance of a building permit. Before the Regional Board considers the RWD to be complete, the following technical information must be submitted:

- A hydrogeologic study which will, using accepted ground water hydrologic techniques and practices, assess the probable rise in the water table associated with the project, including effects of OWTS recharge, landscape irrigation, and ground water pumpage. The study will additionally address the impact of the projected water table rise or fall on the operation of new and existing septic systems.

- A nitrate study which will, using an acceptable mass balance method, demonstrate that the proposed project will not cause the concentrations of wastewater constituents in ground water to exceed applicable ground water quality objectives, particularly for nitrate. The study must also show that the project will not cause wastewater constituents in interconnected surface water to exceed applicable surface water quality objectives, particularly for total nitrogen.

In addition to the technical information submitted, the following conditions must be met:

- In most instances a public entity must assume legal authority and responsibility for the operation and maintenance of the proposed individual wastewater treatment and disposal systems;

- In some instances, such as commercial/industrial establishments, or projects involving only a single homesite, or special extenuating circumstances, the public entity condition may be set aside;

- A final Environmental Impact Report or Negative Declaration must be included covering the total project, unless categorically exempt, prepared and approved by the local lead agency pursuant to the California Environmental Quality Act of 1970 (as amended) and Chapter 3, Division 6, Title 14, of the California Administrative Code (as amended). In the approval process the Environmental Impact Report or Negative Declaration must be circulated through the State Clearinghouse;

- Operation, maintenance, revenue, and contingency plans must be submitted for the wastewater treatment and disposal facilities or a commitment must be made by the public entity to prepare such plans and submit them to the Regional Board at least 60-days prior to the initiation of discharge; and

- In the absence of a satisfactory Report of Waste Discharge, the discharge will be prohibited without prejudice.

WATER RECLAMATION AND REUSE

Water reclamation is a process consisting of the following elements:

- Treatment of wastewater to a level of quality suitable for reuse;
- Transportation of reclaimed water to reuse areas; and
- Application of reclaimed water to an actual use.

Reclaimed water use typically falls into the following seven broad categories:

- Agricultural irrigation;
- Landscape irrigation (including highway landscape and golf courses);
- Impoundments for landscape, recreational or wildlife uses, wetland and wildlife enhancement;
- Industrial and Construction processes (e.g., cooling water, process water, washdown water or for dust control);
- Ground water recharge;
- Flushing of toilet and urinals in non-residential buildings; and
- Stream enhancement.

The State of California has a strong interest in promoting the conservation and efficient use of water through water reclamation. The California Constitution, Article X, section 2 provides that:

> "...Water resources of the state be put to beneficial use to the fullest extent of which they are capable, and that waste or unreasonable use of water be prevented, and that conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare..."

The State interest in the conservation and efficient use of its waters is further emphasized by Water Code section 13510 which deals specifically with water reclamation. Section 13510 provides that:

> "It is hereby declared that the people of the state have a primary interest in the development of facilities to reclaim water containing waste to supplement existing surface water and underground water supplies and to assist in meeting the future water requirements of the state."

In addition, Water Code section 13241 provides that the Regional Board consider the need to develop and use reclaimed water when establishing water quality objectives.

The State Board adopted the "*Policy with Respect to Water Reclamation In California*" and the related "*Action Plan for Water Reclamation in California*" in 1977 (State Board Resolution No. 77-1). The policy directs the State Board and Regional Boards to encourage reclamation and reuse of water, and to promote water reclamation projects which preserve, restore, or enhance instream beneficial uses. The policy also states that the State and Regional Boards recognize the need to protect public health and the environment in the implementation of reclamation projects.

The Porter-Cologne Water Quality Control Act also requires the State Board DDW to establish statewide reclamation criteria (see Table 4-4) for each type of reclaimed water use to protect public health. Any person proposing to discharge reclaimed water must file a report of waste discharge containing appropriate information related to the discharge with the Regional Board. The Regional Board, after consultation with State Board DDW, may adopt waste discharge requirements for the reclaimed water discharge.

Table 4 - 4. Permitted Uses and California Title 22 Health Requirements for Reclaimed Water.

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 23 per 100 milliliters (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 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.
Permitted Use of Reclaimed Water	Summary of Title 22 (sections 60303 et. seq.) Health Requirements

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

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 irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure shall be at all times 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 median 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.
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 in the effluent 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 23 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.
Ground water 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.

When reviewing potential reclamation projects, the Regional Board must also consider potential impacts from reclamation on ground and surface water quality. It is common for the use of reclaimed water to cause an increase in total dissolved solids concentration in the receiving ground waters due to the effects of evapotranspiration. A variety of techniques can be employed to protect the beneficial uses of the receiving waters. Where well controlled irrigation is practiced, nitrate problems in the dry season will be controlled. Vegetative uptake will utilize soluble nitrates which could otherwise migrate into ground water. Demineralization techniques or source control of total dissolved solids may be necessary in some inland areas where ground waters have been or may be degraded. Presence of excessive salts, boron, or sodium could be the basis for rejection of proposals to irrigate cropland with effluent.

WATER RECLAMATION PROJECTS IN THE SAN DIEGO REGION

The water supply in the San Diego Region is largely dependent upon water imported from northern California and the Colorado River. Future increases from these sources may be limited due to environmental concerns, contractual agreements, and over all capital costs. In light of the limited possibilities for future water sources, the need to develop water supply alternatives is important. For many water uses, reclaimed water is a viable alternative water supply.

The status of water reclamation projects in the San Diego Region during March 1993 is shown is shown in Table 4-5. For each water reclamation agency and/or facility in the San Diego Region, the table shows the permitted flow in MGD, the average effluent flow (in MGD), the average effluent flow reused (in MGD), the annual volume reused in million of gallons (MG) and acre-feet (AC-FT), the treatment process and disposal method, the type of use for the reclaimed water, the reclaimed water user and the status of the project. In the San Diego Region, a total of about 175 MGD of reclaimed water flow is permitted. About 16 MGD is reused from an average effluent flow of about 79 MGD. The annual volume reused is about 5,859 MG (18,597 AC-FT).

REGIONAL BOARD ACTION PLAN ON WATER RECLAMATION

The Regional Board supports water reclamation and reuse to the maximum extent feasible to help meet the growing water needs of the Region. It has long been a policy of the Regional Board to encourage and promote water reclamation while taking into consideration the need to protect beneficial uses of surface and ground waters and protect the public health.

On March 24, 1986 the Regional Board adopted Resolution No. 86-06 which amended the Basin Plan to include an action plan for water reclamation. The policy described below updates and supersedes Resolution No. 86-06:

(1) The Regional Board will consider special amendments to the Basin Plan to encourage water reclamation.

(2) The Regional Board will consider comprehensive water quality monitoring programs for confirmation of original hydrogeological predictions, and an accurate measure of adverse ground water quality effects. These monitoring programs will be considered where water reclamation is not expected to result in adverse ground water quality impacts, and where ground water quality impacts are very difficult to predict.

(3) The Regional Board will consider projects involving stream and lagoon replenishment with reclaimed water where, as a minimum, a water quality management plan would be implemented and conformance with the State Board DDW wastewater reclamation criteria for nonrestricted recreational use would be achieved.

(4) The Regional Board will encourage use of ephemeral streams that are not used for domestic water supply, for the conveyance of reclaimed water for beneficial uses during periods of need.

Table 4-5. Water Reclamation Projects as of March 1993.

Name of Agency/ Facility	Hydro-logic Unit	Permit Flow MGD	Average Effluent Flow MGD	Average Effluent Flow Reused MGD	Annual Volume Reused MG	Annual Volume Reused AC-FT	Treatment Process and Disposal	Type of Use	Reclaimed Water User	Status
ORANGE COUNTY										
Joplin Youth Center	1.20	0.0075	0.0067	0.0067	2.45	7.50	AS, PB	Landscape Irrigation, Ground Water Recharge		Operating
San Clemente, City of San Clemente WRP	1.20 1.30	7.00	3.996	0.610	222.65	683.28	AS, PB, CH, SF, OF	Golf Course Irrigation, Construction	Municipal GC, Arvida Co, Talega, Pacific GC	Operating
SOUTH ORANGE COUNTY RECLAMATION AUTHORITY SERVICE AREA										
El Toro WD	1.13	5.50	0.000	0.000	0.00	0.00	AS, OF	Landscape Irrigation		Proposed
Los Alisos WD	1.13	5.50	0.000	0.000	0.00	0.00	AS, OF	Landscape Irrigation		Proposed
Moulton Niguel WD Plant 3A STP	1.20	2.40	0.484	0.484	176.66	542.15	AS, CH	Golf Course & Landscape Irrigation	Mission Viejo Country Club	Operating
Laguna Niguel (AWMA/MNWD) Joint Regional WRF	1.13 1.14	12.00	5.191	0.278	100.67	308.93	AS, F, CL, OF	Landscape Irrigation	El Niguel Country Club	Operating
Santa Margarita WD Oso Creek STP	1.13 1.20	3.00	1.693	1.693	617.95	1896.39	AT, F, CH, Of	Landscape Irrigation	Oso Valley Asn. CALTRANS	Operating
Nichols Institute	1.20	0.04	0.032	0.025	9.13	28.00		Property landscaping	Nichols Inst.	Operating
Chiquita WRF	1.20 1.30	3.50	2.103	0.016	5.92	18.18	CH,F	Nursery, Construction, Dust Control	SeaTree Nursery Los Flores Dev. Desecha Landfill	Operating
South Coast County WD	1.12 1.13 1.14	2.61	0.738	0.738	269.19	826.10	AS, F, CH, OF	Irrigation of parks, greenbelt, golf course	AVCO Community De Ben Brown GC Orange County Parks	Operating
Trabuco Canyon WD Trabuco WRP	1.13 1.20	0.25	0.459	0.561	204.77	628.40	OD, F, CH, PB	Golf Course Irrigation	Dove Canyon GC	Operating
RIVERSIDE COUNTY										
Eastern Municipal WD Rancho Calif. STP	2.51	5.00	4.800	1.210	441.65	1355.4	AS, PB	Irrigation Sod Farm	Ralph Daily Sod Farm	Operating
Rancho California WD Joaquin Ranch STP	2.31	0.60	0.575	0.376	137.24	421.2	OD, F, CH, PB	Golf Course Irrigation	Bear Creek Golf Course	Operating
Santa Rosa SBR WRF	2.51	1.00	0.345	0.345	125.93	386.4	F, CH	Ground Water Recharge		Operating

TREATMENT PROCESS: AQ=aquaculture, AS=activated sludge, CH=chlorination, EA=extended aeration, F=filtration, MS=microscreen, OD=oxidation ditch, OF=ocean outfall, OP=oxidation pond, PB=percolation pond or bed, PS=primary sedimentation, RBC=rotating biological contactor, RO=reverse osmosis, TF=trickling filter

Table 4-5 (continued). Water Reclamation Projects as of March 1993.

Name of Agency/ Facility	Hydro-logic Unit	Permit Flow MGD	Average Effluent Flow MGD	Average Effluent Flow Reused MGD	Annual Volume Reused MG	Annual Volume Reused AC-FT	Treatment Process and Disposal	Type of Use	Reclaimed Water User	Status
SAN DIEGO COUNTY										
Buena Sanitation Dist. Shadow Ridge WRP	4.32	1.10	0.809	0.062	22.63	69.4	MS, RBC, F, RO, CH, OF	Irrigation	Shadow Ridge Golf Course	Operating
Encina	4.40	22.50	19.000	0.001	0.37	1.1	AS, CH, OP	Landscape Irrigation	Caltrans	Operating
Escondido WRP	4.52 5.21	5.00	0.003	0.003	1.10	3.4	AS, CH	Internal Use, Landscape Irrigation, Golf Course	Escondido San Marcos	Operating
Fairbanks Ranch WRP	5.12	0.28	0.180	0.180	65.70	201.6	EA, PB	Ground Water Recharge		Operating
Fallbrook WD Plants 1 & 2	2.13	3.10	1.720	0.160	58.40	179.2	PS, EA, CH, OF	Landscape Irrigation (I-5 Freeway)	Caltrans Nurseries	Operating
4-S Ranch 4-S Ranch WRP	9.31	0.60	0.062	0.038	13.69	42.0	CH	Compaction Irrigation	Construction Pasture	Operating
Leucadia Water Dist. F.R. Gafner WRF	4.51	0.75	0.000	0.000	0.00	0.0	TF, PS, CH, OF	Aviara and La Costa Country Club Irrigation	La Costa & Aviara Country Clubs	Operating
Oceanside, City of N. San Luis Rey STP	3.12	10.50	8.700	0.020	7.30	22.4	AS, CL, OF, PB	Golf Course Irrigation, Ground Water Recharge	Oceanside Golf Course	Operating
La Salina	4.10	0.50	0.000	0.000	0.00	0.00	EA, AS, CH	Landscape Irrigation	Oceanside	Operating
Otay Municipal WD Ralph W Chapman WRF	9.21	1.30	0.900	0.900	328.50	1008.1	EA, F, RO, CH, OF	Landscape Irrigation	Eastlake Development	Operating
Otay Estates Hidden Valley Estates	9.11	0.15	0.000	0.000	0.00	0.0	AS, CH	Landscape Irrigation		Operating
Padre Dam Municipal WD Water Reclamation Pl	7.12	1.00	0.521	0.521	190.17	583.6	AS, PS, OP, CH, OF	Recreational Lakes & Park Irrigation	Santee Lakes	Operating
Pauma Valley	4.63	0.00	0.000	0.000	0.00	0.0	EA, CH	Ground Water Recharge		Proposed
Ramona Municipal WD Santa Maria WWTP	5.41	1.00	0.600	0.600	219.00	672.1	EA, PB	Irrigation, Pasture Ground Water Recharge	Ramona WD site	Operating
San Vicente STP	7.23	0.60	0.541	0.541	197.47	606.0	OD, CH, F, RO, PB	Avocado Grove Irrig. Ground Water Recharge	Solk Ranch	Operating
Rancho Santa Fe	4.61	0.45	0.220	0.220	80.30	246.4	AS, EA, CH, PB	Golf Course Irrigation	Rancho Santa Fe Golf Course	Operating
San Diego, County of Descanso STP	9.31	0.04	0.026	0.026	9.56	29.3	AS, PB	Landscape Irrigation	Descanso Facil.	Operating
Julian	7.43	0.04	0.035	0.035	12.78	39.20	OP	Irrigation (cattle feed)		Operating
Mount Woodson SD	5.11	0.08	0.000	0.000	0.00	0.0	CH	Irrigation	Golf Course	Operating
Rancho Cielo SD	5.11	0.20	0.000	0.000	0.00	0.0		Landscape Irrigation		Operating
Whispering Palms CSD	5.11	0.40	0.175	0.175	63.88	196.0	EA, CH, PB	Ground Water Recharge	Del Rayo Prop.	Operating
San Diego, City of Water Utilities Dept San Pasqual WAP STP	5.31	1.00	0.0190	0.0190	6.94	21.3	AS, CH, PB	Irrigation & Animal Stock Watering	Wild Animal Park	Operating

TREATMENT PROCESS: AQ=aquaculture, AS=activated sludge, CH=chlorination, EA=extended aeration, F=filtration, MS=microscreen, OD=oxidation ditch, OF=ocean outfall, OP=oxidation pond, PB=percolation pond or bed, PS=primary sedimentation, RBC=rotating biological contactor, RO=reverse osmosis, TF=trickling filter

Table 4-5 (continued). Water Reclamation Projects as of March 1993.

Name of Agency/ Facility	Hydro-logic Unit	Permit Flow MGD	Average Effluent Flow MGD	Average Effluent Flow Reused MGD	Annual Volume Reused MG	Annual Volume Reused AC-FT	Treatment Process and Disposal	Type of Use	Reclaimed Water User	Status
SAN DIEGO COUNTY CONTINUED										
Mission Valley Pilot Aquaculture Project	7.11	1.00	0.026	0.025	9.13	28.0	AQ, QF	Freeway Landscaping (I-15 & I-8)	Caltrans	Operating
North City	6.10	30.00	0.000	0.000	0.00	0.0		Landscape Irrigation	Caltrans	Operating
San Elijo JPA	4.51	3.68	0.000	0.000	0.00	0.0	CH, AS	Landscape Irrigation	Encinitas, Del Mar	Operating
US Marine Corps Base, Camp Pendleton Plant No. 1	2.13	1.50	0.429	0.687	247.54	759.7	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 2	2.11	0.92	0.309	0.694	253.13	776.8	TF, CH, PB	Golf Course Irrigation	Camp Pendleton	Operating
Plant No. 3	2.12	1.10	0.492	0.753	274.66	842.9	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 8	1.51	0.59	0.074	0.296	107.86	331.0	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 9	1.52	1.10	0.142	0.357	130.34	400.0	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 10	1.51	0.85	0.325	0.378	138.08	423.7	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 11	1.51	0.85	0.836	1.088	397.01	1218.4	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No.12	1.40	0.85	0.142	0.420	153.37	470.7	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 13	2.11	2.50	1.397	1.225	447.16	1372.3	TF, CH, PB	Ground Water Recharge	Camp Pendleton	Operating
Plant No. 16	1.53	0.03	0.008	0.008	2.74	8.4	EA, PB	Ground Water Recharge	Camp Pendleton	Operating
Vallecitos WD Meadowlark WRP	4.51	2.00	0.995	0.525	191.63	588.1	MS, RBC, F, CH, OF	Golf Course Irrigation	La Costa GC Carlsbad City	Operating
Valley Center MWD Lower Moosa Canyon WRP	3.13	0.50	0.250	0.250	91.25	280.0	AS, CH, PB	Golf Course Irrigation Ground Water Recharge	Circle R GC Valley Center MWD	Operating

TREATMENT PROCESS: AQ=aquaculture, AS=activated sludge, CH=chlorination, EA=extended aeration, F=filtration, MS=microscreen, OD=oxidation ditch, OF=ocean outfall, OP=oxidation pond, PB=percolation pond or bed, PS=primary sedimentation, RBC=rotating biological contactor, RO=reverse osmosis, TF=trickling filter

Summary of San Diego Region Water Reclamation Projects as of March 1993

COUNTY SUBTOTALS	PERMIT FLOW	AVERAGE EFFLUENT FLOW		ANNUAL VOLUME REUSED	
	(MGD)	GENERATED (MGD)	REUSED (MGD)	(MG)	(AC-FT)
Orange	41.81	14.70	4.41	1,609.37	4,938.94
Riverside	35.20	25.532	1.997	728.91	2,236.9
San Diego	98.05	38.94	10.20	3,721.65	11,421.24
REGION TOTALS	175.06	79.171	16.603	6,059.9	18,597

(5) The Regional Board will consider the possibilities for the buyout of a beneficial use that is only minimally realized, and that if protected, would stand in the way of a water reclamation project.

(6) The Regional Board will continue efforts to seek the most recent and accurate environmental and technical information for the purpose of reviewing Basin Plan standards pertaining to the discharge of reclaimed water.

(7) The Regional Board will require all ocean and inland dischargers, having the potential to produce reclaimed water, to develop water reclamation plans.

(8) The Regional Board will encourage economic incentives for using reclaimed water, such as rebates by the San Diego County Water Authority and the Metropolitan Water District of Southern California to water suppliers engaged in water reclamation.

(9) The Regional Board will seek funding for studies to evaluate the potential of water reclamation in various areas of the Region including streams and coastal lagoons.

(10) The Regional Board will take appropriate actions, recommend legislation, and recommend actions by other planning agencies (county, federal, etc.) in the areas of (1) planning, (2) project funding, (3) regulation and enforcement, (4) research and demonstration, and (5) public involvement and information.

(11) The Regional Board will encourage and support measures which conserve the water resources of the San Diego Region.

(12) The Regional Board will encourage other agencies to assist in implementing this policy.

(13) As mitigation against potential nuisance odors and health hazards resulting from reclaimed water use, the Regional Board will continue to adopt and enforce waste discharge requirements containing prohibitions against nuisance odors and implementing the State Board DDW Wastewater Reclamation Criteria.

(14) The Regional Board will prepare Basin Plan amendments necessary for implementation of water reclamation projects in compliance with state policy for water quality control and, to the extent surface waters will be affected, with Environmental Protection Agency water quality standards regulations. Site specific environmental impacts will be evaluated in conformance with the California Environmental Quality Act (CEQA) for specific Basin Plan amendments.

FACTORING WATER SUPPLY CONSIDERATIONS INTO THE REGIONAL BOARD REGULATION OF WATER RECLAMATION PROJECTS

Conventional reclamation facilities are not designed to reduce mineral constituents. Consequently, the mineral effluent quality is dependent on the composition of the water supply plus the mineral pickup during its use. Historically, water supply TDS concentrations have varied significantly. For example, concentrations of TDS of the blended water stored in Lake Skinner ranged from below 400 milligrams per liter (mg/l) to above 700 mg/l between 1985 and 1995.

Residential wastewater discharges will typically be 250 to 300 mg/l higher in TDS than their water supply source. Self-regenerating water softeners, brine from industrial dischargers, and ground water infiltration can further increase TDS concentrations in wastewater effluent. Many wastewater management agencies within the region are implementing programs to minimize the incremental pickup of minerals from these sources. These programs have had varying degrees of success.

Effective water conservation measures that are being implemented within the region may result in higher mineral and other constituent concentrations in wastewater effluent. Although the volume of wastewater is reduced by water conservation, the mineral and organic loading from its use remains nearly constant. As a result, the strength of the wastewater influent becomes stronger. In some cases, the characteristics of the wastewater influent may range briefly above the design parameters of the treatment plant.

In recognition of the variables in wastewater quality that are beyond the control of the discharger, the Regional Board authorizes the Executive Officer to suspend formal enforcement action, when a discharger submits an initial technical report with subsequent quarterly updates, that demonstrate to the satisfaction of the Executive Officer, compliance with the following conditions:

(1) The discharge is not subject to regulation by means of a NPDES Permit; and

(2) The enforcement action is only for violations of discharge specifications for mineral constituents, total suspended solids (TSS), biological oxygen demand (BOD) or carbonaceous biological oxygen demand (CBOD); and

(3) The effluent violations are due solely to changes in the quality of the imported water supply and/or to water conservation measures being implemented within the service area tributary to the treatment plant; and

(4) The discharge does not result in a mass loading of TSS, BOD and CBOD that exceeds the loading prior to implementation of water conservation measures; and

(5) The discharge will not cause Basin Plan water quality objectives to be exceeded, in the long term; and

(6) The discharge will not cause a violation of any applicable section from Title 22 of the CCR or any requirement specified by either the State Board DDW or the appropriate county health officer for the protection of public health; and

(7) The discharge does not contain a concentration of TDS exceeding 1,500 mg/l, or the concentration in the water supply plus 500 mg/l, whichever is less, with comparable adjustments for other mineral constituents; and

(8) The discharger implements a program to identify major sources of the mineral constituents of concern in the discharge, including but not limited to water softener regeneration brine; and to determine the average contribution of each major source and the best available options for reducing levels in the discharge; and to identify any negative effects on the potential for water reclamation caused by the failure to control the constituents of concern in the discharge. The program should include a time schedule to reduce mineral constituents in the discharge as necessary to assure that the potential for water reclamation will be realized to the maximum extent practicable.

RECLAIMED WATER CONFORMANCE WITH WATER QUALITY OBJECTIVES

The Regional Board has established various policies concerning the compliance of reclaimed water discharges with applicable Basin Plan water quality objectives. These policies are described below.

DISCHARGES TO COASTAL LAGOONS FROM PILOT WATER RECLAMATION PROJECTS

The Regional Board may grant an exception to the "Biostimulatory Substances" water quality objective described in Chapter 3 to provide for discharges to coastal lagoons from pilot water reclamation projects. The project proponent must demonstrate that the pilot water reclamation project is consistent with the conditions described in the Principles of the State Water Resources Control Board's Policy and Action Plan for Water Reclamation in California. The Policy and Action Plan for Water Reclamation in California was adopted by the State Board in January 1977 and is summarized below. In addition, the proponent must demonstrate that the threat of eutrophication as a result of the addition of nitrogen and/or phosphorus is reduced as a consequence of one or more of the following factors:

- Waters of the coastal lagoon are highly laden with natural silts or colors which reduce the penetration of sunlight needed for photosynthesis;

- The coastal lagoon is characterized by morphometric features of steep banks, great depths, and substantial flows which have contributed to a history of no plant problems;

- The coastal lagoon is managed primarily for waterfowl or other wildlife;

- An identified element other than nitrogen or phosphorus is limiting to plant growth in the coastal lagoon, and the level and nature of the limiting element would not be expected to increase to an extent that would influence eutrophication; or

- Control of nitrogen and/or phosphorus in the coastal lagoon cannot be sufficiently effective under present technology to make phosphorus or nitrogen the limiting nutrient.

The Principles of the Policy and Action Plan for Water Reclamation in California provide, in part, that water reclamation projects shall be encouraged which do not adversely impact vested water rights or unreasonably impair instream beneficial uses or place an unreasonable burden on present water supply systems, and which meet the following additional conditions:

- Beneficial use will be made of wastewaters that would otherwise be discharged to marine or brackish receiving waters or evaporation ponds;

- Reclaimed water will replace or supplement the use of fresh water or better quality water; or

- Reclaimed water will be used to preserve, restore, or enhance instream beneficial uses which include, but are not limited to, fish, wildlife, recreation, and aesthetics associated with any surface water or wetlands.

Exceptions to the numerical water quality objectives will be made only when a pilot reclamation project meets the following criteria:

- Need for the reclaimed water is demonstrated;

- Alternative disposal facilities are available in the event discharge to a coastal lagoon proves unfeasible;

- Conformance with the State Board's Water Quality Control Policy for the Enclosed Bays and Estuaries of California is demonstrated;

- Data will be generated that will be useful and timely for Regional Board review of water quality objectives for nutrients; and

- The project will include a lagoon management plan addressing the proposed methods of identifying and eliminating any pollution, contamination, or nuisance problems resulting from the proposed discharge and clearly identifying management responsibilities and capabilities.

DISCHARGES TO INLAND SURFACE WATERS

Regional Board Resolutions Nos. 90-53 and 91-23 established an alternate method of conformance with the biostimulatory substances water quality objectives for portions of the San Diego River and Santa Margarita River. The Policy presented below supersedes Resolutions Nos. 90-53 and 91-23 and is applicable to all inland surface waters of the San Diego Region at a point downstream of lakes or reservoirs used for municipal water supply.

The Regional Board has developed an alternate method of showing compliance with the biostimulatory substances water quality objective contained in Chapter 3 to:

- Promote water reclamation;

- Enhance opportunities for reclaimed water discharges to inland surface waters; and

- Protect and enhance existing inland surface water beneficial uses through the greater use of reclaimed water.

The alternate method of compliance described below is applicable to reclaimed water discharges to inland surface waters at a point downstream of lakes or reservoirs used for municipal water supply. The alternate method of compliance is meant to encourage reclaimed water discharges into inland surface waters without degradation of the ambient water quality or adverse effects on beneficial uses.

Compliance Methods

The Regional Board will establish appropriate effluent limitations for nitrogen and phosphorus in waste discharge requirements for discharges of reclaimed water to surface waters using one of the following methodologies:

- The Regional Board may use the goal for phosphorus concentration in flowing water contained in the Biostimulatory Substances objective as guidance in establishing appropriate effluent limitations; or

- Alternatively, the Regional Board may determine compliance with the narrative objective based upon the following four factors:

  - ✓ Measurement of ambient concentrations of nitrogen and phosphorus;

  - ✓ The dissolved oxygen requirements of downstream beneficial uses;

  - ✓ Use of best available technology (BAT) economically feasible for the removal of nutrients; and

  - ✓ The development and implementation of a watercourse monitoring and management plan.

Best available technology for the removal of nutrients includes biological and chemical removal. The extent to which the Regional Board may require additional removal of nutrients through chemical addition processes will be based upon an evaluation of the economic feasibility of this additional treatment in concert with an evaluation of the effectiveness of the watercourse monitoring management plan.

The watercourse monitoring and management plan shall include:

- A comprehensive program for chemical monitoring in receiving waters and effluent that will generate adequate data on ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, organic nitrogen, total phosphate, ortho phosphate, dissolved oxygen (including vertical and diurnal dissolved oxygen profiles), pH, turbidity, biochemical oxygen demand (BOD) and other appropriate constituents and properties which may contribute to, or result from, nutrient related problems and impact beneficial uses.

- A comprehensive program for physical and biological monitoring in the receiving waters that will generate adequate data on chlorophyll 'a', corrected chlorophyll 'a', pheophyton 'a'; temperature (including diurnal and vertical temperature profiles); acute and chronic toxicity; the diversity and numbers of microinvertebrates, macroinvertebrates, and fish; the dynamics of the aquatic flora (macroalgae, phytoplankton, and emergent vegetation) and the related dissolved oxygen regime; substrate composition; frequency of nuisance conditions; flow rate; and other appropriate constituents and properties which may contribute to nutrient related problems and impact beneficial uses.

- A comprehensive program for physical and biological monitoring of the effluent that will generate adequate data on flow, temperature, chronic and acute toxicity, and other appropriate constituents which may contribute to nutrient related problems and impact beneficial uses.

- A procedure for evaluating the data collected under items (1), (2), and (3) above and determining the potential for nutrient related problems that may impact beneficial uses.

- Development and implementation of preventive and corrective actions that will ensure that a discharge containing nutrients will not adversely impact beneficial uses. These preventative and corrective actions may include, but are not limited to, the following:

  - ✓ Achievement of more stringent effluent limits for nutrient constituents discharged to the watercourse, through additional chemical treatment methods at the treatment facility, to further reduce nutrient loading to the river;

  - ✓ Maintenance of minimum reclaimed water flows discharged to the watercourse to prevent stagnant areas subject to nutrient related problems and to maintain the aquatic and riparian habitat beneficial uses that have been enhanced and/or created by such a discharge;

  - ✓ Effective measures for the instream chemical treatment of surface waters to prevent nutrient and stagnant water related nuisance problems that can adversely impact aquatic habitat beneficial uses, where this instream treatment will not adversely impact beneficial uses;

  - ✓ Effective measures for the physical management of the watercourse channel and vegetation;

  - ✓ Effective source control measures to reduce the amount of nutrient constituents in the reclaimed water; and

  - ✓ Other measures deemed appropriate and necessary by the Regional Board to ensure compliance with the Basin Plan narrative objective for nutrients and for the protection of beneficial uses.

Additional Mitigation

As mitigation against adverse impacts of nuisance odors and health hazards resulting from use of reclaimed water, the Regional Board will continue to adopt and enforce waste discharge requirements containing prohibitions against creation of nuisance odors and implementing the State Board DDW Water Reclamation Criteria.

Additionally, as mitigation measures against degradation of ground and surface water quality resulting from an inland reclaimed water discharge, the Regional Board will require well head treatment or treatment at the point of use, or other appropriate measures acceptable to the Board, adequate to maintain the existing quality of ground and surface waters and the beneficial uses for all ground and surface waters adversely impacted by a discharge. The Regional Board will require monitoring of all ground water wells and legal direct diversions of surface water prior to permitting a discharge in order to establish the baseline quality that must be maintained.

As mitigation against any adverse effects to instream or downstream surface or ground water quality and the environment resulting from the discharge of reclaimed water, the Regional Board will require the discharger to establish and implement a comprehensive river monitoring and management program. The implementation of the watercourse monitoring and management plan will often require close coordination between many different public and private entities. The Regional Board shall recognize an agency to implement the watercourse monitoring and management plan and such recognition shall be made part of the provisions of appropriate waste discharge requirements for the discharge.

The watercourse monitoring and management plan, and all the associated requirements, shall apply to all downstream waters, including rivers, lagoons, estuaries, and bays, which may be impacted by the reclaimed water discharge. The Regional Board will regulate the volume of reclaimed water discharged into all inland surface waters to those levels which do not significantly and adversely alter the salinity regimes of downstream lagoons, estuaries, or bays. This regulation of flows will include a prohibition of fresh water flows that could result in the conversion of a lagoon, estuary, or bay from a saline environment to a fresh water environment. Salt marsh habitats are to be considered an integral part of the lagoon, estuary, or bay to which they are associated, and therefore shall be fully protected from conversion.

Implementation of Ground Water Quality Objectives for Reclaimed Water Discharges

In order to facilitate water reclamation in the Region, the Regional Board, adopted Resolution No. 90-61 on November 5, 1990. Resolution No. 90-61 established a methodology for determining reclaimed water effluent limits. The policy described below updates and supersedes Resolution No. 90 61.

The Regional Board shall regulate discharges of reclaimed water by establishing effluent limitations designed to protect beneficial uses and ensure compliance with State Board Resolution No. 68-16. Use of adequately treated reclaimed water for irrigation or ground water recharge shall be encouraged in basins where reuse is clearly beneficial. Regulation of discharges of reclaimed water, where the reclaimed water displaces the use of imported water, or ground water having a quality exceeding the ground water quality objective, shall be in the following manner:

- For discharges upgradient of municipal water supply reservoirs the Regional Board shall adopt numerical effluent limitations for constituents at levels no lower than the quality of the basin's water supply but no higher than the Basin Plan ground water quality objective.

- In ground water basins not upgradient of municipal water supply reservoirs the Regional Board shall adopt numerical effluent limitations for constituents at levels no lower than the quality of the basin's water supply concentration plus an incremental increase equal to the typical incremental increase added to the water supply as a result of domestic use. The effluent limitations shall be no higher than the Basin Plan ground water quality objective.

- For discharges where the discharger has demonstrated sufficient assimilative capacity exists and ground water quality objectives will not be exceeded, the Regional Board may consider adoption of numerical effluent limitations for constituents based on the discharge quality and assimilative capacity analysis results.

- The Regional Board shall also require the implementation of effective salinity source control measures to ensure a reclaimed water quality that is suitable for long-term agricultural and landscape irrigation.

WATER RECLAMATION UNDER RESOLUTION NO. 81-16

On March 23, 1981, the Regional Board adopted Resolution No. 81-16 which modified the water quality standards by relaxing the ground water objectives and modifying the beneficial use designations for portions of the Aliso Hydrologic Subarea (HSA) 901.13, Carlsbad HSA 904.21, Agua Hedionda HSA 904.31, Batiquitos HSA 904.51, and Telegraph HSA 909.11. These areas are described in Table 3-3. The terms and conditions of Resolution No. 81-16 are incorporated in this Basin Plan; accordingly Resolution No. 81-16 is superseded. The use of reclaimed water in these areas is subject to the following provisions:

- Notwithstanding the water quality objectives, the Regional Board will regulate waste discharges in the affected portions of Hydrologic Subareas 904.21 and 904.31 in a manner that will protect the waters produced by the existing operating wells. A presently existing ground water use will be considered terminated when the well has been abandoned pursuant to County of San Diego Water Well Standards.

- In applying the modified standards, the Regional Board will condition waste discharge requirements for discharges of domestic and municipal wastewater to require that the wastewater be reclaimed and reused in a manner that will displace the need for approximately equal volumes of imported potable water.

WATER RECLAMATION AS AN ALTERNATIVE TO OCEAN DISPOSAL

The State Board in Order No. WQ 84-7 concluded that water reclamation should be carefully considered by persons proposing to discharge substantial quantities of once-used wastewater to the ocean particularly in a water short area where water is imported. Order No. WQ 84-7 directs the regional boards to require persons applying for permits to discharge once-used wastewater to the ocean in water-short areas to justify as part of each report of waste discharge why the wastewater is not being reclaimed.

The San Diego Region water supply is primarily imported water and the Region is clearly a water short area. Pursuant to State Board Order No. 84 7, the Regional Board will require persons proposing a discharge of once-used wastewater into the ocean to:

- Carefully analyze as an alternative, or partial alternative, the feasibility of reclaiming the wastewater for a beneficial use in lieu of ocean disposal.

- Submit, with the report of waste discharge in application for waste discharge requirements, sufficient information to justify why any wastewater proposed for discharge to the ocean after a single use is not being reclaimed for a beneficial use.

Reports of waste discharge which do not contain the water reclamation feasibility analysis described above, to the satisfaction of the Regional Board Executive Officer, will be considered incomplete and the Regional Board will not issue waste discharge requirements for the proposed discharge.

RECLAIMED WATER STORAGE REQUIREMENTS

During the winter season, wet weather, and other periods when there is little or no demand, treatment plants continue to operate at normal flows and the excess treated effluent must either be: (1) discharged to storage facilities until such time as the irrigation demand requires the use of the stored water; (2) discharged through a fail-safe land outfall connection to an ocean outfall under the terms of an NPDES permit; or (3) discharged to inland surface waters for ground water recharge and/or stream replenishment under the terms of an NPDES permit. Theoretical water balance calculations for disposal of reclaimed water at golf courses and other reuse sites in the Region indicate that storage facilities should be sized for 84-days of storage. (1975 Comprehensive Water Quality Control Plan Report, Page II-16-32). In situations where reclaimed water storage ponds are necessary, the Regional Board will require reclaimed water producers to:

- Provide 84-days of storage capacity; or

Provide storage capacity based upon water balance calculation procedures such as described in:

- USEPA. 1981. Process Design Manual for Land Treatment of Municipal Wastewater. Center for Environmental Research Information. Cincinnati, OH. EPA 625/1-81-013 (COE EM1110-1-501).

INDUSTRIAL WASTE

PRETREATMENT PROGRAM FOR INDUSTRIES

It is generally recognized that the discharge of industrial pollutants can be controlled most economically at their source. This is particularly true for industries discharging waste to municipal wastewater treatment plants (commonly called "POTWs" for "publicly owned treatment works"). On that basis USEPA has developed pretreatment requirements (40 CFR 403) for many industries and has developed minimum standards for POTW pretreatment programs. A POTW is required to implement a pretreatment program as a condition of its NPDES permit if its design flow is greater than five MGD or there are significant industrial users discharging to the POTW. POTWs with design flows less than 5 MGD may also be required to establish a pretreatment program if nondomestic waste causes upsets, sludge contamination, or violations of NPDES permit conditions, or if industrial users are subject to national pretreatment standards.

The goal of the USEPA's National Pretreatment Program is to protect municipal treatment plants and the environment from the adverse impact that may occur when hazardous or toxic wastes are discharged into a sewer system. This protection is achieved mainly by regulating nondomestic users of POTWs that discharge toxic wastes or unusually strong conventional wastes. Local pretreatment programs are required to fulfill the following objectives:

- Prevent the introduction of pollutants into POTWs which will interfere with the operation of a POTW, including interference with its use or disposal of municipal sludge;

- Prevent the introduction of pollutants into POTWs which will pass through the treatment works or otherwise be incompatible with such works;

- Improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges; and

- Prevent exposure of POTW personnel from chemical hazards and poisonous gases.

The general pretreatment regulations establish industrial pretreatment standards to control industrial pollutant discharges into wastewater collection systems and treatment plants. The discharge standards apply to all industrial and commercial establishments discharging waste to wastewater collection systems tributary to POTWs. The standards prohibit the discharge of pollutants that may damage the POTW's facilities, disrupt operations or expose workers

to hazards. Categorical pretreatment standards are numerical effluent limits which apply to industrial and commercial discharges in 25 specific industrial categories determined to be the most significant sources of toxic pollutants. All firms regulated by a particular pretreatment standard are required to comply with these standards. One hundred and twenty-six toxic pollutants are regulated in the 25 categorical standards. Prohibited discharges into POTW plants, besides toxic substances, include:

- Substances that create a fire or explosion hazard in the plant or sewer system;
- Discharges that are corrosive (have a pH < 5.0);
- Discharges that obstruct flow in the sewer system or interfere with plant operation;
- Discharges that upset the treatment process or cause a violation of the POTW's permit;
- Discharges that increase the temperature of the wastewater entering the treatment plant to above 104º F (40º C);
- Oil based products in amounts that will cause interference or pass through;
- Substances which cause toxic gases, vapors or fumes in a quantity which may cause worker health or safety problem(s); and
- Trucked or hauled pollutants, except at discharge points designated by the POTW.

Municipalities are required to use and enforce these standards as well as locally developed standards, to control nondomestic users discharging to their wastewater collection and treatment systems. The federal regulations require all states that administer NPDES programs to POTW operators to develop local pretreatment programs. The California pretreatment program includes the same general elements which parallel the pretreatment compliance schedule activities specified in most POTWs' NPDES permits. Pretreatment programs are required to contain the following elements:

- Identification and evaluation of the nondomestic discharges to a treatment system.
- The POTW must operate under a legal authority that will enable it to apply and enforce the requirements of pretreatment regulations and other state and local rules needed to control nondomestic discharges.
- The POTW must establish local industrial effluent limits to protect treatment plant operation, receiving water quality and sludge quality.
- The POTW must develop procedures for monitoring its industrial users to determine compliance and non-compliance.
- The POTW must develop administrative procedures to implement its pretreatment program.
- The POTW must have sufficient resources (funds, equipment, personnel) to operate an effective and ongoing program.

STEAM ELECTRIC POWER PLANTS

The Region has five steam electric power plants, four are operated by San Diego Gas and Electric Company (SDG&E) and one by Southern California Edison (SCE). Each of the SDG&E plants has one cooling water intake and one outfall structure. A separate NPDES permit has been issued for each SDG&E plant. The SCE plant, called the San Onofre Nuclear Generation Station (SONGS) has three power generating units, each with its own cooling water intake and outfall structure, and a separate NPDES permit has been issued for each of the three power generating units. All of these plants obtain cooling water from the ocean or San Diego Bay.

The SDG&E power plants are conventional fossil-fuel burning electrical generating facilities. The SDG&E plants are located in San Diego County, three of them are adjacent to San Diego Bay and one is adjacent to the Pacific Ocean. The San Onofre Nuclear Generating Station is located adjacent to the

Pacific Ocean in northern San Diego County and consists of three nuclear fueled electrical generating units.

The cooling water discharges from the power plants are regulated under the provisions of the Thermal Plan, which incorporates provisions of Section 316(a) of the Clean Water Act. All of the plants employ a once-through cooling water system. Seawater is pumped into the facility and used to cool the condensers, which results in an increase in the cooling water temperature of approximately 20 degrees Fahrenheit above the ambient seawater temperature. The cooling water is then discharged to marine waters, where the heat accumulated in the cooling water is dissipated.

The power plant NPDES permits establish effluent limitations for the discharge of cooling water and other wastes generated at the facilities. The effluent limitations are based upon applicable state water quality objectives and USEPA effluent guidelines and standards for steam electric power plants contained in 40 CFR 423. Each facility has a unique arrangement and thus a unique set of waste streams. Other wastewater discharges regulated by power plant NPDES permits, in addition to the cooling water discharge, include boiler blowdown, evaporator blowdown, floor drain discharges, chemical cleaning wastes and boiler wash.

Each power plant is required under the terms and conditions of its NPDES permit to comply with federal Clean Water Act sections 316 (a) and (b). Section 316(a) addresses the control of the thermal component of a discharge and its effects on fish population and wildlife. Section 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best available technology for minimizing adverse impacts to the environment.

SUBSURFACE DISPOSAL FROM CAMPGROUNDS AND RECREATIONAL VEHICLE PARKS

Since the early 1970's, the Regional Board has been issuing waste discharge requirements to campgrounds and/or recreational vehicle (RV) parks that discharge wastewater to subsurface disposal systems. Chemical preservatives in RV holding tanks increase the threat to ground water quality from these facilities. At one time, the WDRs specified that wastes other than domestic sewage shall be excluded from the discharge. Consequently, the requirements prohibited the discharge of water softener regeneration brine and RV holding tank waste to the septic tank and leach line systems and required the discharger to provide impervious storage tanks for RV holding tank wastes. In order to comply with the WDRs adopted by the Regional Board prior to 1978, the RV campground managers required RVs to empty their holding tank wastes into the campground's dump station if the RV would be provided with sewer hookups. WDRs adopted after 1978 do not require the installation of impervious holding tanks at RV parks nor are RVs required to dispose of RV holding tank wastes to impervious tanks. Currently, most campgrounds and/or RV parks in the Region do not have impervious storage tanks for RV holding tank wastes.

In 1978, the Regional Board adopted Resolution No. 78-24, suspending all ground water monitoring requirements at the campgrounds until such time as a study by the State Board on RV waste disposal was completed and reviewed by the Regional Board staff. In June 1980, the Sanitary Engineering Research Laboratory at University of California, Berkeley published a report for the State Board entitled, "*Recreational Vehicle Waste Disposal in Roadside Rest Septic Tank Systems*". This report however, did not address the requirements for ground water monitoring.

A common problem with community systems is that individual property owners and homeowners associations often deny responsibility for system failure and necessary repairs. Additional problems result when private entities operate community systems and do not have sufficient funds available to correct problems. Consequently, prior to approval of projects proposing community subsurface disposal systems, the Regional Board requires as part of the Report of Waste Discharge, documentation from the proponent that demonstrates that adequate funding is available to operate and maintain the disposal systems.

VESSELS (RECREATIONAL, COMMERCIAL, AND NAVAL) AND MARINAS

Vessels of all types and sizes including recreational, commercial, and Naval craft, and the marinas (or other facilities) in which they berth can have serious impacts on water quality. This section will describe the most important waste categories, pollutants, and other water quality problems associated with vessels and marinas. A description of BMPs and applicable regulations is also included. Although presented below, it should be noted that vessels and marinas are typically considered a nonpoint source category.

San Diego Bay sailboat

VESSELS AND MARINAS IN THE SAN DIEGO REGION

There are approximately 8,400 boat slips in San Diego Bay, 2,400 in Mission Bay, over 1,000 in Oceanside Harbor, and over 1,500 in Dana Point Harbor. In addition to boats with assigned slips, there are several hundred additional boats moored at a variety of "free" anchorages. In San Diego Bay, the San Diego Unified Port District has organized two of its free anchorages into formal anchorages which have shoreside showers, rest rooms, and docking facilities. Boat owners are required to pay fees for these services.

In 1986, the San Diego Unified Port District was granted permission by the Coast Guard to establish additional formal anchorages in San Diego Bay. Because of the reluctance of some boat owners to pay fees for mooring in the bay, many have elected to move their boats to new free anchorages. Such anchorages can be especially important sources of human pathogens from vessel sewage releases. In addition to the vessels normally maintained in the water, there are several thousand additional "trailer" boats using San Diego's boat harbors. In total, approximately 55,000 vessels are registered in San Diego County.

NAVY VESSELS IN THE SAN DIEGO REGION

Home port to approximately one hundred US Navy vessels, San Diego Bay is one of the largest Naval ports on the west coast of the United States. As described above, Navy vessels are responsible for the same types of water quality impacts as other vessels. They are also subject to the same regulations and requirements as other vessels except that discharges from Naval vessels under certain circumstances are not subject to NPDES permits. A description of this exclusion (as found in Title 40, CFR, Part 122.3) was discussed earlier in this Chapter.

If enforcement action is necessary, operators of Naval vessels are subject to all of the same enforcement mechanisms outlined previously in this Chapter with one exception; the Navy is not subject to Administrative Civil Liability.

VESSEL WASTES

The most significant waste categories associated with vessels include:

- Hull maintenance related wastes;
- Sewage;
- Marine engine related wastes; and
- Trash.

Of these categories, hull maintenance related wastes, and particularly antifouling paint, is believed to pose the greatest potential threat to water quality. This is because of its high degree of toxicity. Antifouling paint, which is applied to vessel hulls, is specifically designed to prevent the growth and attachment of marine organisms by continuously releasing toxic substances into the surrounding water. Cuprous oxide and tributyltin fluoride or tributyltin oxide are the principal toxicants in copper-based and organotin-based paints, respectively. Although the use of TBT is now significantly limited, leaching pollutants from antifouling paints remains a widespread and serious concern especially in areas of high vessel density and low hydrologic flushing.

Antifouling paint may pose an even greater water quality threat during and after its removal from vessel hulls since the pollutants in the paint chip wastes may continue to leach into receiving waters. In most cases, because paint removal activities on ships are conducted in ship repair yards, responsibility for the paint chip wastes is transferred from the vessel owner to the shipyard. (See shipyards and boatyards discussion). The same is generally true for recreational craft serviced at boatyards. However, small craft can also obtain some hull maintenance services directly in the water by underwater hull cleaners. In addition to paint, other examples of hull maintenance wastes include strippers, cleaners, and cathodic protection products. Although a variety of pollutants can be released during hull maintenance activities, metals are the pollutants of greatest concern.

Sewage is often intentionally discharged directly into receiving waters due to the lack of pumpout stations, inconvenience or inoperation of pumpout stations, or the irresponsibility or ignorance of vessel operators. Human pathogens present in sewage include a variety of fecal bacteria and viruses. Today sewage discharges in recreational marinas are believed to be more significant than at Naval berthing areas. This is because all US Navy vessels are currently equipped to connect to pumpout facilities while in port.

Marine engine related wastes such as fuels, oils, lubricants, antifreeze, solvents, and polluted bilge water are commonly released from vessels into receiving waters. The pollutants of greatest concern for marine engine wastes are metals and petroleum hydrocarbons. PAHs are a particular concern because they tend to accumulate and persist in aquatic sediments for years, poisoning benthic organisms. Garbage and trash are also discharged from vessels.

Each of the above waste categories can be, and frequently are, washed, spilled, scraped, dumped, and pumped directly into receiving waters. As a result, each of the wastes can take a major toll on water quality and beneficial uses. The marine habitat and shellfish harvesting beneficial uses are particularly sensitive to vessel wastes.

Furthermore, each of the waste categories is relevant to all vessel types and sizes including recreational boats as well as commercial and Naval ships. However, because of a ship's greater size and corresponding greater magnitude, variety, and toxicity of wastes generated, ships (particularly Navy ships) are generally believed to pose a greater threat to water quality than boats. For example, Navy vessels are typically drydocked for hull maintenance only once every five or more years and spend more time in port or at anchor than underway. Fouling organisms attach more readily when a ship is stationary. For these reasons, Navy coating systems are required to be effective for longer periods of time than those applied to commercial and recreational vessels. Accordingly, Navy vessels are blasted to "white metal" meaning all paint is removed to bare metal and the surface is abraded in preparation for adherence of a complete new coating system. Additionally antifouling paints used on Navy vessels contain higher levels of toxicants than those used on commercial and recreational vessels.

Nevertheless there is a formidable set of water quality impacts associated with small craft and small craft marinas as described below.

MARINAS

Marinas and other boat berthing facilities typically have high boat densities and low hydrologic flushing. As a consequence of these characteristics, the following significant water quality problems often result within marinas:

- Increased pollutants in the water column;
- Decreased dissolved oxygen in the water column;
- Increased pollutants in aquatic sediment;
- Increased toxicity in the water column and sediments;
- Increased pollutants in the tissues of aquatic organisms; and
- Physical alteration or destruction of aquatic habitat.

The physical disruption, or destruction of wetlands, sediment, and other aquatic habitat is an especially troublesome impact. It is a result of both the original construction of the marina, ramps, and related facilities, as well as their ongoing use, operation, and maintenance.

Although most of the water quality problems listed above arise from the direct discharge of wastes by vessels, pollutants can also be transported into marina waters by way of storm water runoff from parking lots, docks, and other impervious surfaces.

Oceanside Harbor

CZARA(G) GUIDANCE FOR MARINAS

Most of the impacts listed above can be mitigated by utilizing best possible siting and design criteria for each marina. Construction and operation and maintenance practices are also crucial to protecting water quality. Recognizing the importance of this, USEPA developed fifteen specific management measures (BMPs) to protect coastal waters from nonpoint pollution from marinas and recreational boating.

The management measures for marinas which are grouped into two broad headings, (1) siting and design; and (2) operation and maintenance, were developed pursuant to section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 and are incorporated into the (g) guidance. As with all nonpoint source pollution protection measures, the key to protecting water quality in marinas is pollution prevention.

REGULATION OF VESSELS AND MARINAS

Management measures related to preventing pollutants, such as sewage, fuel and oil leaks, toxics, fish wastes, and hull scrapings from entering coastal waters are primarily the responsibility of the Regional Board. The Regional Board prohibits the discharge of these wastes through a variety of Basin Plan discharge prohibitions. The Board also encourages and participates in public education/awareness campaigns. The Harbors and Navigation Code section 151 prohibits the intentional or negligent discharge of oil to the waters of the state. Penal Code section 374(e) as amended in 1970 provides that any person who litters or places waste matter into any bay, lagoon, channel, river, creek, slough, canal or reservoir or body of water is guilty of a misdemeanor.

Local governments have significant authority to carry out these CZARA management measures through their zoning ordinances, and by using their police, fire, or building departments to ensure implementation.

The California Department of Pesticide Regulation regulates the application of antifouling paints. Regulations for organotin-based paints have been established which limit the TBT release rate, require application by certified commercial applicators, and allow application only on vessels at least 25 meters in length and/or aluminum hulls and parts. As described earlier, tributyltin fluoride or tributyltin oxide are the principal toxicants in organotin-based paints.

The Health and Safety Code section 4425 prohibits a vessel with a toilet from operating upon the waters of any lake, reservoir, or fresh water impoundment of this State unless the toilet is designed so that no human sewage can be discharged in such waters. This code section does not apply to rivers, estuaries or saltwater areas of California. Section 312 of the Clean Water Act provides that marine sanitation devices on board new or existing vessels must be designed to prevent the discharge of untreated or inadequately treated sewage into or upon the navigable waters of the United States (see discussion below on "No Discharge Zone"). The Marine Sanitation (section 775) of the Harbors and Navigation Code declares that every vessel terminal shall be equipped with vessel pumpout facilities for the transfer and disposal of sewage from marine sanitation devices in order to protect water quality.

NO DISCHARGE ZONE

Division 7 of the Water Code authorizes the Regional Board to regulate any discharge of waste, including sewage, to waters of the state. The federal Clean Water Act however partially preempts the state's authority to regulate vessel sewage discharges. Section 312 of the Clean Water Act provides that no state or local entity may adopt or enforce any laws regarding the design, manufacture, installation or use of marine sanitation devices (MSDs). Instead, USEPA must adopt federal standards of performance for MSDs which must be enforced and implemented through regulations adopted by the United States Coast Guard (USCG).

Marine sanitation devices either retain sewage or discharge treated sewage. If sewage is discharged, the effluent must meet USCG specified effluent standards described in 33 CFR 159, Coast Guard Regulations on Marine Sanitation Devices. Types I and II MSDs are flow-through systems which treat and discharge sewage. Type I MSDs produce an effluent having a fecal coliform bacteria count not greater than 1,000 per 100 ml and no visible floating solids. Type II MSDs produce an effluent having a fecal coliform bacteria count not greater than 200 per 100 ml and suspended solids not greater than 150 mg/l. Type III MSDs are holding tanks only and prevent the overboard discharge of treated or untreated sewage.

There is one significant exception to the federal preemption of a state's regulation of vessel sewage discharges. Clean Water Act section 312 (f) allows states to completely prohibit vessel sewage discharges into waters requiring greater water quality protection, provided that USEPA determines that adequate vessel sewage pumpout facilities are available for these waters.

In 1976 the State of California petitioned USEPA, pursuant to section 312 (f)(3) of the Clean Water Act, for a determination that adequate pump-out facilities were reasonably available for that portion of San Diego Bay that is less than 30 feet deep at MLLW; and for all of Mission Bay, Oceanside Harbor, and Dana Point Harbor (41 Federal Register 21516 May 26, 1976). On August 6, 1976, USEPA made the requested determination (41 Federal Register 34453 August 6, 1976).

As a result, the discharge of all sewage, treated or untreated, from all vessels is completely prohibited in all portions of Mission Bay, Oceanside Harbor, and Dana Point Harbor (regardless of vessel size or water depth). Mission Bay, Oceanside Harbor, and Dana Point Harbor are, in their entirety, "No Discharge Zones". (Note that this prohibition includes discharges from a properly functioning USCG certified MSD).

The discharge of all sewage, treated or untreated, from all vessels is completely prohibited in all portions of San Diego Bay that are less than 30 feet deep at MLLW. The No Discharge Zone in San Diego Bay is defined as all portions of the bay having a depth of less than 30 feet MLLW. In the absence of the no discharge zone (i.e., in those portions of San Diego Bay having a depth of 30 feet or greater), discharge of treated sewage through a properly functioning USCG certified Type I or II marine sanitation device is allowed. (USCG certification provides that the specified effluent limitations will be met). The discharge of untreated sewage from a Type III holding tank is not allowed under any condition in any portion of San Diego Bay (regardless of depth).

Because of dilution and circulation in San Diego Bay, it is assumed that the discharge of treated sewage into waters deeper than 30 feet from a properly functioning USCG certified Type I or II MSD will not degrade the bay's beneficial uses. Additionally, with the exception of a few recent uses (such as jet skiing and sail boarding), the REC I designated beneficial use occurs in shallow waters (i.e., in waters less than 30 feet). This supports the need for a complete prohibition in such shallow waters.

Furthermore, as a practical matter, it is not possible to regulate sewage discharges from all vessels in San Diego Bay. For example, some foreign vessels may not be equipped to use the existing pump-out facilities. Since the no discharge designation is conditioned upon the existence of adequate pump-out facilities, it was necessary to make an allowance in the prohibition for such vessels. These vessels require berthing accommodations outside of the designated area. (All US Navy vessels are equipped to connect to pump-out barges or pier-side sewage facilities).

Most small pleasure craft are equipped with either a Type I or II flow-through treatment device or a Type III holding tank, but rarely both. Those vessels equipped with only a flow-through treatment device must secure their device while in a No Discharge Zone in order to prevent overboard sewage discharges. Those vessels equipped with only a holding tank are required to utilize pump-out facilities at all times and may not discharge into any portion of any bay. In other words, a vessel in San Diego Bay with a holding tank may not move into water greater than 30 feet and discharge sewage from its holding tank.

A study of the levels of coliform and Enterococcus bacteria caused by vessel discharges is needed to allow the Regional Board to make decisions based on measured levels. The Regional Board could then advise the county health officer, the Port District, and the Coast Guard so appropriate actions could be taken to abate the effects of sewage discharges from vessels.

SHIPYARDS

This section contains a general discussion of shipyards, their threat to water quality, and regulatory complexity. A discussion specific to San Diego Bay shipyards is included near the end of this section.

Shipyard activities may result in the discharge of wastes to receiving waters. The presence of elevated concentrations of pollutants, primarily heavy metals, in the sediment adjacent to shipyards nationwide is well documented in the literature (see references). Although there are numerous other potential threats, the single most significant threat to water quality posed by shipyards is the potential discharge of abrasive blast waste to receiving waters.

SHIPYARD THREAT TO WATER QUALITY

From the perspective of protecting beneficial uses, a discharger's threat to water quality is critically important and plays a role in virtually all regulatory decisions. By definition, the basis of a discharger's threat to water quality is the effect the discharger would have on the receiving water if discharges occurred in violation of its NPDES permit. In other words, a discharger's threat to water quality is its potential for degrading water quality. The following six characteristics are relevant in evaluating a shipyard's threat to water quality: (1) primary activities; (2) facilities; (3) industrial processes; (4) materials used; (5) wastes generated; and (6) waste discharges to receiving waters (actual and potential). A discussion of each follows.

PRIMARY ACTIVITIES AT SHIPYARDS

The shipbuilding and repair industry is engaged in the construction, conversion, alteration, repair, and maintenance of all types of military and commercial ships and vessels. Shipbuilding and repair encompasses a large number and variety of activities and industrial processes including, but not limited to, formation and assembly of steel hulls; application of paint (coating) systems; installation and repair of a large variety of mechanical, electrical, and hydraulic systems and equipment; repair of damaged vessels; removal and replacement of expended or failed paint (coating) systems; and provision of entire utility/support systems to ships (and crew) during repair.

The list of occupations required to conduct these activities is also extensive, including sandblasters, painters, shipfitters, machinists, metalsmiths, welders/burners, blacksmiths, boilermakers, chemists, carpenters, coppersmiths, electricians, electronic technicians, joiners and patternmakers, laborers, riggers, pipefitters, and foundrymen. Not all occupations are present at all shipyards.

SHIPYARD FACILITIES

There are four major types of building/repair facilities at shipyards, which together with cranes, enable ships to be assembled, launched, or repaired. These facilities are graving docks/shipbuilding ways, floating drydocks, marine railways, and berths/piers. With the exception of berths and piers, the basic purpose of each facility is to separate the vessel from the bay and provide access to parts of the ship normally underwater.

Each facility type presents its own unique set of environmental concerns. Depending on size and capabilities, a single shipyard will generally have a combination of two or more of these facilities.

In addition to these facilities, shipyards must also conduct the wide range of support or complementary activities previously described. Many of these activities require their own facility, space, or shop; for example concrete platens (for steel fabrication), machine shop, pipe shop, electroplating shop, weld shop, sheet metal shop, electrical shop, coppersmith shop, blacksmith shop, carpentry shop, and boiler shop, etc. Not all facilities are present at all shipyards.

SHIPYARD INDUSTRIAL PROCESSES

The primary activities described above involve a multitude of industrial processes, many of which must be conducted over water or very close to the waterfront. Because they typically represent the greatest threat to water quality, the following discussion will focus primarily on the industrial processes conducted inside graving docks or floating drydocks.

Surface Preparation and Paint Removal

Methods of surface preparation and paint removal include dry abrasive blasting, wet abrasive or slurry blasting, hydroblasting, and chemical paint stripping. Each paint removal method has a unique purpose and poses its own set of water quality risks.

Dry abrasive blasting is the preferred method of preparing steel surfaces for application of a new paint (coating) system for saltwater immersion. It is used for most exterior hull work and virtually all interior tank work (e.g., fuel, bilge, ballast tanks etc). Dry abrasive blasting is the process in which blasting abrasive is conveyed in a medium of high pressure air, through a nozzle at velocities up to 450 feet per second resulting in very large quantities of solid waste and airborne particulates (dust). Although the most efficient of the paint removal methods, dry blasting produces the largest quantity of airborne particulates.

Wet abrasive or slurry blasting is the process in which water replaces air as the abrasive propellant. The use of water significantly reduces airborne particulate emissions but generates large quantities of wet residue and wastewater.

Hydroblasting is a process in which water under very high pressure is used instead of abrasive. Hydroblasting produces large amounts of wastewater and is primarily used at shipyards to remove marine growth, not to remove existing coatings. Chemical paint stripping is uncommon in drydocks and used primarily for removable parts.

Paint (coating) Application

After preparation, surfaces are painted. Most painting occurring in a drydock involves the ship hull and internal tanks. Painting is also conducted in other locations throughout a shipyard including piers and berths. Paint application is accomplished by way of air or airless spraying equipment.

Tank Cleaning

Tank cleaning operations utilize steam to remove dirt and sludge from internal tanks, particularly fuel tanks and bilges. Detergents, cleaners, and hot water may be injected into the steam supply hoses. Wastewater is generated.

Other Industrial Processes (graving docks/drydocks)

Other industrial processes conducted inside graving docks or floating drydocks include mechanical repair, maintenance, installation; structural repair, alteration, assembly; and integrity/ hydrostatic testing. Hydrostatic or strength testing (flushing) is conducted on hull, tanks, or pipe repairs and on new systems during ship construction phases. Hydrostatic testing generates significant water flow.

Other Industrial Processes (elsewhere)

Numerous other industrial processes take place at numerous other locations throughout a typical shipyard, including activities at a variety of repair and specialty shops. Examples include paint equipment cleaning; engine repair/ maintenance/ installation; pipe fitting; steel fabrication and machining; electrical repair/ maintenance/ installation; hydraulic repair/ maintenance/ installation; tank emptying; fueling; pattern making; shipfitting; boiler cleaning; carpentry; refurbishing/ modernization/ cleaning; air conditioning/ refrigeration repair; sheet metal fabrication; fiberglass repair; electroplating/ metal finishing; blacksmithing; zinc primer application; printing; and photo processing. As a result of these processes, an assortment of wastes are generated, many of which are hazardous.

MATERIALS USED AT SHIPYARDS

Materials commonly used at shipyards are described below beginning with those utilized during graving dock or floating drydock operations.

Abrasive Grit

Abrasive grit is typically slag from the smelting of copper ore and consists principally of iron. Trace elements such as copper, zinc and titanium may also be present in the slag. Sand, cast iron, or steel shot are also used as abrasives. Very large amounts of abrasive are needed to remove paint to bare metal. For example, removing paint from a 15,000 square foot hull can take up to 6-days and consume 87 tons of grit. Grit is needed in all dry and wet (slurry) abrasive blasting.

Fresh Paints

Fresh paints contain copper, zinc, chromium, and lead (all priority pollutants) as well as numerous hydrocarbons. The two major types of paints used on ship hulls are anticorrosive paints and antifouling paints. Anticorrosive paint (primers) include vinyl, vinyl-lead, or epoxy based coatings. Others contain zinc chromate and lead oxide. (Although newer paint formulations no longer include chromium and lead, such constituents may be present in shipyard wastes due to the removal of older coating systems).

Antifouling paints are designed to prevent growth and attachment of marine organisms by continuously releasing toxic substances into the water. Cuprous oxide and tributyltin fluoride or tributyltin oxide are the principal toxicants in copper-based and organotin-based paints, respectively.

Other Materials

Other materials used include oils (engine, cutting, and hydraulic); lubricants, grease; fuels; weld rod; detergents, cleaners; rust inhibitors; paint thinners; hydrocarbon and chlorinated solvents; degreasers; acids; caustics; resins; adhesives/ cement/ sealants; cyanide; zinc (e.g., zinc dust); chlorine; and mercury.

WASTES GENERATED AT SHIPYARDS

The major categories of wastes commonly generated by shipyard industrial processes are discussed below. Wastes resulting from graving or floating drydock operations are presented first.

Abrasive Blast Waste

Abrasive blast waste, consisting of spent grit, spent paint, marine organisms, and rust is generated in very large quantities during all dry or wet abrasive blasting procedures. The constituent of greatest concern with regard to toxicity is the spent paint, particularly the copper and tributyltin antifouling components, which are designed to be toxic and designed to continuously leach into the water column. Other priority pollutants in paint include zinc, chromium, and lead. Although the grit itself is not highly toxic, it is a major component in the large solid waste load and is settleable. As a result, its deposition can degrade the benthic community and increase the need for dredging. Abrasive blast waste can be conveyed by water flows, become airborne (especially during dry blasting), or fall directly into receiving waters. Wet abrasive blasting of a Naval DDG class destroyer (437-536 feet long; 47-67 feet wide; 15-20 feet draft) can generate up to 180 tons of solid wet abrasive waste.

Paint Losses

Paint losses, or paint which ends up somewhere other than its intended location (e.g., drydock floor, bay, worker's clothing), results from spills, drips, and overspray. Typical overspray losses are estimated at approximately 5% for air spraying and 1-2% for airless spraying.

Bilge Waste/Other Oily Wastewater

This is generated during tank emptying, leakages, and cleaning operations (bilge, ballast, fuel tanks). In addition to petroleum products (fuel, oil), tank washwater may also contain detergents or cleaners (nitrogen and phosphorus compounds) and can be generated in large quantities.

Blast Wastewater

Wet abrasive (slurry) blasting and hyrdoblasting generates large quantities of wastewater. Wet abrasive blasting of a Naval DDG class destroyer can generate up to 500,000 gallons of contaminated water. In addition to suspended and settleable solids (spent abrasive, paint, rust, and marine organisms) and water, blast wastewater may also contain rust inhibitors such as diammonium phosphate and sodium nitrite.

Other Wastes

These include oils (engine, cutting, and hydraulic); lubricants, grease; fuels; waste paints/ sludge/ solvents/ thinners; construction/ repair wastes and trash; asbestos (from ship refurbishing/ modernization); sewage (black and grey water from vessels or docks); boiler blowdown, condensate, discard; spent hydrocarbon or chlorinated solvents; electroplating/ metal finishing wastes; acid wastes; caustic wastes; and aqueous wastes (with and without metals).

SHIPYARD WASTE DISCHARGES TO RECEIVING WATERS

Actual and potential waste discharges to receiving waters from typical shipyard operations are discussed below. Most are either the direct result of an industrial process (drydock, marine railway, or berth operations) or, more commonly, the result of water coming into contact with wastes, typically spent abrasive blast waste. There are numerous sources of water at a shipyard including: industrial processes; building or repair facilities (e.g., drydock); vessels under repair (e.g., cooling water); bay water (e.g., due to tidal influence or wave action); storm water; or other sources.

Actual and potential waste discharges to receiving waters include: floating drydock deballasting (tanks); floating drydock submergence/ emergence (platform); floating drydock operations; graving dock dewatering; gate leakage; hydrostatic relief flows; shipbuilding ways dewatering/ gate leakage/ relief flows; marine railway operations; berth and pier operations; storm water; integrity/ hydrostatic testing discharge (new vessels); boiler and cogeneration feedwater; fire protection system discharge; cooling water; and miscellaneous water flows.

SHIPYARD COMPLEXITY

From a regulatory and environmental control standpoint, shipyards present a unique and difficult problem. Traditional NPDES dischargers generate or intake wastewater, treat it to specified effluent limits, and discharge treated effluent, often by way of a single pipe. Unlike traditional dischargers, shipyards are significantly more complex in all respects: numerous and diverse industrial processes; numerous discharge mechanisms, waste streams, and discharge points; and Best Management Practices Plan based permits. Each is discussed below.

Numerous and Diverse Industrial Processes

As described previously, shipyards conduct a large number and broad range of industrial processes which require a wide range of facilities and substantial workforce.

Numerous Discharge Mechanisms, Waste Streams, and Discharge Points

Shipyards are complex to regulate because they have numerous discharge mechanisms, discharge points, and waste streams. A less complex discharger will typically have a single or small number of each. A discussion of abrasive blast waste with respect to discharge mechanisms, discharge points, and waste streams follows. Abrasive blast waste is discharged primarily as a result of graving dock flooding, drydock immersion, drainage, or runoff. In other words, at shipyards, the principle mechanism by which wastes are conveyed to receiving waters is via the contact of wastes with water, both of which occur in large quantities. For this reason, storm water and storm drain inlets are of particular concern at shipyards. Abrasive blast waste can also become subject to tidal or wave action. Airborne releases represent another important discharge mechanism. Because abrasive blast waste is generated in part as airborne particulates, such releases to receiving waters pose a significant threat to water quality. Furthermore, and because of their proximity to receiving waters, a third discharge mechanism exits at shipyards. Direct discharges from shipyards occur when wastes are allowed to fall directly into receiving waters (off the end drydock, edge of pier, between gratings, etc).

In summary, because abrasive blast waste can be washed, hosed, pushed, blown, become subject to tidal/wave action, and be directly or otherwise discharged, the potential for abrasive blast waste from shipyards to enter receiving waters is great. In addition to multiple discharge mechanisms, numerous waste streams, and discharge points also exist at shipyards. The discharges described above can potentially enter receiving waters from numerous shipyard worksites including graving docks, drydocks, marine railways, piers, repair/ specialty shops, as well as via storm drains and sheet flow runoff.

Best Management Practices Based Permits

Unlike traditional NPDES discharges which are regulated by numerical effluent limits, the control of waste discharges from shipyards is accomplished by the implementation of BMP plans. The purpose of a BMP plan is to prevent, reduce, or eliminate the spillage or illicit discharge of pollutants into receiving waters and can include any number of preventive controls or measures. Due to the types of activities and multiple discharge pathways, numerical effluent limitations are not practical at shipyards. The evaluation of the effectiveness of BMP Plans from a regulatory standpoint is more complicated and resource intensive than comparison of end-of-pipe monitoring results to numerical effluent limitations.

LONG-TERM EFFECTS OF SHIPYARD DISCHARGES ON WATER QUALITY AND BENEFICIAL USES

Unlike short lived pollutants (e.g., BOD and bacteria) the type of pollutants present in shipyard discharges are typically long-lasting. Shipyard pollutants, such as heavy metals and PAHs are persistent in the marine environment, in part, because they can become attached to sediment particles and can accumulate to high concentrations in both sediments and in marine organisms. Once incorporated into sediment and tissues, these pollutants are very difficult to remove and may recycle in the marine system indefinitely. Because sediment cleanup projects are difficult, expensive, and lengthy, contaminated sediment can remain in place, adversely affecting beneficial uses and water quality, for many years.

SAN DIEGO BAY SHIPYARDS

The following discussion is specific to San Diego Bay shipyards.

NPDES Permits

There are currently four commercial shipyards in the San Diego Region, all of which are located adjacent to San Diego Bay. All of the shipyards are currently regulated under individual NPDES permits which are BMP based, rather than based on effluent limits. The shipyard permits also include standard receiving water limitations and discharge prohibitions. Additionally, all of the shipyards are also subject to the statewide General Industrial Storm Water Permit.

Threat to Water Quality and Best Management Practices

Although the discussion above was intended as a general description of the shipyard industry as a whole, the majority of the information is applicable to the San Diego Bay shipyards. One notable exception is that wet abrasive or slurry blasting and chemical paint stripping are currently not conducted at San Diego Bay shipyards.

By definition a discharger's threat to water quality is its potential to cause damage to water quality and beneficial uses under worst case conditions, i.e., assuming all BMPs and treatment measures fail. For this reason, the general shipyard discussion on threat to water quality focuses on potential risks rather than on BMPs. As described, a shipyard's potential risks to water quality are significant in many respects. BMPs are specifically designed to reduce those risks and are therefore extremely important for shipyards. Hence, the second reason to focus on potential risks is to emphasize the need for effective BMPs at shipyards.

San Diego shipyards report strict adherence to a large number of BMPs to control water and airborne wastes during a variety of industrial processes. Such BMPs include physical and procedural controls. Physical controls isolate runoff pathways from contact with abrasive blast wastes through the use of shrouding, sealing of drains, and diversion of sump discharge pathways. Procedural control methods include dock sweeping and elimination of sources of runoff during blasting operations. The shipyards also report the effective management of their wastes including treatment, recycling, and disposal in compliance with the San Diego County Hazardous Materials Management Division, their San Diego Metropolitan Industrial Waste Program permits, and the San Diego County Air Pollution Control District.

Contaminated San Diego Bay Sediment and Mussels

Regional Board staff has reviewed the results of sediment samples collected adjacent to the shipyards in San Diego Bay. Elevated concentrations of copper, tributyltin, and zinc exist in these sediments. Copper, tributyltin and zinc are contained in both the materials used by San Diego Bay shipyards as well as in the wastes which they generate. Furthermore elevated concentrations of copper, tributyltin, and zinc have also been measured in the tissues of mussels collected from stations located adjacent to San Diego Bay shipyards.

Although this data may suggest that the BMPs employed by San Diego Bay shipyards are not effective, it may also represent historical discharges which occurred at a time when BMPs were not carefully implemented. Regional Board staff plans to investigate the matter further. The existence of contaminated sediment adjacent to the shipyards serves to further underscore the importance of shipyard BMPs.

SHIPYARDS – GENERAL CONCLUSIONS

In summary, shipyards typically pose a significant threat to water quality for the following reasons. Relative to other regulated dischargers, shipyards conduct a large number and wide variety of activities and industrial processes. The conduct of these industrial processes requires numerous physical facilities and a large number, amount, and variety of materials. As a result, a large number, amount, and variety of wastes are generated and are, or may be, discharged to receiving waters. Shipyard discharges have the potential to cause the long-term loss of a designated beneficial use in receiving waters.

From a regulatory perspective, shipyards are complex. Toxic pollutants are, or could be, present in wastes discharged to receiving waters from shipyards. They have numerous discharge points and are regulated by permits which do not contain numeric effluent limits. Shipyards are typically "major" NPDES dischargers and require a high level of regulatory effort.

In conclusion, because shipyards pose a significant threat to water quality and are complex to regulate, the BMPs which they employ (to reduce or eliminate the discharge of wastes to receiving waters) are extremely important. It is critical that shipyard BMPs are effective and diligently implemented.

BOATYARDS

There are currently 12 boat building and boat repair facilities (commonly called boatyards) adjacent to receiving waters in the San Diego Region. Most of the boatyards are located adjacent to San Diego Bay, while Mission Bay, Oceanside Harbor, and Dana Point Harbor are serviced each by a single boatyard. Additional boatyards are located in inland areas of the Region. Seven of the boatyards located adjacent to receiving waters are currently regulated under an individual NPDES permit. Eventually all of the waterfront boatyards will be regulated under an individual NPDES permit. Additionally, all of the boatyards in the Region are currently subject to the statewide General Industrial Storm Water Permit. Like the shipyard permits, boatyard permits do not contain numeric effluent limits but are based instead on BMPs.

The most significant waste categories associated with boatyards include hull maintenance related wastes and marine engine related wastes. Hull maintenance related wastes, and particularly antifouling paints, are believed to pose the greatest threat to water quality from boatyard operations. Cuprous oxide (copper) and TBT fluoride or TBT oxide are the principle toxicants in antifouling paint used at boatyards. Marine engine related wastes include fuels, oils, lubricants, antifreeze, solvents, and bilge water. The pollutants of concern from marine engine wastes are metals and petroleum hydrocarbons. PAHs are of particular concern because they persist in the marine environment. Implementation of BMPs is the key to controlling boatyard waste discharges to receiving waters.

GROUND WATER DEWATERING

A number of dewatering operations are associated with construction projects for foundations, bridges, roads, etc. Other dewatering operations are ground water remediation projects which are required under Cleanup and Abatement Orders issued by the Regional Board. Many of the proposed dewatering operations are located where petroleum or other pollutants plumes exist. Petroleum or other pollutants may be pumped from the ground water and discharged to a storm drain and subsequently to a water of the United States.

Since the mid-1980's, the Regional Board has regulated dewatering operations under the NPDES permit process. Two general NPDES permits have been adopted by the Regional Board which regulate discharges from ground water remediation projects and discharges from ground water dewatering operations to surface waters of the United States.

The first permit, Order No. 2000-90, NPDES No. CAG919001 regulates temporary ground water extraction and similar waste discharges to San Diego Bay and storm drains or other conveyance systems tributary thereto. This Order prohibits ground water extraction waste discharges to San Diego Bay from new permanent ground water extraction operations.

The second permit, Order No. 2001-96, NPDES No. CAG919002 regulates ground water extraction waste discharges from construction, remediation, and permanent ground water extraction projects to surface waters within the San Diego Region except for San Diego Bay.

In addition, the Waiver Order described earlier in this Chapter waives WDRs for short-term construction dewatering operations where there is no discharge to surface waters.

DREDGING AND DISPOSAL OF DREDGE SPOIL

REGULATORY FRAMEWORK FOR DREDGED MATERIAL DISPOSAL

FEDERAL STATUTES AND REGULATION

The regulation of dredged material disposal in waters of the United States (US) on a federal level is a responsibility shared by the USEPA and the USACOE. The Marine Protection, Research and Sanctuaries Act, also called the Ocean Dumping Act, is the primary federal environmental statute governing the discharge of dredged material to the ocean. The Clean Water Act is the primary federal statute governing the discharge of dredged and/or fill material into US waters. Material dredged from waters of the US and disposed in the territorial sea is evaluated under the Marine Protection, Research and Sanctuaries Act unless the material discharged is for the primary purpose of fill (e.g., beach replenishment, island creation, or underwater berms), in which case the disposal is evaluated under the Clean Water Act [33 CFR 336.0(b)]. Other applicable federal statutes and regulations include the following.

The Rivers and Harbors Act of 1899

The Rivers and Harbors Act of 1899 (33 USC 401 et. seq.) requires a USACOE permit for any work or structure, including fill material discharges, in navigable waters of the United States. The primary purpose of section 10 of this act is to ensure that structures (i.e., disposal berms, piers, pipelines, bridges, wharfs) constructed in navigable waters do not adversely affect federal interstate navigation.

The Fish and Wildlife Coordination Act of 1958

The Fish and Wildlife Coordination Act requires that, for any proposed federal project or permit that may affect a stream or other body of water, the USACOE must first consult with federal and state fish and wildlife agencies. This consultation addresses the prevention of damages to wildlife resources and provides for the development and improvement of wildlife resources.

The Endangered Species Act of 1973

Section 7(a)(2) of the Endangered Species Act (ESA), as amended (16 USC 1531 et. seq.) requires federal agencies, in consultation with the Secretaries of Interior (represented by the US Fish and Wildlife Service) and Commerce (represented by the National Marine Fisheries Service), to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species.

The Coastal Zone Management Act of 1972

The Coastal Zone Management Act (16 United States Code (USC) 1451 et. seq.) authorizes a federal program for the effective management, beneficial use, protection and development of the coastal zone. The act requires the USACOE to coordinate permit review and federal projects with all state level coastal zone review agencies. Under this act, coastal states are required to formulate a management program for the land and water resources of its coastal zone, which extends out to the seaward limit of the territorial sea, and submit it for approval to the Secretary of Commerce. In 1977, the California Coastal Management Program was approved.

Overview of the Clean Water Act

California tree frog

Section 404 of the Clean Water Act requires the USEPA, in conjunction with the USACOE, to promulgate guidelines for the discharge of dredged or other fill material to ensure that such proposed discharge will not result in unacceptable adverse environmental impacts to waters of the United States. Section 404 assigns to the USACOE the responsibility for authorizing all such proposed discharges, and requires application of the guidelines in assessing the environmental acceptability of the proposed action. The USACOE and the USEPA also have authority under section 230.80 to specify, in advance, sites that are either suitable or unsuitable for the discharge of dredged or fill material in US waters. In addition, Clean Water Act section 401 provides the States a certification role as to project compliance with applicable water quality standards.

Clean Water Act, Section 401 Certification State of California

The Clean Water Act, section 401 gives the states authority to grant, deny, or waive certification for a federally permitted or licensed activity that may result in a discharge to waters of the United States. Any applicant for a federal permit which conducts any activity which may result in any discharge into the navigable waters of the State must present to the permitting agency a certification (or waiver of certification) from the State that any such discharge will comply with the applicable Clean Water Act provisions of section 301, 302, 303, 306, and 307. The certification issued by the State should establish relevant effluent limitations, monitoring requirements, and standards or performance which become conditions of the federal permit. In California, the responsibility for section 401 certification is assigned to the State Board and regional boards. After review of data submitted by an applicant, and any other information available as to whether the proposed activity will comply with all applicable water quality standards, limitations and restrictions, the Regional Board may:

- Waive water quality certification;
- Issue waste discharge requirements; or,
- Recommend approval with or without conditions, or denial of water quality certification, to the State Board.

In order to grant section 401 certification, the State Board must certify that the proposed discharge will not result in unacceptable adverse environmental impacts to waters of the United States.

For a project to proceed, a waiver of certification or waste discharge requirements must be obtained from the Regional Board or a certification with or without conditions must be obtained from the State Board, indicating the Board's concurrence with the decision that the proposed action is not expected to cause a violation of the State's water quality standards.

STATE STATUTES AND REGULATIONS

The State of California has several programs that parallel or overlap many of the listed federal Acts. Relevant state statutes and regulations include the following:

- Water Code, Division 7 (Porter-Cologne Water Quality Control Act);
- State Board and Regional Water Quality Control Board Plans and Policies;
- Water Code, Division 4 (California Bay Protection and Toxic Cleanup Act);
- California Fish and Game Code;
- California Environmental Quality Act; and
- California Coastal Zone Management Act.

The primary statutory state law pertaining to the regulation of water quality and sediment control issues is the Porter-Cologne Water Quality Control Act which is contained in Division 7 of the Water Code.

California Water Code, Division 7 (Porter-Cologne Water Quality Control Act)

Dredging and dredged material disposal is an ongoing activity at harbors within the San Diego Region. The discharge of dredged or fill material which comes within the purview of section 404 of the federal Clean Water Act is not subject to regulation under the NPDES permit program (Clean Water Act section 402). However, if the project involves the discharge or potential discharge of waste (e.g. dredge spoils, dredge spoil return water, etc.) which may adversely impact water quality, then the discharge may be regulated through the issuance of WDRs. WDRs are issued by the Regional Board pursuant to the Porter-Cologne Water Quality Control Act.

The Regional Board is concerned with turbidity, dissolved oxygen depletion, and other physical, chemical, and biological parameters in the receiving waters which are impacted by dredge/fill projects. In recent years, there has also been concern about the concentrations of chemicals in the material to be dredged. Harbor areas may contain high levels of contaminants in bottom sediments due to navigational use, and due to wastes from urban, industrial, and riverine sources. For projects involving dredging the proponent is required to submit a Report of Waste Discharge (RWD) in application for WDRs. The RWD must include a characterization of the material to be removed to determine whether the proposed project is expected to meet all applicable water quality standards, limitations, restrictions and discharge prohibitions. The decision to issue or waive WDRs for dredging projects is made on a case-by-case basis regardless of dredge spoil volume. Disposal of dredge material at authorized open-ocean disposal sites (e.g., LA-5 Ocean Dredged Material Disposal Site) fall under the jurisdiction of the USEPA and the USACOE. However, because of the potential threat to water quality due to dredging operations, the Regional Board may still issue a WDR for the actual dredging portion of the project.

Adopted WDRs typically require monitoring for dissolved oxygen, turbidity and, where concentrations of chemicals in the sediments are high, monitoring for chemical constituents. Monitoring may be required of the receiving water at the dredge site or at the disposal site(s), and of the dredge spoil return water if applicable.

Enforcement Process for Contaminated Sediment

Dredging is often part of the remediation process for contaminated sediments in marine waters. The Regional Board under the authority of the Water Code section 13304 may issue a cleanup and abatement order to require an identified responsible party which caused the discharge of chemical constituent(s) present in a contaminated sediment to remediate or effect cleanup of the contaminated sediment.

Specific directives of cleanup and abatement orders issued for remediation or cleanup of contaminated sediments typically direct the responsible party to:

- Quantify the lateral and vertical extent of the contaminated sediment;
- Examine the engineering feasibility of the following alternative sediment cleanup/ remediation strategies;
  - ✓ Complete removal of all contaminated sediment;
  - ✓ Removal or remediation of contaminated sediment to a level that will conform with water quality objectives and protect/ restore beneficial uses; and
  - ✓ No action alternative level - The "no action" alternative level involves reliance upon natural processes for the remediation of contaminated sediment sites;
- Examine the cost of sediment cleanup/ remediation to various cleanup/ remediation levels; and
- Examine the environmental consequences of sediment cleanup/ remediation to various cleanup/remediation levels.

State Water Resources Control Board and Regional Water Resources Control Board Plans and Policies

State plans and policies which affect dredging and disposal of dredge spoil include the Ocean Plan, the (Resolution No. 74-43), the Basin Plan, and any other applicable plans or policies.

Ocean Plan

The Ocean Plan establishes general requirements for waste discharges which could affect state ocean waters. For dredge/fill projects, this may include discharges associated with dredging operations, dredge spoils disposal including beach replenishment, or discharge of dredge spoil return water. The Ocean Plan requirements are incorporated into WDRs issued by the Regional Board for dredge/fill projects.

Water Quality Control Policy for the Enclosed Bays and Estuaries of California

This policy requires that dredge spoils to be disposed of in bay and estuarine waters must comply with federal criteria for determining the acceptability of dredged spoils to marine waters, and must be certified by the State Board or Regional Board as in compliance with state plans and policies. Dredging must also comply with applicable discharge prohibitions contained in the policy (i.e., the policy prohibits the direct or indirect discharge of silt, sand, soil, clay, or other earthen materials from onshore operations including mining, construction, agriculture, and lumbering, in quantities which unreasonably affect or threaten to affect beneficial uses).

California Bay Protection and Toxic Cleanup Act

The California Bay Protection and Toxic Cleanup Act (Water Code, Division 4, Chapter 5.6, sections 13390-13396) requires the Regional Board to identify and characterize toxic hot spots in bays and estuaries and ocean waters of the state and plan for cleanup or remediation of the sites. Furthermore, CWC section 13396 states that no person shall dredge or otherwise disturb a toxic hot spot without first obtaining Clean Water Act section 401 certification or WDRs. Dredging projects involving removal or disturbances of sediments at toxic hot spots must meet the following conditions to the satisfaction of the Regional Board:

- The polluted sediment will be removed in a manner that prevents or minimizes water quality degradation.
- Polluted dredge spoils will not be deposited in a location that may cause significant adverse effects to aquatic life, fish, shellfish, or wildlife or may harm the beneficial uses of the receiving waters, or does not create maximum benefit to the people of the state.

- The project or activity will not cause significant adverse impacts upon a federal sanctuary, recreational area, or other waters of significant national importance.

California Coastal Zone Management Act

The California Coastal Zone Management Act requires that the dredging of coastal waters and estuaries be limited where feasible to maintaining navigational depths [section 30233(a)(2)]. Section 30233(b) further encourages the transportation of dredged material so generated and determined to be suitable for beach replenishment to appropriate beaches or into suitable long shore current systems.

California Fish and Game Code

Dredging operations and the disposal of dredge spoil and dredge spoil return water are subject to applicable sections of the California Fish and Game Code, especially those pertaining to:

- Water pollution (Division 6, Chapter 2, section 5650);
- Endangered species (Division 3, Chapter 1.5, sections 2050 - 2098); and/ or the
- Alteration of any river, stream or lake (Division 2, Chapter 6, section 1601 and section 1603).

California Environmental Quality Act of 1973

The Regional Board may not adopt WDRs for a dredge/fill project until the California Environmental Quality Act (CEQA; P.R.C. 21000-21177) requirements have been satisfied. CEQA requires full public disclosure of a project and the assurance that environmental factors are considered in the decision making process. CEQA requires one of the following:

- An Environmental Impact Report;
- A Categorical Exemption; or
- A Negative Declaration.

HISTORY OF DREDGE AND FILL PROJECTS

SAN DIEGO BAY

San Diego Bay Bridge

Dredging of San Diego Bay has occurred for a variety of reasons. San Diego Bay is a major port for commercial and military vessels. In order to provide adequate water depths for navigation and berthing of vessels, dredging projects are required from time-to-time to maintain existing water depths or to increase depths to accommodate these vessels. Significant dredging first occurred within San Diego Bay in the early 1900's.

The volume of material dredged from San Diego Bay over the years is estimated to be between 180 and 190 million cubic yards (mcy) (Smith, 1977 from US Navy, Sept. 1992). About 5 to 8 mcy was disposed at ocean dumping sites, about 35 mcy was placed along Silver Strand beach, and about 147 mcy was used around the Bay as fill. Most of this material was placed prior to 1970. During 1992 and 1993, there were a total of fifteen recent, ongoing, and future dredge and fill projects in San Diego Bay for a total volume of about 3.7 mcy. The US Navy anticipates dredging an additional 13 mcy through 1998.

OTHER AREAS

There is on-going maintenance dredging in other areas throughout the San Diego region.

These areas include:

- Agua Hedionda Lagoon;
- Mission Bay; and
- Oceanside Harbor.

Mission Bay and San Diego River

Additional areas which have dredging projects scheduled include the following:

- Batiquitos Lagoon;
- Murrieta Creek;
- San Marcos Creek; and
- Santa Margarita River.

DISPOSAL OF DREDGED MATERIAL

Disposal of dredged material is a necessity whenever a dredging project is undertaken. There are alternatives for disposal available within the San Diego Region, including several which can yield significant environmental benefits. However, disposal of dredged material can be a significant problem when there is toxic contamination of the dredged materials. Prior to dredging, physical, chemical, and biological testing of the sediment have been required in order to determine the appropriate alternative for disposal of the dredged material. Potential alternatives for the disposal of dredged material from San Diego Bay include:

- Beach replenishment;
- Habitat restoration/ enhancement;
- Ocean disposal;
- Incineration;
- Upland disposal without treatment;
- Upland disposal with treatment;
- Confined aquatic disposal; and
- Reuse sites such as capping.

Physical Characteristics of Dredged Material

Evaluation of the physical characteristics of sediments proposed for discharge is necessary to determine potential environmental impacts of disposal, the need for additional chemical or biological testing, as well as potential beneficial use of the dredged material. The physical characteristics of the dredged material include: particle-size distribution, water content or percent solids, specific gravity of solids, and plasticity characteristics. The sediment physical characteristics should also be evaluated from the standpoint of compatibility with different kinds of biological communities likely to develop for the disposal environments under consideration.

Chemical Characteristics of Dredged Material

The initial screening for contamination is designed to determine, based on available information, if the sediments to be dredged contain any contaminants in forms and concentrations that are likely to cause unacceptable impacts to the environment. During this screening procedure, specific contaminants of concern are identified in a site-specific sediment so that any subsequent evaluation is focused on the most pertinent contaminants.

Physical behavior of the material at the disposal site

Physical testing and assessment should focus on both the short-term and long-term physical behavior of the material. For open-water alternatives, these assessments might include an analysis of water-column dispersion, mound development, and long-term mound stability or dispersion. For confined alternatives, these assessments might include an analysis of solids retention and storage requirements during disposal and long-term consolidation behavior in the confined disposal facility.

Any contaminant testing should focus on those contaminant pathways where contaminants may be of environmental concern, and the testing should be tailored to the available disposal site. For open-water alternatives, contaminant problems may be related to either the water column or benthic environment, and the appropriate testing and assessments would include required Clean Water Act or MPRSA testing. For confined sites, potential contaminant problems may be either water quality related (return water effluent, surface runoff, and ground water leachate), contaminant uptake related (plant or animal), or air related (gaseous release).

Traditional locations for disposal of non-contaminated dredged material have included nearshore ocean waters along Silver Strand, in-bay waters of the Naval Amphibious Base Coronado, and the LA-5 Ocean Dredged Material Disposal Site (LA-5).

Dredging permits issued during the past twenty years have allowed about 10 mcy of material to be disposed either on Silver Strand beaches or LA-5. Chemical testing data for projected future US Navy projects suggest that 92 percent of the material planned to be dredged from San Diego Bay will qualify for placement at either habitat enhancement sites, Silver Strand beaches or at LA-5.

Material which is not physically compatible with the receiving disposal site may qualify to be disposed of at LA-5. Material which cannot meet either the 404(b)(1) Guidelines or the USEPA ocean dumping criteria must be disposed in a different manner.

Beach Replenishment

Shore erosion is a major concern along the coast of the San Diego Region. Beach replenishment is usually accomplished by dredging sand from inshore or offshore locations and transporting the sand by truck, by split-hull hopper dredge, or by hydraulic pipeline to an eroding beach (e.g., Silver Strand beach). These operations may result in displacement of the substrate, changes in the topography or bathymetry of the borrow and replenishment areas, and destruction of nonmotile benthic communities. However, a well-planned beach nourishment operation can minimize these effects by taking advantage of the resiliency of the beach and nearshore environment and its associated biota, and by avoiding sensitive resources. When dredged material is used for beach replenishment it should closely match the sediment composition of the eroding beach and be low in fine sediments, organic material, and pollutants. The USACOE requires that dredged sediments proposed for placement on a beach must be:

- Particles mostly greater than 74 microns (i.e., sand, gravel or rock);
- Compatible with sediments on the receiving beach; and
- Substantially the same as the disposal site.

Generally, the disposal of clean, sandy material on beaches poses no present problem in terms of sediment quality, quantity, or feasibility. In fact, to be consistent with the California Coastal Management Plan, every effort must be made to beneficially use sandy material for beach nourishment or habitat restoration/ enhancement.

Habitat Restoration/ Enhancement

Restoration/ enhancement of wetlands is an alternative that can benefit the environment. In general, restoration of a former wetland is more likely to be successful than creation of a new wetland where none had existed previously. In selecting a site, alteration of substrate and changes in circulation and sedimentation patterns should be considered. In general, the material used for wetland restoration should remain water-saturated, reduced, and near neutral in pH. These characteristics have a great influence on the environmental activity of any chemical contaminants which may be present.

Ocean Disposal

The ocean water disposal technique involves placing the dredged sediment in open ocean waters at an USEPA approved site. The suitability of dredged sediment for open-water disposal is evaluated by effects-based testing as there are no sediment criteria.

In situations where the contaminated sediment will not meet USEPA's or the Corps of Engineers' criteria for ocean disposal, the sediment must be treated to meet those criteria by physical, chemical, biological, or thermal treatment methods.

LA-5 Ocean Dredged Material Disposal Site

LA-5 received final designation from the USEPA in 1991. This site has been used for the disposal of dredged material since the 1970's and has no capacity or dumping rate restrictions. About 4 mcy were disposed there by the USACOE between 1977 and 1987. About 2.5 mcy were deposited by the US Navy, the National Steel and Shipbuilding Corporation, and Southwest Marine, Inc. during that same period (USEPA, 1988). The LA-5 site is a non-dispersive open water disposal site. Most of the material placed here is intended to remain on the bottom following placement. This site is located 11 km (5.4 nm) southwest of Point Loma on the continental shelf in 147 to 200 m (80 to 110 fm) of water. The center coordinates of the site are 32º 36' 83" North latitude and 117º 20' 67" West longitude, with a radius of 910 m (1,000 yd).

Upland (Landfill) Disposal without Treatment

Upland disposal is the process of placing dredged material into or onto a properly permitted solid waste disposal facility or landfill, or into a structure specifically designed to accept dredged material. This upland disposal alternative is used when the dredged material does not qualify for any aquatic disposal alternative.

Upland (Landfill) Disposal with Treatment

The landfill disposal with treatment technique refers to situations where the contaminated sediment will not meet state criteria for landfill disposal without the employment of physical, chemical, biological or thermal treatment methods.

Confined Disposal

Confined disposal is placement of dredged material within diked nearshore or upland confined disposal facilities via pipeline or other means. Confined disposal facilities are designed and operated to provide adequate storage capacity for meeting dredging requirements and to maximize efficiency in retaining the solids. If contaminants are present in the dredged material, then control of contaminant releases is important in the design and operation of the confined disposal facility. In most cases confined disposal facilities must be used over a period of many years, storing material dredged periodically over the design life. Long-term storage capacity of these confined disposal facilities is therefore a major factor in design and management. Once water is drained from the confined disposal facility following active disposal operations, natural drying forces begin to dewater the dredged material, adding additional storage capacity.

Reuse Sites – Capping

Capping can be done in place or through the controlled accurate placement of contaminated material at an open water disposal site. Capping in place is a type of non-removal action and refers to the placement of a clean cover material over the contaminated sediment. Capping can also be done by the accurate placement of contaminated material at an open water disposal site followed by a covering or cap of clean isolating material.

In both cases, the purpose of the cover material is to minimize or prevent the migration of contaminants from the sediment to the water column. In remedial actions involving capping, monitoring is needed to ensure that the integrity of the cap is maintained. The key elements of the monitoring program may include the monitoring of:

- Changes in cap thickness;
- Erosion around cap boundaries; and/ or
- Possible leakage of contaminants from the cap.

PROBLEMS POSED BY DREDGING SEDIMENT / CONTAMINATED SEDIMENT

Many chemical substances discharged into marine waters tend to become attached to sediment particles and thus accumulate to high concentrations in benthic sediments. The dredging process can disturb bottom sediments leading to the release of pollutants into the water column by resuspension of contaminated sediment particles; dispersal of interstitial water in the sediment pores; and desorption of chemicals from the contaminated sediment. Common toxic constituents of many sediments include ammonia, low dissolved oxygen and hydrogen sulfide.

ENVIRONMENTAL THREAT ASSOCIATED WITH CONTAMINATED SEDIMENTS

Benthic marine sediments support biological communities which reside there (e.g., clams, worms, bottom feeding fish), and provide spawning habitat for many pelagic species (e.g., invertebrates and fish). Elevated concentrations of chemicals in the sediment may cause acute mortality or affect the reproductive behavior, egg hatching characteristics, and early life development of these organisms. In addition to causing acute mortality and abnormal development, contaminated sediments can also lead to the accumulation of contaminants in organisms due to the effects of bioaccumulation. In addition, biomagnification of the contaminants can occur in the food chain when small contaminated organisms are consumed by higher trophic level species including man.

The threat to the public health from contaminated sediments centers around three principal pathways of exposure:

- Consumption of fish and shellfish contaminated by chemicals in the sediment through the processes of bioaccumulation and biomagnification;
- Direct contact with contaminated sediments by people; and
- Incidental ingestion of contaminated sediment or associated waters by people.

DISPOSAL OF CONTAMINATED MATERIAL AND DREDGE SPOIL RETURN WATER

After removal of the contaminated material from the water, the contaminated material must be separated from the slurry to attain two distinct waste streams, the concentrated contaminated material and the dredge spoil return water. The methods for separating the material solids from the water include the use of settling basins, clarifiers, impoundment basins, screens and cyclones. The dredge spoil return water consists of a substantially liquid waste stream that may need to be subsequently treated by physical, chemical or biological methods for removal of dissolved and suspended pollutants.

DISCHARGES OF WASTE TO LAND

Discharges of solid, semi-solid, and liquid wastes to landfills, waste piles, surface impoundments, pits, trenches, tailings ponds, natural depressions and land treatment facilities (collectively called "waste management units") have the potential to create significant pollution sources affecting water quality. Unlike surface waters, which often have the capacity to assimilate discharges of wastes, ground waters have little or no assimilative capacity. This is due to slow contaminant migration rates, lack of aeration, minimal biological activity, and laminar flow patterns. Waste containing elevated pollutant concentrations can require containment in waste management units or active treatment for extended periods to prevent waste migration and impairment of the underlying ground water quality. The pollutants may continue to affect water quality long after the

discharge has ceased, either because of continued leachate or gas discharges from the unit, or because pollutants have accumulated in underlying soils from which they are gradually released to ground water.

Landfills for disposal of municipal or industrial solid waste (solid waste disposal sites) are the major categories of waste management units in the Region. Surface impoundments are also used for storage or evaporative treatment of liquid wastes, waste piles for the storage of solid wastes, and land treatment units for the biological treatment of semi-solid sludge from wastewater treatment facilities. Sumps, trenches, and soil depressions have also been used in the past for liquid waste disposal. The Regional Board issues waste discharge requirements to ensure that these discharges are properly contained to protect the Region's water resources from degradation, and to ensure that dischargers implement effective monitoring to verify continued compliance with all applicable requirements.

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

The laws and regulations governing discharges of hazardous and non-hazardous wastes have been revised and strengthened over the past decade. The discharge of municipal solid wastes to land are closely regulated and monitored; however, some water quality problems have been detected and are being addressed. Past monitoring efforts under the State and Regional Boards' Land Disposal and SWAT programs revealed that discharges of municipal solid wastes to unlined landfills have resulted in ground water degradation and pollution by volatile organic constituents (VOCs) and other waste constituents. VOCs are components of many household hazardous wastes and certain industrial wastes that are present within municipal solid waste streams. VOCs can easily migrate from landfills either in leachate or by vapor-phase transport. Clay liners and natural clay formations between discharged wastes and ground waters are largely ineffective in preventing water quality impacts from municipal solid waste constituents. In a recently adopted policy for water quality control, the State Board found that "research on liner systems for landfills indicates that (a) single clay liners will only delay, rather than preclude, the onset of leachate leakage, and (b) the use of composite liners represents the most effective approach for reliably containing leachate and landfill gas" (State Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste).

The USEPA adopted federal regulations under Subtitle D of the Resource Conservation and Recovery Act (RCRA) which require the containment of municipal solid wastes by composite liners and leachate collection systems. Composite liners consist of a flexible synthetic membrane component placed above and in intimate contact with a compacted low-permeability soil component. This liner system enhances the effectiveness of the leachate collection and removal system and provides a barrier to vapor-phase transport of VOCs from the unit. Regional Boards and CalRecycle are implementing these new regulations in California under a policy described in State Board Resolution No. 93-62. The State Board developed revised regulations under

CCR, Division 2, Title 27, Solid Waste, to fully implement water quality-related portions of the RCRA Subtitle D federal regulations. While a single composite liner of the type that can be approved under RCRA Subtitle D regulations is a significant improvement over past municipal solid waste containment systems, it should be noted that single composite liners will not necessarily provide complete protection for ground water resources.

CALIFORNIA CODE OF REGULATIONS TITLE 27 AND TITLE 23, CHAPTER 15

Discharges of wastes to land include treatment, storage, or disposal:

- The regulations governing discharges of non-hazardous wastes to land in California Code of Regulations (CCR) Title 27, Division 2 cover landfills, surface impoundments, waste piles, land treatment units, mining waste management units and confined animal facilities.

- The regulations governing discharges of hazardous wastes to land in CCR, Title 23, Division 3, Chapter 15 cover landfills, surface impoundments, and waste piles.

In addition, actions to clean up and abate conditions of pollution or nuisance at contaminated sites[9] are covered by relevant portions of the regulations where contaminated materials are taken off-site for treatment, storage, or disposal and, as feasible, where wastes are contained or remain on-site at the completion of cleanup actions. The regulations classify wastes according to their threat to water quality, classify waste management units according to the degree of protection that they provide for water quality, and provide siting, construction, monitoring, corrective action, closure and post closure maintenance criteria. The applicable regulatory requirements are minimum standards for proper management of each waste category. These regulations require the complete containment of wastes which, if discharged to land for treatment, storage or disposal, have the potential to degrade the quality of water resources. The Regional Board may impose more stringent requirements to accommodate regional and site-specific conditions.

The applicable regulations define waste types including hazardous wastes, designated wastes,[10] nonhazardous wastes and inert wastes as shown in Table 4-6.

Chapter 15 required the review and update of waste discharge requirements for all nonhazardous waste treatment, storage, and disposal sites by July 1, 1994. As of 2014, the San Diego Region has two hazardous waste disposal sites (Class I), which are the Otay Class I Landfill and former Omar Rendering Class I Landfill. Designated wastes (Class II), nonhazardous solid wastes (Class III) and the management of inert wastes are regulated by the Regional Board.

The regulation of nonhazardous solid waste disposal sites (Class III) has been ongoing by the Regional Board since the early 1960's. Many of the small older sites have closed, and waste is now being disposed at large regional sanitary landfills. The Regional Board's main actions at nonhazardous solid waste facilities are review of Joint Technical Documents (JTDs) for the review and revision of waste discharge requirements for the active sites to assure consistency with the current regulations. These actions include review of proposed engineering design and construction plans for liner systems, leachate collection and removal systems, storm water conveyance systems, etc. and construction quality assurance (CQA) documents for new expansions of operating waste containment units and landfill cover systems at closing units; defining the levels of designated wastes, the upgrading of water quality monitoring systems to determine if water quality protection standards are violated; establishing corrective action programs where standards are violated; and review and oversight of the development and implementation of facility closure plans.

[9] Also see State Water Board Policy Resolution No. 92-49 (Chapter 5)

[10] Also see Water Code section 13173

Table 4 – 6. Landfill Classifications

Disposal Site Classification	Definitions of Waste Types (California Code of Regulations, Title 27, Division 2, section 20220 et. seq.)	Examples
Class I Hazardous Waste	(a) Hazardous waste is any waste which, under Division 4.5 of Title 22, is required to be managed according to Division 4.5 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 25143 of the Health and Safety Code. (c) Waste which have been designated as restricted wastes by DTSC pursuant to section 66268.29, of Title 22 shall not be discharged to waste management units after the restriction dates established by Article 2, Chapter 18, Division 4.5 of Title 22 unless: (1) Such discharge is for retrievable storage; and (2) DTSC has granted a variance from restrictions against land disposal of the waste under section 66268.29 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 25143 of the Health and Safety Code. (b) Wastes in this category shall be discharged only at Class I waste management units in compliance with Chapter 15 or at Class II waste management units which comply with the applicable provisions of Title 27 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 biological oxygen demand (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).	Garbage, trash, refuse, paper, demolition and construction wastes, manure, vegetable or animal solid and semisolid wastes.

Table 4 – 6 (continued). Landfill Classifications

Disposal Site Classification	Definitions of Waste Types (California Code of Regulations, Title 27, Division 2, section 20220 et. seq.)	Examples
Class III Nonhazardous Solid Waste (continued)	(b) Except as provided in section 20220(b) of Title 27, nonhazardous solid waste may be discarded 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 CalRecycle or Solid Waste LEA 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 DTSC determines that the waste must be managed as a 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 ration 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 wastes. The actual ratio required by the Regional Board shall be based on site-specific conditions. (d) Incinerator ash may be discharged at Class III landfill unless DTSC 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 Waste	(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 waste 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, asphalt, plaster, brick, vehicle tires, uncontaminated soils.

The criteria for classifying a nonhazardous waste as a designated waste are based on water quality objectives in the vicinity of the site, the containment features of the solid waste facility, and the solubility/mobility of the waste constituents. Therefore, all owners andoperators of active nonhazardous municipal solid waste facilities in the San Diego Region who wish to receive wastes other than municipal solid waste or inert waste must propose waste constituent concentration criteria above which wastes will be considered designated waste and therefore, not suitable for disposal at their site.

In addition, the Regional Board may revise waste discharge requirements to incorporate reclassification and retrofitting requirements and a revised monitoring program. Closed, abandoned and inactive landfills and other nonhazardous solid waste disposal sites are also subject to the provisions of either Title 27 (section 20080(g) for nonhazardous wastes) or Chapter 15 (for hazardous wastes).

Persons responsible for such sites may be required to develop and implement monitoring, to comply with closure and post-closure maintenance requirements, and to comply with reporting, notification, financial assurances, and record keeping requirements.

Waste Classification

Contaminated soil and other material must be treated or properly disposed in order to minimize the threat to the quality of surface or ground waters.

Waste is classified in California by two separate California Environmental Protection Agency (Cal-EPA) agencies with separate regulatory authority. The California Department of Toxic Substances Control (DTSC) classifies waste as hazardous or non-hazardous based on the threat to public health. The State Board, together with the Regional Boards, classifies non-hazardous waste as "designated", "nonhazardous", or "inert" based on the threat that each poses to the beneficial uses of ground and surface waters, as required by the Porter-Cologne Water Quality Control Act and regulations, water quality control plans and policies set forth by the Regional Board.

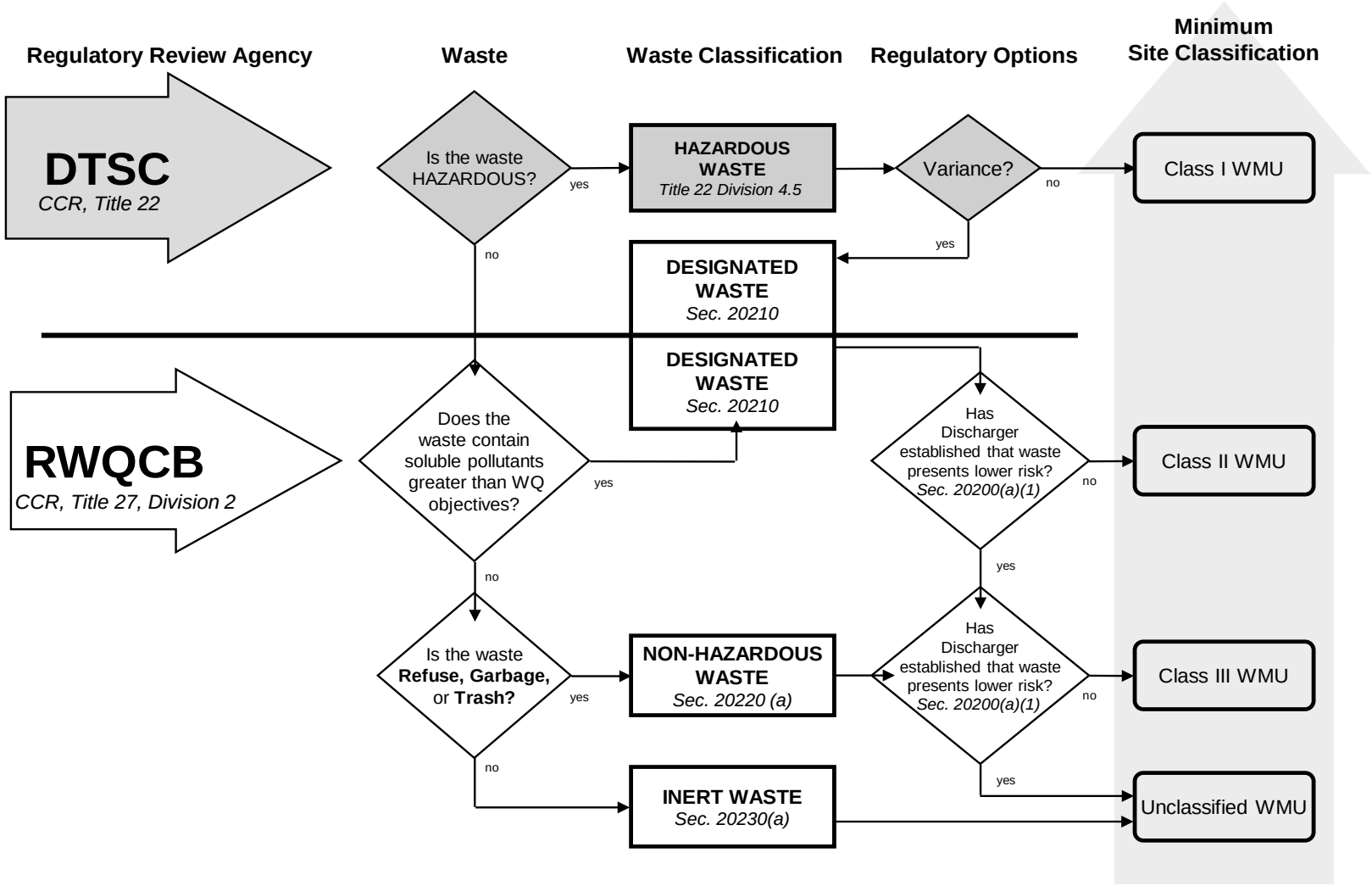
As shown in Figure 4-2, the applicable regulations divide waste into four categories which in turn, determine the classes of waste management units to which their discharge is permitted for treatment, storage or disposal. Detailed criteria are contained in Title 22 of the CCR, Division 4.5, for determining whether a waste falls into the hazardous category. These criteria fall under the headings of toxicity, ignitability, reactivity, corrosivity, and listing under the Resource Conservation and Recovery Act (RCRA). Hazardous waste may be discharged only to Class I waste management units which provide both natural geologic and engineered containment features to isolate the wastes from the environment, unless a specific variance has been granted by DTSC from California's hazardous waste management requirements.

"Nonhazardous solid waste" (see Title 27, section 20220, Table 4-6) is the regulatory term for "municipal solid waste" or "refuse" and is characterized as having a significant proportion of putrescible (degradable) matter, stringent moisture limitations, and prohibitions against inclusion of "designated" or "hazardous" wastes. "Nonhazardous solid waste" may be discharged to Class III landfills that protect beneficial uses of nearby waters, but do not provide complete waste containment. The only threat to water quality posed by wastes in the "inert" category is siltation. Paving fragments and non-degradable construction debris are examples of "inert waste". Wastes in this category may be discharged to unclassified waste management units that are located and managed to keep the wastes from entering surface waters or drainage courses.

"Designated waste" is defined in the California Water Code section 13173 and Title 27, section 20210 regulations, and is described in Table 4-6. The second part of the definition refers to those wastes granted a variance by DTSC from Class I disposal.

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.

Figure 4-2. Waste Classification Process



All permitted treatment or disposal includes monitoring and reporting requirements.

Remediation treatment includes biodegradation (by a land treatment process) for hydrocarbon contaminated soil found on a 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.

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976

The Resource Conservation and Recovery Act (RCRA) is the federal law regarding the treatment, storage and disposal of waste to land. The State implements RCRA's Subtitle C (management of hazardous wastes) through the Department of Toxic Substance Control (DTSC) and the Regional Boards. In August 1992, the USEPA formally delegated RCRA Subtitle C program implementation authority to DTSC. As described above, regulation of hazardous waste discharges is also included in Chapter 15. Monitoring requirements were amended in 1991 to make Chapter 15 equivalent to RCRA requirements. Those RCRA equivalent monitoring requirements also carried over into Title 27 in 1997. These monitoring requirements are implemented through the adoption of WDRs for hazardous waste sites covered by RCRA. The discharge requirements are then a part of a state RCRA permit issued by DTSC.

Federal regulations required by the RCRA's Subtitle D (nonhazardous wastes) were adopted for municipal solid waste landfills (40 CFR Parts 257 & 258). The California Department of Resources Recycling and Recovery (CalRecycle) and the State Board are jointly responsible for implementation of Subtitle D in California. The State Board also has the responsibility to implement Subtitle I (Underground Storage Tanks).

SOLID WASTE ASSESSMENT TEST (SWAT)

The Regional Board administers the Solid Waste Assessment Test (SWAT) Program in the Region. The SWAT program requires owners of active or inactive non-hazardous solid waste disposal sites to evaluate the possible migration of hazardous waste or leachate to waters of the state. The SWAT program was initiated with the enactment of Water Code section 13273 in 1985. 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 the State Board to develop a ranked list of all solid waste disposal sites, on the basis of the threat which they may pose to water quality; and

- Requires operators of active and inactive solid waste disposal sites to implement a water quality monitoring system to verify that the solid waste disposal site has not been affected by leakage, and if there is leakage to take remedial actions under the Land Disposal program.

Program funding was eliminated in 1991, reducing Regional Board review to SWAT sites under regulation due to higher priority work in other Regional Board programs. All sites eventually will be required to complete a SWAT and more sites will be reviewed if more program funding becomes available.

SLUDGE USE AND DISPOSAL

Sludge is a residual by-product of sewage treatment, water treatment, and certain industrial processes. The higher the degree of wastewater treatment, the larger the residue of sludge that must be handled. The treatment and disposal of sludge can be the single most complex and costly operation in a municipal wastewater treatment system. The sludge is

made of materials settled from the wastewater-such as rags, sticks, and organic solids - and of solids generated in the wastewater treatment processes - such as the excess activated sludge created by aeration or the chemical sludge created by a tertiary treatment process.

The quantities of sludge involved are significant. For primary treatment the quantities of sludge may be 2,500 to 3,500 gallons per MG of wastewater treated. When treatment is upgraded to activated sludge, the quantities increase by 15,000 to 20,000 gallons per MG of wastewater treated. Use of chemicals can add another 10,000 gallons. For a typical activated sludge municipal wastewater treatment plant, the amount of sludge to be disposed of is typically about one ton per MG or about 20 pounds per month per home.

Raw sludge usually contains 93 to 99.5 percent water before it is treated further or dewatered. It contains organic solids and dissolved nutrients (e.g., nitrogen and phosphorus), making it useful as a supplement to chemical fertilizers and soil conditioners. Other typical constituents are inorganic ions, such as iron and zinc. While trace amounts of these inorganic ions are used by plants and organisms, some heavy metals that may be present in sewage sludge from household or commercial and industrial sources can be toxic to plants, animals, and humans. Untreated sludge also contains disease-causing organisms (e.g., bacteria, viruses, protozoa, and eggs of parasitic worms). In addition, sewage sludge may contain toxic chemicals from household, commercial, and manufacturing activities that use the sewer system to dispose of these liquid wastes.

Most wastewater treatment plants treat the sludge prior to ultimate use or disposal. Normally this treatment consists of some combination of the following processes:

Conditioning
Treatment of the sludge with chemicals or heat so that the water may be readily separated.

Thickening
Separation of as much water as possible by gravity or flotation process by subjecting the sludge to vacuum pressure, or other drying processes.

Stabilization
Stabilization of the organic solids so that they may be handled or used as soil conditioners without causing a nuisance or health hazard through processes referred to as "digestion".

Reduction
Reduction of solids to a stable form by wet oxidation processes or incineration.

The disposal point alternatives for municipal wastewater sludge in the San Diego Region are limited. Since treated and untreated sludge can contain high concentrations of toxic metals and significant amounts of toxic organic pollutants and pathogens, the USEPA and the Regional Board do not allow the direct discharge of sludge to the ocean or any other surface waters. Air pollution regulations have strict requirements on sludge incineration processes. Sludge disposal to land must be carefully controlled because of potential impacts on ground and surface water quality.

Sludge handling and disposal is regulated under 40 CFR Part 503 as a self-implementing program enforced by USEPA; the State does not have delegated authority for implementing the sludge program. Uses of sludge or sludge by-products and sludge disposal in the Region include:

- Sludge digester methane gas as fuel in gas boilers to generate electricity;
- 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;
- Sludge disposal in-situ; and
- Incineration.

Prior to disposal of sludge, an initial analysis by a state certified laboratory is required to determine if there are any hazardous substances in the sludge. Nonhazardous sludge can be disposed of in the above ways, usually under WDRs. Disposal of nonhazardous sludge at Class III landfills is regulated under WDRs and must meet criteria listed in Table 4-6. Landfills are required to report the quantity and chemical composition of all accepted sludge as part of their individual WDRs.

Currently, the Regional Board can regulate handling and disposal of sludge pursuant to Title 27 and DTSC standards. The USEPA has promulgated a policy of promoting those municipal sludge management practices that provide for the beneficial use of sludge while maintaining or improving environmental quality and protecting public health. USEPA is currently developing sludge use and disposal criteria. The USEPA has also proposed a rule which requires states to develop a program to assure compliance with the Federal criteria. The State Board will be developing a state sludge management program consistent with the USEPA policy and criteria.

AUTO SHREDDER WASTE

According to CalRecycle, autoshredder waste is one of the top three materials used for alternative daily cover at nonhazardous waste landfills in California. There is a significant volume of auto shredder waste generated in California every year. CalRecycle reports that approximately 500,000 tons of autoshredder wastes were used as alternative daily cover in 2004, 2008 and 2012. Auto shredder waste is the material that remains after articles such as auto bodies, appliances and sheet metal are shredded and have had their metals removed. The majority of auto shredder waste is being treated to nonhazardous levels, but a significant portion of the waste must be disposed of in a hazardous waste landfill. Eight metal compounds, which include cadmium, total and hexavalent chromium, lead, copper, mercury, nickel and zinc, plus PCBs may cause auto shredder waste to be classified as hazardous. Senate Bill 976 was passed in 1985 which required Regional Boards to prepare a list of Class III, nonhazardous waste landfills as authorized to accept and dispose of auto shredder waste.

POLICY ON DISPOSAL OF SHREDDER WASTE

The State Board Policy on the Disposal of Shredder Wastes (Shredder Waste Disposal Policy Order 87-22) was adopted on March 19, 1987. The Regional Board adopted Resolution No. 88-06 on February 8, 1988 to incorporate that policy into the Basin Plan and enforce the statewide policy (Resolution 87-22). This policy designates West Miramar Landfill, Otay Annex Landfill, and Prima Deshecha Landfills as facilities that are authorized to receive shredder wastes. The policy also permits the disposal of shredded wastes produced by the mechanical destruction of car bodies, old appliances and similar castoffs, into certain landfills under specific conditions designated and enforced by the Regional Boards. Hazardous and nonhazardous shredder waste may be disposed of in appropriate Class III landfills where doing so would not cause water quality impairment. The policy specifies the shredder waste must not exceed PCB levels of 50 milligrams per kilogram (mg/kg). Also, the shredder waste must be disposed on the last and highest lift in a closed disposal cell or in an isolated cell solely designated for the disposal of shredder waste.

CONTROL OF NONPOINT SOURCE POLLUTION

CHRONOLOGY OF NONPOINT SOURCE POLLUTION CONTROL MEASURES

To implement nonpoint source pollution control, several regulatory measures have been taken by federal, state, regional and local government. The following chronology shows the applicable regulatory measure, responsible governmental agency, and year when each measure was enacted or adopted. These regulatory measures will be discussed in the pages that follow.

Regulatory Measure	Responsible Agency	Year
RB Resolution No. 79-25	RB	1979
RB Resolution No. 87-91	RB	1987
CWA, section 201(g)(1)(b)	USEPA	1987
CWA, section 205(j)(5)	USEPA	1987
CWA, section 319(h)	USEPA	1987
CWA, section 402(p)	USEPA	1987
CWA, section 603(c)(2)	USEPA	1987
CZARA, section 6217	USEPA	1990
RB Resolution No. 92-21	RB	1992

THE NEED FOR NONPOINT SOURCE POLLUTION CONTROL

Efforts to improve water quality under the NPDES program have traditionally focused on reducing pollutants from the major point sources, namely municipal sewage and industrial process wastewater. Point sources are defined as discrete conveyances, from which pollutants are, or may be discharged. These point sources received early emphasis because they were obvious sources of pollution and easily linked to degraded water quality conditions. However, as the permitting effort proceeded and control measures for municipal sewage and industrial wastewater were implemented, it became increasingly clear that control and reduction of nonpoint source pollution was also needed in order to restore and protect the nation's waters.

DEFINITION OF NONPOINT SOURCE POLLUTION

In contrast to point sources, nonpoint sources of water pollution are generally defined as sources which are diffuse in nature, usually associated with man's uses of land, and are not subject to the federal NPDES permitting program. Diffuse sources originate over a wide area rather than from a definable point. They often enter receiving waters in the form of surface runoff but are not conveyed by way of pipes or discrete conveyances. By definition, nonpoint sources (like discharges to ground water) are exempt from the federal NPDES permitting program which regulates point sources to surface waters.

CATEGORIES OF NONPOINT SOURCE POLLUTION

Nonpoint source pollution is primarily the result of man's uses of land such as urbanization, roads and highways, vehicles, agriculture, construction, industry, mineral extraction, physical habitat alteration (dredging/ filling),

hydromodification (diversion, impoundment, channelization), silviculture (logging), and other activities which disturb land. Additional categories of nonpoint sources include agricultural return water, marinas and recreational boating, confined animal facilities, resource extraction, channel erosion, resuspension of pollutants from contaminated aquatic sediments, waste disposal sites, septic systems (onsite or subsurface disposal), atmospheric deposition, acid precipitation, seawater intrusion, and geothermal development.

OVERLAPS BETWEEN NONPOINT & POINT SOURCES

The distinction between point source and nonpoint sources is not always clear. As a result, there have always been overlaps and ambiguities between programs designed to control nonpoint sources and those designed to control point sources of pollution. The most important example of such an overlap involves urban runoff and storm water which are clearly diffuse and nonpoint in origin, but become channelized and are ultimately discharged through discrete point source conveyance systems to receiving waters. Because it becomes channelized, urban runoff is legally considered a point source discharge. However, because it originates as nonpoint source, urban runoff and storm water are discussed in the Nonpoint Source section.

SEVERITY OF NONPOINT SOURCE PROBLEM

According to the 1988 National Water Quality Inventory, nonpoint source pollution has become the largest single factor preventing the attainment of water quality standards. The inventory reported over 40% of the nation's rivers and streams are impaired due to siltation and 25% are impaired due to nutrients (such as phosphorus and nitrogen) from nonpoint sources. Agricultural runoff was reported as the major nonpoint pollution source affecting over 50% of impaired rivers. Also, over half of the states reported threats to ground water from nonpoint pollution sources.

NONPOINT SOURCE FUNDING

Innovative ways of financing and implementing nonpoint source projects have been developed. Prior to the 1987 amendments to the Clean Water Act, states used section 106 and 205(j) monies to fund limited nonpoint source activities. The primary federal funding for current nonpoint source program development and implementation includes section 104(b)(3), 205(j)(5), 319(h), 201(g)(1)(b), 603(c)(2), and 604(b) monies as described below.

Section 104(b)(3)

This section established grants for state water pollution control agencies and others for the purpose of conducting and promoting research and investigations related to the causes, effects, extent, prevention, reduction, and elimination of pollution. Such research and investigations are to be carried out in cooperation with federal, state, and local agencies.

Section 205(j)(5)

This section established a set-aside of construction grants 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 this section can be used for the implementation of nonpoint source management programs but cannot be used for assessment activities. States must have an 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 percent which illustrates the intent of Congress and USEPA to have the states make a financial commitment to implementing nonpoint source programs.

Section 201(g)(1)(b)

The 1987 amendments to the Clean Water Act added this section that established a new purpose for which 201 funds could be used, "...*any purpose for which a grant can be made under section 310(h) and (i)*". These funds can be used for either nonpoint source development or implementation projects.

Section 603(c)(2)

The 1987 amendments added Title VI to the Clean Water Act 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 (1) construction of publicly owned treatment works, (2) the implementation of state nonpoint source management programs, and (3) 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 Clean Water Act. 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.

SECTION 319 NONPOINT SOURCE MANAGEMENT PROGRAM

To address the nonpoint source pollution problem, Congress added section 319 to the Clean Water Act in 1987. Section 319 requires each state to develop and implement a Nonpoint Source Management Program and to conduct an inventory of the waterbodies in the State which are impaired due to nonpoint source pollution. To fulfill these requirements, the State Board adopted the Nonpoint Source Management Plan (NPSMP) in 1988 which is discussed in Chapter 5 and the Water Quality Assessment in 1990 which is discussed later in this chapter.

The NPSMP established a statewide policy for managing nonpoint source inputs to California's waters and is incorporated by reference into this Basin Plan. The objective of the Nonpoint Source Management Program in California is to measurably improve water quality through the implementation of various BMPs.

Unlike end of pipe treatment for point sources (which is impractical and cost prohibitive for nonpoint sources), the key to managing nonpoint source pollution is pollution prevention. Pollution prevention means stopping the generation of pollution at its source by reducing the use of products containing pollutants. Once pollutants have been generated, pollution control BMPs must be employed to prevent the existing pollution from coming into contact with the waters of the State. BMPs are defined as the schedules of activities, prohibitions, procedures, or other management practices designed to prevent or reduce the discharge of pollutants into receiving waters.

The State and Regional Board(s) believe that the voluntary and widespread application of BMPs is the most effective means by which nonpoint source pollution can be reduced. Accordingly the following three general management options are adopted in the

Nonpoint Source Management Plan to address nonpoint source problems. In general, the least stringent option that successfully protects or restores water quality is employed. More stringent options are only required if water quality improvements are not achieved.

Voluntary Implementation of BMPs

Voluntary implementation of BMPs is encouraged through financial assistance, education, training, technical assistance, and demonstration projects. Grants and loans provide incentives.

Regulatory Based Encouragement of BMPs

Regional Boards require waste discharge requirements for nonpoint sources but waive the requirement if BMPS are effectively implemented. Regional Boards can also enter into Management Agency Agreements (MAAs) with other agencies which specify acceptable BMPs and their implementation. The MAAs are referenced in Regional Board basin plans and become the primary basis for evaluation of compliance. The State Board has existing MAAs with the US Forest Service, the California Board of Forestry and Department of Forestry.

In either case, the Regional Board will generally refrain from imposing effluent requirements on dischargers who are implementing BMPs in accordance with a waiver of waste discharge requirements or an approved management agency agreement. In both cases, the BMPs become the primary mechanism for meeting water quality standards.

Issuance of Permits

Adopt and enforce waste discharge requirements which set effluent limits on the discharge of specific pollutants.

The State Board has also established four program objectives for its Nonpoint Source Management Program, each of which are being implemented in the San Diego Region as follows:

(1) **Implementation of Nonpoint Source Management Plan.** This includes integration of the Coastal Nonpoint Pollution Control Program (which is required under the CZARA and is described below) into the NPSMP.

(2) **Outreach Activities.** Regional Board outreach activities primarily center around the industrial, construction, and municipal participants in the NPDES Storm Water Permit Program (described in a later section). Other activities include participation in Resource Conservation District, technical advisory and planning committee, and lagoon foundation meetings.

(3) **Watershed Assessment Projects.** San Diego's target watershed is Escondido Creek and San Elijo Lagoon.

(4) **Project Tracking and Participation.** The Regional Board has two nonpoint source program contracts. The first contract is entitled the Chollas Creek Watershed Protection Plan project. The Chollas Creek contract has been completed. However, the watershed remains a high priority for the toxic substances monitoring program and for chronic and acute toxicity monitoring. These monitoring programs may identify changes in the water quality due to the education program funded by this contract. The second project involves a nitrate contamination project in the Rainbow Creek watershed. Although the USEPA funded study has not been formally initiated, the Flynn-Rainbow Nursery has converted to a complete tailwater recovery and reuse system. This conversion resulted in a reduction of nitrate loads to the creek. The Rainbow Creek contract will be modified to study other nurseries and sources of nutrients.

ALL NONPOINT SOURCE DISCHARGES ARE CURRENTLY REGULATED

Despite the overlaps between point and nonpoint sources, all nonpoint source discharges are currently regulated under one of two relatively new statutory requirements. These requirements are the NPDES Storm Water Permitting Program required under section 402(p) of the Clean Water Act and the Coastal Nonpoint Pollution Control Program required under section 6217 of the CZARA.

Although the two programs are complementary and exclusive of each other (i.e., one program applies to any discharge that the other does not), their recent implementation has heightened the confusion about point source verses nonpoint source program applicability.

Both the programs are fully discussed in later sections, and a brief overview is included here. In its simplest form, the Clean Water Act section 402(p) program, which is an NPDES permitting program, is designed to regulate storm water and urban runoff (i.e., the nonpoint source discharges that become point sources). Virtually all other nonpoint sources are subject to the Coastal Nonpoint Pollution Control Program under CZARA. Although there are a few minor complications which are also discussed later, the essential concept is that all nonpoint source discharges are currently subject to regulation under either the NPDES Storm Water Program or the Coastal Nonpoint Pollution Control Program.

NPDES STORM WATER PROGRAM

CLEAN WATER ACT SECTION 402(P)

Pursuant to the federal Clean Water Act, many municipalities and most industries in the United States are now required to obtain coverage under an NPDES permit for discharges of storm water runoff. NPDES storm water permits authorize only the discharge of storm water into storm water conveyance systems and prohibit all non-storm water discharges.

DEFINITION OF STORM WATER

The federal regulations (40 CFR 122, 123, 124, November 1990) define storm water as surface runoff from rain or snow melt, including sheet flow. This is a narrow definition which is meant to include the runoff of precipitation only. Storm water does not include water which originates from any source other than precipitation such as process wastewater, cooling waters, and wash waters. These are examples of non-storm water discharges and are not allowed in the storm water conveyance system. A non-storm water discharge is any discharge that is not composed entirely of storm water. Also unacceptable for discharge into the storm water conveyance system is precipitation runoff which has come in contact with pollutants.

THE PROBLEM

Although storm water runoff is part of the natural hydrologic cycle, human activities, particularly urbanization, can result in significant and problematic changes to the natural hydrology of an area. Under conditions of minimal urbanization, water is percolated through pervious surfaces in which soil filtration and biological action remove pollutants. During urbanization, pervious surfaces (i.e., vegetated and natural ground cover) are converted to impervious surfaces (i.e., rooftops and roads) decreasing the infiltration capacity of the soil for both water and pollutants.

As a result, when rain falls on and drains through urban freeways, industries, construction sites, and neighborhoods it picks up a multitude of pollutants. The pollutants can be dissolved in the runoff and quickly transported by gravity flow through a vast network of concrete channels and underground pipes referred to as storm water conveyance systems.

Such systems ultimately discharge the polluted runoff, without treatment, into the nation's creeks, rivers, estuaries, bays, and oceans. In short, urbanization results in a dramatic increase in the volume, velocity, and especially in the pollutant load carried by storm water runoff to receiving waters.

Pollutants typically found in urban runoff include sediment, nutrients (e.g., fertilizers), oxygen-demanding substances (e.g., decaying vegetation), bacteria, viruses, heavy metals, synthetic organics (e.g., fuels, oils, solvents, lubricants), pesticides, and other toxics. These pollutants severely degrade the beneficial uses of surface waters, and threaten the health of both humans and aquatic organisms.

In addition to the pollutants contributed by precipitation runoff, dry weather flows also cause serious degradation of receiving water quality. Dry weather flows, which can be substantial, consist of flows from illicit connections and illegal discharges to the storm water conveyance system. Common examples of the latter include illegally disposed used motor oil and antifreeze.

Studies, most notably the Nationwide Urban Runoff Program (NURP), found pollutants in urban runoff to be similar to those found in sewage and industrial wastewater discharges. Similar concentrations were also observed. Thirty-eight states report urban runoff as a major cause of impaired water quality. Locally, the closure of Southern California beaches following major storm events due to high bacteriological levels in ocean waters is a common occurrence. Clearly urban runoff is a significant water quality problem which deserves attention.

STATUTORY AUTHORITY

To address the storm water/urban runoff problem, Congress added section 402(p) to the Clean Water Act in 1987. This section, and the federal regulations which implement it (40 CFR 122, 123, and 124; November 1990) require NPDES permits for storm water/ urban runoff discharges from municipalities and industries, including construction.

The distinction between point source and nonpoint sources of pollution begins to fade with the requirement for NPDES permits for storm water discharges. Although storm water is clearly diffuse and nonpoint source in origin, it is quickly channelized and ultimately discharged through discrete point source conveyance systems to receiving waters. Because of this, storm water is legally considered a point source discharge and as such is subject to the NPDES permitting program under section 402(p).

MUNICIPAL, INDUSTRIAL, AND CONSTRUCTION PERMITS - COMMON CHARACTERISTICS

As a result of the 1987 Clean Water Act amendments, there are currently three types of storm water permits in California: municipal, industrial, and construction. The municipal permits are areawide permits which were issued by the Regional Board. The industrial and construction permits are statewide general permits which were issued by the State Board. There are three important characteristics which all storm water permits have in common.

Permit Objective

The overall objective of the entire storm water program and all three types of permits is to reduce or eliminate the discharge of pollutants into the storm water conveyance system. Section 402(p) of the Clean Water Act does however establish different performance standards for municipal and industrial discharges. Municipalities must reduce pollutant discharges to the maximum extent practicable, or MEP (see discussion below). Industries (including construction) must implement Best Available Technology (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce pollutants.

Pollution Prevention

Best Management Practices

The permit objective is achieved by way of pollution prevention. To eliminate pollutants in storm water, one can either clean it up by removing pollutants or prevent it from becoming polluted in the first place. Because of the overwhelming volume of storm water and the enormous costs associated with pollutant removal, pollution prevention is the only approach that makes sense.

Pollution prevention which means stopping the generation of pollution at its source by reducing the use of products containing pollutants, is in fact, the basis of the entire storm water program. Once pollutants have been generated, pollution control best management practices (BMPs) must be employed to prevent the existing pollution from coming into contact with the water of the State. It is important to point out that this approach is distinctly different from the conventional end-of-pipe treatment approach commonly used in water quality regulation.

Pollution prevention is accomplished by way of BMPs which are defined as schedules of activities, prohibitions, procedures, or other management practices designed to prevent or reduce the discharge of pollutants to storm water.

Source control BMPs include practices that eliminate or reduce pollutants at their point of generation, or source, so that they cannot come into contact with storm water. Source controls are non-structural, inexpensive, and can be extremely effective. Because source control BMPs are site specific, they vary widely depending on the application. For example, regulatory powers and land use planning are important BMPs for municipalities. Berming and covering storage areas are excellent BMPs at industrial facilities; reduced vegetation removal and phased development planning are effective at construction sites.

Two source control BMPs are common to all three applications (municipalities, industries, and construction), namely good housekeeping practices (cleaning up and immediately disposing of wastes properly) and most importantly, education (employee and public). Education, which ultimately results in a change in behavior and increased public awareness, is the key to pollution prevention. Many people think that street gutters are plumbed to the sanitary sewage treatment plant and do not realize that they flow instead directly to the bays and ocean without treatment. Education should be conducted in two directions: (1) prevent the discharge of pollutants and (2) reduce the use of materials which are the sources of pollution.

No Numeric Effluent Limits

None of the three types of storm water permits contain numeric effluent limits at this time. The permits are intended to be BMP based and instead contain narrative receiving water limitations.

AREAWIDE MUNICIPAL STORM WATER PERMITS

Under section 402(p) of the Clean Water Act and the federal regulations implementing it, operators of large and medium sized municipal storm water conveyance systems are required to obtain NPDES permits for their storm water conveyance systems at this time. Large and medium sized municipal storm water conveyance systems are defined as those serving populations greater than 250,000 and 100,000, respectively. Smaller municipalities (those under serving populations less than 100,000) have until late 1994 to obtain coverage but may be required to do so earlier if it is determined that (1) they are significant contributors of pollutants to receiving waters or (2) if their storm water conveyance systems are "interrelated" to larger municipal systems. In the municipal permits the Regional Board made a finding that all of the smaller municipalities in the San Diego Region meet both of these criteria (Order No. 90-42). All the municipalities contribute to the condition of water quality impairment (see Table 4-7) and the storm water discharges are "interrelated" in that they jointly and cumulatively contribute significant pollutants to the near coastal waters of San Diego County. Consequently, in July 1990, the Regional Board adopted an areawide Municipal Storm Water Permit for each of the three counties in the Region, San Diego, Riverside, and Orange as follows:

(1) Order No. 90-42 (NPDES Permit No. CA 0108758), Waste Discharge Requirements for Storm Water and Urban Runoff from the County of San Diego and Incorporated Cities of San Diego County and the San Diego Unified Port District.

Table 4 - 7. Receiving Waters Impacted by Pollution from Storm Water and Urban Runoff (Order No. 90-42)

IMPACTED RECEIVING WATER	REFERENCES	PARAMETERS	MUNICIPALITIES / JURISDICTION
San Diego Bay	WQLS, NPSI	PET, TRA, SYN, COL, DEB, MET	City of San Diego, Coronado, National City, Chula Vista, Imperial Beach, La Mesa, Lemon Grove, County of San Diego, San Diego Unified Port District
Mission Bay	WQLS, NPSI	COL, MET	City of San Diego
Santa Margarita Lagoon	WQLS, NPSI	NUT	Camp Pendleton, County of San Diego, County of Riverside, Temecula
Oceanside Harbor	NPSI	TRA, SYN	Camp Pendleton, Oceanside
Buena Vista Lagoon	NPSI	NUT, SED	Oceanside, Vista, Carlsbad, County of San Diego
Agua Hedionda Lagoon	SDHSR	COL	Carlsbad, San Marcos
Batiquitos Lagoon	WQLS, NPSI	NUT, SED	Carlsbad, Encinitas, San Marcos, County of San Diego
San Elijo Lagoon	WQLS, NPSI	NUT, SED	Encinitas, Escondido, Solana Beach, County of San Diego
San Dieguito Lagoon	NPSI, TSMP	SED, TRA	City of San Diego, Del Mar, Solana Beach, County of San Diego, Escondido
Los Penasquitos Lagoon	WQLS, NPSI	NUT, SED	City of San Diego, Del Mar, Poway, County of San Diego
Tijuana River Estuary	WQLS, NPSI	TRA, SYN, DOX, NUT	Tijuana, Mexico, City of San Diego, Imperial Beach
San Diego River	NPSI	SYN, PES, SED	City of San Diego, La Mesa, El Cajon, Santee, County of San Diego
Forester Creek	NPSI	TRA	El Cajon, Santee
Tijuana River	WQLS, NPSI	NUT, DEB, COL, DOX, SYN, PES, TRA	Tijuana, City of San Diego
Lake Hodges	NPSI	NUT, DIS	City of San Diego, Escondido, Poway

*** Abbreviations for Table 4-7:**

REFERENCES

- **WQLS** Water Quality Limited Segment
- **NPSI** Nonpoint Source Inventory Report
- **SDHSR** State DHS Report on Shellfish Contamination in Agua Hedionda Lagoon
- **TSMP** Toxic Substances Monitoring Program elevated values

PARAMETERS

- **COL** Coliform bacteria or other microbes
- **DEB** Debris
- **DIS** Dissolved Solids
- **DOX** Low dissolved oxygen, except when associated with algal blooms caused by nutrients
- **MET** Metals, except trace elements
- **NUT** Nutrients, macro- and micro-nutrients, including algal bloom-low dissolved oxygen syndrome
- **PES** Pesticides, except trace elements, including insecticides, nematocides, herbicides, and fungicides
- **PET** Petroleum distillates
- **SED** Sedimentation/turbidity, including habitat alteration due to sedimentation
- **SYN** Synthetic organics, except herbicides and pesticides
- **TRA** Trace elements: aluminum, beryllium, cadmium, chromium, copper, lead, mercury, manganese, molybdenum, nickel, selenium, silver, titanium, and zinc

(2) Order No. 90-46 (NPDES Permit No. CA 0108766), Waste Discharge Requirements for Storm Water and Urban Runoff from the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the San Diego Region.

(3) Order No. 90-38 (NPDES Permit No. CA 0108740), Waste Discharge Requirements for Storm Water and Urban Runoff from the County of Orange, the Orange County Flood Control District and the Incorporated Cities of Orange County within the San Diego Region.

Included as co-permittees in the above permits are all of the land use regulatory agencies; the county, all incorporated cities within the county, and special districts. For this reason, the municipal permits are referred to as "areawide" permits. As it moves from inland to coastal areas, storm water does not recognize jurisdictional boundaries. Since all municipalities contribute to the cumulative storm water pollution problem, a coordinated, "areawide" approach to managing it is essential, more effective, and far less expensive than numerous individual efforts.

Objective

The objective of an areawide municipal storm water permit is to reduce pollutants in storm water discharges to the maximum extent practicable (MEP). This is a standard used by USEPA for municipal discharges of storm water. Although not specifically defined in the federal regulations, the intent of MEP is to reduce as much as possible the discharge of pollutants. Thus, the municipal dischargers are required to employ whatever BMPs are feasible (i.e., are likely to be effective and are not cost prohibitive). Where a choice is made between two BMPs which provide generally comparative effectiveness, the discharger may choose the least expensive alternative and exclude the more expensive BMP. However, it would not be acceptable either to reject all BMPs which address a pollutant source or to pick a BMP based solely on cost, which would be clearly less effective. In order to reduce pollutants to the MEP many factors including technical feasibility and effectiveness, as well as economic factors, must be taken into consideration.

Permit Requirements

Municipal Storm Water Permits contain the following two major requirements:

(1) Prohibit non-storm water discharges; and

(2) Develop/implement a comprehensive storm water management program. The comprehensive storm water management program must include the following five components:

- BMP program;
- Monitoring and reporting program;
- Illicit connection/ illegal discharge detection program;
- Storm water ordinance or code; and
- A funding source.

Ultimate Responsibility for Quality of Storm Water Discharges (Municipal Regulation of Industry)

Under an areawide municipal storm water permit, municipalities are ultimately held responsible for the quality of discharges from their storm water conveyance systems, including contributions from industrial and construction activities. This provides important incentive for municipalities to regulate these activities occurring within their jurisdiction.

As called for in the federal storm water regulations, the regulation of industrial storm water discharges (including construction) into municipal storm water conveyance systems should be accomplished by a cooperative effort between the Regional Board and the local municipality.

Under a municipal storm water permit, municipalities are required to adopt and enforce ordinances (including ordinances for erosion control) which prohibit the discharge of pollutants to storm water conveyance systems. In order for the municipalities to be in compliance with their municipal permit, it is essential that the municipalities rigorously enforce their ordinances and grading permits and conduct inspections for compliance with both. They are further authorized to impose additional requirements on industry as necessary to ensure compliance with their municipal permit.

GENERAL INDUSTRIAL STORM WATER PERMIT

To reduce the administrative burden of issuing individual permits to the overwhelming number of industries now subject to NPDES storm water permitting, USEPA has initiated a four-tiered strategy for regulating industries. The first tier involves the use of a small number of "general" permits. A general permit is a single permit under which many facilities can obtain coverage (for example, all of the industries in a given type). Under the tiered strategy, the permitting process begins general and becomes increasingly more specific and rigorous over time. Subsequent tiers target specific watersheds, industry types, and finally individual facilities.

Consistent with the tiered approach, the statewide General Industrial Storm Water Permit entitled, "*Waste Discharge Requirement (WDR) for Discharges of Storm Water Associated with Industrial Activities excluding Construction Activities, Order No 91-13 (General Permit No. CAS 000001)*" was adopted by the State Board on November 19, 1991.

Industries Requiring Coverage

As shown below, the federal regulations identify eleven categories of industrial facilities which are required to obtain coverage under an NPDES storm water permit. Ten of the eleven categories are covered under the statewide General Industrial Storm Water Permit. Category x, construction activities, is covered under a separate permit, which will be discussed in a later section. Categories i through ix are considered "mandatory industries" and are required to obtain coverage under the General Industrial Storm Water Permit whether or not they have materials and activities exposed to storm water. Category xi, "*conditional industries*," are only required to obtain coverage under the general permit if they have materials, equipment, or activities exposed to storm water. Six of the categories are defined by narrative descriptions of the industrial activity. The remaining five categories are defined by Standard Industrial Classification (SIC) codes.

(i)	Facilities Listed Under 40 CFR Subchapter N
(ii)	(Heavy) Manufacturing Facilities
(iii)	Oil and Gas/ Mining Facilities
(iv)	Hazardous Waste Treatment, Storage, or Disposal Facilities
(v)	Landfill, Land Application Sites and Open Dumps
(vi)	Recycling Facilities
(vii)	Steam Electric Power Generation Facilities
(viii)	Transportation Facilities
(ix)	Sewage or Wastewater Treatment Works
(x)	Construction Activities
(xi)	(Light) Manufacturing Facilities (with exposure)

In addition to private industry, industrial facilities owned or operated by governmental entities (including federal, state, and municipal facilities) are also required to obtain permit coverage.

When Is Coverage Not Needed

If a facility discharges all of its storm water to a municipal sanitary sewer system or to evaporation ponds, percolation ponds, or dry wells, and if there is no discharge to surface water under any circumstances, coverage under the general permit may not be required.

Permit Requirements

The General Industrial Storm Water Permit and General Construction Storm Water Permit both contain the following three major requirements:

(1) Eliminate non-storm water discharges;

(2) Develop and implement a Storm Water Pollution Prevention Plan. A Storm Water Pollution Prevention Plan (SWPPP) is a site specific plan consisting of all BMPs which will be implemented at a facility to reduce or eliminate the discharge of pollutants to storm water. (It is the most important requirement and the key to source controls); and

(3) Develop and implement Monitoring and Reporting program in accordance with the general permit.

GENERAL CONSTRUCTION STORM WATER PERMIT

Although it is one of eleven industrial categories specified in the federal regulations, construction activities are regulated under a separate general permit in California. The statewide General Construction Storm Water Permit entitled, "*Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity, Order No. 92-08-DWQ (General Permit No. CAS 000002),*" was adopted by the State Board on August 20, 1992.

Definition of Construction

Construction activity includes, but is not limited to clearing, grading, and excavation, as well as building and reconstruction. Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

Who Needs Coverage?

In California at this time, discharges of storm water associated with construction activities that result in the disturbance of five acres or more of total land are required to obtain coverage under the general permit. Construction activities disturbing less than five acres are also required to obtain coverage under the permit if they are part of a larger common plan of development or sale. Because of a recent court ruling, it is important to note that the current five acre exemption is subject to change.

Erosion - The Major Construction Concern

Natural erosion processes are greatly accelerated when protective ground cover is removed during construction activities. Studies reveal that the rate of erosion on land where construction activities are occurring is approximately 2,000 times greater than on timber land that has not been logged.

Erosion results in not only the loss of productive soil, which is essentially irreplaceable, but also in severe impacts to water quality. Twenty-one states, including California, report construction site runoff as a major cause of water quality impairment. "Clean sediment" alone is by definition, a pollutant because of its ability to degrade water quality. Although there are many water quality impacts associated with clean sediment, the two most important ones include: (1) increased turbidity and corresponding decreased light transmittance (resulting in reduced biological productivity and adverse effects on aesthetic value); and (2) direct suffocation of benthic (bottom dwelling) communities due to excessive sediment deposition. In addition to these problems, sediment also provides a major transport mechanism for countless other pollutants. First priority should be placed on soil stabilization and erosion prevention, not sediment interception.

Permit Requirements

The General Construction Storm Water Permit contains the same three requirements as the General Industrial Storm Water Permit (see discussion above).

Industries/Construction Are Subject To Municipal Regulation

There is a "double" system of regulation for industrial storm water which is discharged through municipal conveyance systems. Such discharges are regulated by both the statewide general permit (industrial or construction) issued to the discharger and by the municipality subject to the areawide Municipal Storm Water Permit. It is the Regional Board's responsibility to enforce the general permits and the areawide Municipal Storm Water Permit. It is the responsibility of the municipality to enforce its own ordinances. The statewide general permits (industrial and construction) specifically require dischargers to comply with the lawful requirements of local agencies regarding discharges to storm water conveyance systems within their jurisdiction.

HIGHWAY RUNOFF CONTROL PROGRAM

Cars, trucks, and other vehicles are the major contributors to highway runoff pollution. Landscaping, highway maintenance, and highway construction also contribute to highway runoff pollution (see Table 4-8). An essential component of the NPDES storm water program is the implementation of practices for maintaining public highways that reduce impacts on receiving waters from highway runoff.

Highway

However, cities and counties (permittees) do not have jurisdiction over public highways controlled by the California Department of Transportation (Caltrans). To comply with the requirements of the NPDES storm water program, Caltrans must either actively participate as an entity in the Area Wide storm water program, or 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.

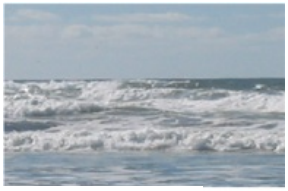
The highway runoff management plan shall specifically address litter control, proper pesticide/ herbicide management, reduction of direct discharges, reduction of runoff velocity, landscape over-watering, use of grassed channels, curb elimination, catch basin maintenance, appropriate street cleaning, 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.

Table 4-8. Highway Runoff Constituents and their Primary Sources

CONSTITUENT	PRIMARY SOURCES
Particulates	Pavement wear, vehicles, maintenance
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Tire wear (lead oxide filler material, lubricating oil and grease, bearing wear)
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guard rails, bridges, etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, brake lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Cyanide	Anticake compound used to keep deicing salt granular (ferric ferrocyanide, sodium ferrocyanide, yellow prussiate of soda)
Sodium, Calcium, Chloride	Deicing salts
Sulfate	Roadway beds, fuel, deicing salts
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate

COASTAL NONPOINT POLLUTION CONTROL PROGRAM

COASTAL ZONE ACT REAUTHORIZATION AMENDMENTS



Imperial Beach

In 1990, Congress amended the Coastal Zone Management Act (CZMA). The amendments are referred to as the Coastal Zone Act Reauthorization Amendments (CZARA). Section 6217, "Protecting Coastal Waters", of CZARA established the Coastal Nonpoint Pollution Control Program. Section 6217 of CZARA requires USEPA to develop, and states to implement, enforceable "management measures" (i.e., BMPs) to control nonpoint source pollution in coastal waters. The definition of the "coastal zone" in California was expanded to encompass the entire state.

Like the NPDES storm water permitting program, implementation of the Coastal Nonpoint Pollution Control Program is still evolving. As of the 1994 Basin Plan update, USEPA has published management measures, which are collectively referred to as the "(g) guidance", pursuant to section 6217(g) of the CZARA. There are six major categories of nonpoint sources addressed by the (g) guidance, including: agriculture sources, forestry, urban areas, marinas, hydromodification projects and wetlands.

The storm water NPDES permitting program under the Clean Water Act and the Coastal Nonpoint Pollution Control Program section under CZARA are intended to be complimentary but exclusive of each other. In other words, the Coastal Nonpoint Pollution Control Program applies only to nonpoint sources that are not currently regulated under an NPDES storm water permit. This includes all of the traditional non-urban nonpoint sources such as agriculture and silviculture and those urban sources which are not currently subject to the NPDES storm water permitting program. Examples of the latter in 1994 include some municipalities with populations under 100,000; construction sites disturbing less than 5 acres; and storm water discharges from wholesale, retail, service, or commercial activities.

The key concept is that all nonpoint pollution sources, both urban and non-urban (including those that become point sources), are currently subject to regulation under either the NPDES Storm Water Permitting Program required under section 402 (p) of the Clean Water Act or the Coastal Nonpoint Pollution Control Program required under section 6217 of the CZARA.

AGRICULTURE

In the San Diego Region, agriculture ranks as the fourth largest industry in the economy and accounts for 1.7 percent of the Region's economy. The coastal and inland valley areas of the county possess a moderate and virtually frost-free climate able to support a variety of sub-tropical crops, making the San Diego area a unique agricultural region. The primary crops being grown for the national and international markets are avocados, citrus, cut flowers, and nursery products. To a lesser extent, local fresh market crops and livestock are produced in the area.

The San Diego County Water Authority (Authority) is the largest agricultural water consuming agency within Metropolitan Water District (MWD), requiring approximately 50 percent of MWD's total agricultural water supply each year. Agricultural water use within the Authority is concentrated mainly in north county agencies such as Rainbow MWD, Valley Center MWD, Fallbrook PUD and Yuima MWD.

Pursuant to the CZARA section 6217 (g), USEPA has identified management measures to protect coastal waters from sources of nonpoint pollution from agriculture. Specifically, the (g) Guidance for agriculture contains management measures to address erosion from cropland, applying nutrients to cropland, applying pesticides to cropland,

confined animal facilities, land used for grazing, and cropland irrigation. The three most significant water quality impacts from agriculture in the San Diego Region are:

- Erosion of agricultural soils;
- Agricultural irrigation return water (salt loading and applied chemicals); and
- Confined animal facilities.

Basic information on each impact is summarized below.

EROSION CONTROL

Erosion is a problem, not only in terms of the loss of agricultural production, but also because it degrades important aquatic habitat. Eroded soils can bury benthic communities, cover spawning grounds, destabilize channel banks and fill sensitive wetland areas. Furthermore, other pollutants are often bound to eroded soils. Under certain conditions, these pollutants may be remobilized into the water column causing problems for human health, wildlife, and aquatic resources.

The State and Regional Boards have adopted narrative standards that prohibit the impairment of aquatic habitat from erosion. However, no specific numeric standard limiting sediment loads has been established. Implementation of effective management practices to control erosion is typically accomplished through the combined efforts of several agencies working with landowners. Local Resource Conservation Districts, with technical assistance from the U.S. Soil Conservation Service, help landowners prevent erosion problems. The University of California, Agricultural Extension Service also assists in developing management practices and informing growers of optimum strategies for soil fertility and stabilization. Additionally, the U.S. Agricultural Stabilization and Conservation Service provides grants and low interest loans to farmers for improvements which retain valuable topsoil in cultivated areas.

AGRICULTURAL IRRIGATION RETURN WATER

Agricultural irrigation return water is the wastewater which runs off or leaches through an irrigated area. The two major concerns with agricultural irrigation return water are salt loading and the release of applied chemicals.

SALT LOADING

Since the water supply in the San Diego Region is generally quite high in salts and the climate is dry, irrigation with this relatively saline water causes salt accumulation in the soil. Crop roots absorb only essentially pure water while leaving dissolved salts behind. If these salts are not leached out by regularly applying more irrigation water than is needed for evapotranspiration, salts accumulate in the root zone and the land eventually becomes too salty for agriculture. However, the saline soils may be reclaimed by leaching. The percolation of the water used to leach salts from the soil can be a serious source of ground water degradation.

The actual effect of irrigation return water on ground water quality in the Region is difficult to determine without further study. The construction of irrigation return water drain tiles to collect and transport return flows is a possible remedial measure that could be implemented in certain portions of the Region. This has not been considered necessary to date and no plans for such construction are presently pending.

APPLIED CHEMICALS

Modern agriculture is based on the extensive use of applied chemicals such as fertilizers, pesticides, and herbicides to obtain high crop yields. The improper use of these applied chemicals may lead to serious degradation of both ground water and surface water quality. Some of the chemicals applied to farm land move down with deep-percolation water from crop root zones and can contaminate underlying ground water. Surface waters are primarily contaminated by the runoff of irrigated agriculture containing sediments, nutrients such as phosphorus and nitrogen, pesticides, and other pollutants.

The release of applied chemicals, into surface and ground waters can have adverse effects on the quality of those waters and the beneficial uses supported by them. Aquatic toxicity, as measured by toxicity bioassay tests, has been found in many waters within the State. The application of agricultural chemicals, in some cases, has been linked directly to this toxicity and is suspect in many other impaired waterbodies. In addition to degradation of the aquatic environment, the contamination of ground and surface waters by pesticides and fertilizers is believed to also pose a threat to human health. Pesticides for example are known to bioaccumulate.

The Basin Plan contains a water quality objective requiring that all waters be maintained free of toxic substances in concentrations that are toxic to human, plant, animal, or aquatic life. The Basin Plan also contains a water quality objective for pesticides requiring that no individual pesticide or combination of pesticides be present in the water column, sediments, or biota at concentrations that adversely affect beneficial uses.

Although the Department of Pesticide Regulation (DPR) controls the application and use of agricultural pesticides, regulation of the quality of agricultural runoff waters is the responsibility of the State and regional boards. The regional boards have adopted water quality standards that apply to all surface waters of the State. Although standards for certain metals and some older pesticides have been adopted, standards for the majority of currently used agricultural chemicals do not exist. Generally, narrative standards which prohibit toxicity and degradation of waterbodies apply to agricultural discharges as do specific toxicity standards. To implement these standards, the regional boards have relied on a number of voluntary efforts and a concerted effort to educate growers on the need to protect waterbodies from the adverse effects of farm chemicals. The State Board also uses grant funds to support implementation of projects which demonstrate improved management practices.

In coordination with DPR, the regional boards have begun to put restrictions on the use of certain agricultural chemicals to address water quality problems. DPR has the responsibility to condition the use of any agricultural chemical to ensure its safe use. Where DPR has been convinced of the significant potential to cause environmental problems, it has established restrictions on the application, release, or timing of pesticide applications. DPR also encourages changes in formulations or in the combinations of pesticides applied in order to minimize water quality problems. An overall integrated pest management program for each agricultural site, rather than sole reliance on pesticides is needed.

There are other reasons to be concerned with the judicious use of agricultural chemicals (in addition to environmental issues). These interests are often concerned with questions of production and profit. To the extent that the application of agricultural chemicals are limited for cost control reasons, these concerns often result in benefits for water quality as well.

The narrative and/or numeric nutrient objectives presented in this Basin Plan are also applicable to irrigation return water. The State Board may require the use of pollutant control techniques to implement irrigation water management in its water rights permits or through Nonpoint Source Management Plan.

Irrigation water management may be implemented through reducing the use of fertilizers and pesticides to levels which minimize their presence in irrigation return water, as well as through the implementation of irrigation systems which reduce the volume of return water.

IRRIGATION WATER

In 1992, two laws were passed which require agricultural water suppliers delivering more than 50,000 AF/Y to prepare water management plans (CWC, sections 10800 and 10904). The plans are to focus on water conservation measures, improved irrigation efficiency, and environmental enhancement. The Department of Water Resources has established an advisory committee to review and study irrigation practices for these purposes. The implementation of conservation plans will likely have a side benefit of reduced erosion as irrigation efficiency improves.

DAIRIES – CONFINED ANIMAL FACILITIES


Dairy

Problems associated with dairy operations in the San Diego Region include ground water mineralization, the addition of nitrates to ground water, surface runoff of biodegradable and suspended material, nuisance odors, the addition of nutrients to adjacent surface water streams and other miscellaneous problems. All dairies in the Region are regulated under waste discharge requirements. These waste discharge requirements implement the regulations for confined animal facilities contained in CCR, Title 27, Division 2, Article 1, sections 22560-22565.

The major requirements contained in waste discharge requirements for dairies are as follows:

(1) Dairies must be designed and constructed to retain all facility wastewater generated, together with all precipitation on, and drainage through manured areas during a 25-year, 24-hour storm.

(2) All precipitation and surface drainage outside of manured areas, including that collected from roofed areas, and runoff from tributary areas during the storm events described in subsection (1) of this section, shall be diverted away from manured areas, unless such drainage is fully retained.

(3) Retention ponds and manured areas at dairies must be protected from inundation or washout by overflow from any stream channel during 20 year peak stream flows. Existing facilities that are protected against 100-year peak stream flows must continue to provide such protection.

(4) New facilities shall be protected against 100 year peak stream flows.

(5) Retention ponds shall be lined with or underlain by soils which contain at least 10 percent clay and not more than 10 percent gravel or artificial materials of equivalent impermeability.

(6) Facility wastewater, collected precipitation and drainage may be discharged to properly operated use or disposal fields or to wastewater treatment facilities approved by the Regional Board.

Regional Board Dairy Waste Management Policy (Resolution No. 87-71)

The Regional Board adopted Resolution No. 87-71, "*A Resolution Adopting Amendments to the Comprehensive Water Quality Control Plan for the San Diego Region*" (Regional Board Dairy Waste Management Policy) on November 16, 1987. On March 17, 1988, the State Board adopted Resolution No. 88-35 approving the Regional Board Dairy Waste Management Policy with a few minor changes.

The Regional Board Dairy policy contained in Resolution No. 87-71 is incorporated below; accordingly Resolution No. 87-71 is superseded.

The Regional Board regulatory program on dairy waste disposal is designed to be a part of the Basin Plan. The program is based upon the following principles to ensure that the goals of the Basin Plan are implemented:

(1) The Regional Board is committed to the reasonable protection of present and future beneficial uses of ground water.

(2) Coordination among state, federal, and local agricultural and regulatory agencies, the dairy industry, local planning and land-use agencies is necessary to resolve potential water quality problems associated with dairies.

(3) Cooperation between this Regional Board and the dairy industry is required when developing and implementing measures to achieve conformance with the Basin Plan ground water objectives.

(4) Comprehensive assessments of salt loading on the ground water basins in the San Diego Region are necessary to develop reasonable and cost effective water quality protection measures for all nonpoint and point sources of waste.

(5) An interim dairy wasteload regulatory program is necessary until the assessment studies noted in Principle 4 are completed. The interim program should provide a simple, region-wide approach to controlling dairy wasteloads, that may be reviewed on a case-by-case basis if necessary. The program should be easy to understand, easy to implement and enforce and provide greater protection of water quality than present practices.

As part of an overall program of dairy waste management, the following measures shall be implemented:

(1) The Regional Board shall continue to enforce all State and Federal water quality laws, and regulations regarding dairy waste treatment and disposal, including CCR Title 27 and USEPA Effluent Guidelines and Standards for feedlots point source category (40 CFR 412).

(2) The Regional Board shall continue to seek funding to conduct the necessary studies and develop computer models to provide an accurate assessment of existing and projected wasteloads in the various ground water basins.

(3) Based upon the results of the studies described in item 2, the Regional Board will revise Basin Plan ground water objectives if warranted and specify or revise wasteload limits that will be appropriate for the point and nonpoint sources of waste, including dairies if necessary.

(4) For an interim period, until the necessary ground water assimilative capacity and wasteload assessment studies are completed, the Regional Board shall limit the disposal of corral manure to dairy disposal land to no more than 3 tons dry weight or 10 cubic yards per acre per year, and to cropland where crops are grown and harvested twice annually, to no more than 12 tons dry weight per acre per year. The Regional Board shall consider manure application higher than the 12 tons per acre per year limit upon demonstration that the crops require the increased manure loadings.

(5) The U.S. Department of Agriculture, Soil Conservation Service, University of California at Riverside, the State and County Departments of Agriculture and other governmental and educational institutions are encouraged to provide dairy operators with the latest technical information regarding waste disposal practices that would result in additional water quality protection.

(6) The local land use and planning agencies are encouraged to conduct long-term planning for addressing water quality issues of new and expanded dairies in the region. The dairy industry is encouraged to provide accurate five-year projections of dairy herds at existing dairies and potential locations for new dairies to the planning agencies and to the Regional Board, so that the Board may include the required Basin Plan studies as part of the Board's triennial review process.

(7) The Regional Board will continue to obtain and review technical information regarding the hydrologic basins and to recommend the update of Basin Plan standards if warranted.

(8) The Regional Board encourages the implementation of water conservation measures at dairies, and the beneficial reuse of dairy farm wastewater that would replace the use of imported water.

EROSION AND SEDIMENT CONTROL

Currently erosion and sediment control is accomplished primarily by way of the municipal and construction storm water permits (see previous discussion).

In 1987, the San Diego Regional Water Quality Control Board implemented a policy for the control of human induced erosion and sedimentation. This policy is presented below. The Regional Board deferred the implementation of regulatory programs for erosion and sedimentation control to local government agencies. The local Resource Conservation Districts have agreements with the Regional Board regarding erosion and sediment control.

Santa Margarita River

Soil erosion resulting from a wide variety of causes, including construction, hillside cultivation and other agricultural activities, non-maintained roads, and off road vehicles may result in serious water quality impacts. The goal of the policy is the protection of water quality through the reduction and prevention of accelerated (man-caused) erosion to the level necessary to restore and protect beneficial uses of receiving waters now significantly impaired or threatened by impairment due to sedimentation through the implementation of the Best Soil Management Practices (BMPs). Construction sites can contribute runoff into storm drains at rates 100 to 2,000 times greater than non-developed sites, due to the large amounts of soil that are usually uncovered. Property owners are held responsible for all activities and practices that may cause an adverse impact on water quality due to waste discharges and surface runoff from their lands.

Sediment and erosion control is particularly important in areas with, or that drain into, delicate habitats such as lagoons, floodplains and some waterways. Lagoons are particularly sensitive to influx of silts and nutrients, which may cause severe turbidity and eutrophication problems. Severe amounts of silt may cause a lagoon to eventually become infilled. Siltation also damages tributaries and riparian corridors leading to the lagoons.

Poor agricultural grading practices may cause significant erosion of the soil, causing heavy sediment, nutrient and possibly herbicide and pesticide runoff loads to be discharged into nearby surface waters.

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

EROSION AND SEDIMENT CONTROL PROGRAM (RESOLUTION NO. 87-91)

Regional Board Resolution No. 87-91 entitled, "A Resolution Adopting Amendments to the Comprehensive Water Quality Control Plan for the San Diego Region" (Erosion and Sediment Control Program) was adopted on December 21, 1987. The Regional Board Erosion and Sediment Control Program contained in Resolution No. 87-91 is incorporated below; accordingly Resolution No. 87-91 is superseded.

GOAL OF PROGRAM

The goal of the Regional Board's erosion control program is the protection of water quality through the reduction and prevention of accelerated (man-caused) erosion to the level necessary to restore and protect beneficial uses of receiving waters now significantly impaired, or threatened by impairment, by sediment.

MANAGEMENT PRINCIPLES

(1) Property owners are considered ultimately responsible for all activities and practices that could result in adverse effects on water quality from waste discharges and from surface runoff.

(2) Local units of government should have the lead role in controlling land use and construction activities that cause erosion and may, as necessary, impose further conditions, restrictions, or limitations on waste disposal and other activities that might degrade the quality of waters of the State.

(3) BMPs should be implemented to reduce erosion and sedimentation and minimize adverse effects on water quality.

REGIONAL BOARD IMPLEMENTATION MEASURES

(1) Local governments shall be encouraged to develop effective erosion and sedimentation control ordinances and regulatory programs that are at least equivalent to the model ordinance in the "*Erosion and Sediment Control Handbook*" published by the California Department of Conservation, May 1981.

(2) If necessary, a Memorandum of Understanding (MOU) or Management Agreement could be adopted to more clearly define the cooperative roles between the local units of government and the Regional Board.

(3) The Regional Board may participate with other concerned agencies such as the California Department of Fish and Game, the Resource Conservation Districts, the various lagoon foundations, etc., to identify watersheds, coastal lagoons and estuaries with critical erosion and sediment problems. The Regional Board may assist in the assessment of such problems and causes, and assist in the development of alternative measures to prevent future problems.

(4) As time and resources permit, the Regional Board will review existing local grading ordinances to determine the adequacy of the ordinances to provide effective erosion control. The Regional Board may then recommend specific improvements to the ordinances for consideration by the local agencies. If necessary, the Regional Board may request a report on the implementation of the Board's recommendation.

(5) If necessary, the Regional Board may request periodic status reports of construction and grading activities from local agencies to determine the effectiveness and potential problems with the implementation of local erosion and sediment control program.

(6) The Regional Board shall encourage the Resource Conservation Districts to review and update if necessary, their erosion control ordinances in order to develop more effective programs for erosion and sediment control for agricultural activities. Local units of government are encouraged to take a more active role in addressing erosion problems from agricultural activities.

THE ELSINORE-MURRIETA-ANZA RESOURCE CONSERVATION DISTRICT SEDIMENT CONTROL ORDINANCE (RESOLUTION NO. 79-25) AND THE RESOURCE CONSERVATION DISTRICTS OF SAN DIEGO COUNTY EROSION AND SEDIMENT CONTROL POLICY (RESOLUTION NO. 92-21)

The Elsinore-Murrieta-Anza Resource Conservation District and the Resource Conservation Districts (RCDs) of San Diego County were established to provide for the conservation of soil and water resources and for the prevention and control of soil erosion and sediment damage due to agricultural and other land use activities.

The RCDs establish guidelines for land management programs by adopting BMPs such as those presented in the Soil Conservation Service Technical Guide covering San Diego County. Currently, farmers and other land owners contact the RCDs on a voluntary basis for assistance in developing individual erosion and sediment control programs which conform to the BMPs.

In order to assure that all farmers and other land owners operate under the Resource Conservation Districts BMP guidelines, and to better address the existing and potential water pollution problems caused by agriculture and other land uses, the RCDs have adopted sediment control ordinances and policies (e.g., Elsinore-Murrieta-Anza Resource Conservation District Sediment Control Ordinance and the Resource Conservation Districts of San Diego County Erosion and Sediment Control Policy). These documents formally adopt the Soil Conservation Service's BMPs and define the existing and expanded functions and responsibilities of the RCDs. These documents also suggest means by which the California Regional Water Quality Control Board, San Diego Region, can assist the RCDs in implementation of the policy.

The Resource Conservation District Sediment Control Ordinance, and the Erosion and Sediment Control Policy establish the duties of the Regional Board and the RCD's as outlined below. The Resource Conservation Districts will implement these documents as follows:

(1) Continue to assist farmers and other land owners in establishing management programs which comply with BMPs.

(2) Authorize any of its directors to file a formal complaint against any person who is causing or permitting any accelerated erosion and sediment damage.

(3) Take action against any person causing or permitting any accelerated erosion and sediment damage.

   A. Receive complaints from RCD directors, land occupiers, or city, state and county officials responsible for the maintenance of water quality in the jurisdictions.

   B. Conduct hearings of the Resource Conservation District Board of Directors on complaints. If the complaint is valid, the "land disturber" is allowed two months to develop and implement a voluntary conservation plan.

   C. Request action by the Regional Board if compliance schedules are not followed or if further noncompliance occurs, when such noncompliance results in the intentional or negligent discharge or deposition of any waste where it is, or probably will be discharged into the waters of the state or creates or threatens to create a condition of pollution or nuisance.

The Regional Board will assist the Resource Conservation Districts in implementing the Erosion and Sediment Control Policy by doing the following:

(1) Inform the appropriate RCD of instances when the staff of the Regional Board finds that accelerated erosion damage has occurred or is likely to occur as a result of violations of the BMP guidelines.

(2) Receive requests for action on complaints from the RCDs when compliance schedules have not been met or when further noncompliance has occurred, and consider appropriate enforcement action pursuant to section 13304 (a) of the Porter-Cologne Water Quality Control Act.

RESOURCE EXTRACTION

SAND, GRAVEL AND OTHER MINERAL RESOURCE EXTRACTION OPERATIONS

The sand and gravel related processing industry represents one of the largest single classes of industry in the San Diego Region. Construction activities in the Region will require a continuing need for sand and gravel products. The industry can generally be classified as follows:

- Sand and gravel processing (including rock crushing);
- Concrete batching;
- Asphalt batching;
- Asphalt product manufacturing;
- Concrete product manufacturing; and
- Clay and clay product processing.

The largest volume of waste from sand and gravel processing operations results from product washing. Many of the sedimentary deposits mined for sand and gravel in the San Diego Region contain a high percentage of silt and clay. Extensive washing is required to remove the fine material. Other waste includes cement truck wash water, sediment separated from the wash water, and rejected product (broken brick, block, pipe etc.).

Recycled wash waters are discharged to storage ponds and can contain high concentrations of total dissolved solids because of evaporation and leaching from product materials. The percolation of these recycled waters can adversely affect ground water quality. It is recognized that the permeability of the ponds receiving the wash waters is low because of the sealing effects of silts and clay sediments in the wash water. Sediment and wash water discharged to surface waters can adversely affect aquatic life through sediment deposition and increases in turbidity.

Many sand and gravel operations are regulated with waste discharge requirements (WDR). The waste discharge requirements prohibit the discharge of sand and gravel wash water to surface waters. The requirements also require that waste holding ponds have 100-year frequency flood protection. Mining Operations may also be subject to “Mining Waste Management” requirements in CCR Title 27 (sections 22470 to 22510).

Sand and gravel mining operations are subject to regulation under section 404 of the Clean Water Act. Before a section 404 permit can be obtained, the discharger must obtain water quality certification pursuant to section 401 of the Clean Water Act. See previous discussion of Water Quality Certification (section 401).

Many mining operations are subject to California's Surface Mining and Reclamation Act (SMARA) of 1975 and the federal Surface Mining Control and Reclamation Act (SMCRA) of 1977. These laws, which have similar provisions, require reclamation of mined lands in order to protect public health and safety and to prevent or minimize adverse environmental effects such as water quality degradation, flooding, erosion, and sedimentation. Additionally, SMCRA requires mine operators to establish baseline hydrologic conditions; in the event that adjacent waters are contaminated, diminished, or interrupted, SMCRA further requires mine operators to replace the water supply.

Under SMARA regulations (California Public Resources Code (section 3505, Article 1), mining operators must:

- Control soil erosion by minimizing removal of vegetation and overburden, managing stockpiles, and constructing erosion control facilities;
- Control water quality by constructing settling ponds and basins and conducting operations in such a way as to prevent siltation of ground water recharge areas;
- Protect fish and wildlife habitat by taking "reasonable measures";
- Protect natural drainage ways by proper placement and control of mine waste rock and overburden piles or dumps; and
- Control erosion and drainage by grading and revegetation, and construction of basins to impound surface runoff, and protection of spillways from erosion.

FLOOD CONTROL

In a natural setting, the dynamic nature of water creates an ever changing stream channel within the floodplain. In the San Diego Region, where rainfall is extremely variable, flood plains which appear to be dry one year, may contain tremendous torrents the following year. Sometimes the dry appearance of the flood plain has made people mistakenly think flood waters do not occur there. The dry appearance of a portion of the flood plain is deceptive. Floods are a natural part of any flood plain. Flood plains cannot be fully protected against floods.

In the past, developments clustered near or within the flood plain. Flood control channels were constructed to protect these properties. Flood control channels were built to constrict the flood plain and to allow maximum development on adjacent lands. These developments increased the amount of impervious area (roads, buildings, parking lots and other structures) and increased local storm runoff. Storm water, which prior to development would have been absorbed into the soil, instead filled local storm drains. Thus, the precipitation which might at one time have caused local flooding caused intensified downstream flooding.

Today, many flood plains have been channelized to protect property. There are a variety of channel designs which have been built. Channel designs vary in range from completely natural to entirely concrete lined with concrete bottoms. Other channel types include natural channels modified to contain a low-flow channel with or without side filling or riprap or concrete; and with or without encroachment by agriculture and/or urban areas.

Rose Canyon Creek

IMPACTS OF CHANNELIZATION

To the degree that a natural watercourse is channelized, the negative impacts to the watershed are increased. The following impacts occur with channelization:

(1) Channel modification and channelization of streams induces changes in land use practices. The resulting change in land use practices often results in detrimental changes to surface water quality.

(2) With future increases in the urbanization of an area, the impervious area increases, contributing additional storm water runoff. Flood channels were built to contain a certain design flow and the design flow can be exceeded by additional storm water runoff.

(3) As the flood plain is constricted and confined within a channel, the potential damage from storm runoff is increased.

(4) Channelization reduces ground water recharge.

(5) Impervious channels designed to remove the runoff quickly also transport pollutants down the flood control system just as quickly. Most of the surface water runoff from urban areas flows into flood control channels without any mechanism to control the input of toxics.

(6) Channelization results in the direct loss of instream habitat. Fish and other aquatic life are totally dependent upon the surface waters within floodplains.

(7) Channelization results in the loss of riparian habitat.

(8) Channelization causes an increase in ambient stream temperatures within and downstream from the channelized section. The rise in stream temperature may degrade the habitat for aquatic life.

(9) The loss of riparian areas through channelization results in the loss of wildlife. Riparian areas are the most important habitat for the majority of western wildlife species, and are essential for many wildlife species.

(10) Loss of riparian areas results in a loss of the buffering capacity of the riparian vegetation to moderate flows.

(11) Loss of the riparian areas results in a loss of the natural filtering capacity that these areas provide. The natural filtering capacity of riparian areas reduces the concentration of potentially toxic constituents in storm water runoff. Riparian areas provide an improvement in the quality of water produced from the watershed.

(12) Stream and riparian habitats are needed to provide corridors for fish and wildlife resources. A highly modified concrete channel may not allow for fish or wildlife passage. Even a limited section of concrete channel can disconnect habitats. The separation of habitats reduces the viability of fish and wildlife populations.

CONCLUSION

Channel modifications need to be evaluated for their ultimate consequences for the watershed. In California's past there was inadequate consideration towards the retention of wetlands, riparian systems, and natural flood plains. The economic assessment of flood control alternatives should consider any proposed project in its entirety. Wetlands, riparian systems and natural flood plains accommodate natural stream meandering, aggradation, degradation and overbank flow better than those lands directly encroached upon by development.

Consideration and utilization of methods to reduce storm water runoff and allow infiltration and percolation of storm waters are needed. Methods should include minimizing the further construction of flood control channels, particularly concrete channels, and the retention of riparian areas within floodplains. Riparian areas within flood plains need to be protected in order to allow the natural filtering capacity of the riparian area to improve the quality of storm water produced from the watershed; and to preserve alluvial percolation capacity and aquatic habitat values. When possible riparian areas need to be restored.

Riparian and stream habitats provide natural beauty which is appreciated and valued by people. Riparian and stream habitats, especially in urban areas, are vital to enhancing our quality of life. People are far more likely to respect and be stewards of "natural" reaches of streams than channelized or artificially modified reaches. Riparian lands represent a significant value to society.

Noble Canyon Creek

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 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 that the water resources community look at a more integrated approach which considers impacts from both point and nonpoint sources of pollutants.

The Watershed Protection Approach is built on the following three main principles:

- The target watersheds should be those where pollution poses the greatest risk to human health, ecological resources, desirable uses of the water, or a combination of these;

- All parties with a stake in the specific local situation should participate in the analysis of the problems and the creation of solutions; and

- The actions undertaken should draw on the full range of methods and tools available, integrating them into a coordinated, multi-organizational attack on the 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 CZARA, USEPA guidance, and various legislative proposals clearly state the need to consider the implications of land use on water quality. 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.

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 the total water quality problem. Some of these programs have different, overlapping, or conflicting priorities. Moving from the more facility-specific controls of the past to management of water quality on a watershed basis, will entail some growing pains. Many of the programs at our disposal will need to be reshaped and integrated at the watershed level. Some programs will need to be reoriented and integrated, while other programs may not be amenable to the watershed approach. Nonetheless, public agencies and private organizations concerned with water resources have come to recognize that a comprehensive evaluation of pollutant contributions on a watershed scale is the only way to realistically assess cumulative impacts and formulate workable strategies to truly protect our water resources. Both water pollution and habitat degradation problems can best be solved by following a basin-wide approach.

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 Program including the Local Oversight Program;

- Site Cleanup Program;

- Aboveground Petroleum Storage Tank Program; and

- DOD Site Investigations.

Naval Base Point Loma (submarine facility)

California Coastal Record Project www.californiacoastline.org

The Regional Board sets cleanup goals based on the State's Antidegradation Policy set forth in State Board Resolution No. 68-16 and Resolution No. 92-49 Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code section 13304 and the Cleanup and Abatement Policy discussed later in this chapter. Under these policies, whenever the existing quality of water is better than that needed to protect present and potential beneficial uses, such existing quality will be maintained, with certain exceptions (as described in Chapter 5, Plans and Policies). Accordingly, the Regional Board prescribes cleanup goals that are based upon background concentrations. For those cases where dischargers have demonstrated that cleanup goals based on background concentrations cannot be attained due to technological and economic limitations, the Antidegradation Policy sets forth policy for cleanup and abatement based on the protection of beneficial uses. The Regional Board can, on a case-by-case basis, set cleanup goals as close to background as technologically and economically feasible. Such goals must at a minimum, restore and protect all designated beneficial uses of the waters.

Furthermore, such cleanup levels cannot result in water quality less than that prescribed in the Basin Plan and policies adopted by the State and Regional Board, and must be consistent with maximum benefit to the people of the State.

UNDERGROUND STORAGE TANKS

Underground storage tank

The Underground Storage Tank Program was enacted in 1983 and took effect January 1, 1984. The authority for the program is found in the Health and Safety Code, Division 20, Chapter 6.7, and the regulations for the program are found in the CCR, Title 23, Division 3, Chapter 16. The regulations are designed to ensure the integrity of all underground storage tanks (UST), and to detect any leaks.

There are approximately 2,000 known cases of leaking underground storage tanks in the Region. Approximately 35 percent of the cases involve instances where only soil contamination is present, 35 percent involve instances where ground water contamination has been confirmed, and the remaining 30 percent are cases which have been closed. The majority of the releases from these underground storage tanks are gasoline and the constituent of most concern is benzene, a known carcinogen. A smaller percentage of the underground storage tank releases involve chlorinated industrial solvents, which are suspected carcinogens. As anticipated, the majority of the sites where these releases have occurred are automotive service stations. Tanks from industrial facilities contribute a smaller but significant minority. To date, these ground water impacts have affected only a few drinking water supply wells. The Regional Board maintains and regularly updates the Leaking Underground Storage Tank Information System (LUSTIS) database, which identifies all known underground storage tank release sites in the Region.

Implementation of the underground storage tank program includes direct Regional Board oversight of leaking underground storage tank cleanups. It also involves coordination of oversight activities with local agencies under contract with the State Board through the Local Oversight Program. Local agencies have the authority, pursuant to section 25297.1 of the Health and Safety Code to act on behalf of the Regional Board in requiring investigations and cleanup of underground tank cases. The local agencies also implement the permitting, construction, inspections and monitoring portion of the Underground Tank Regulations. The Orange County Health Care Agency, the County of Riverside Department of Environmental Health and San Diego County Department of Health Services, Environmental Health Services handle the vast majority of the active cases in the Region.

Title 23, Division 3, Chapter 16, Article 11 provides that corrective action of releases from underground storage tanks includes one or more of the following phases:

Preliminary Site Assessment Phase
This includes, at a minimum, initial site investigation, initial abatement actions and initial site characterization.

Soil and Water Investigation Phase
This includes the collection and analysis of data necessary to assess the nature and vertical and lateral extent of the unauthorized release to determine a cost-effective method of cleanup.

Corrective Action Plan Implementation Phase
This consists of carrying out the cost-effective alternative selected during the Soil and Water Investigation Phase for remediation or mitigation of the actual or potential adverse effects of the unauthorized release.

Verification Monitoring Phase
This includes all activities required to verify implementation of the Corrective Action Plan and evaluate its effectiveness.

Cleanup levels for soil and ground water pollution resulting from leaking underground storage tanks will be established based on the Cleanup and Abatement Policy described later in this chapter.

UNDERGROUND STORAGE TANK CLEANUP FUND

The State Board, Division of Clean Water Programs, administers the Underground Storage Tank Cleanup Fund. The Cleanup Fund can be used as a mechanism to satisfy federal financial responsibility requirements and pay for corrective action and third party liability costs resulting from a leaking petroleum underground storage tank. The Fund can also pay for direct cleanup (by local agency or regional board) of underground storage tank sites requiring emergency and prompt action on abandoned or recalcitrant sites. This Fund, collected by the Board of Equalization, is supported by a 0.6 cent per gallon fee for gasoline. The Fund has been established to provide reimbursement to tank owners or operators for costs of cleanup of the effects of unauthorized releases of petroleum. Up to 1.5 million dollars ($1,500,000) can be provided per site, with the first ten thousand dollars ($10,000) being provided by the claimant. With certain qualifications, expenditures made to remediate an unauthorized petroleum release since January 1, 1988, can be reimbursed and letters of credit can be issued for the funding of ongoing remediation activities.

Owners/operators of petroleum USTs as defined in section 25281(x) of the California Health and Safety Code and owners of petroleum USTs located on residential property who meet the following requirements are eligible for the fund:

- There has been an unauthorized release of petroleum from the UST reported to and confirmed by the regulatory agency.
- As a result of this unauthorized release, the owner/operator must take corrective action as required by a regulatory agency.
- The owner/operator must be in compliance with any applicable financial responsibility requirements and any UST requirements.

Regional boards provide technical support to both applicants who file claims against the underground storage tank Cleanup Fund and State Board staff members who verify the corrective action work that the claims cover. For claims that involve future work, the Regional Board will oversee site investigation and cleanup on cases for which they are the lead agency.

SITE CLEANUP

Reports of unauthorized discharges, such as spills and leaks from above ground storage tanks are investigated through the Regional Board's Site Cleanup 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 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 Water Code, Division 7, section 13304. Guidelines for site investigation and remediation are promulgated in State Board Resolution No. 92-49 as amended on April 21, 1994 entitled "*Policies and Procedures For Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304*".

Cleanup levels for soil and ground water pollution resulting from sites investigated through the SLIC Program will be established based on the Cleanup and Abatement Policy described later in this chapter.

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 state's Aboveground Petroleum Storage Act was enacted in 1989 and amended in 1991. The Act became effective on January 1, 1990 (Health and Safety Code, Chapter 6.67, section 25270 et. seq.) The Act 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 tanks containing crude oil or its fractions, the installation of secondary containment for all tanks with sufficient capacity to hold the contents of the largest tank at the facility plus sufficient volume for rainfall to avoid the overflow, and development of a "Spill Prevention Control and Countermeasure Plan." In the event of an unauthorized release, the owner or operator must notify the Regional Board officials and undertake appropriate monitoring and corrective action. Additionally, annual fees are levied on tank owners. These fees are used to fund aboveground petroleum tank inspections and enforcement.

DEPARTMENT OF DEFENSE FACILITIES

There are twenty-two major Department of Defense (DOD) facilities in the San Diego Region. The following is a list of DOD facilities and the corresponding lead agency for the facility in the Region.

Department of Defense Facility	Lead Agency
United States Marine Corps Base, Camp Pendleton	USEPA
Coronado Navy Amphibious Base	DTSC
Imperial Beach Auxiliary Landing Field	DTSC
Naval Air Station Miramar	DTSC
North Island Naval Aviation Depot	DTSC
Naval Air Station North Island	DTSC
San Diego Fleet Anti-Submarine Warfare Training Center	DTSC
San Diego Fleet Combat Training Center	DTSC
Marine Corp Recruit Depot, San Diego	DTSC
Naval Command, Control and Ocean Surveillance Center	DTSC
San Diego Naval Computer and Telecommunications Station	DTSC
San Diego Naval Electronics Systems Engineering Center	DTSC
San Diego Naval Hospital	DTSC
32 Street Naval Station, San Diego	DTSC
Naval Submarine Base, San Diego	DTSC
Fleet Industrial Supply Center	DTSC
San Diego Naval Training Center	DTSC
San Diego Public Works Center	DTSC
San Diego Shore Intermediate Maintenance Activity	DTSC
Air Force Plant # 19, San Diego	DTSC
Fallbrook Naval Weapons Station	DTSC
Search, Evade, Resist, Escape Camp, Warner Springs	DTSC

Significant ground water contamination has been detected at a number of these facilities. Contamination is severe enough at one of these facilities to have it placed on USEPA's National Priorities List (NPL) for remediation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly referred to as Superfund).

For the National Priority List facility (Camp Pendleton), the USEPA is the lead environmental regulatory agency for oversight of investigation and cleanup. CERCLA requires USEPA to consider applicable or relevant and appropriate state laws and regulations when establishing cleanup standards for remedial activities. To ensure that the state's concerns are properly addressed, two Cal-EPA agencies, the Regional Board and the Department of Toxic Substances Control (DTSC), also perform a significant oversight role in the investigations and cleanup of these facilities.

The USEPA, DOD, DTSC and the Regional Board have signed Federal Facility Agreements (FFA) for the National Priorities List facility. The intent of the FFA is to ensure that:

(1) Environmental impacts are investigated;

(2) Remedial actions are defined;

(3) Procedural framework or schedules are established;

(4) Cooperation among agencies is facilitated;

(5) Adequate assessment is performed; and

(6) Compromise is reached.

The USEPA is not involved in the investigation and cleanup of DOD facilities that are not on the National Priority List (DOD facilities other than Camp Pendleton). However, many of the facilities potentially have significant contamination. In these cases, the Regional Board and DTSC enter into Federal Facility Site Remediation Agreements (FFSRA) with DOD. Federal Facility Site Remediation Agreements are very similar to the above-mentioned Federal Facility Agreements, with the exception that USEPA is not a party.

In the table above showing the DOD facilities in the San Diego Region, the DTSC has been identified as the "lead" agency, and the Regional Board is the "support" agency. A Memorandum of Understanding has been signed by the State Board and DTSC which describes the roles of each agency. The Regional Board's oversight role is with regard to the investigation and cleanup of water resources that have been impacted, or are threatened, by waste discharges from the facilities. The Regional Board's responsibility also extends to source areas (landfills, contaminated soil, etc.) that currently, or may in the future, pose a threat to water quality. DTSC's role is to address all other environmental aspects including health risk assessment, air emissions, community relations, etc.

The State Board and DTSC have entered into a two-year cooperative agreement with the DOD for cleanup and oversight reimbursement. All work performed by the State agencies with regard to the investigation and cleanup of environmental problems at these facilities is fully reimbursed by DOD.

Cleanup levels for soil and ground water pollution resulting from DOD facilities will be established based on the Cleanup and Abatement Policy described later in this chapter.

CLEANUP AND ABATEMENT POLICY

I. CONTAMINATED SOIL AND GROUND WATER

The Regional Board has identified numerous sites where unauthorized waste discharges have resulted in soil and ground water pollution. The majority of these sites have been identified as a result of the Regional Board's implementation of the remediation programs described previously in this Chapter.

The unauthorized waste discharges at many of these sites have resulted in adverse effects on water quality and beneficial uses. In some cases the polluted sites pose a threat to the public health. It is the responsibility of the Regional Board to establish cleanup and abatement goals and objectives for the protection of water quality and the beneficial uses of waters of the state in this Region which are consistent with applicable state and federal statutes and regulations.

Water Code section 13304 authorizes the Regional Board to require cleanup and abatement of soil and ground water pollution. The Cleanup and Abatement Policy described below shall apply to all types of discharges subject to Water Code section 13304.

II. PURPOSE OF POLICY

The purpose of this Cleanup and Abatement Policy is to provide:

A. Guidance to dischargers involved in the investigation, cleanup and abatement of soil and ground water pollution sites to ensure these activities are in conformance with applicable state and federal laws, regulations and policies;

B. Guidance to dischargers on Regional Board methodology for determining cleanup levels at soil and ground water pollution sites; and

C. Consistency and uniformity in Regional Board requirements for investigation, cleanup and abatement of analogous discharges that involve similar wastes, site characteristics, and water quality considerations.

III. CLEANUP AND ABATEMENT PRINCIPLES

A. The Cleanup and Abatement Policy is guided on the following principles, which are based on Water Code sections 13000 and 13304, CCR, Title 23, Division 3, Chapter 15 (hereinafter Chapter 15), CCR, Title 23, Division 3, Chapter 16 (hereinafter Chapter 16), and applicable State Board policies. The Regional Board shall require:

1. Cleanup and abatement actions to conform with the provisions of State Board Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality Waters in California) provided that under no circumstances shall these provisions be interpreted to require cleanup and abatement which achieves water quality conditions that are better than "natural" background conditions;

2. Cleanup and abatement actions to conform with the provisions of State Board Resolution No. 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code section 13304;

3. Cleanup and abatement actions to conform with applicable or relevant provisions of Chapter 15 to the extent feasible;

4. Cleanup and abatement actions to implement the applicable provisions of Chapter 16 for investigations and cleanup of hazardous substances from underground storage tanks; and

5. Dischargers to cleanup and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible. Any alternative cleanup levels less stringent than background shall apply section 2550.4 of Chapter 15, or, for cleanup and abatement associated with underground storage tanks, apply section 2725 of Chapter 16, provided that the Regional Board considers the conditions set forth in section 2550.4 of Chapter 15 in setting alternative cleanup levels pursuant to section 2725 of Chapter 16. Any such alternative cleanup level shall:

a. Be consistent with maximum benefit to the people of the State;

b. Not unreasonably affect present and anticipated beneficial use of such water; and

c. Not result in water quality less than prescribed in the Water Quality Control Plans and Policies adopted by the State and this Regional Board.

IV. CLEANUP AND ABATEMENT INVESTIGATIONS

A. The Regional Board shall apply the guidelines described in IV.B. below in overseeing investigations to determine the nature and extent of a discharge and appropriate cleanup and abatement measures. The level and complexity of the investigations, assessments, and feasibility studies of cleanup and abatement alternatives required below shall be determined by the discharge type, the extent of pollution, and any other applicable site-specific characteristic(s).

B. The Regional Board shall require dischargers to:

1. Investigate the nature and extent of the discharge or threatened discharge to ensure that adequate cleanup plans are proposed. The goal of the investigation shall be to adequately characterize the pollutants in the discharge and determine the vertical and horizontal extent of pollution in soil and ground water. The investigation shall determine where concentrations of pollutants reach background levels.The investigation shall extend off-site to any location necessary to determine the source and assess the vertical and horizontal extent of the discharge.

2. Take immediate action to remove, treat, or contain pollution source(s) to the maximum extent practicable. Sources of pollution may include:

a. Ongoing sources of discharge from storage or distribution systems for wastes or hazardous materials;

b. Soils or ground water which are polluted with mobile or immobile concentrations of non-aqueous phase liquids (NAPLs);

c. Soils which are polluted with leachable concentrations of soluble pollutants;

d. Polluted soils which are eroded and transported to storm drains, abandoned or active wells, surface waters, or lands beyond the control of the discharger.

3. Submit the following information for consideration in establishing cleanup levels in accordance with the conditions set forth in Chapter 15, section 2550.4:

a. An assessment of the adverse effects on ground water quality and beneficial uses;

b. A risk assessment to determine impacts and threats to human health and the environment; and

c. A feasibility study of cleanup alternatives which compares effectiveness, relative cost, and time to attain the following alternative cleanup levels:

(1) Background levels;

(2) Levels which meet all applicable water quality objectives and do not pose significant risks to health or the environment; and

(3) An alternate cleanup level in between the cleanup levels described in (1) and (2) above which meets the requirements as specified in section III.A.5. of this Cleanup and Abatement Policy.

4. Provide documentation that plans and reports are prepared by professionals qualified to prepare such reports, and that all investigative, and cleanup and abatement activities are conducted under the direction of appropriately qualified professionals. Professionals should be qualified, licensed where applicable, and competent and proficient in the fields pertinent to the required activities. A statement of qualifications of the responsible lead professionals shall be included in all plans and reports submitted by the discharger.

V. APPROVAL of CLEANUP LEVELS

A. The Regional Board shall approve soil and ground water cleanup levels through the adoption or affirmation of cleanup and abatement orders; or

B. The Executive Officer or a local agency may approve cleanup levels as appropriately delegated by the Regional Board.

VI. GROUND WATER CLEANUP LEVELS

A. Ground water cleanup levels shall be based on:

1. The provisions of State Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California, State Board Resolution No. 88-63, Sources of Drinking Water, and State Board Resolution No. 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code section 13304.

2. Applicable narrative and numerical water quality objectives and beneficial uses described in Chapters 2 and 3 of this Basin Plan.

3. Pollutant concentrations which do not pose a significant threat to human health or the environment. Threat to human health and the environment shall be determined through a risk assessment:

a. The Regional Board is not the lead agency for specifying risk assessment procedures. The risk assessment shall be conducted using the most current procedures authorized by the DTSC, Office of Environmental Health Hazard Assessment or the USEPA. The Regional Board will assist the discharger, as necessary, in obtaining the appropriate, most current, procedures from these agencies.

b. In the absence of scientifically valid data to the contrary, theoretical risks from chemical constituents shall be considered additive across all media of exposure, and shall be considered additive for all chemicals having similar toxicological effects or having carcinogenic effects.

c. The Regional Board is not the lead agency for reviewing risk assessments. The Regional Board will rely on the California Department of Toxic Substances Control, Office of Environmental Health Hazard Assessment, or appropriately designated regulatory local health agencies to review and evaluate the adequacy of risk assessments.

d. The discharger shall submit the risk assessment to the Regional Board in accordance with section IV.B.3.b. of this policy. The Regional Board will coordinate the review of the risk assessment in accordance with the following hierarchy:

(1) The Regional Board will first seek the assistance of any appropriate supporting health agency currently involved with the cleanup of the site.

(2) If unsuccessful, the Regional Board will seek the assistance of previously uninvolved appropriate health agencies.

(3) If unsuccessful, the Regional Board will seek the assistance of the DTSC in accordance with the terms and conditions of the *Memorandum of Understanding Between the Department of Health Services and the State Water Resources Control Board, the Regional Water Quality Control Boards for the Cleanup of Hazardous Waste Sites August 1, 1990*.

4. Applicable state and federal statutes and regulations.

5. Relevant standards, criteria, and advisories adopted by other state and federal agencies.

6. Technical and economic feasibility of attaining background concentrations and of attaining concentrations lower than defined by 2 and 3 above. Technical and economic feasibility shall be determined in accordance with the following criteria:

a. Technical feasibility shall be determined by assessing the availability of technologies which have been shown to be effective in reducing the pollutant concentrations to the established cleanup levels. Bench-scale and/or pilot-scale studies may be necessary to make this feasibility assessment.

b. Economic feasibility refers to the objective balancing of the incremental benefit of attaining more stringent cleanup levels compared with the incremental cost of achieving those levels. Economic feasibility does not refer to the subjective measurement of the discharger's ability to pay the costs of cleanup.

c. Applicable factors to be considered in the establishment of cleanup levels greater than background are listed in Chapter 15, section 2550.4.

d. The discharger's ability to pay is one factor to be considered in determining whether the cleanup level is reasonable. However, availability of economic resources to the discharger is primarily considered in establishing reasonable schedules for compliance with cleanup levels.

B. The Regional Board shall set ground water cleanup levels to attain background water quality, unless the discharger demonstrates that it is either technically or economically infeasible to attain background water quality. If the discharger makes such a demonstration to the satisfaction of the Regional Board, cleanup levels are set between background water quality concentrations and concentrations that meet all criteria in items A.2 and A.3 above. Within this concentration range, cleanup levels will be set at the lowest concentrations that are technically and economically feasible to achieve. In no case will cleanup levels be established below natural background conditions.

C. Compliance with cleanup levels must occur at all points throughout the plume or area of contamination to protect potential beneficial uses of water resources as required by Water Code sections 13000 and 13244 and Health and Safety Code section 25356.1 (c).

D. The Regional Board may consider relaxing ground water cleanup levels that were previously established at levels more stringent than applicable water quality objectives, only when a final remedial action plan has been pursued in good faith and all of the following conditions are met:

1. Modified cleanup levels meet the conditions listed in VI.A.1., VI.A.2., and VI.A.3. above; and

2. An approved cleanup program has been fully implemented and operated for a period of time which is adequate to understand the hydrogeology of the site, pollutant dynamics, and the effectiveness of available cleanup technologies; and

3. Adequate source removal and/or isolation is undertaken to eliminate or significantly reduce future migration of pollutants to ground water; and

4. The discharger has demonstrated that no significant pollutant migration will occur to other underlying or adjacent aquifers; and

5. Ground water pollutant concentrations have reached asymptotic levels (i.e., pollutant concentration reductions are no longer significant) using appropriate technology; and

6. Alternative remediation techniques for achieving cleanup levels have been evaluated and are inappropriate or not economically feasible.

VII. SOIL CLEANUP LEVELS

A. Soil pollution can present a health risk and a threat to water quality. The Regional Board designates soil cleanup levels for the unsaturated zone based upon threat to water quality and risk to human health or the environment. Guidance from the USEPA, DTSC, or the Office of Health Hazard Assessment is considered in determining health and environmental risks. Cleanup levels for contaminated soils which threaten water quality, shall be established in accordance with the following criteria:

1. Concentrations of the residual leachable/mobile pollutants shall be equal to background concentrations unless background levels are technically or economically infeasible to achieve.

2. Where background levels are technically or economically infeasible to achieve, soil cleanup levels shall be established to ensure that residual leachable/mobile pollutants will not cause, or threaten to cause, exceedances of applicable ground water cleanup levels or water quality objectives, and do not pose significant risks to health or the environment.

3. Soil cleanup levels less stringent than background may be based on site specific technical evaluations of pollutant fate and transport processes, human health and environmental risk assessment methods as long as such methods are based on site specific field data, technically sound principles, and the criteria described in VII.A.2 above.

B. Where residual leachable/mobile soil pollutants which threaten water quality remain on site the discharger shall:

1. Implement measures as necessary to ensure that soils with residual pollutants are covered or otherwise managed to minimize pollution of surface waters or exposure to the public; and

2. Implement the applicable provisions of Chapter 15 to the extent that it is technologically or economically feasible to do so as described in State Board Resolution No. 92 - 49. This may include, but is not limited to, subsurface barriers or other containment systems, pollutant immobilization, toxicity reduction, and financial assurances.

C. The Regional Board shall generally require sampling to verify soil cleanup and may also require follow-up ground water monitoring. The degree of monitoring will reflect the amount of uncertainty associated with the soil cleanup level selection process. Follow-up ground water monitoring may be limited where residual concentrations of leachable/mobile pollutants in soils are not expected to adversely affect ground water quality.

VIII. TIME SCHEDULES

The Regional Board shall determine schedules for investigation, and cleanup and abatement, taking into account the following factors:

A. The degree of threat or impact of the discharge on water quality and beneficial uses;

B. The obligation to achieve timely compliance with cleanup and abatement goals and objectives that implement the applicable Water Quality Control Plans and Policies adopted by the State and Regional Board;

C. The financial and technical resources available to the discharger; and

D. Minimizing the likelihood of imposing a burden on the people of the state with the expense of cleanup and abatement, where feasible.

TOTAL MAXIMUM DAILY LOADS

A total maximum daily load (TMDL) is the amount of a pollutant that can be discharged into a waterbody and still maintain its water quality standards (i.e., the designated beneficial uses and the adopted water quality objectives that support the beneficial uses). A TMDL must account for seasonal variations and include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between pollutant loadings and receiving water quality.

Pollutant loadings in excess of the TMDL are expected to have an adverse effect on water quality by causing exceedances of the applicable water quality standards. Allowable pollutant loadings are calculated and assigned to all point source and nonpoint source discharges to ensure that the applicable water quality standards are not exceeded in the receiving water.

A portion of the TMDL may be held explicitly in reserve as the MOS (e.g., MOS = 10 percent of TMDL), or the MOS may be implicitly included (i.e., MOS = 0) by incorporating conservative assumptions in the calculation of the TMDL (i.e., assumptions result in a lower calculated TMDL). The portion of the TMDL not in the MOS is assigned to point sources and nonpoint sources.

Point sources are assigned wasteload allocations (WLAs) and nonpoint sources (including natural and background sources) are assigned load allocations (LAs). The WLAs and LAs may differ for each pollutant source, but the TMDL and MOS do not change. The TMDL for a pollutant in the receiving water, and the WLAs and LAs for a pollutant discharged from different sources into a waterbody are calculated at levels that, when each are met, are expected to result in the attainment of the associated water quality objectives for the pollutant and protection of the applicable beneficial uses in the receiving water.

Establishing TMDLs for waters is required under section 303(d) of the Clean Water Act. Clean Water Act section 303(d) requires that the State establish a priority ranking of waters that do not meet water quality standards after application of technology based controls. The USEPA strongly encourages states to include the priority ranking as part of the Biennial Clean Water Act Sections 303(d), 305(b) and 314 Integrated Report, which is discussed in more detail in Chapter 6.

Waters identified under section 303(d) (a.k.a. the 303(d) List) are designated as Water Quality Limited Segments (WQLSs). In accordance with the priority ranking, TMDLs must be established for pollutants suitable for such calculations. For the purpose of developing information for all waters not identified as WQLSs, states are also required to estimate the TMDLs with seasonal variations and margin of safety.

One or more numeric targets are typically required to calculate TMDLs at levels necessary to attain and maintain applicable narrative and numerical water quality standards in WQLSs. Numeric targets interpret the existing water quality standards (i.e., beneficial uses and the water quality objectives established at levels sufficient to support those uses). After identifying the impaired beneficial uses of a waterbody, the numeric targets are often based on the water quality objectives in Chapter 3. Chapter 3 contains numeric and narrative water quality objectives. If applicable water quality objectives are numeric, the numeric water quality objectives can serve as the basis for the numeric targets. If applicable water quality objectives are narrative, one or more quantifiable target values or measurable indicators must be selected to measure progress and evaluate final attainment and maintenance of the narrative water quality objectives. In WQLSs, when numeric targets are met in the waterbody, the water quality standards should be attained and restored. While numeric targets and TMDLs interpret water quality standards, *numeric targets and TMDLs are not water quality standards.*

TMDLs are not self-implementing or directly enforceable for sources in the watershed. Instead, TMDLs must be implemented through the programs or authorities of the San Diego Water Board and/or other entities to compel dischargers responsible for controllable sources to achieve the pollutant load reductions identified by a TMDL analysis to attain the water quality objectives that will support the designated beneficial uses of a waterbody.

The authorities that are available to the San Diego Water Board to implement TMDLs are given under the Porter-Cologne Water Quality Control Act (Division 7 of the Water Code). The available regulatory authorities include incorporating discharge prohibitions in to the Basin Plan, issuing individual or general waste discharge requirements (WDRs), or issuing individual or general conditional waivers of WDRs. The San Diego Water Board has the authority to enforce Basin Plan prohibitions, WDRs, or conditional waivers of WDRs through the issuance of enforcements actions (e.g., time schedule orders, cleanup and abatement orders, cease and desist orders, administrative civil liabilities). The San Diego Water Board also has the authority to require monitoring and/or technical reports from dischargers, which may be used to support the development, refinement, and/or implementation of TMDLs, WLAs, and/or LAs.

Additionally, the USEPA has delegated responsibility to the State and Regional Boards for implementation of the federal National Pollutant Discharge Elimination System (NPDES) program, which specifically regulates discharges of "pollutants" from point sources to "waters of the United States." The San Diego Water Board regulates discharges from point sources to surface waters with WDRs that implement federal NPDES regulations (NPDES requirements). Federal regulations

require that NPDES requirements incorporate water quality based effluent limitations (WQBELs) that must be consistent with the requirements and assumptions of any available WLAs. WQBELs may be expressed as numeric effluent limitations, when feasible, and/or as a best management practice (BMP) program of expanded or better-tailored BMPs.

Upon establishment of TMDLs by the state or U.S. Environmental Protection Agency (USEPA), the state is required to incorporate TMDLs into the state water quality management plan. This Basin Plan and applicable statewide plans serve as the water quality management plan for the watersheds under the jurisdiction of the Regional Board. TMDLs are programs for the implementation of existing water quality standards, and are established in the Basin Plan subject to the requirements of Water Code section 13242. TMDLs incorporated into the Basin Plan, therefore, are required to include 1) a description of the actions (i.e., programs or authorities) of the Regional Board and/or other entities necessary to achieve the TMDLs, 2) a compliance time schedule by which the TMDLs, and thereby the restoration of the beneficial uses in the receiving waters, are to be achieved, and 3) a description of the monitoring program that is required to determine compliance with TMDLs, WLAs, and LAs in the receiving waters. These elements are referred to as the TMDL Implementation Plan.

TMDLs that have been established for the San Diego Region are provided in Chapter 7.

IMPLEMENTATION PROVISIONS FOR INDICATOR BACTERIA WATER QUALITY OBJECTIVES IN THE CONTEXT OF A TMDL

Water quality objectives for indicator bacteria shall be strictly applied except when otherwise provided for in a TMDL. Within the context of a TMDL, the Regional Board may implement the indicator bacteria water quality objectives by using a "reference system and antidegradation approach" or a "natural sources exclusion approach," as described in Chapter 3 (Water Quality Objectives).

There are natural sources of bacteria which may cause or contribute to exceedances of water quality objectives for indicator bacteria. It is not the intent of the Regional Board to require treatment or diversion of natural water bodies or to require treatment of natural sources of bacteria. Such requirements, if imposed by the Regional Board, could adversely affect valuable aquatic life and wildlife beneficial uses supported by water bodies in the Region.

Implementation of indicator bacteria water quality objectives using the reference system and antidegradation approach requires control of indicator bacteria from anthropogenic sources so that bacteriological water quality in the targeted waterbody is consistent with that of a reference system. The reference system and antidegradation approach also requires that no degradation of existing bacteriological water quality in the targeted water body occurs when the existing bacteriological water quality is better than that of a water body in a reference system. A reference system is a watershed and the beach to which the watershed discharges that is minimally impacted by anthropogenic activities that can affect bacterial densities in the water body. Under the reference system and antidegradation approach, a certain frequency of exceedances of the indicator bacteria water quality objectives is allowed. The allowed frequencies of exceedances are either the observed frequency of exceedances in the selected reference system or the targeted water body, whichever is less.

Under the natural sources exclusion approach, dischargers must demonstrate they have implemented all appropriate best management practices to control all anthropogenic sources of indicator bacteria to the target water body such that they do not cause or contribute to exceedances of the indicator bacteria water quality objectives. The requirement to control all sources of anthropogenic indicator bacteria does not mean the complete elimination of all anthropogenic sources of bacteria as this is both impractical as well as impossible. Dischargers must also demonstrate that the residual indicator bacteria densities are not indicative of a human health risk. After all anthropogenic sources of indicator bacteria have been controlled such that they do not cause exceedances of the indicator bacteria

water quality objectives, and natural sources have been identified and quantified, exceedances of the indicator bacteria water quality objectives may be allowed based on the residual exceedances in the target water body. The residual exceedances shall define the background level of exceedance due to natural sources.

The Regional Board will evaluate the appropriateness of these approaches and the specific exceedances or exceedance frequencies to be allowed under each within the context of TMDL development or recalculation for a specific water body. If appropriate, the Regional Board may select to use one or both of these approaches during initial TMDL calculation or during subsequent recalculation following TMDL implementation.

These implementation provisions may only be used within the context of a TMDL addressing municipal storm water (including discharges regulated under statewide municipal NPDES waste discharge requirements), discharges from concentrated animal feeding operations, and discharges from non-point sources. These implementation provisions shall not be applied within the context of a TMDL addressing individual industrial storm water discharges, or general industrial and construction storm water discharges.

OTHER PROGRAMS

GROUND WATER MANAGEMENT

Ground water management programs can both enhance water quality and protect beneficial uses of ground water in the larger basins of the San Diego Region. These management programs consist of measures for the periodic monitoring and assessment of ground water levels and quality; the planned extraction and export of poor quality ground water with recharge of better quality water from an outside source; controls established on the use of ground water within the basin; and controls on inflow of poor quality water from outside the basin.

Because of the limited amount of natural recharge, the use of reclaimed water for ground water recharge must be considered in any effective ground water management program in the San Diego Region. For this reason, agencies involved in wastewater disposal play a vital role in the development of these programs. Several local and state agencies, as well as some private consultants have been studying ways to encourage this approach for protecting the Region's ground water basins. Proponents have noted that there are many advantages in storing water and reclaimed water in ground water aquifers as opposed to surface water reservoirs. Underground facilities are less costly than surface storage facilities and they are less land intensive than surface water reservoirs. Also, the ground water aquifers can serve as distribution systems, minimizing the need for surface water transport facilities. In addition, reclaimed water stored in ground water aquifers are not subject to evaporative losses.

Filtration through the soils in the basin can provide additional treatment of the reclaimed water, and injection of reclaimed water along the coastal strip can be used to help combat seawater intrusion.

Ninety percent of the potable water supply for the San Diego Region comes from two major sources of imported water. Water from the Colorado River is imported through the Colorado River Aqueduct and water from northern California is imported through the State Water Project. Both sources are blended to form San Diego Region's water supply. Additionally, approximately ten percent of the water supply comes from local reservoirs. The quality of the imported water has been showing increases in mineral content, particularly boron, percent sodium and TDS. Direct use of this supply reflects the mineral content of Colorado River water. Each additional use of the water (reclaimed from this supply) for irrigation and ground water recharge incrementally increases the dissolved mineral content.

Water reclamation activities should, then, be focused on local benefits and impacts on ground water quality. Proposed projects should be examined in terms of:

- Areas with high reclaimed water demands;
- Constituent concentrations in relation to basin plan objectives;
- Assimilative capacity of receiving basins; and
- Potential for improving ground water quality in near-surface and deep aquifers.

The major basins in San Diego County that have been studied for the implementation of a ground water management plan are the San Juan Creek, Upper Santa Margarita River Basin, Lower San Luis Rey Valley, Lower San Dieguito River Valley, San Pasqual Valley, Santee, Lower Sweetwater River Basin, and the Lower Tijuana River Basin. A goal of these management plans is to rejuvenate the quality of the ground water in these basins to meet basin objectives. The general plan is to pump the poor quality ground water from these basins to the ocean, and recharge the basins with reclaimed and natural run off waters, which will then be extracted for beneficial use when water quality objectives are met. The following is a description of the proposed programs.

SAN JUAN CREEK

In Orange County, a management plan is underway in the San Juan Creek Basin. Ground water supplies are limited in this basin due to low recharge and poor quality. The capacity of the San Juan Creek Basin is approximately 90,000 acre-feet. With proper management of the ground water basin, approximately 50,000 AF/Y could be utilized. The basin currently provides approximately 5,000 AF/Y of usable ground water - less than 2,000 AF/Y is used for urban supply and approximately 3,000 AF/Y is used for agricultural and irrigation purposes. The only ground water that meets drinking water standards and most agricultural requirements is found in the highlands of the northeasternmost portion of the basin. Ground water quality data indicate that the TDS concentration ranges from 300 mg/l (in the northeasternmost portion of the basin) to 1,850 mg/l (in the lower and western portion of the basin). Approximately 3.0 MGD of treated wastewater is being reclaimed for irrigation of a golf course, park, greenbelt and landscaping. In addition, reuse is proposed for effluent from Moulton-Niguel Water District's Water Reclamation Plant 3A, which has been expanded from a capacity of 0.5 MGD to 2.4 MGD, and for effluent from Trabuco Canyon Water District's Robinson Ranch Wastewater Reclamation Plant, which has a capacity of 0.25 MGD. The TDS concentration in secondary effluent in the basin ranges from 500 to 900 mg/l. Reclaimed water could be used to enhance surface water flows and quality or to improve ground water quality in the lower and western parts of the basin. The use of reclaimed water for urban or agricultural irrigation could help reduce demands for ground and imported water. A ground water monitoring plan for the San Juan Creek Basin has been proposed by the Department of Water Resources which would identify any basinwide changes that may occur in water quality that could affect current and potential beneficial uses. This program would provide an early warning that ground water supplies may be endangered.

UPPER SANTA MARGARITA RIVER BASIN

In Riverside County, the upper Santa Margarita River Basin contains several million acre-feet of high quality ground water in the Pauba/ Temecula aquifer system. The Rancho California Water District is considering a plan that will implement the use of reclaimed water for beneficial uses and for ground water recharge. Some changes in basin plan water quality objectives are needed to develop this project. The Santa Rosa SBR Water Reclamation Facility, near Temecula, percolates reclaimed waters through highly permeable alluvium, which recharge and mix with ground water in an upper aquifer. A tentative projection calls for 5 MGD of reclaimed water production by the year 2000.

LOWER SAN LUIS REY VALLEY

Imported water comprises almost the entire supply for this basin. Ground water use is limited due to deteriorated water quality. There are four operating wastewater treatment facilities in this basin that could supply over 12,000 acre-feet per year (AF/Y) of treated wastewater that could be used for ground water recharge or other beneficial uses. At the present time reclaimed water is only being used for freeway landscape irrigation. Many springs and wells that used to be ephemeral, now flow all year long with imported irrigation return water. In many areas of this basin, reclaimed water is of higher quality than the existing ground water quality. Use of reclaimed water can be utilized to improve the conditions of the ground water quality.

LOWER SAN DIEGUITO RIVER VALLEY

The San Dieguito ground water management plan includes the utilization of approximately 2,000 to 4,000 AF/Y of recharge of reclaimed water. The reclaimed water will initially be used for irrigation, rejuvenation of non-potable ground water resources and for creating a fresh water barrier near Interstate 5. Water from the City of Escondido's Hale Avenue Reclamation Facility will be treated to tertiary treatment standards and pumped to the reclamation area in the San Dieguito Valley, where it will undergo recharge to replace poor quality water pumped to the ocean or desalted and treated to potable water standards. This reclaimed water will be used for agriculture and landscape irrigation. As the ground water quality improves, this basin could supply water to areas outside the basin, such as La Jolla Valley and North City West for landscape irrigation. The San Dieguito Basin lacks a centralized wastewater collection system. Water services are provided by four different governmental agencies, and sewer service is provided by eight governmental agencies. There are plans to interconnect the existing and proposed treatment facilities into an integrated system which can supply reclaimed water throughout the basin. The benefits of a ground water management plan in this basin include inexpensive storage and distribution of excess reclaimed water flows available during low irrigation months. This ground water management plan will result in improved ground water quality and will provide an efficient use of available water resources.

SAN PASQUAL VALLEY

The San Pasqual ground water management plan would utilize between 5,000 and 8,000 AF/Y of reclaimed water for agricultural irrigation and ground water recharge, thus reducing the need for this amount of imported water. The reclaimed water is available from the City of Escondido Hale Avenue Wastewater treatment plant, which presently discharges directly to the ocean. The City of San Diego owns 7,436 acres of land in the San Pasqual Valley which has been set aside as an agricultural preserve. There is 38,000 acre-feet of usable ground water in the valley. The western portion of the valley has degraded ground water quality, and has been designated as the reclamation basin. There is a plan to pump this poor quality ground water to the ocean and recharge the basin with reclaimed water of higher quality, to provide a positive salt balance. When the ground water quality improves, it will be used for irrigation of parks and golf courses, the Wild Animal Park and for landscape and freeway irrigation. There is a large and continued demand for irrigation water in the area. The eastern portion of the basin is designated as potable, and efforts will be made to keep the quality of the ground water from degrading. A third part of the basin, called the Narrows, is located between the San Pasqual reclamation basin and the Hodges basin. It has a very small capacity and will be used to prevent surface and ground water flows of reclaimed water from entering Lake Hodges Reservoir, a potable storage reservoir for the City of San Diego.

SANTEE

The Padre Dam Municipal Water District is reviewing the feasibility of a comprehensive ground water management plan for Santee basin. Ground water from the eastern part of the basin is used for domestic, agricultural and stock watering purposes, and generally has TDS concentrations of 260-1,310 mg/l. The ground water in the main portion of the Santee basin has TDS concentrations of up to 2,990 mg/l. In times of drought, this water

could supplement imported water supplies. At the present time, reclaimed water is used only for recreational purposes at Santee Lakes Campground, and Park. The Padre Dam Municipal Water Districts 1.0 MGD tertiary and 2.0 MGD secondary capacity treatment facility provides 1,200 AC/Y of reclaimed water which is used for the Santee Lakes. Water from Lake No. 1 is used to irrigate the landscaping of the surrounding the lakes. Currently only 1 MGD of the plant's capacity is being utilized. All flows over 1 MGD are sent to the Metropolitan Sewer System. Future water reuse projects include another 1,200 AF/Y projected need for the Santee Town Center and city park and approximately 1,400 AF/Y for industrial use. High quality reclaimed water could provide a potential source for recharging the ground water basin and improve existing water quality. Careful management of the basin could mitigate impacts of a high water table to prevent resurfacing of reclaimed water.

LOWER SWEETWATER RIVER BASIN

The Sweetwater Authority completed initial ground water basin studies of the Lower Sweetwater River Basin in June, 1993. As part of the agency's water resources program, the Sweetwater Authority is reviewing the feasibility of using ground water from the Lower Sweetwater Basin to augment its potable water supply.

The Lower Sweetwater Basin extends along the Sweetwater River from the Sweetwater Reservoir Dam approximately eight miles to San Diego Bay. It consists of an alluvial aquifer and the underlying San Diego Formation aquifer. Current use of ground water within the basin is limited, with turf irrigation the predominate use. The Basin is recharged from natural runoff and water from the upstream urban runoff diversion system which, in part, surrounds the Sweetwater Reservoir and spills over the Sweetwater Dam. Water quality data indicate that the ground water is moderately saline with TDS concentrations averaging 1,400 mg/l.

The Sweetwater Authority is currently evaluating the feasibility of constructing ground water extraction wells, a water treatment facility, a brackish water pipeline from each well to the treatment facility, a product water delivery pipeline and pump station, and a brine disposal pipeline. Preliminary findings indicate that extraction and treatment (to potable water standards) of 1,600 to 3,600 AF/Y of ground water from the Lower Sweetwater River Basin is feasible. Some additional production and/or ground water storage may be available in the San Diego Formation aquifer. San Diego Formation hydrogeological studies are ongoing; however preliminary findings indicate that the managed storage potential in the aquifer may be significant.

LOWER TIJUANA RIVER BASIN

The Tijuana Valley County Water District adopted a Resolution of Intention to prepare a Ground Water Management Plan in accordance with Water Code sections 10750 - 10755 in February, 1993. The stated goals of the District are summarized as follows:

- Protect ground water quality and quantity in the Tijuana River Basin for existing and future property owners, agricultural and recreational users;

- Develop the ground water basin into a sub-regional water supply reservoir;

- Provide water to Valley customers and sell excess ground water to customers outside the Basin;

- Implement measures for ground water recharge with surface floodwater containment and runoff control facilities, and reclaimed water, if available; and

- Work with the City and County of San Diego and appropriate state and federal agencies, to propose a workable international floodwater and wastewater control solution for the Valley.

The District's current plans include development of ground water management alternatives for the production and treatment of approximately 2,500 AF/Y of potable ground water.

SALT BALANCE

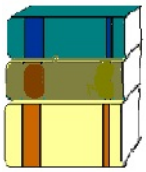
Salt balance is a theoretical concept where the total mass of dissolved minerals entering a ground water basin system from all sources is equal to the total mass of dissolved minerals leaving the system, either through extraction or natural outflow. It is preferable to have a balance of the salt inflows and outflows to maintain water quality in a basin.

Utilizing the following management measures would enhance the prospects for salt balance for ground water basins in the Region. These measures include:

- Limiting ground water extractions from basins to perennial-yield levels;
- Increasing the efficiency of irrigation practices;
- Reducing fertilizer application;
- Improving the quality of imported water used for irrigation;
- Use storm water runoff for ground water recharge, since storm water is low in TDS;
- Extract and demineralize poor quality ground water when this option becomes economically feasible; and
- Utilize intrusion barriers and regulate ground water pumpage to prevent and reverse problems of salt water intrusion.

SOLE SOURCE AQUIFER PROGRAM

The Safe Drinking Water Act of 1974 provides for a sole source aquifer program. Under this program, USEPA may designate an aquifer as a sole source if it provides more than half of the drinking water for a given area, and no other affordable sources of drinking water exist. The Act provides that, when certain criteria are met, a group may petition the USEPA to designate a sole source aquifer. Thus, in May of 1993, a local citizens' group, Backcountry Against Dumps petitioned the USEPA to designate the Campo/ Cottonwood Creek aquifer as the sole source of drinking water in a 400 square-mile area. The Campo/Cottonwood aquifer is bordered by Mexico to the south, and includes within its borders reservations for the Campo, La Posta, Manzanita, and Cuyapaipe Indian tribes. The aquifer lies about 20 miles east of El Cajon, California. This designation means the USEPA may review proposed projects in the aquifer area which receive partial federal funding and which could contaminate the aquifer or endanger public health. Examples of projects potentially subject to review include construction or renovation of housing projects, airports, and highways. Projects that do not receive some federal funds would not be reviewed.



REFERENCES

Annapolis Field Office Region III Environmental Protection Agency. January, 1974. Distribution of Metals in Baltimore Harbor Sediments. Technical Reports 59.

Bengtson, Debell, Elkin & Titus, Ltd. 1989. Best Management Practices Manual for the Shipbuilding and repair Industry. Draft Document. Prepared for Virginia State Water Control Board. Richmond, Virginia.

California Administrative Code. 1985 (and all amendments thereto). Title 22 and Title 23.

California Department of Fish and Game (CDFG), 2000. San Diego Regional Water Quality Control Board: 1999 Biological Assessment Annual Report. CDFG, Office of Spill Prevention and Response, Water Pollution Control Laboratory, Rancho Cordova, CA.

California Porter-Cologne Water Quality Act, Water Code, Division 2 and 7. 1969 (and all amendments thereto).

California Regional Water Quality Control Board, San Diego Region. 1975. Comprehensive Water Quality Control Plan Report for the San Diego Basin (9). James M. Montgomery, Consulting Engineers, Inc.

California Regional Water Quality Control Board, San Diego Region. June 12, 1992. Policy Statement - Water Rights Phase of the Bay Delta Estuary Proceedings.

Department of Water Resources. 1964. Names and Areal Code Numbers of Hydrologic Areas in the Southern District.

Department of Water Resources. 1967. Ground Water Occurrence and Quality San Diego Region. Bulletin No. 106-2. Volume 1: Text. 235 pp.

Engineering-Science, Inc. February 22, 1974. Summary Report, Lower James River Basin Comprehensive Water Quality Management Study.

Federal Water Pollution Control Act. 1972 (and all amendments thereto). PL 92-500. (Clean Water Act).

Governor's Office of Planning and Research. 1992. CEQA California Environmental Quality Act Statutes and Guidelines 1992. Sacramento, California. 256 pp.

Harrington, J., and M. Born. 2000. Measuring the Health of California Streams and Rivers, A Methods Manual for: Water Resource Professionals, Citizen Monitors, and Natural Resources Students, Second Edition, Revision 3. Sustainable Land Stewardship International Institute, Sacramento, CA.

Irrigation Training & Research Center, California Polytechnic State University San Luis Obispo (IRTC). September 9, 2014. Recommendations to the State Water Resources Control Board pertaining to the Irrigated Lands Regulatory Program.

Jayne, Deborah S. February 1, 1993. California Regional Water Quality Control Board, San Diego Region. Staff Report on Petitions to Downgrade Threat to Water Quality and Complexity Ratings for Campbell Industries, Southwest Marine, and National Steel and Shipbuilding Company Shipyards, Revised Edition.

Naval Civil Engineering Laboratory. March, 1973. A Study of Sediments and Soil Samples from Pearl Harbor Area. Port Hueneme, California.

Planning and Conservation League Foundation. June 1985. Citizen's Guide to the California Environmental Quality Act. 14 pp.

Pryde, Philip P. 1976. Chapter 8, Water Supply for the County. In San Diego, An Introduction to the Region. pp. 103-120. Prepared by the Department of Geography, San Diego State University. Kendall/Hunt Publishing Company, Dubuque, Iowa.

San Diego County Water Authority. 1992. Forty-Sixth Annual Report of Authority Operations for Fiscal Year Ending June 30, 1992. San Diego, California. 128 pp.

San Diego County Water Authority. November 1993. Water Resources Plan: Urban Water Management Plan. 83 pp.

SCS Engineers. 1989. Hazardous Waste Minimization Audit Study of Marine yards for Maintenance and Repair. File No. 188057.00. Prepared for California Department of Health Services, Alternative Technology and Policy Development Section. Sacramento, California.

State Water Resources Control Board. July 1975. Comprehensive Water Quality Control Plan for the San Diego Basin, Abstract. 58 pp.

State Water Resources Control Board. 1988. Water Quality Inventory. Nonpoint Source Management Plan.

State Water Resources Control Board, Division of Water Quality, Nonpoint Source Section. 1994. Polluted Runoff Watershed Solutions. 31 pp.

State Water Resources Control Board. 1990. Chapter 9: Compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

State Water Resources Control Board. June 1992. The Porter-Cologne Water Quality Control Act and Related Code Sections (including 1991 amendments). 218 pp.

U.S. Environmental Protection Agency. 1974. Draft Report to the San Diego Regional Water Quality Control Board on Guidelines for the Control of Shipyard Pollutants. National Field Investigations Center. Denver, Colorado.

U.S. Environmental Protection Agency. 1979. Development Document for Proposed Effluent Limitations Guidelines and Standards for the Shipbuilding and repair Point Source Category. Effluent Guidelines Division, WH-552. Washington, D.C.

U.S. Environmental Protection Agency. 2000. Nutrient Criteria Technical Guidance Manual, Rivers and Streams. EPA 822-B-00-002. USEPA, Office of Water, Washington, D.C.

U.S. Geological Survey. 1998. Groundwater and Surface Water A Single Resource, USGS Circular 1139, U.S. Department of the Interior.

U.S Geological Survey, 2010. The Quality of Our Nation's Water-Nutrients in the Nation's Streams and Groundwater, 1992-2004. USGS, Reston, Virginia.

Vanderver, T.A., R.V. Randle, and J.C. Martin. 1989. Chapter 10: National Environmental Policy Act (NEPA). pp 441-472. In Environmental Law Handbook, Tenth Edition. Government Institutes, Inc.

Virginia Institute of Marine Science. 1972. Study of Channel Sediments, Baltimore Harbor (Norfolk District), York River Entrance Channel.

Virginia Institute of Marine Science. June, 1971. Study of Channel Sediments, James River.