WATER QUALITY CONTROL PLAN

SANTA ANA RIVER BASIN (8)

TABLE OF CONTENTS

TABLE OF CONTENTS - cont.

Chapter Contents | Page No.

TABLE OF CONTENTS - cont.

TABLE OF CONTENTS - cont.

Chapter Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (CONTINUED)

CHAPTER 1

INTRODUCTION

THE WATER QUALITY CONTROL PLAN (BASIN PLAN) FOR THE SANTA ANA RIVER BASIN

The State Water Resources Control Board (SWRCB or State Board) and the nine Regional Water Quality Control Boards (RWQCBs or Regional Boards) are responsible for the protection and, where possible, the enhancement of the quality of California's waters. The SWRCB sets statewide policy, and together with the RWQCBs, implements state and federal laws and regulations. Each of the nine Regional Boards adopts a Water Quality Control Plan, or Basin Plan, which recognizes and reflects regional differences in existing water quality, the beneficial uses of the region's ground and surface waters, and local water quality conditions and problems.

This document is the Basin Plan for the Santa Ana Region. The Santa Ana Regions includes the upper and lower Santa Ana River watersheds, the San Jacinto River watershed, and several other small drainage areas. The Santa Ana Region covers parts of southwestern San Bernardino County, western Riverside County, and northwestern Orange County.

FUNCTION OF THE BASIN PLAN

The Basin Plan for the Santa Ana Region is more than just a collection of water quality goals and policies, descriptions of conditions, and discussions of solutions. It is also the basis for the Regional Board's regulatory programs. The Basin Plan establishes water quality standards for the ground and surface waters of the region. The term "water quality standards," as used in the federal Clean Water Act, includes both the beneficial uses of specific waterbodies and the levels of quality which must be met and maintained to protect those uses. The Basin Plan includes an implementation plan describing the actions by the Regional Board and others that are necessary to achieve and maintain the water quality standards.

The Regional Board regulates waste discharges to minimize and control their effects on the quality of the region's ground and surface water. Permits are issued under a number of programs and authorities. The terms and conditions of these discharge permits are enforced through a variety of technical, administrative, and legal means.

Water quality problems in the region are listed in the Basin Plan, along with the causes, where they are known. For waterbodies with quality below the levels necessary to allow all the beneficial uses of the water to be met, plans for improving water quality are included.

In some cases, it has been necessary for the Regional Board to completely prohibit the discharge of certain materials. Some types of discharges are prohibited in specific areas. Details on these prohibitions also appear in the Basin Plan.

LEGAL BASIS AND AUTHORITIES

The Basin Plan reflects, incorporates, and implements applicable portions of a number of national and statewide water quality plans and policies, including the California Water Code and the Clean Water Act.

California Water Code

California's Porter-Cologne Water Quality Control Act (Section 13000 ["Water Quality"] ***et seq***., of the California Water Code), which established both the State Water Resources Control Board and the present system of nine Regional Water Quality Control Boards, directs in Chapter 4, Article 3, "Regional Water Quality Control Plans," that each Regional Board is to formulate and adopt water quality control plans for all areas within the region and is to periodically review and revise them as necessary. Each Regional Board is to set water quality objectives that will insure the reasonable protection of beneficial uses and the prevention of nuisance, with the understanding that water quality can be changed somewhat without unreasonably affecting beneficial uses.

The California Water Code also lists the specific factors which are to be considered in establishing water quality objectives. A detailed listing appears in Chapter 4 (p. 4-1).

Implementation plans are to include, but not limited to:

(1) a description of the nature of the actions necessary to achieve the objective, including recommendations for appropriate action by any entity, public or private;

(2) a time schedule for the actions to be taken; and

(3) a description of the surveillance to be undertaken to determine compliance with the objectives.

Clean Water Act

The objective of the federal Clean Water Act is to "***restore and maintain the chemical, physical and biological integrity of the Nation's waters,***" to make waters of the United States "fishable and swimmable." The Clean Water Act includes several sections which relate to Basin Plans and the basin planning process, including sections on Areawide Waste Treatment Management, Basin Planning, and Water Quality Standards and Implementation Plans.

The Clean Water Act requires that states adopt water quality standards, including standards for toxic substances. The states are also required to have a continuing planning process, which includes public hearings at least once every three years to review the water quality standards and revise them if necessary.

ENVIRONMENTAL SETTING

The Santa Ana Region is the smallest of the nine regions in the state (2800 square miles) and is located in southern California, roughly between Los Angeles and San Diego. Although small, the region's four million residents (1993 estimate) make it one of the most densely populated regions. People have come to southern California over the years for a wide variety of reasons. Once here, many decide to stay. Snow skiing areas in the mountains are as little as two hours from world-famous broad, sandy ocean beaches.

The climate of the Santa Ana Regions is classified as Mediterranean: generally dry in the summer with mild, wet winters. The average annual rainfall in the region is about fifteen inches, most of it occurring between November and March. Much of the area would be near-desert were it not for the influence of modern civilization.

Regional Boundaries and Geography

In very broad terms, the Santa Ana Region is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean (See Figure 1-1).

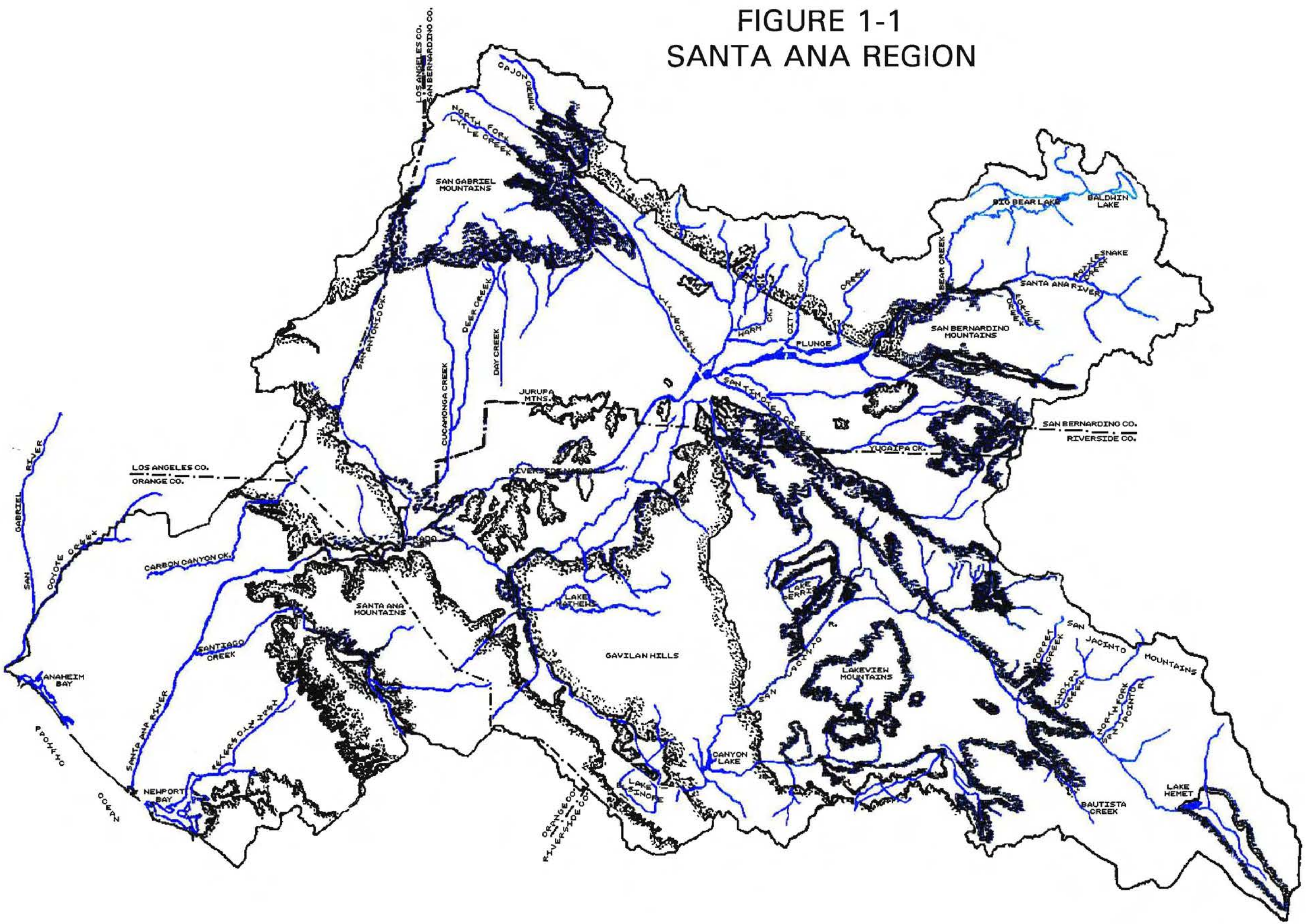
The boundaries between California's nine regions are usually hydrologic divides that separate watersheds, but the boundary between the Los Angeles and Santa Ana Regions is the Los Angeles County Line. Since that county line only approximates the hydrologic divide, part of the Pomona area drains into the Santa Ana Region, and in Orange County, part of the La Habra drains into the Los Angeles Region.

The east-west alignment of the crest of the San Gabriel and San Bernardino Mountains separates the Santa Ana River basin from the Mojave Desert, which is part of the Lahontan Basin (Region 6).

In the south, the regional boundary divides the Santa Margarita River drainage area from that of the San Jacinto River, which normally terminates in Lake Elsinore.

Near Corona, the Santa Ana River has cut through the Santa Ana Mountains and flows down onto the Orange County coastal plain. The Pacific Ocean coast of the Santa Ana Region extends from just north of Laguna Beach up to Seal Beach and the Los Angeles County line. Other features of the coast include Newport Bay, Anaheim Bay-Huntington Harbour, and the major coastal wetlands areas associated with those bays.

FIGURE 1-1
SANTA ANA REGION

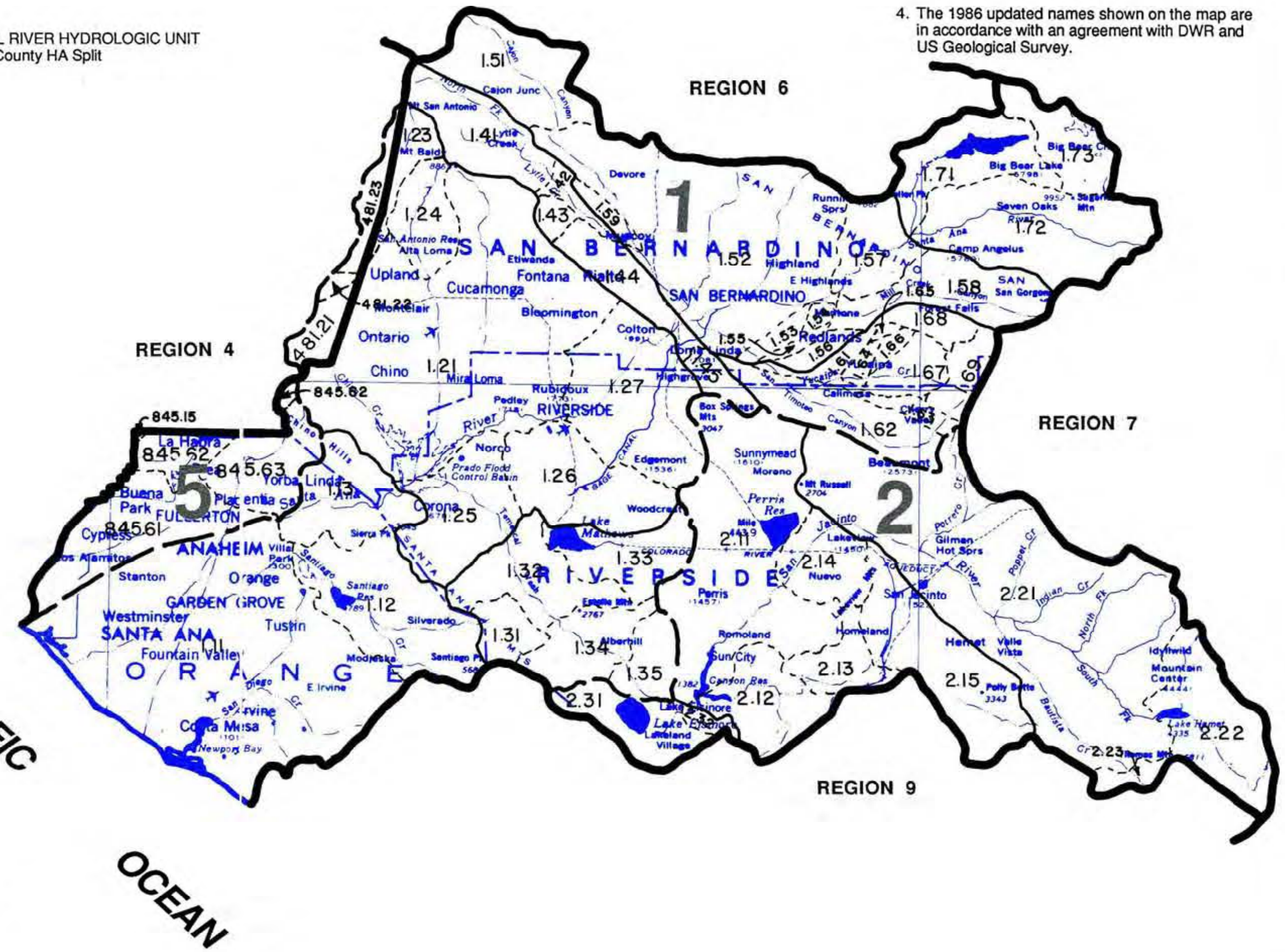


REGION 8 INDEX

801.00	SANTA ANA RIVER HYDROLOGIC UNIT
801.10	Lower Santa Ana River HA
1.11	East Coastal Plain HSA
1.12	Santiago HSA
1.13	Santa Ana Narrows HSA
801.20	Middle Santa Ana River HA Split
801.21	Chino HSA Split
481.21	Chino HSA Split
481.22	Harrison HSA
801.23	Claremont Heights HSA Split
481.23	Claremont Heights HSA Split
801.24	Cucamonga HSA
1.25	Temescal HSA
1.26	Arlington HSA
1.27	Riverside HSA
801.30	Lake Matthews HA
1.31	Coldwater HSA
1.32	Bedford HSA
1.33	Cajalco HSA
1.34	Lee Lake HSA
1.35	Terra Cotta HSA
801.40	Colton-Rialto HA
1.41	Upper Lytle HSA
1.42	Lower Lytle HSA
1.43	Rialto HSA
1.44	Colton HSA
1.45	Reche HSA
801.50	Upper Santa Ana River HA
1.51	Cajon HSA
1.52	Bunker Hill HSA
1.53	Redlands HSA
1.54	Mentone HSA
1.55	Reservoir HSA
1.56	Crafton HSA
1.57	Santa Ana Canyon HSA
1.58	Mill Creek HSA
1.59	Sycamore HSA
801.60	San Timoteo HA
1.61	Yucaipa HSA
1.62	Beaumont HSA
1.63	Cherry Valley HSA
1.64	Chicken Hill HSA
1.65	Gateway HSA
1.66	Oak Glen HSA
1.67	South Mesa HSA
1.68	Triple Falls Creek HSA
1.69	Noble Creek HSA
801.70	San Bernardino Mountain HA
1.71	Bear Valley HA
1.72	Seven Oaks HSA
1.73	Baldwin HSA
802.00	SAN JACINTO VALLEY HYDROLOGIC UNIT
802.10	Perris HA
2.11	Perris Valley HSA
2.12	Menifee HSA
2.13	Winchester HSA
2.14	Lakeview HSA
2.15	Hemet HSA
802.20	San Jacinto HA
2.21	Gilman Hot Springs HSA
2.22	Hemet Lake HSA
2.23	Bautista HSA
802.30	Elsinore Valley HA
2.31	Elsinore HSA
2.32	Railroad HSA
805.00	LOS ANGELES-SAN GABRIEL RIVER HYDROLOGIC UNIT
805.10	Coastal Plain of Los Angeles County HA Split
845.15	Central HSA Split
845.60	Anaheim HA Split
845.61	Anaheim HSA Split
845.62	La Habra HSA Split
845.63	Yorba Linda HSA Split

NOTE:

1. The names and areas shown on this map are the same as used by the Department of Water Resources (DWR) in their Bulletin 130 Series except as explained below.
2. The numbering system used on this map is an adaptation of the numbering system used in the 130 Series.
3. The boundary between Region 8 and Region 4 follows the boundary between Los Angeles County and Orange or San Bernardino Counties, not the Hydrologic Boundary. The San Bernardino County line splits Hydrologic Unit 1 (Santa Ana River HU) so that Sub-Areas 481.21, 481.22, and 481.23 are legally in Region 4 but drain into Region 8. The Orange County line splits Hydrologic Unit 5 (Los Angeles-San Gabriel River HU) so that Sub-Areas 845.15, 845.61, 845.62 and 845.63 are legally in Region 8 but drain into Region 4. Therefore, a 5 digit number on the map indicates that a regional boundary divides a hydrologic unit, area or subarea. In these cases the second digit is the number of the region from which the hydrologic area has been separated by the regional boundary. All other digits are as described in the legend.
4. The 1986 updated names shown on the map are in accordance with an agreement with DWR and US Geological Survey.



KEY TO REGION

LEGEND

STREAM

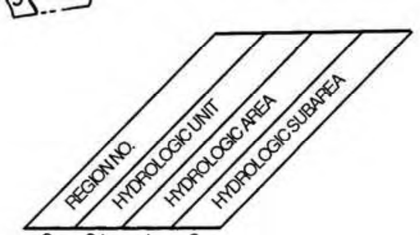
REGIONAL BOUNDARY

HYDROLOGIC UNIT BOUNDARY (HU)

HYDROLOGIC AREA BOUNDARY (HA)

HYDROLOGIC SUBAREA BOUNDARY (SA)

5 HYDROLOGIC UNIT NUMBER



April 1973
Revised: July 1976
Revised: August 1986

State Water Resources Control Board
Surveillance and Monitoring Section
T.E. Lavenda, P.E. *T.E. Lavenda*

State of California

REGIONAL WATER QUALITY CONTROL BOARD

Santa Ana Region (8)

SANTA ANA HYDROLOGIC BASIN PLANNING AREA (SA)

Scale in miles

8 0 8 16 24 32

Scale 1:500,000

Geological Faults

Southern California is a geologically active area. Major earthquake faults in the region include the San Andreas Fault and its large branch, the San Jacinto Fault; the Elsinore-Whittier Fault; and the Newport-Inglewood Fault. The San Andreas Fault divides the San Gabriel Mountains from the San Bernardino Mountains. The San Jacinto Fault, which splits off from the San Andreas Fault near San Bernardino, affects groundwater flows associated both with the Santa Ana and San Jacinto Rivers. The Elsinore-Whittier Fault passes under Prado Dam as it trends, like the others, from the northwest toward the southeast. The Newport-Inglewood Fault enters the region from the Los Angeles basin and passes offshore at Newport Beach. In addition to these major faults, there are many branching, connecting, and parallel faults in the region.

HISTORY OF WATER DEVELOPMENT

Early Settlement

Following the Spanish Mission and Rancho Periods, early agriculture centered around horses and cattle. In the early 1800s, the increasing population required more farms and orchards to produce more food. The weather generally supported farming year-round, but the dry summers made irrigation a necessity. Once water supplies became dependable, vast areas of citrus orchard and vineyards also followed. Today, the region still has strong ties to agriculture, including a large dairy industry, but much of what remains is under increasing development pressure. The future probably involves an even larger human population and much less commercial agriculture.

Original Conditions

Before this area was settled, it is thought that the Santa Ana River flowed from its headwaters in the San Bernardino Mountains to the Pacific Ocean throughout most of the year. The San Jacinto River, also a substantial surface stream, typically would have ended at Lake Elsinore, which acted as an inland sink. Once out of the sycamore-filled mountain canyon, these rivers meandered along in sandy streambeds, shaded by willows, cottonwoods, and live oaks, flows decreasing where water percolated, filling the groundwater basins, increasing where local geological features forced the groundwater to the surface. High groundwater made springs, swampy areas, marshes and bogs common.

Deep alluvial valley deposits made up large groundwater basins, both in the inland valleys and on the coastal plain, basins naturally full of fresh water. Along with its nearby tributaries, the Santa Ana River fed the Bunker Hill groundwater basin, the Colton and Riverside basins, and to a lesser extent, part of the Chino Basin. Streams in the San Gabriel Mountains recharged the Chino Basin. The San Jacinto River recharged a deep (over two thousand feet) graben, the San Jacinto groundwater basin, as it left the mountains, then several other basins in succession on its way to Lake Elsinore. When especially heavy rainfalls or a series of wet winters filled Lake Elsinore, overflows went down Temescal Creek to the Santa Ana River near Corona. The Santa Ana River entered Santa Ana Canyon and passed through the coastal mountains out onto the Orange County Plain, overlying another large, deep groundwater basin largely recharged by river flows. With the diversion of most of this natural surface flow for agricultural and domestic uses, creeks and rivers dried up, carrying only storm flows and runoff. Eventually, treated wastewater replaced some of the flows in some streams.

Irrigation

The first irrigation diversions were made directly from the streams, often using crude brush and sand dams and hand-dug ditches to lead the water from the river to the fields. As more and more settlers arrived, the number of diversions increased. Eventually, all the surface flows were taken and groundwater recharge diminished sharply.

Ground water pumping became necessary to provide water for irrigation and for the growing settlements. Windmills were followed by motor-driven pumps, and as groundwater levels fell, deep well turbines became necessary. Artesian areas, such as those near San Bernardino and in Fountain Valley, stopped flowing naturally. The springs, swamps, and other historically wet areas began drying up.

The history of the San Jacinto River and its tributaries parallels that of the Santa Ana. The San Jacinto had historically kept all the groundwater basins in that part of the region full. Now, there is essentially no surface flow beyond the mouth of the canyon, where it exits the mountains; the riverbed is typically dry. Flood flows every five or ten years, however, produce a broad, shallow “Mystic Lake” in the riverbed near the town of Lakeview.

Further downstream, the river is dammed to form Canyon Lake, just upstream from Lake Elsinore. As noted earlier, Lake Elsinore is normally a sink, with no outflow. High annual evaporation rates have historically limited the amount of water in the lake, which has gone dry several times in this century. Only torrential rains or extended wet cycles have produced the rare overflows down Temescal Creek to the Santa Ana River. Several projects to stabilize the level of Lake Elsinore are now being completed.

When local water supplies inevitably ran short, the area’s economy, based on agriculture, was strong enough to help support the construction of large imported water projects. The Metropolitan Water District of Southern California (locally MWD-

SC or “Met”) built and still operates the Colorado River Aqueduct, which has imported millions of acre-feet of water from the Colorado River across the Mojave Desert and into the region. A second, newer system, the California Water Project, pumps comparable volumes of water out of the Sacramento-San Joaquin Delta for delivery to the Santa Ana Region and other parts of Southern California.

Santa Ana River Stipulated Judgement

Despite the availability of imported water, legal arguments focused on locally available (generally cheaper) water supplies. Overuse of the upstream water by extensive recycling had reduced summer flows in the Santa Ana River to a trickle, and even that trickle was somewhat salty. The largest of these legal arguments pitted Orange County (the downstream users) against all of the upstream users in Riverside and San Bernardino Counties. When the case was settled through an engineered solution the four largest water districts - San Bernardino Valley Municipal Water District (MWD), Chino Basin MWD, Western MWD, and Orange County WD agreed to implement the court’s solution through a Santa Ana River Watermaster.

Minimum average annual flows and guaranteed quality (total dissolved solids, or TDS) from the San Bernardino area to and through the Riverside Narrows were required, as well as flows from the upper basin to the lower basin (Orange County), measured at Prado Dam. The water required to meet the Stipulated Judgement can be made up of wastewater, imported water, dry weather runoff or some combination of these, with TDS the measure of minimum acceptable quality.

Together, the four large water agencies affected by the judgement formed SAWPA, the Santa Ana Watershed Planning (later “Project”) Authority, a forum for discussion of water issues as well as a joint powers agency that can build projects of common interest to two or more members.

BASIN PLANNING

History

In the 1950s and ‘60s, the Regional Boards were not actively involved in water quality planning. Water quality problems typically resulted in controls on waste discharges, usually including effluent limits for TDS and perhaps a few other parameters. Beyond that, the only serious restrictions prohibited the creation of a pollution or nuisance. By 1970, however, the Regional Boards were actively involved in the formulation of plans to meet established water quality objectives. The federal Clean Water Act and the Porter-Cologne Act, which required basin-wide planning, plus the National Pollution Discharge Elimination System (NPDES), which empowers the states to set discharge standard, placed new tools in the hands of the Regional Boards and encouraged the development of new approaches to water quality management. With the development of the “1967 Standards,” applicable to interstate waters, came Water Quality Control

Policies for the San Gabriel Tidal Prism, for the Coastal Bays, Marinas and Sloughs, and for Pacific Ocean Coastal Waters.

In the Santa Ana Region, the 1971 Interim Water Quality Control Plan incorporated the 1967 Standards and set water quality objectives for the Santa Ana River at Prado Dam. After the State Board developed the Ocean Plan and the Thermal Plan, the revised Interim Water Quality Control Plan incorporated that information.

Also in the early 1970s, the Santa Ana Regional Water Quality Control Board (Regional Board) was investigating the salt balance situation in the upper basin. An early computer model, primitive and slow by modern standards but providing answers of a kind never available before, had been used to assess the situation. SAWPA was contracted to write the first (1975) essentially complete Basin Plan (Water Quality Control Plan) for the Regional Board, using an improved version of that model.

The 1975 Basin Plan outlined a specific water quality management scheme designed to improve groundwater quality in the upper basin. Unfortunately, the kinds of large-scale actions necessary to maintain the quality of the region's ground and surface waters – basin management facilities, changes in water supply, regional wastewater treatment – were well beyond the regulatory powers of the Regional Board.

One of the region's major problems at that time was salt balance. Salt (TDS) buildup in the water results from excessive reuse of a given volume of water. Each cycle of use, whether in the home, in industry or use by irrigated agriculture, adds salts directly or indirectly, either through partial evaporation (or evapotranspiration) or direct addition of soluble materials. Typically, each use of water adds 200-300 parts per million (ppm) or milligrams per liter (mg/L) of TDS. TDS begins to interfere with the use of water somewhere between 500 and 1000 mg/L TDS; at 2000 mg/L, water is brackish and generally unusable. In order to allow for subsequent use downstream and to keep ground and surface water bodies usable, careful management of water reuse was necessary. Unlimited recycling created water quality problems. "Pumpback" schemes were strongly discouraged.

Part of the 1975 Basin Plan's solution to the salt balance problem, which seemed most acute in the Chino groundwater basin, was to import and recharge large volumes of low-TDS State Water Project (SWP) water. A second feature of the implementation plan was a large wellfield to extract poor quality water from the lower part of the basin. The third component was a pipeline to the sea to export brines from the upper basin. As years have passed, the list of projects has changed, with desalters replacing groundwater flushing projects. Most of the brine line (the Santa Ana River Interceptor or SARI Line) has been built and one groundwater desalter (Arlington) is now in place. Plans for two more desalters (East and West Chino Basin) in this area are still in design; at least one more is proposed in the San Jacinto watershed.

The Santa Ana Regional Water Quality Control Board and SAWPA (now also including Eastern MWD as a member) have continued to work together toward a common goal

– a well-operated basin that meets reasonable standards in an economical manner and provides high-quality water supplies when and where they're needed.

THE SANTA ANA RIVER

Reaches

The mainstem of the Santa Ana River is divided into six reaches (Figure 1-2). Each reach is generally a hydrologic and water quality unit.

Reach 6 includes the river upstream of Seven Oaks Dam, now under construction. Flows consist largely of snowmelt and storm runoff. Water quality tends to be very high.

Reach 5 extends from Seven Oaks Dam to San Bernardino, to the San Jacinto Fault (Bunker Hill Dike), which marks the downstream edge of the Bunker Hill groundwater basin. Most of this reach tends to be dry, except as a result of storm flows, and the channel is largely operated as a flood control facility. The extreme lower end of this reach includes rising water and intermittently, San Timoteo Creek flows.

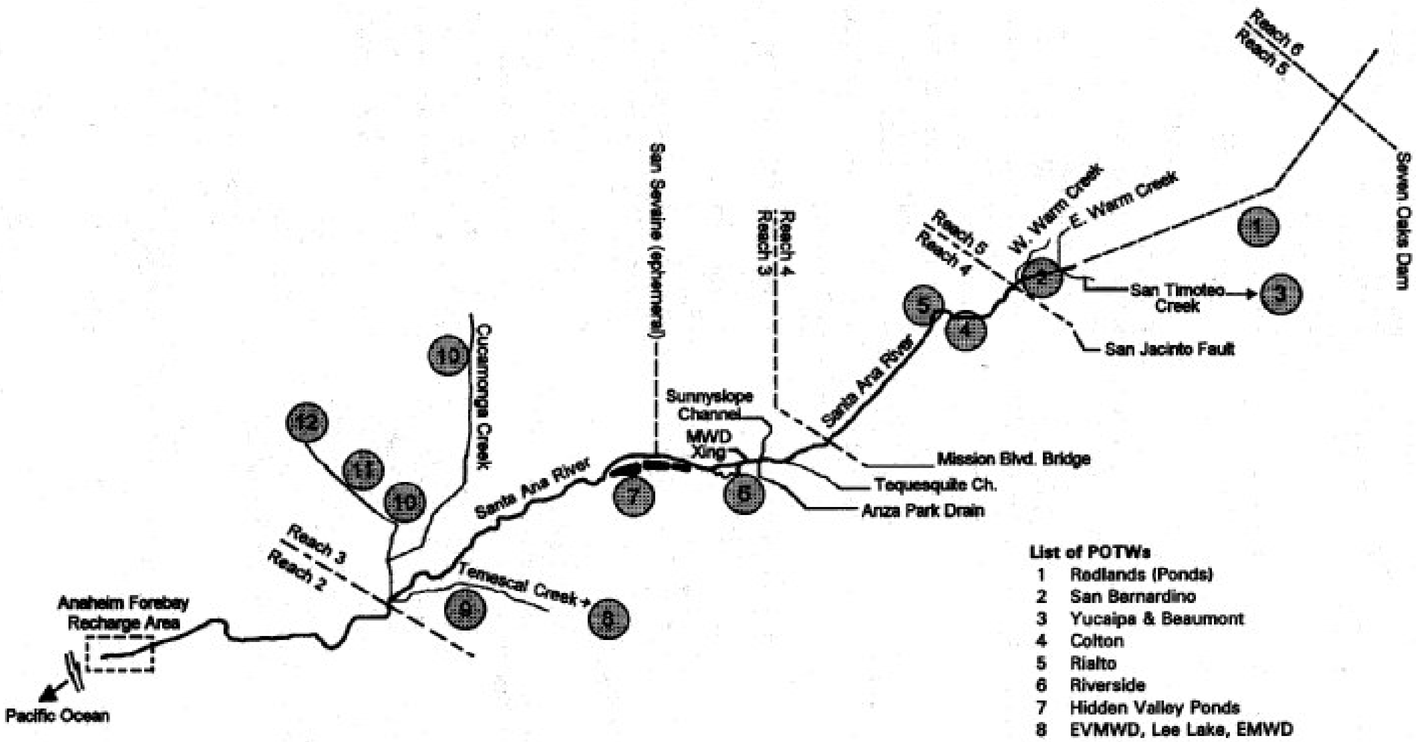
Reach 4 includes the river from the Bunker Hill Dike down to Mission Boulevard Bridge in Riverside. That bridge marks the upstream limit of rising water induced by the flow constriction in the Riverside Narrows. Until about 1985, rising water from upstream and wastewater discharges percolated and the lower part of the reach was dry. Flows are now perennial, but may not remain so as new projects are built. Much of this reach is also operated as a flood control facility.

Reach 3 includes the river from Mission Bridge to Prado Dam. In the Narrows, rising water feeds several small tributaries (Sunnyslope Channel, Tequesquite Arroyo, and Anza Park Drain) which are important breeding and nursery areas for the native fish. Temescal, Chino, and Mill/Cucamonga Creeks in Prado Basin are also important river tributaries.

Reach 2 carries all the upstream flows down through Santa Ana Canyon to Orange County where as much of the water as possible is recharged into the Orange County groundwater basin. The downstream end of the forebay/recharge area and, therefore, the ordinary limit of surface flows, is at 17^{th} Street in Santa Ana.

Reach 1 is a normally dry flood control facility, presently being expanded and improved even further as a part of the US Army Corps of Engineers' Santa Ana River Project. This reach extends from 17^{th} Street to the tidal prism at the ocean.

FIGURE 1-2
SANTA ANA RIVER AND TRIBUTARIES



List of POTWs

1 Redlands (Ponds)
2 San Bernardino
3 Yucaipa & Beaumont
4 Colton
5 Rialto
6 Riverside
7 Hidden Valley Ponds
8 EVMWD, Lee Lake, EMWD
9 Corona (Ponds)
10 CBMWD RP-1
11 CBMWD RP-2
12 CBMWD Carbon Cyn.

Flows and Water Quality

When the Santa Ana River Stipulated Judgement was finalized in 1969, surface diversions and groundwater pumping had eliminated most of the dry weather surface flows in the river system between the mountains and Prado Dam. As the inland cities grew, wastewater flows increased. Between 1970 and 1990, the total volume rose from less than 50,000 to over 130,000 acre-feet per year. The river is effluent-dominated, a rare circumstance outside the Southwest. Nevertheless, water quality in the river has improved steadily, due largely to the efforts of the dischargers action in response to the requirements of the Regional Board.

In the 1970s, secondary treatment with disinfection was required in order to protect the health of the people who used it for contact recreation. These treatment requirements were further upgraded to include virus control: in-line coagulation and filtration and improved disinfection (or their equivalents) were then required. In the late 1980s, control of inorganic nitrogen levels was required to protect the aquatic habitat from un-ionized ammonia toxicity and to manage nitrate levels in groundwater for subsequent municipal uses. Further controls on residual chlorine levels were also added.

By 1991, when SAWPA's Use-Attainability Analysis of the middle Santa Ana River was conducted; full compliance with all these requirements had not yet been achieved. The river was posted to warn against water contact recreation, because certain upstream dischargers had not achieved compliance with virus control requirements. Compliance is expected by the end of 1995. Other identifiable water quality problems in the river were restricted to parts of Reach 4 where ammonia and chlorine controls were not yet in place. No water quality impairment due to toxics was seen in other parts of the system. In those other areas, the kinds and numbers of aquatic organisms at any given location tend to be dictated by habitat conditions.

Aquatic Environment in the Santa Ana River

Because flows are limited or generally absent in several parts of the Santa Ana River, there is no sustained aquatic habitat in those areas. Even where there are perennial flows, the habitat is frequently harsh – warm, shallow water, shifting sand substrate, little or no instream cover, and no riparian vegetation or tree canopy for shade.

There are no dependable flows from the mouth of the canyon, where the river leaves the mountains, for some distance downstream. In the canyon itself, the Corps of Engineers is presently building the Seven Oaks Dam, a large flood control structure. Groundwater recharge basins immediately downstream percolate flows from the river and its nearby tributaries. The river channel is operated as a typically dry flood control facility.

In the San Bernardino area, the San Jacinto Fault (Bunker Hill Dike) forces groundwater to the surface. At present (1993), perennial flows in the middle Santa Ana River begin at the confluence with East Warm Creek, a short distance upstream. The rising water area associated with the fault, now relatively small, was historically a much larger, swampy area with many large springs. San Timoteo Creek, which the Corps of Engineers plans to line with concrete in the near future, joins the river in this area, its flows predominantly reclaimed wastewater from Yucaipa and other upstream dischargers.

East Warm Creek (near San Bernardino) carries small amounts of water from various non-point sources as well as some rising water. The San Bernardino Publicly-Owned Treatment Works (POTW) currently discharges to this creek just upstream of where it joins the river, but the city plans to move its point of discharge downstream in the near future. The river passes under several major highways and railroads in this area, and parts of the river bottom are lined with concrete. West Warm Creek, fully improved by the Corps for flood control but usually dry, also joins the river in this area.

The Santa Ana River Use-Attainability Analysis (1991) found areas of relatively high habitat value downstream of La Cadena Avenue in Colton, but these areas were largely washed out during the wet 1992-93 winter. Aquatic biota in the stream in this part of Reach 4 were limited, however, because certain POTWs had not yet installed full tertiary treatment and because physical conditions downstream – high temperatures, lack of cover or shelter – strongly discouraged upstream or downstream migration. Recent flood control maintenance practices have included removal of all vegetation and straightening of the river channel, severely reducing the value of the habitat. Surface flows presently continue on down through Reach 4, though conditions are likely to change when San Bernardino and Colton effluents are diverted to the RIX (rapid infiltration and extraction) project further downstream. The City of Rialto may also change its point of discharge to the river.

Near the Mission Boulevard Bridge and the upstream limit of Reach 3, rising water marks the Riverside Narrows area. Groundwater rises in the river channel and to either side as well. This water supports several small tributaries: Sunnyslope Channel, mostly improved for flood control; Tequesquite Arroyo Creek, which also drains Sycamore Canyon; and Anza Park Drain. In addition, the overflow from Lake Evans makes up a perennial tributary to the river in this area. These small streams form the present center of population of the Santa Ana Sucker, one of two remaining native species (in the Santa Ana River).

The City of Riverside’s POTW on the south side of the river discharges in the Narrows, diverting all or part of its flows through the Hidden Valley Wildlife Area. Jurupa’s Indian Hills POTW on the north side is permitted to discharge under certain conditions as well, but typically reclaims all its flow for golf course landscape irrigation.

From the Riverside Narrows area downstream to Prado Basin, the river is generally natural and unmodified. Even here, however, the water is warm because the mainstem is generally shallow and has a limited canopy. The substrate is dominated by shifting sand, limiting the bottom habitat and available opportunities for attached algae and insects, with only occasional gravel bars and riffles. The Santa Ana River Use-Attainability Analysis demonstrated that these habitat limitations dictate the kinds of numbers of aquatic organisms found here.

The Prado Flood Control Basin is a largely undisturbed, dense riparian wetland. In this area, flows in tributaries from both north and south of the river are again augmented by rising water. Temescal Creek comes in from the south, also carrying Arlington Channel flows and the occasional overflows from Lake Elsinore mentioned previously. A short distance from the river, near the edge of Prado Flood Control Basin, a section of Temescal Creek is the breeding center of the local Arroyo Chub population, the second native fish species still present in the middle river system. All the other species of fish found in the Middle Santa Ana River, including mosquitofish, bass, carp, catfish, etc., are exotics, escaped or introduced species.

All of the creeks draining Chino Basin come into the river on the north side, but the total dry-weather surface flow is negligible. Reclaimed wastewater from Chino Basin MWD's Regional Plant 1 is discharged to Cucamonga Channel, concrete-lined, offers extremely limited aquatic habitat – some attached algae, a few worms and insects, but not resident finfish. The improved channel ends near Prado Basin, and the stream changes names to Mill Creek. Chino Basin MWD's Regional Plant 2 discharges to Chino Creek near Prado Basin, some distance downstream of the discharge from the relatively new Carbon Canyon Plant. The lowest segments of Chino and Mill Creeks, down in Prado Basin, are quite different from most other streams in the watershed, with their muddy bottoms and deeper, slow-flowing water.

Most of the rising Chino Basin groundwater in the Prado area is high in TDS, nitrate, and other constituents, largely reflecting heavy present and historic agricultural water use in the area. Much of the initial water development went to citrus irrigation. That was supplanted first by large-scale vineyards and then by dairies, which are now slowly yielding to urban development.

Temescal Creek also carries reclaimed wastewater from the Lake Elsinore area, but most of that water percolates fairly quickly. Eastern MWD may discharge reclaimed wastewater to Temescal Creek in the future.

Below Prado Dam, the aquatic habitat is again different. The channel is deep in many places, with some rocky substrate and rapid sections. It supports a variety of organisms. In contrast, other stretches are improved for flood control. The river slows as it reaches Anaheim, where Orange County Water District diverts and recharges essentially all the dry weather flows. Downstream from the groundwater recharge areas near Anaheim, the Santa Ana River is normally dry.

WATER SUPPLY AND WASTEWATER RECLAMATION

The most serious water-related problem in the Santa Ana River Basin at this time is water supply. This region now uses approximately twice as much water as is available from local sources. As a result, the quantity of water imported into this region each year now equals or exceeds the amount of ground and surface water utilized.

As noted earlier, the Colorado River Aqueduct delivers water to Lake Matthews, but the relatively high mineral content of this water limits its reuse in this area. The State Water Project likewise imports water from the Sacramento-San Joaquin Delta, water with lower levels of dissolved minerals. State Water Project water can be used and reused again.

FLOOD CONTROL

Most of the annual rainfall in the Santa Ana Region occurs in the winter, as noted earlier. Further, most of it can come in a day or two, resulting in major floods and widespread damage. The last of these was shortly before World War II – much of coastal Orange County was inundated, stimulating the construction of Prado Dam by the US Army Corps of Engineers (Corps). The subsequent further urbanization of Orange County has been accompanied by channelizing essentially all the surface steams in the area.

The Corps is presently increasing the capacity of the main river channel through Orange County, and has begun construction of Seven Oak Dam in the San Bernardino Mountains, upstream of the mouth of Santa Ana River Canyon. Another of the Corps' current projects involves increasing the height of the Prado dam.

Flood control channels are typically designed to move large volumes of water from one place to another rapidly, without property damage. A fully improved channel is usually concrete, severely limiting the aquatic habitat beneficial uses. Partially improved channels may only have levees on either side, but other flood control activities (such as channel straightening, vegetation clearing, and weed control using copper or other toxic materials) can reduce or eliminate the aquatic habitat. Storm flows themselves, not necessarily part of flood events, can and do eliminate streamside habitat in parts of the river through sheer scouring force every few years.

ADOPTION OF THE BASIN PLAN – AMENDMENTS TO THE BASIN PLAN

As noted earlier, the California Water Code established the original requirements for the Basin Plan. After the necessary workshops and public hearings, the Regional Board formally adopts the Plan and forwards it to the State Board for their review and approval.

Pursuant to the California Fish and Game Code, Section 2090, Article 4, the Regional Board is required to consult with the Department of Fish and Game with respect to addressing the potential impacts (a) Basin Plan provision(s) may have on rare, threatened or endangered species within the Region. A Basin Plan or amendment is not considered final until that consultation has occurred.

After the State Board approval, the Office of Administrative Law (OAL) must review and approve any new regulatory provisions in the plan to assure that six specific standards are met: necessity (need for the regulation), authority (legislative or legal), clarity (easily understood), consistency (with other regulations), reference (Water Code or other citation), and non-duplication (of existing regulations).

The plan is also transmitted to EPA for review and approval of those parts of the plan that establish or modify water quality standards as defined in the Clean Water Act (CWA).

CONTENTS OF THE BASIN PLAN

Chapter 2 (Plans and Policies) describes some of the many statewide regulatory and guidance documents which apply to the shape and the Regional Board's activities.

Chapter 3 (Beneficial Uses) discusses the many beneficial uses of the various waters of the Santa Ana Region. Ground and surface waterbodies are identified and tabulated, showing the beneficial uses of each.

Chapter 4 (Water Quality Objectives) also tabulates the region's waterbodies, and lists the water quality objectives (levels of various water quality parameters which must be met) necessary to protect those beneficial uses.

Chapter 5 (Implementation) details the Regional Board's water quality regulations and protection programs, lists the region's significant water quality problems and conditions, and describes approaches and solutions to them.

Chapter 6 (Monitoring and Assessment) contains listings and discussions of the monitoring programs, agencies involved, sampling locations and parameters tested, as well as the programs which collect, manage and maintain the data bases. California's statewide Water Quality Assessment is also described and referenced.

Chapter 7 (Water Resources and Water Quality Management) covers topics of regional importance not addressed in the other chapters.

REFERENCES

California Water Code, Section 13000, "Water Quality" ***et seq.***

Clean Water Act, PL 92-500, as amended

Annual Reports of the Santa Ana River Watermaster (Orange County Water District vs. City of Chino, ***et al.***) Case No. 117628 – County of Orange

Santa Ana Watershed Project Authority, Reports of the Santa Ana River Use-Attainability Analysis, 1991-3

CHAPTER 2

PLANS AND POLICIES

INTRODUCTION

In addition to the Santa Ana Region Basin Plan, a number of water quality control plans and policies adopted by the State Water Resources Control Board direct the Regional Board's actions. The State Board Plans and Policies which apply in this region are briefly described below. Copies of the plans and policies are attached in Appendix I.

These plans and policies may be reviewed periodically and may be revised. The Regional Board should be contacted to determine if a particular plan or policy is still current.

SATE BOARD PLANS

Thermal Plan (Resolution No. 75-89)

This plan, formally known as the "Water Quality Control Plan for Control for Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California," was developed and adopted in order to minimize the effects of wastes and wastewaters on the temperature of the receiving waters. This plan specifies water quality objectives, effluent quality limits, and discharge prohibitions related to thermal characteristics of interstate waters, enclosed bays estuaries, and waste discharges.

Ocean Plan (Resolution No. 90-27)

The "Water Quality Control Plan for Ocean Waters of California," amended in 1990, establishes beneficial uses and water quality objectives for waters of the Pacific Ocean along the California coast outside of enclosed bays, estuaries, and coastal lagoons. The Ocean Plan prescribes effluent quality requirements and management principles for waste discharge prohibitions.

The Ocean Plan identifies specific objectives for bacteriological, physical, chemical, and biological characteristics and radioactivity. These objectives are implemented by issuance of waste discharge requirements which include effluent limitations on major wastewater constituents and receiving water limitations for toxic materials. In addition, the Ocean Plan prohibits discharges of specific hazardous substances and waste sludge, bypassing of untreated waste, and impacts to Areas of Special Biological Significance.

Nonpoint Source Management Plan (Resolution No. 88-123)

In 1988, the State Board adopted the Nonpoint Source Management Plan which established the framework for statewide nonpoint source activities. Six statewide objectives and implementation strategies to manage nonpoint source problems are included in the plan. Chapter 5 provides more detailed information regarding the management plan.

Point sources were the principal focus of water quality control in the 1970s and 1980s. Nonpoint sources are now receiving a larger proportion of planning and regulatory attention.

STATE BOARD POLICIES

Policy with Respect to Maintaining High Quality Waters in California (Resolution No. 68-16)

The regulations implementing the Clean Water Act (40 CFR 131.6; 131.12(a)) require that each state develop and adopt a statewide antidegradation policy. In California, this requirement is satisfied by SWRCB Resolution No. 68-16, the "Statement of Policy with Respect to Maintaining High Quality Waters of California." The SWRCB policy requires the continued maintenance of existing high quality waters unless there is a demonstration that: (1) allowing some degradation is consistent with the maximum benefit to the people of the state; and (2) that such degradation would not unreasonably affect existing or potential beneficial use.

Actions which may adversely affect surface water quality must satisfy both Resolution No. 68-16 and the federal antidegradation policy (40 CFR 131.12). The requirements of the two policies are similar: the federal policy requires that existing instream uses and the level of water quality necessary to protect them must be maintained and protected. In addition, a reduction in water quality can be allowed only if there is a demonstration that such a reduction is necessary to accommodate important economic or social development.

Policy for Water Quality Control (by motion July 6, 1972)

This policy declares the State Board's intent to protect water quality through the implementation of water resources management programs and serves as the general basis for the adoption of subsequent water quality control policies.

Policy for Enclosed Bays and Estuaries (Resolution No. 74-43)

The Bays and Estuaries Policy recognizes the high environmental and ecological values of the bays and estuaries in the state. Specific direction is given regarding the San Francisco Bay-Delta system. New discharges to other bay and estuarine waters are prohibited unless enhancement of those waters can be demonstrated. It is also the state's stated policy to phase out or in other ways eliminate existing discharges to bays and estuaries unless such enhancement can de demonstrated.

Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (Resolution No. 75-58)

This policy provides consistent principles and guidance for supplementary waste discharge requirements or other water control actions for thermal powerplants using inland waters for cooling. The policy specifies that fresh inland waters should be used for cooling only when other alternatives are environmentally undesirable or economically unsound.

Policy and Action Plan for Water Reclamation (Resolution No. 77-1)

The Reclamation policy recognizes the present and future need for increased amounts of water in California primarily to support growth. This policy commits both the State Board and Regional Boards to support reclamation in general and reclamation projects which are consistent with sound principles and demonstrated needs.

Policy on the Disposal of Shredder Waste (Resolution No. 87-22)

This policy permits the disposal of shredded waste 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.

Supplementary to the state policy, the Santa Ana Regional Board Shredder Waste Policy (Resolution 87-108) designates specific solid waste facilities in the region which are authorized to accept shredder waste. Prior to accepting shredder waste at a facility, a Report of Waste Discharge (ROWD) is required to be submitted to the Regional Board.

Sources of Drinking Water Policy (Resolution No. 88-63)

The sources of Drinking Water Policy (Policy) declares that with specified expectations, all waters of the state are to be considers suitable, or potentially suitable, for municipal or domestic supply and should be so designated (**MUN**) by the Regional Boards. Those waters excepted under the Policy include the following: surface and ground waters that are contaminated, either by natural processes or by human activity, to the extent that they cannot reasonably be treated for domestic use; and surface waters in systems designated or modified to carry municipal/industrial/agricultural wastewaters or stormwater runoff. Other exceptions are specified in the Policy.

Adoption of the Policy required that Regional Boards review the beneficial uses of their ground and surface waters and determine where **MUN** designations should be added and which water bodies should be excepted. Periodic reviews and updates of Regional Basin Plans must conform to this policy.

STATE BOARD PLANNING ACTIVITES FOR THE BAY/DELTA

The SWRCB is engaged in a comprehensive, multiphase program to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. While the Santa Ana Regional Board will not be directly involved in implementing the management plans which result from this program, the SWRCBs actions are likely to affect both water quality and quantity in the Regional Board's water quality control programs.

The Bay/Delta water system is a major source of supply to the State, providing more than half of all water used in California. The Bay/Delta is also of extreme ecological significance: it is one of the largest systems for fish and waterfowl habitat and production in the United States.

Two major water distribution systems divert water from the Delta: the Central Valley Project, operated by the United States Bureau of Reclamation; and the State Water Project (SWP), operated by the California Department of Water Resources. The SWP is an important source of high quality, supplemental water supplies for the Santa Ana Region (see Chapter 5 - Salt Balance and Assimilative Capacity). Numerous other water diversion and management efforts influence the inflows into, flows through, and outflows from the Bay/Delta estuary.

In 1978, the SWRCB adopted the "Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh" (the Delta Plan) and Water Rights Decision 1485 (D-1485). The Delta Plan established water quality objectives for salinity and outflow standards and operational constraints necessary to meet the objectives and assure reasonable protection of beneficial uses. These outflow standards and operational constraints are implemented through D-1485.

The Delta Plan proceedings were limited to the current and near term conditions in the Delta. The SWRCB committed to subsequent review of the Delta Plan and is not in that process.

The current Bay/Delta review program has a number of components, including the development and adoption by the SWRCB of the "Water Quality Control Plan for Salinity – San Francisco Bay/Sacramento-San Joaquin Delta Estuary" (Salinity Plan, 19-15 WR, May 1991). This Plan is primarily concerned with salinity and temperature factors. Numerous water quality objectives were established for: salinity at municipal and industrial intakes; salinity levels to protect Delta agriculture; salinity levels to protect export agriculture; and salinity for fish and wildlife resources in the Estuary. Water quality objectives were also established to provide expansion of the period of protection for striped bass spawning, and to address temperature and dissolved oxygen levels for fisheries in the Delta.

This Salinity Plan set the stage for the ongoing Water Rights phase of the proceedings. Determining the flow requirements necessary to meet the Plan objectives and the allocation of responsibility for meeting those objectives will lead to a revised Water Rights Decision.

A draft decision (D-1630) was released in 1992 and revised in 1993. D-1630 called for substantial limits on exports of waters from the Bay/Delta system, including exports to the SWP, during spring. The quality of Bay/Delta waters is generally best during this time of high flows. Limiting exports to other times of the year is likely to mean that poorer quality water will be supplied to users outside the Bay/Delta system, including the Santa Ana Region. High quality SWP water is essential to address the severe mineralization problem in this Region (see Chapter 5).

The SWRCB has determined that it will not adopt an interim water rights decision (D-1630), in part because the above-average rainfall during 1993 eliminated the urgent need to do so to protect fish and wildlife resources. The SWRCB has resumed its proceedings to establish a long-term water right decision to replace D-1485.

CHAPTER 3
BENEFICIAL USES

INTRODUCTION

Basically, a beneficial use is one of the various ways that water can be used for the benefit of people and/or wildlife. Examples include drinking, swimming, industrial and agricultural water supply, and the support of fresh and saline aquatic habitats.

Section 303 of the federal Clean Water Act (33 USC §1313) defines water quality standards as consisting of both the uses of the surface (navigable) waters involved and the water quality criteria which are applied to protect those uses. Under the Porter-Cologne Water Quality Control Act (California Water Code, Division 7, Chapter 2 §13050) these concepts are separately considered as beneficial uses and water quality objectives. Beneficial uses and water quality objectives are to be established for all waters of the state, both surface and subsurface (groundwater).

BENEFICIAL USES

Beneficial uses were tabulated and discussed in Chapters 1 and 2 of the 1975 Basin Plan and in Chapter 2 of the 1983 Basin Plan. In 1983, twenty-one beneficial uses were defined statewide. Of those, eighteen were identified and recognized in the 1983 Plan: **MUN, AGR, IND, PROC, GWR, NAV, POW, REC1, REC 2, COMM, WARM, COLD, BIOL, WILD, RARE, SPWN, MAR,** and **SHEL.**

In 1988, the State Board adopted the Sources of Drinking Water Policy (SWRCB Resolution No. 88-63) which directed the Regional Boards to add the Municipal and Domestic Supply (**MUN**) Beneficial Use for all waterbodies not already so designated, unless they met certain exception criteria. To implement this Policy, the Regional Board revised the table of Beneficial Uses in the 1983 Basin Plan, adding the **MUN** designation for certain waterbodies and specifically excepting others (RWQCB Resolution No. 89-42). Shortly thereafter, this revised Beneficial Use table was reviewed again and changes were made, including the addition of the Water Contact Recreation (**REC 1**) use for some waterbodies, the revision of some Beneficial Use designations from intermittent (I) to existing (X), and the addition of more waterbodies (RWQCB Resolution No. 89-99).

In this Plan, further changes to the Beneficial Use table have been made. Significant waterbodies not previously identified are included and the beneficial uses are designated. Certain of these waters are excepted from the **MUN** designation. The designation **RARE** has been added where substantial evidence indicates that the waterbody supports rare, threatened or endangered species (Appendix II). Certain known wetlands in the Region are listed in a new waterbody category (see wetlands discussion below). A revised list of Beneficial Uses was developed as part of a comprehensive statewide update of all Basin Plans. Using this revised statewide list as a guide, this Basin Plan updates the list of Beneficial Uses definitions contained in the 1983 Plan.

In all, twenty-three beneficial uses are now defined statewide; of these, nineteen are recognized within the Santa Ana Region. (The four not utilized are Migration of Aquatic Organisms, Freshwater Replenishment, Inland Saline Water Habitat and Aquaculture). One beneficial use specific to the Region, Limited Warm Freshwater Habitat, has been added, bringing the total number of beneficial uses recognized in the Santa Ana Region to twenty. The region’s beneficial uses are listed and described below.

<<<<<<<<<<<<>>>>>>>>>>>>

BENEFICIAL USE DEFINITIONS

Municipal and Domestic Supply (**MUN**) waters are used for community, military, municipal or individual water supply systems. These uses may include, but are not limited to, drinking water supply.

Agricultural Supply (**AGR**) waters are used for farming, horticulture or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.

Industrial Service Supply (**IND**) waters are used for industrial activities that do not depend primarily on water quality. These uses may include, but are not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection and oil well repressurization.

Industrial Process Supply (**PROC**) waters are used for industrial activities that depend primarily on water quality. These uses may include, but are not limited to, process water supply and all uses of water related to product manufacture or food preparation.

Groundwater Recharge (**GWR**) waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality or halting saltwater intrusion into freshwater aquifers.

Navigation (**NAV**) waters are used for shipping, travel or other transportation by private, commercial or military vessels.

Hydropower Generation (**POW**) waters are used for hydroelectric power generation.

Water Contact Recreation **(REC 1***) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing and use of natural hot springs.

* The **REC 1** and **REC 2** beneficial use of designations assigned to surface waterbodies in this Region should not be construed as encouraging recreational activities. In some cases, such as Lake Matthews and certain reaches of the Santa Ana River, access to the waterbodies is prohibited because of potentially hazardous conditions and/or because of the need to protect other uses, such as municipal supply or sensitive wildlife habitat. Where **REC 1** or **REC 2** is indicated as a beneficial use in Table 3-1, the designations are intended to indicate that the uses exist or that the water quality of the waterbody could support recreational uses.

Non-contact Water Recreation (**REC 2***) waters are used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing and aesthetic enjoyment in conjunction with the above activities.

Commercial and Sportfishing (**COMM**) waters are used for commercial or recreational collection of fish or other organisms, including those collected for bait. These uses may include, but are not limited to, uses involving organisms intended for human consumption.

Warm Freshwater Habitat (**WARM**) waters support warmwater ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish and wildlife, including invertebrates.

Limited Warm Freshwater Habitat (**LWRM**) waters support warmwater ecosystems which are severely limited in diversity and abundance as the result of concrete-lined watercourses and low, shallow dry weather flows which result in extreme temperature, pH, and/or dissolved oxygen conditions. Naturally reproducing finfish populations are not expected to occur in **LWRM** waters.

Cold Freshwater Habitat (**COLD**) waters support coldwater ecosystems that may include, but are not limited to, preservations and enhancement of aquatic habitats, vegetation, fish and wildlife, including invertebrates.

Preservation of Biological Habitats of Special Significance (**BIOL**) waters support designated areas or habitats, including, but not limited to, established refuges, parks, sanctuaries, ecological reserves or preserves, and Areas of Special Biological Significance (ASBS), where the preservation and enhancement of natural resources requires special protection.

Wildlife Habitat (**WILD**) waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

Rare, Threatened or Endangered Species (**RARE**) waters support the habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.

* The **REC 1** and **REC 2** beneficial use of designations assigned to surface waterbodies in this Region should not be construed as encouraging recreational activities. In some cases, such as Lake Matthews and certain reaches of the Santa Ana River, access to the waterbodies is prohibited because of potentially hazardous conditions and/or because of the need to protect other uses, such as municipal supply or sensitive wildlife habitat. Where **REC 1** or **REC 2** is indicated as a beneficial use in Table 3-1, the designations are intended to indicate that the uses exist or that the water quality of the waterbody could support recreational uses.

Spawning, Reproduction and Development (**SPWN**) waters support high quality aquatic habitats necessary for reproduction and early development of fish and wildlife.

Marine Habitat (**MAR**) waters support marine ecosystems that include, but are not limited to, preservation and enhancement of marine habitats, vegetation (***e.g.,*** kelp), fish and shellfish and wildlife (***e.g.,*** marine mammals and shorebirds).

Shellfish Harvesting (**SHEL**) waters support habitats necessary for shellfish (***e.g.,*** clams, oysters, limpets, abalone, shrimp, crab, lobster, sea urchins and mussels) collected for human consumption, commercial or sport purposes.

Estuarine Habitat (**EST**) waters support estuarine ecosystems, which may include, but are not limited to, preservation and enhancement of estuarine habitats, vegetation, fish, and shellfish, and wildlife, such as waterfowl, shorebirds, and marine mammals.

<<<<<<<<<<<<>>>>>>>>>>>>

More than one beneficial use may be identified for a given waterbody. The most sensitive use must be protected. The Regional Board reserves the right to resolve any conflicts among beneficial uses based on the facts in a given case.

WETLANDS

The Clean Water Act was enacted by Congress to restore and maintain the chemical, physical and biological integrity of the nation's waters. The nation's waters include ***wetlands***, as well as rivers, streams, lakes, estuaries and the territorial seas. Generally, wetlands include swamps, marshes, bogs, sloughs, mangroves, wet meadows, savannas, wet tundra, playa lakes and vernal pools. Wetlands serve a number of important functions, including absorption of floodwaters, shoreline erosion control and water quality improvement by the removal of pollutants. They also provide habitat for wetland species, and have important aesthetic, recreational, scientific and educational values. More than half of the wetlands in the United States have been destroyed. Due to this high loss, a goal of "no net loss" of wetlands has been established at both the federal and state level.

The definition of wetlands varies widely among the federal agencies, however both the United States Army Corps of Engineers and United States Environmental Protection Agency (US EPA) agree on the definition in Section 404 of the Clean Water Act, which specifies that wetlands are "those areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands are generally agreed to have three characteristics: hydrophytic vegetation; hydric soils; and wetland hydrology. Hydrophytic vegetation describes those plants adapted for growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Hydric soils are those soils that are oxygen-depleted due to saturation for long periods during the growing season. Wetland hydrology can be described as the presence of water at or above the soil surface for a sufficient period of the year to significantly influence the plant types and soil that occur in the area. Strict definitions of these characteristics have not been formally adopted. The Regional Board includes these characteristics and criteria as general reference and not as guidance.

As part of an overall effort to protect the Nation's wetland resources, US EPA has called for states to adopt water quality standards (beneficial uses and water quality objectives) for wetlands. Applying water quality standards to wetlands provides a regulatory basis for a variety of wetlands management programs. For example, these standards will play an important role in the State and Regional Boards' water quality certification process by providing the basis for approving, conditioning or denying federal permits and licenses as appropriate. (This certification process, conducted in accordance with Section 401 of the CWA is described in more detail in Chapter 5.)

The 1975 and 1983 Basin Plans listed a number of waterbodies which are known to be or to include wetlands (*e.g.,* San Joaquin Freshwater Marsh, Upper Newport Bay, Anaheim Bay-National Wildlife Refuge). These Plans specified both beneficial uses and water quality objectives for these waterbodies. In the earlier Plans, these waters were not specifically identified as wetlands. In this plan, a "Wetlands" waterbody category has been added to the Table of Beneficial Uses. Certain waters known to be wetlands are listed under this category and their beneficial uses are designated. (Note: estuarine wetlands continue to be shown in the "Bays, Estuaries and Tidal Prisms" category). The numeric objectives specified for these wetlands in the earlier Basin Plans are included in this Plan (Chapter 4). Additional numeric objectives will be developed and implemented as part of the ongoing Basin Planning process. Further detailed review of the water resources within the Region is also expected to result in the listing of additional wetlands.

The intent of including the wetlands category is to provide a more accurate description of the Region's waters. The listing of specific wetlands does not trigger any new or different regulatory actions by the Regional Board. Standards applied to permitting, 401 certification, and/or enforcement actions will not be affected by this listing. Again, the listing of wetlands in this Plan is a <u>partial</u> one only and should not be construed as placing any limitations on the exercise of the Regional Board's responsibilities or authorities with respect to the protection of wetlands in the region. Nor is the present listing intended to define wetlands which are subject to the United States Army of Corps of Engineers jurisdiction.

Figure 3-1 shows the general locations of the wetlands listed in this Plan. The specific boundaries of each of these wetland areas will be determined on an as-needed basis (for 401 certifications and the like), using the methods described in the 1987 Corps of Engineers Wetland Delineation Manual or other accepted techniques.

A brief description of each of the wetlands listed in this Plan is provided in Appendix III. Some of these wetlands occur naturally. Others were created, either incidentally, as the result of the construction of dams or levees, or purposefully, as mitigation for development projects elsewhere. Examples of created wetlands include those in the Prado Basin, which resulted from the construction of Prado Dam, and the San Joaquin Freshwater Marsh, created for development mitigation purposes.

A third type of wetlands, constructed wetlands, is proposed for the Santa Ana Region. Constructed wetlands would be designed, built and managed to provide wastewater treatment to meet specific waste discharge requirements. Constructed wetlands do not include percolation ponds, equalization basins or other conventional treatment works. At this time, the proposed use of constructed wetlands in the region would be principally for nitrogen removal. The use of constructed wetlands for management of stormwater flows may also be proposed. Currently, the Orange County Water District is using approximately 600 acres of ponds in the Prado area to investigate the use of constructed wetlands for nitrogen removal. The City of Riverside proposes to construct and operate wetlands treatment ponds in the Hidden Valley area. Constructed wetlands are also being contemplated by Eastern Municipal Water District and Elsinore Valley Municipal Water District.

While the purpose of these constructed wetlands would be to provide wastewater treatment, they will inevitably have other uses and benefits, including the support of waterfowl and other wildlife and opportunities for education and recreation. The Regional Board's approach toward regulation of the use of these constructed wetlands will be to ensure that these affiliated uses are reasonably protected, while appropriate wastewater treatment uses are supported. As an example, the Board could allow the use of constructed wetlands for the treatment of various parameters such as nitrogen and phosphorus. However, the Board may disallow the use of wetlands for treatment of certain parameter such as toxics if there is evidence that these parameters would adversely and unreasonably affect the affiliated uses of the constructed wetlands. In this case, the Board would require compliance with toxics limits prior to discharge to the constructed wetlands.

In August 1993, the "California Wetlands Conservation Policy" was announced by the Governor. The Policy, included in the Appendix III, has three principal objectives:

- to ensure no overall net loss of wetlands and achieve a long-term gain in the quantity, quality and permanence of wetlands acreage and values;
- to reduce procedural complexity and confusion in the administration of wetlands conservation programs; and
- make cooperative planning efforts and landowner incentive programs the primary focus of wetland conservation and restoration.

The methods identified to achieve these objectives are numerous and include:

- a statewide wetlands inventory and identification of conservation, restoration and enhancement goals;

- development of a consistent wetlands definition, standards, and guidelines for regulatory purposes; and

- integration of wetlands policy and planning with other environmental and land use processes.

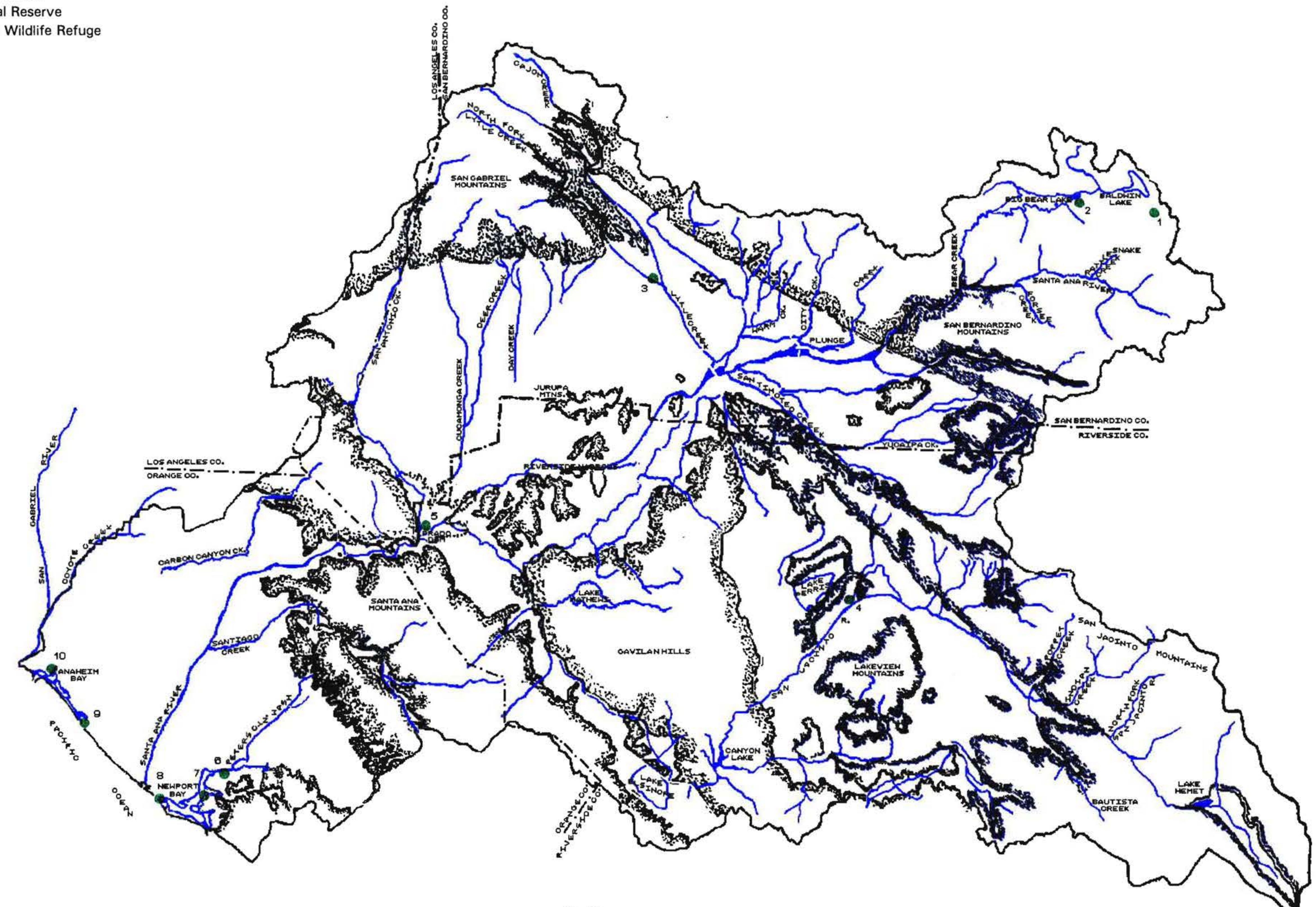
An interagency task force on wetlands is to be created to direct and coordinate administration and implementation of this policy.

This space has been intentionally left blank

List of Wetlands

1 Shay Meadows
2 Stanfield Marsh
3 Glen Helen
4 San Jacinto Wildlife Area
5 Prado Flood Control Basin
6 San Joaquin Freshwater Marsh
7 Upper Newport Bay
8 Santa Ana River Salt Marsh
9 Bolsa Chica Ecological Reserve
10 Seal Beach - National Wildlife Refuge

FIGURE 3-1
SANTA ANA REGION
WETLANDS



GROUNDWATER (Amended by Resolution No. R8-2004-0001, January 22, 2004)

Groundwater subbasin boundaries included in the 1975 and 1984 Basin Plans, and initially in this 1995 Basin Plan, were, for the most part, based on data and information collected in the 1950's and 1960's. Since these boundaries were first established in the 1975 Basin Plan, a considerable amount of new water level, water quality and geologic data has become available. As part of the 2004 update of the TDS/Nitrogen management plan in the Basin Plan (see further discussion of this work in Chapter 5 – Salt Management Plan), these new data were used to review and revise the sub-basin boundaries.

To accomplish this task, all available geologic studies of the Santa Ana Region, through 1995, were gathered and re-analyzed. A comprehensive database of water level and water quality data and well drilling logs was created and utilized to delineate revised groundwater subbasin boundaries, now designated as groundwater "Management Zones". The groundwater Management Zones are shown in Figures 3-3 through 3-7.

The specific technical basis for distinguishing each groundwater Management Zone is provided in the report entitled "TIN/TDS Study – Phase 2A Final Technical Memorandum," Wildermuth Environmental, Inc., July 2000. In general, the new groundwater Management Zone boundaries were defined on the basis of (1) separation by impervious rock formations or other groundwater barriers, such as geologic faults; (2) distinct flow systems defined by consistent hydraulic gradients that prevent widespread intermixing, even without a physical barrier; and (3) distinct differences in water quality. Groundwater flow, whether or not determined by a physical barrier, was the principal characteristic used to define the Management Zones. Water quality data were used to support understanding of the flow regime and to assure that unusually high or poor quality waters were distinguished for regulatory purposes.

In addition to these technical considerations, water and wastewater management practices and goals for the Chino Basin were considered and used to define an alternative set of Management Zone boundaries for that area. These so-called "maximum benefit" Management Zone delineations , shown in Figure 3-5a, were developed as part of recommendations by the Chino Basin Watermaster and the Inland Empire Utilities Agency (IEUA) to implement a "maximum benefit" proposal, including an Optimum Basin Management Plan (OBMP), for the area.[1] These agencies have committed to the implementation of a specific set of projects and

[1] The term "maximum benefit" is drawn from the state's antidegradation policy (SWCRB Resolution No. 68-16; see Chapter 2)), which provides that high quality water can be lowered only if beneficial uses are fully protected and water quality consistent with ***maximum benefit*** to the people of the state is maintained.

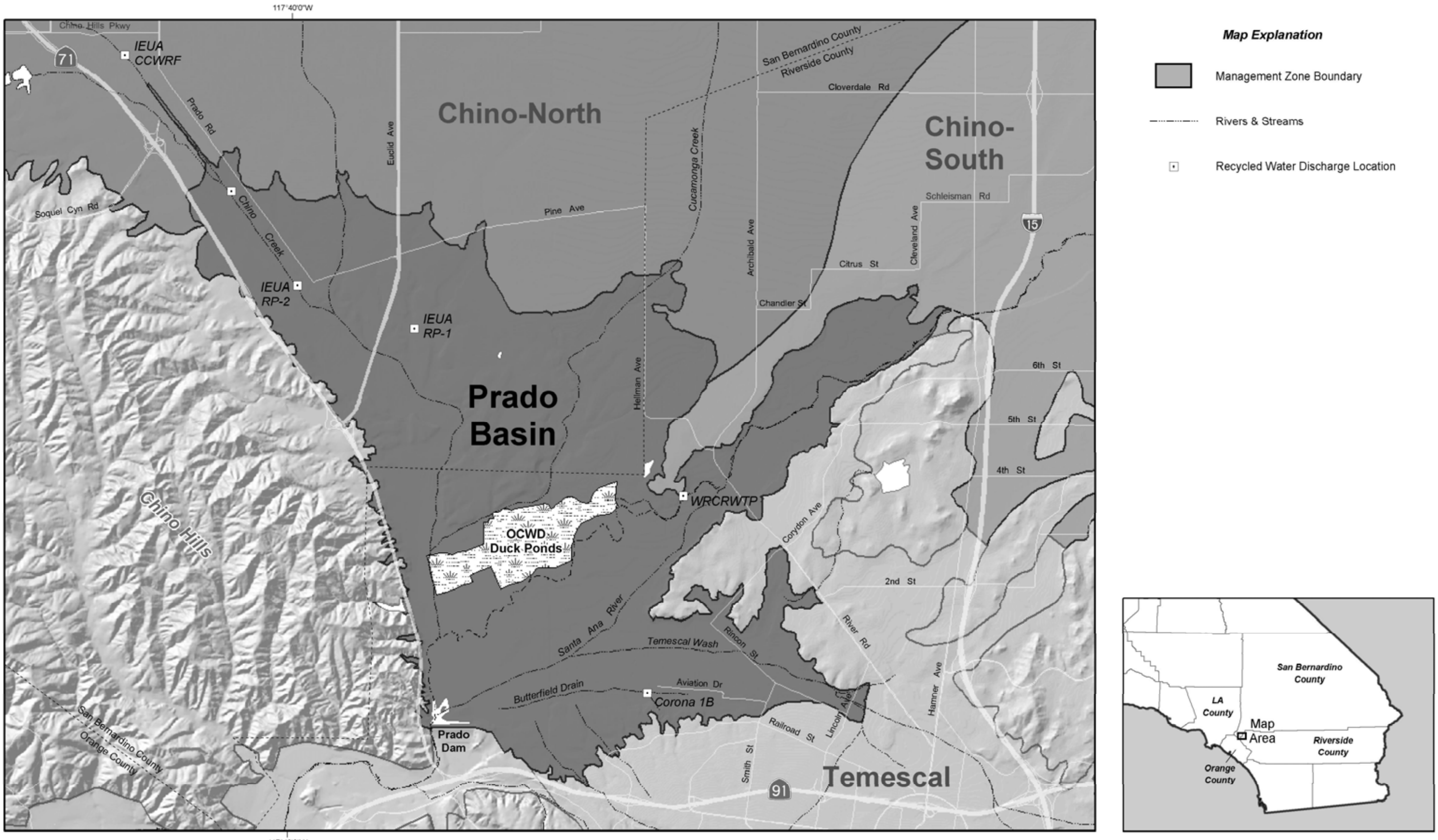
requirements in order to demonstrate that the “maximum benefit” Management Zone boundaries, and particularly the “maximum benefit” nitrate-nitrogen and TDS objectives for these Zones (see Chapter 4), assure protection of beneficial uses and are of maximum benefit to the people of the state (see Chapter 5, VII. Maximum Benefit Implementation Plans for Salt Management, A. Salt Management – Chino Basin and Cucamonga Basin). These “maximum benefit” Management Zone boundaries apply for regulatory purposes provided that the Regional Board continues to find that the Watermaster and IEUA are demonstrating “maximum benefit” by timely and appropriate implementation of these agencies’ commitments. If, after consideration at a duly noticed Public Hearing, the Regional Board finds that these commitments are not being met and that “maximum benefit” is not being demonstrated, then the Management Zone boundaries for the Chino Basin shown in Figure 3-5b apply for regulatory purposes.

PRADO BASIN SURFACE WATER MANAGEMENT ZONE (PBMZ)

The flood plain behind Prado Dam has unique hydraulic characteristics. Chino Creek, Cucamonga Creek (which flows into Mill Creek) and Temescal Creek join the Santa Ana River behind the dam. Flood control operations at the dam, coupled with an extremely shallow groundwater table and an unusually thin aquifer, significantly affect these surface flows, as well as subsurface flows in the area. Depending on how the dam is operated, surface waters may or may not percolate behind the dam. There is little or no groundwater storage in the flood plain behind the dam. Any groundwater in storage is forced to the surface because the foot of Prado Dam extends to bedrock and subsurface flows cannot pass through the barrier created by the dam and the surrounding hills. Given these characteristics, this area is designated as a surface water management zone, rather than a groundwater management zone. The Prado Basin Management Zone is generally defined by the 566-foot elevation above mean sea level. It extends from Prado Dam up Chino Creek, Reach 1A and 1B to the concrete-lined portion near the road crossing at Old Central Avenue, up the channel of Mill Creek (Prado Area) to where Mill Creek becomes named as Cucamonga Creek and the concrete-lined portion near the crossing at Hellman Road, up what was formerly identified as Temescal Creek, Reach 1A (from the confluence with the Santa Ana River upstream of Lincoln Avenue) (this area is indistinguishable because of shifting topography and is now considered a part of the Prado Basin Management Zone), and up the Santa Ana River, Reach 3 to the 566-foot elevation (just west of Hamner Avenue). The Prado Basin Management Zone encompasses the Prado Flood Control Basin, which is a created wetlands as defined in this Plan (see the discussion of wetlands elsewhere in this Chapter). Orange County Water District’s wetlands ponds are also located within the Prado Basin Management Zone.

The beneficial uses of the proposed PBMZ include all of the beneficial uses currently designated for the surface waters identified above. The PBMZ also incorporates the Prado Flood Control Basin. The beneficial uses previously identified for this Basin are designated also for the Zone (See Table 3-1, Beneficial Uses, page 3-21).

The Prado Basin Management Zone is shown in Figure 3-2.



Produced by:

WE Wildermuth Environmental, Inc.
415 North El Camino Real Suite A
San Clemente, CA 92672
949.498.9294
www.wild-environment.com

Author: AEM
Date: 20031113
File: Figure_3-2.mxd

0 1 Miles
0 2 KM

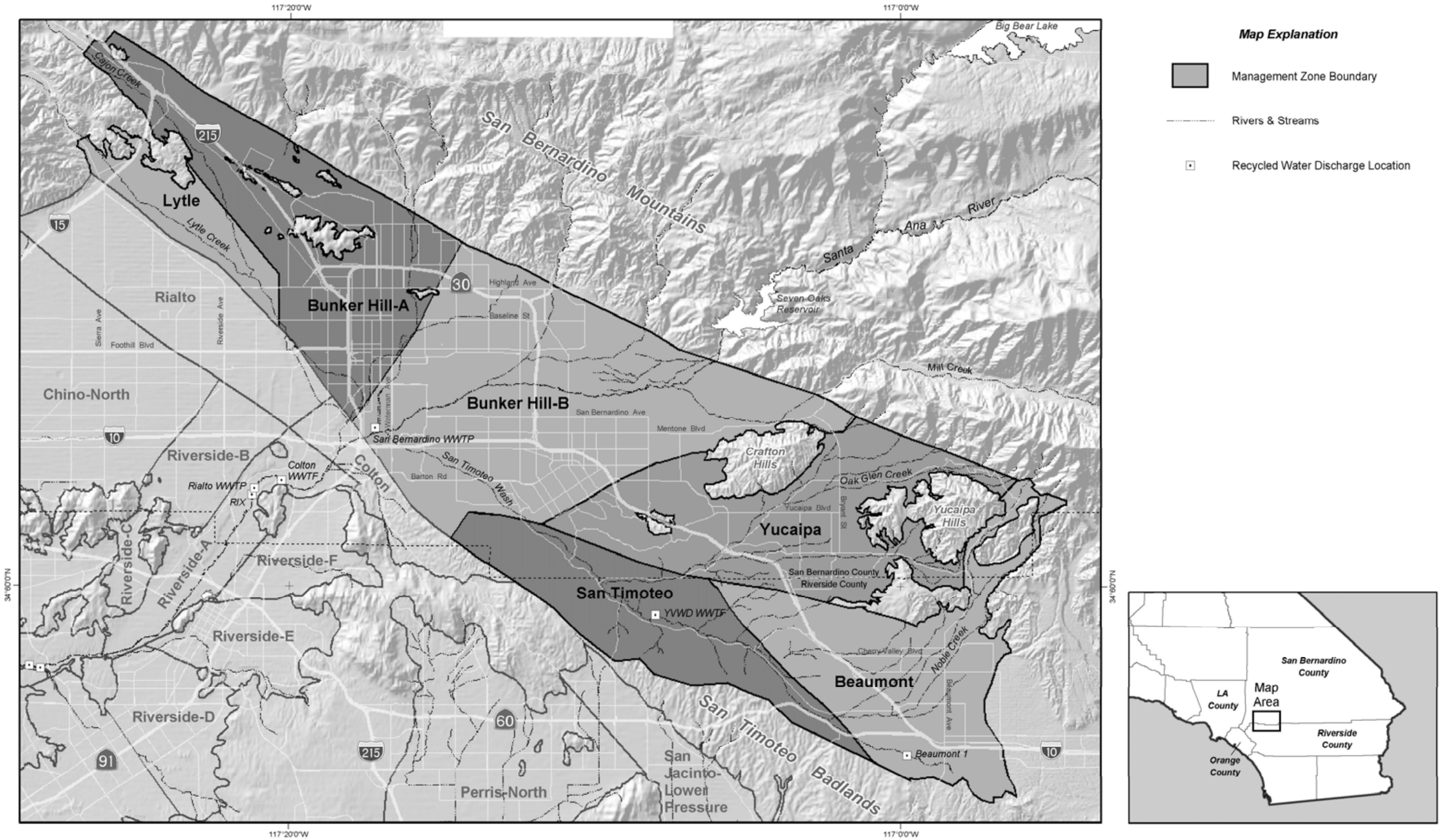
Produced for:

TIN/TDS Task Force

TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Prado Basin Management Zone Boundaries

Figure 3-2



Produced by:

WE WILDERMUTH ENVIRONMENTAL, INC.
23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wild-environment.com

Author: AEM
Date: 20031113
File: Figure_3-3.mxd

0 1 2 3 4 5 6 Miles
0 2 4 6 8 10 KM

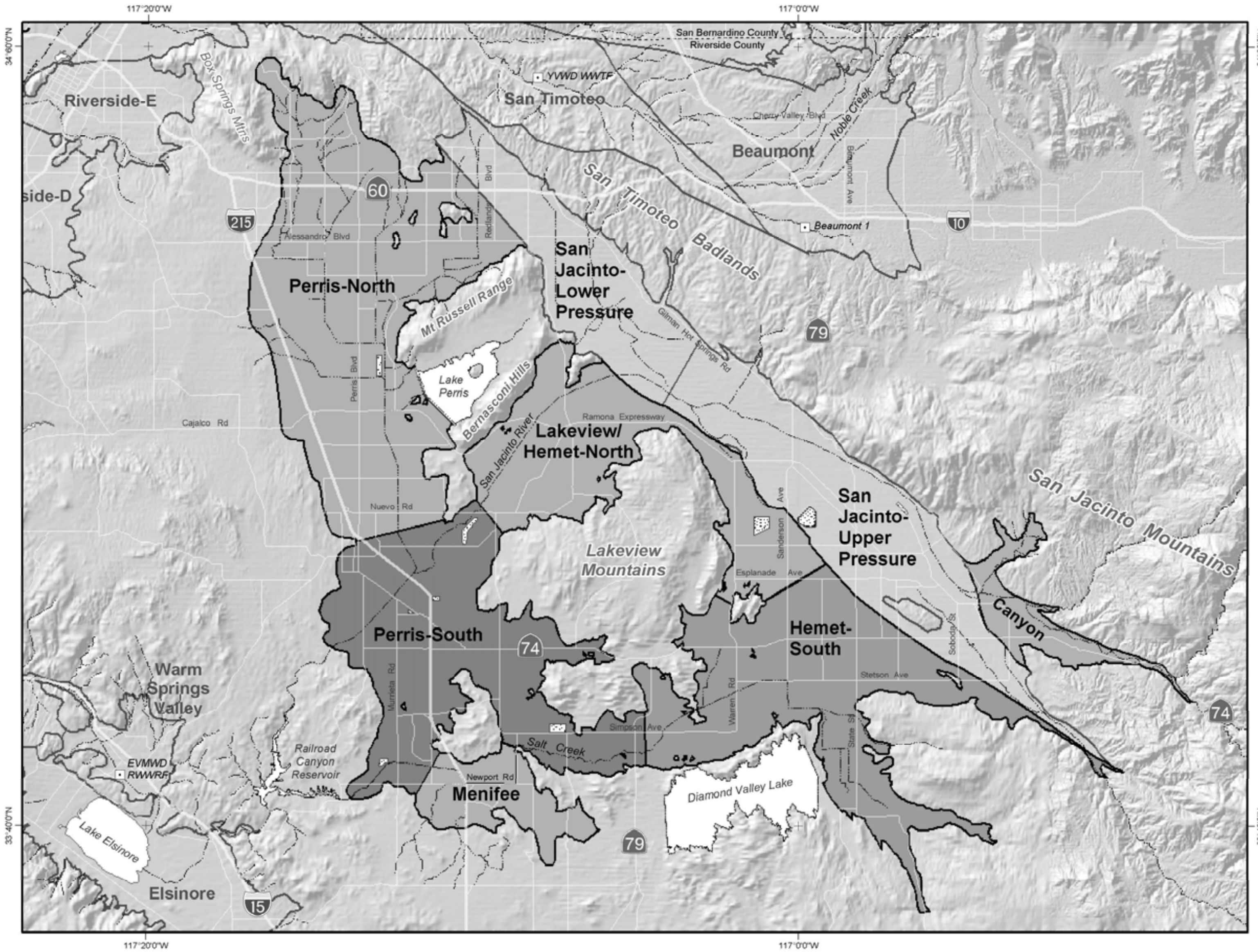
Produced for:

TIN/TDS Task Force

TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Management Zone Boundaries
San Bernardino Valley & Yucaipa/Beaumont Plains

Figure 3-3



Map Explanation

Management Zone Boundary

Rivers & Streams

Recycled Water Discharge Location

Recycled Water Pond

Produced by:

WE WILDERMUTH ENVIRONMENTAL, INC.
23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wild-environment.com

Author: AEM
Date: 20031113
File: Figure_3-4.mxd

0 1 2 3 4 5 6 Miles
0 2 4 6 8 10 KM

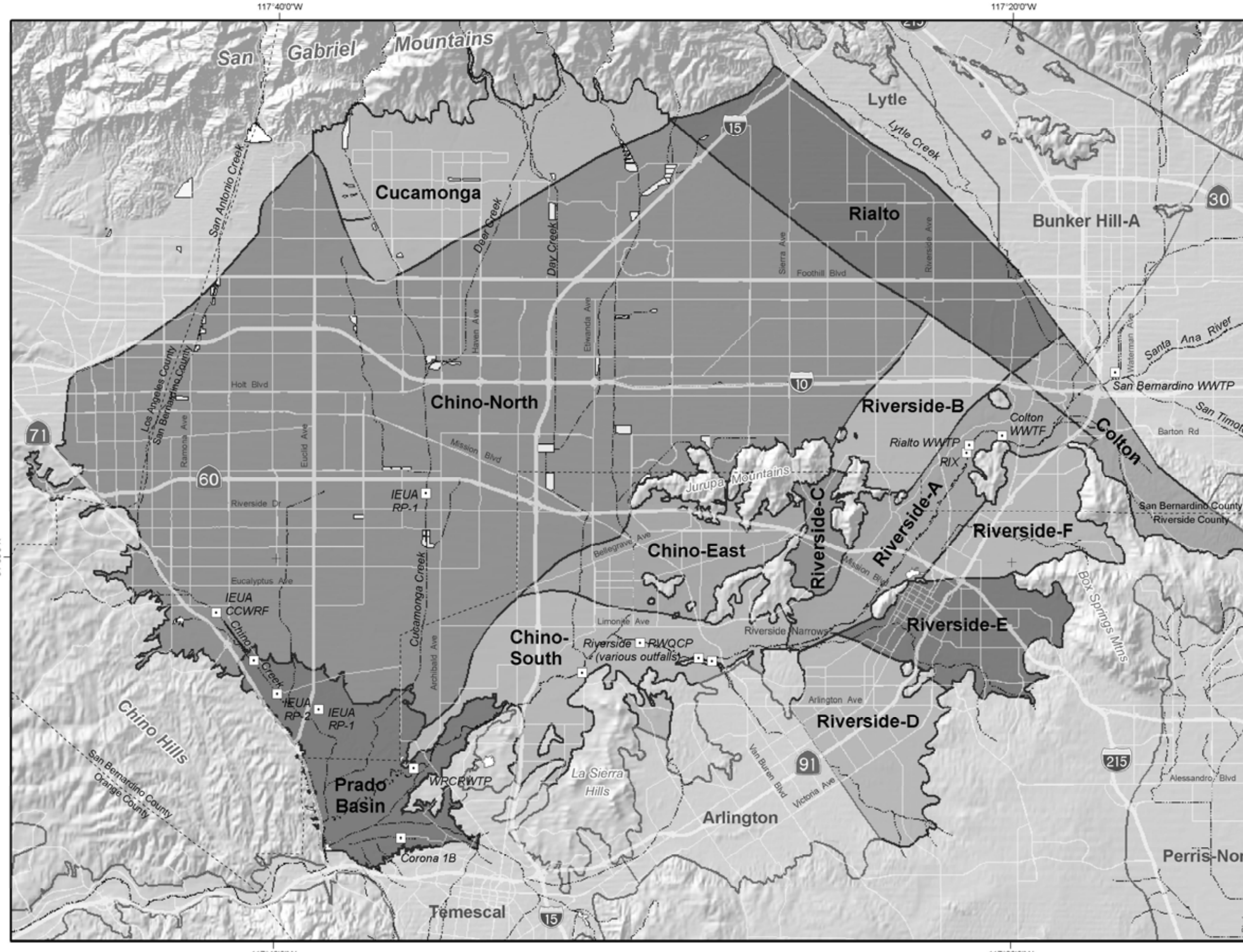
Produced for:

TIN/TDS Task Force

TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Management Zone Boundaries
San Jacinto Basins

Figure 3-4



Map Explanation

Management Zone Boundary

Rivers & Streams

Recycled Water Discharge Location

Produced by:

WE WILDERMUTH ENVIRONMENTAL, INC.
23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wild-environment.com

Author: AEM
Date: 20031113
File: Figure_3-5a.mxd

0 1 2 3 4 5 6 Miles
0 2 4 6 8 10 KM

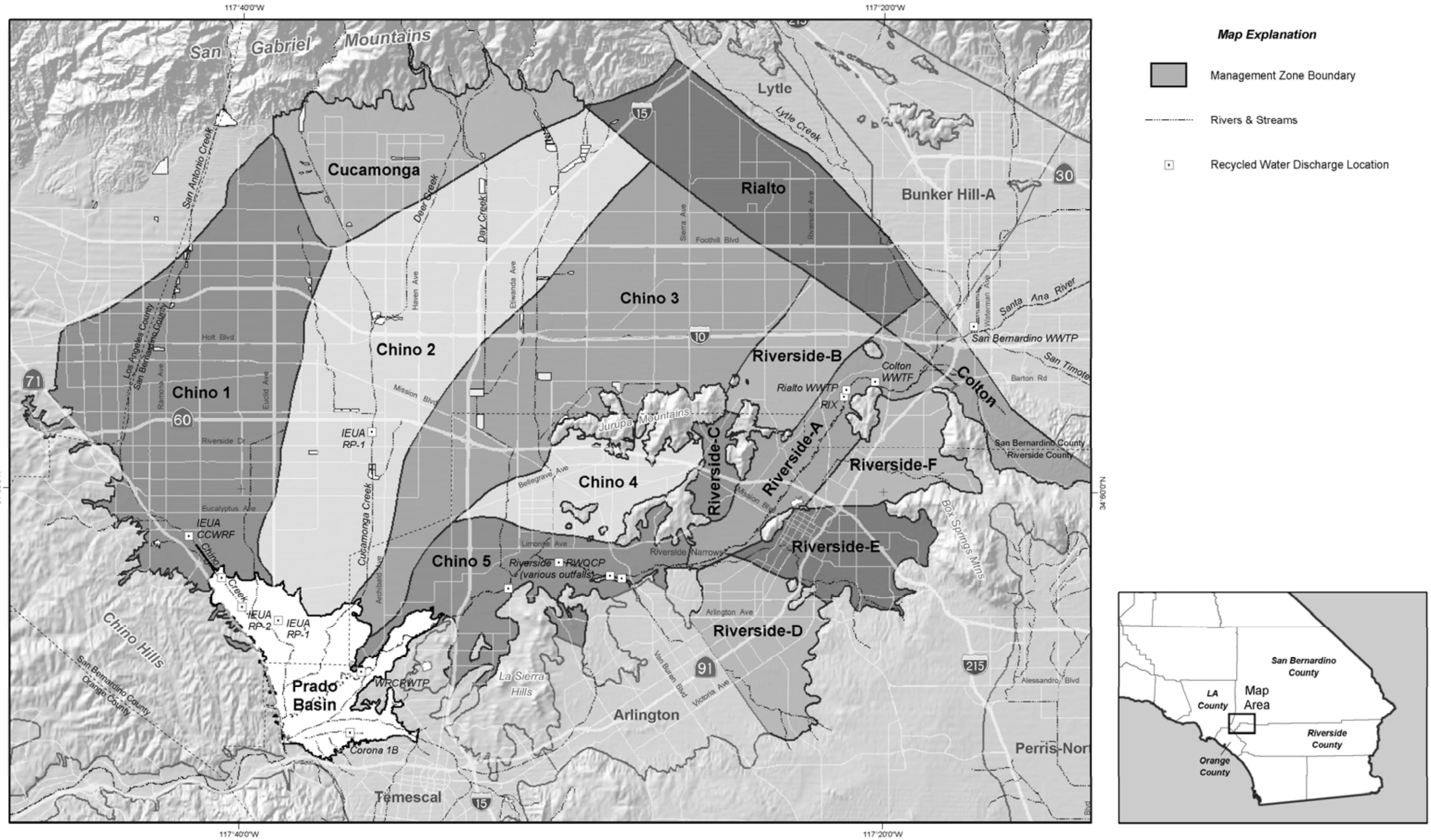
Produced for:

TIN/TDS Task Force

TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Management Zone Boundaries
Chino (Maximum Benefit), Rialto-Colton, & Riverside Basins

Figure 3-5a



Produced by:

WE WILDERMUTH ENVIRONMENTAL, INC.
23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wild-environment.com

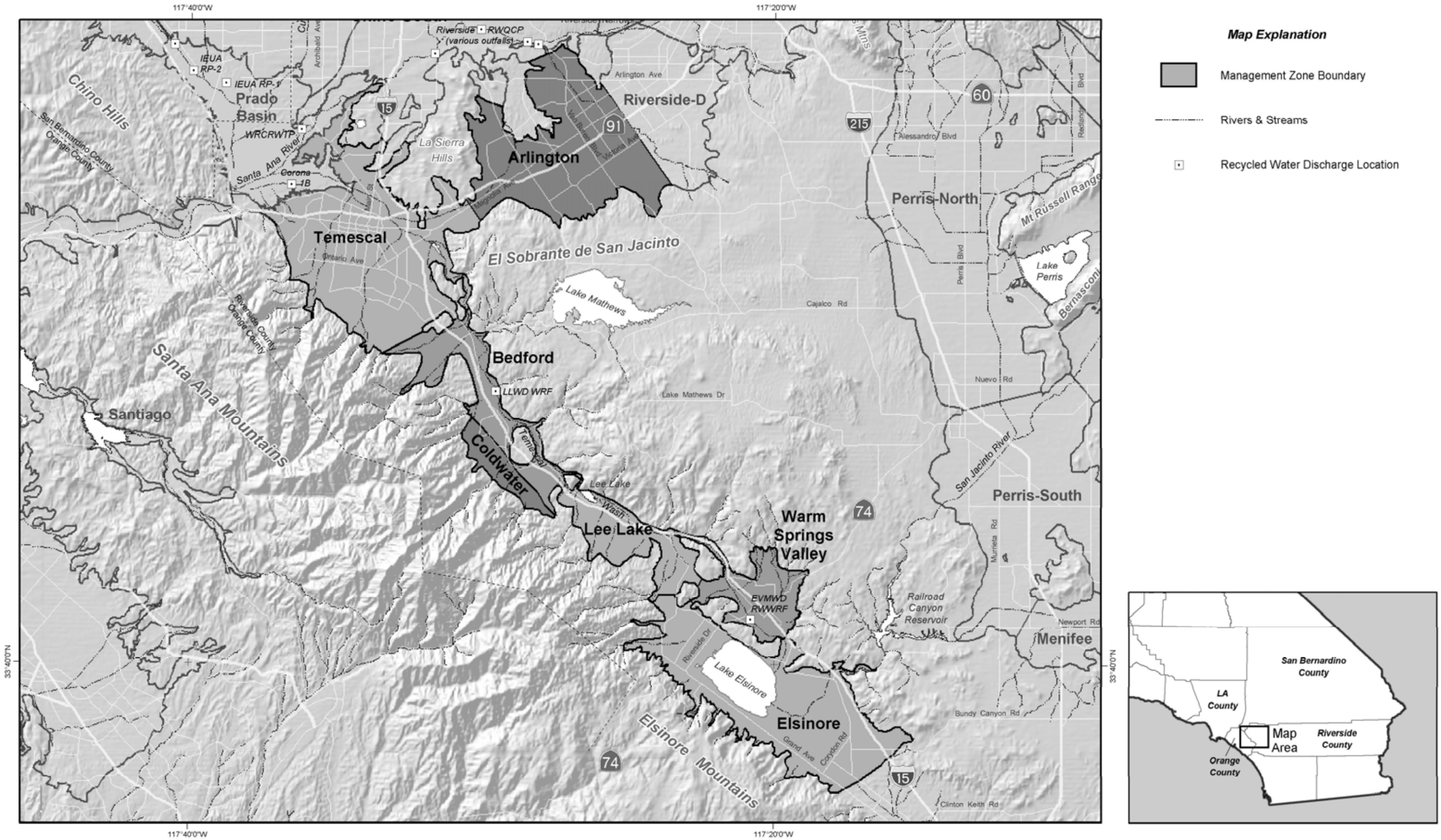
Author: AEM
Date: 20031113
File: Figure_3-5b.mxd

0 1 2 3 4 5 6 Miles
0 2 4 6 8 10 KM

Produced for:
TIN/TDS Task Force
TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Management Zone Boundaries
Chino (Anti-degradation), Rialto-Colton, & Riverside Basins

Figure 3-5b



Produced by:

WE WILDERMUTH ENVIRONMENTAL, INC.
23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wild-environment.com

Author: AEM
Date: 20031113
File: Figure_3-6.mxd

0 1 2 3 4 5 6 Miles
0 2 4 6 8 10 KM

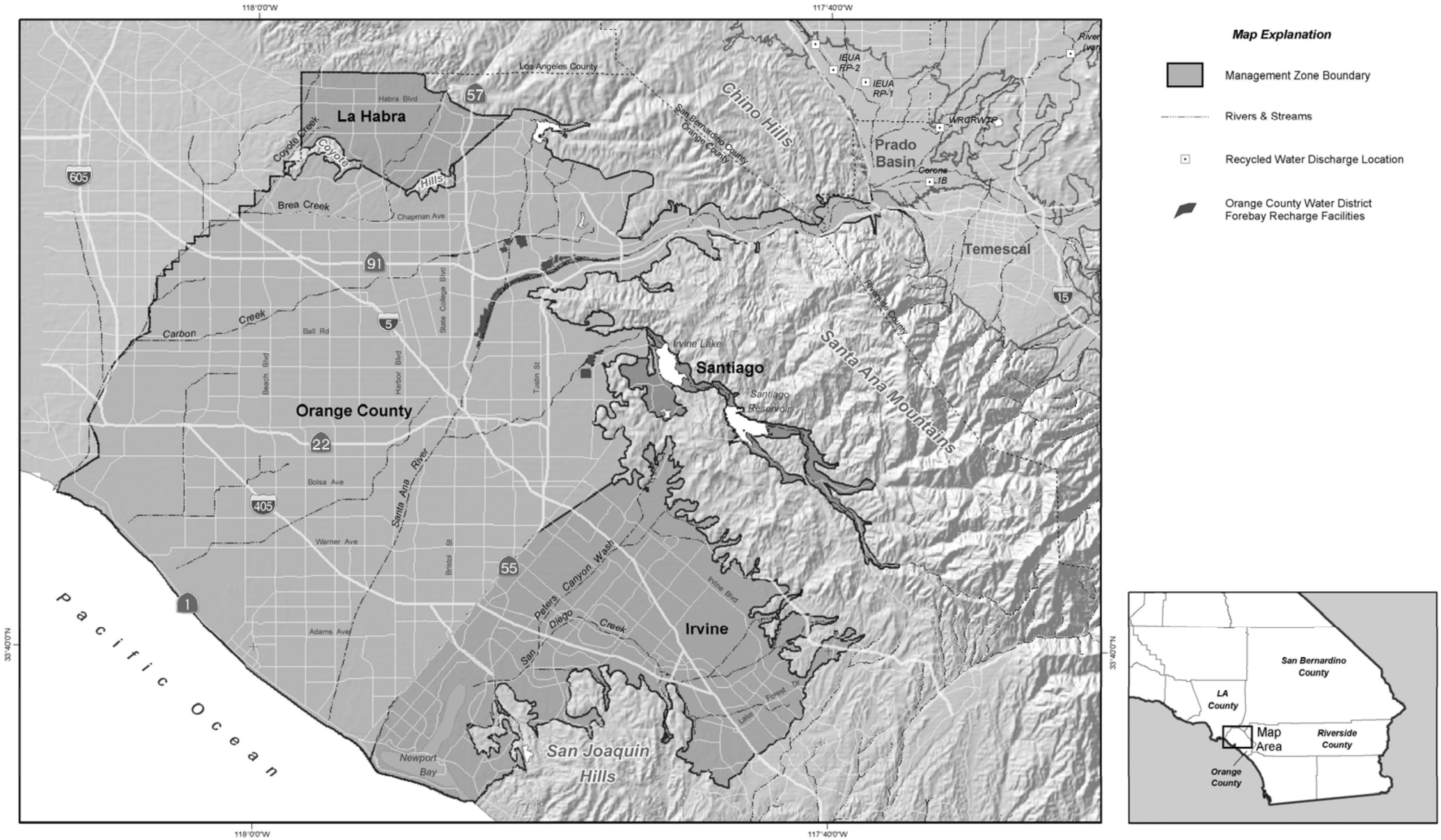
Produced for:

TIN/TDS Task Force

TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Management Zone Boundaries
Elsinore/Temescal Valleys

Figure 3-6



Produced by:

WE Wildermuth Environmental, Inc.
23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wild-environment.com

Author: AEM
Date: 20031113
File: Figure_3-7.mxd

0 1 2 3 4 5 6 Miles
0 2 4 6 8 10 KM

Produced for:

TIN/TDS Task Force

TIN/TDS Study Phase 2A -- Task 3
Develop Updated Boundary Maps for Management Zones (as Ammended and Revised)

Management Zone Boundaries
Orange County Basins

Figure 3-7

BENEFICIAL USE TABLE

Table 3-1 lists the designated beneficial uses for waterbodies within the Santa Ana Region. In this table, an "X" indicates that the waterbody has an existing or potential use. Many of the existing uses are well-known; some are not. Lakes and streams may have potential beneficial uses established because plans already exist to put he water to those uses, or because conditions (***e.g.,*** location, demand) make such future use likely. The establishment of a potential beneficial use serves to protect the quality of that water for such eventual use.

An "I" in Table 3-1 indicates that the waterbody has an intermittent beneficial use. This may occur because water conditions do not allow the beneficial use to exist year-round. The most common example of this is an ephemeral stream. Ephemeral streams in this region include, at one extreme, those which flow only while it is raining or for a short time afterward, and at the other extreme, established streams which flow through part of the year but also dry up for part of the year. While such ephemeral streams are flowing, beneficial uses are made of the water. Because such uses depend on the presence of water, they are intermittent. Waste discharges which could impair intermittent beneficial uses, whether they are made while those uses exist or not, are not permitted.

A "+" in the **MUN** column in Table 3-1 indicates that the waterbody has been specifically excepted from the **MUN** designation in accordance with the criteria specified in the "Sources of Drinking Water Policy."

The listing of waters within the basin attempts to include all significant surface streams and bodies of water, as well as the significant groundwater basins and subbasins which are receiving waters. Specific waters which are not listed have the same beneficial uses as the steams, lakes or reservoirs to which they are tributary or the groundwater basins or subbasin to which they are tributary or overlie.

REFERENCES

The Federal Clean Water Act, 33 USC 466 ***et seq.***

California State Water Resources Control Board, Resolution No. 88-63, "Sources of Drinking Water Policy," adopted May 19, 1988.

California Regional Water Quality Control Board, Santa Ana Region, Resolution No. 89-42, "Incorporation of 'Sources of Drinking Water' Policy into the Water Quality Control Plan (Basin Plan)," adopted March 10, 1989.

California Regional Water Quality Control Board, Santa Ana Region, Resolution No. 89-99, "Adoption of Revised Table of Beneficial Uses," adopted July 14, 1989.

California Water Code, Section 13000, "Water Quality" ***et seq.***

City of Big Bear Department of Water and Power, “Final Report – Task 4, Revised Water Quality Objectives, Big Bear Ground Water Basins,” April 1993.

United States Environmental Protection Agency “National Guidance-Water Quality Standards for Wetlands,” EPA 440/s-90-011, July 1990.

Governor Pete Wilson, “California Wetlands Conservation Policy,” August, 1993.

REGION 8 INDEX

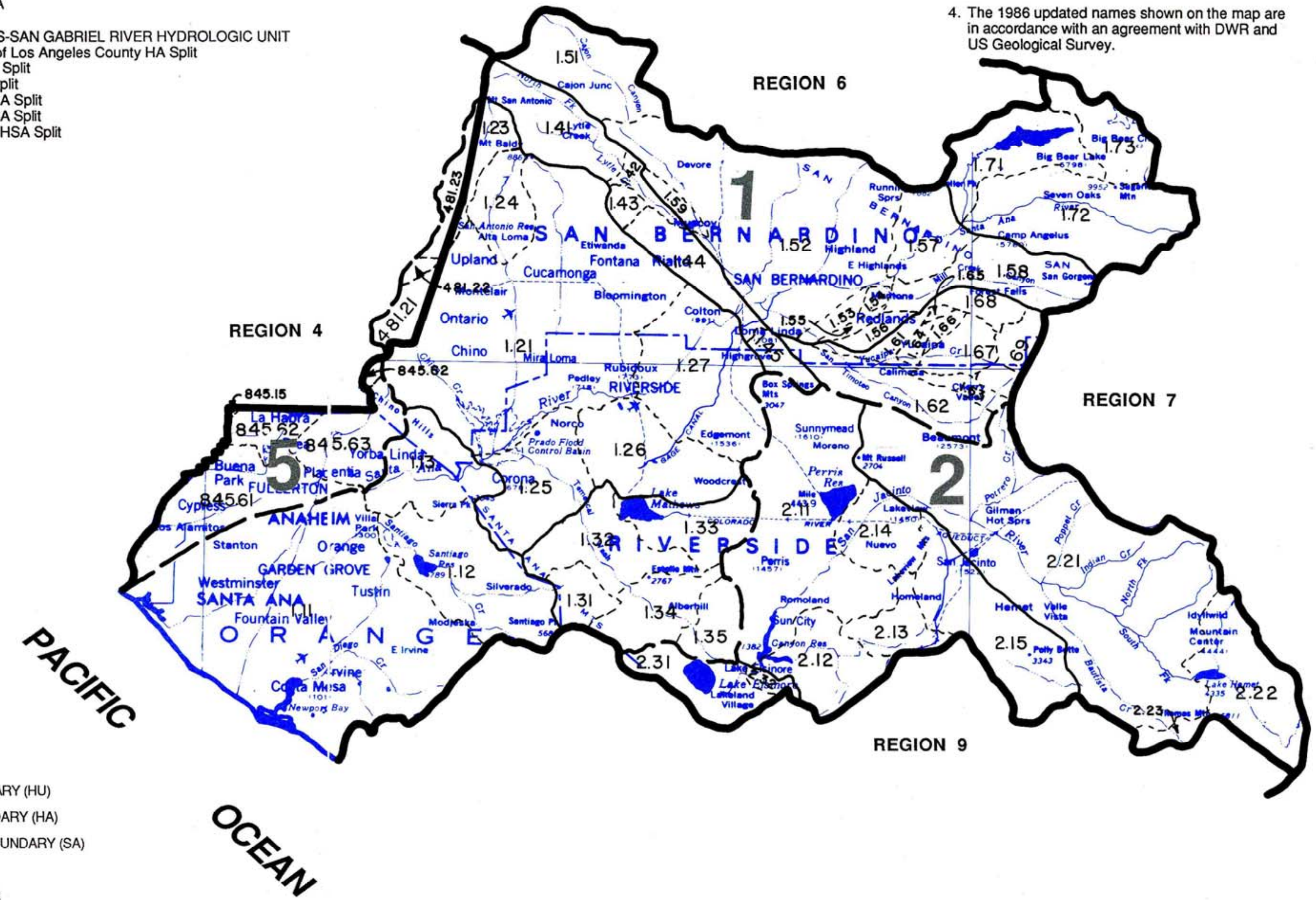
801.00 SANTA ANA RIVER HYDROLOGIC UNIT
801.10 Lower Santa Ana River HA
1.11 East Coastal Plain HSA
1.12 Santiago HSA
1.13 Santa Ana Narrows HSA
801.20 Middle Santa Ana River HA Split
801.21 Chino HSA Split
481.21 Chino HSA Split
481.22 Harrison HSA
801.23 Claremont Heights HSA Split
481.23 Claremont Heights HSA Split
801.24 Cucamonga HSA
1.25 Temescal HSA
1.26 Arlington HSA
1.27 Riverside HSA
801.30 Lake Matthews HA
1.31 Coldwater HSA
1.32 Bedford HSA
1.33 Cajalco HSA
1.34 Lee Lake HSA
1.35 Terra Cotta HSA
801.40 Colton-Rialto HA
1.41 Upper Lytle HSA
1.42 Lower Lytle HSA
1.43 Rialto HSA
1.44 Colton HSA
1.45 Reche HSA
801.50 Upper Santa Ana River HA
1.51 Cajon HSA
1.52 Bunker Hill HSA
1.53 Redlands HSA
1.54 Mentone HSA
1.55 Reservoir HSA
1.56 Crafton HSA
1.57 Santa Ana Canyon HSA
1.58 Mill Creek HSA
1.59 Sycamore HSA
801.60 San Timoteo HA
1.61 Yucaipa HSA
1.62 Beaumont HSA
1.63 Cherry Valley HSA
1.64 Chicken Hill HSA
1.65 Gateway HSA
1.66 Oak Glen HSA
1.67 South Mesa HSA
1.68 Triple Falls Creek HSA
1.69 Noble Creek HSA
801.70 San Bernardino Mountain HA
1.71 Bear Valley HA
1.72 Seven Oaks HSA
1.73 Baldwin HSA

802.00 SAN JACINTO VALLEY HYDROLOGIC UNIT
802.10 Perris HA
2.11 Perris Valley HSA
2.12 Menifee HSA
2.13 Winchester HSA
2.14 Lakeview HSA
2.15 Hemet HSA
802.20 San Jacinto HA
2.21 Gilman Hot Springs HSA
2.22 Hemet Lake HSA
2.23 Bautista HSA
802.30 Elsinore Valley HA
2.31 Elsinore HSA
2.32 Railroad HSA

805.00 LOS ANGELES-SAN GABRIEL RIVER HYDROLOGIC UNIT
805.10 Coastal Plain of Los Angeles County HA Split
845.15 Central HSA Split
845.60 Anaheim HA Split
845.61 Anaheim HSA Split
845.62 La Habra HSA Split
845.63 Yorba Linda HSA Split

NOTE:

1. The names and areas shown on this map are the same as used by the Department of Water Resources (DWR) in their Bulletin 130 Series except as explained below.
2. The numbering system used on this map is an adaptation of the numbering system used in the 130 Series.
3. The boundary between Region 8 and Region 4 follows the boundary between Los Angeles County and Orange or San Bernardino Counties, not the Hydrologic Boundary. The San Bernardino County line splits Hydrologic Unit 1 (Santa Ana River HU) so that Sub-Areas 481.21, 481.22, and 481.23 are legally in Region 4 but drain into Region 8. The Orange County line splits Hydrologic Unit 5 (Los Angeles-San Gabriel River HU) so that Sub-Areas 845.15, 845.61, 845.62 and 845.63 are legally in Region 8 but drain into Region 4. Therefore, a 5 digit number on the map indicates that a regional boundary divides a hydrologic unit, area or subarea. In these cases the second digit is the number of the region from which the hydrologic area has been separated by the regional boundary. All other digits are as described in the legend.
4. The 1986 updated names shown on the map are in accordance with an agreement with DWR and US Geological Survey.

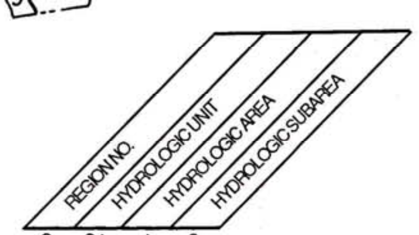


KEY TO REGION

LEGEND

STREAM
REGIONAL BOUNDARY
HYDROLOGIC UNIT BOUNDARY (HU)
HYDROLOGIC AREA BOUNDARY (HA)
HYDROLOGIC SUBAREA BOUNDARY (SA)

5 HYDROLOGIC UNIT NUMBER



April 1973
Revised: July 1976
Revised: August 1986

State Water Resources Control Board
Surveillance and Monitoring Section
T.E. Lavenda, P.E. T.E. Lavenda

State of California

REGIONAL WATER QUALITY CONTROL BOARD

Santa Ana Region (8)

SANTA ANA HYDROLOGIC BASIN PLANNING AREA (SA)

Scale in miles
8 0 8 16 24 32
Scale 1:500,000

Table 3-1 BENEFICIAL USES

OCEAN WATERS	BENEFICIAL USE																				Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST	Primary	Secondary
NEARSHORE ZONE*																						
San Gabriel River to Poppy Street in Corona Del Mar	+		X			X		X	X	X					X	X	X	X	X		801.11	
Poppy Street to Southeast Regional Boundary	+					X		X	X	X				X	X	X	X	X	X		801.11	
OFFSHORE ZONE																						
Waters Between Nearshore Zone and Limit of State Waters	+		X			X		X	X	X					X	X	X	X				

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from MUN (see text)

* Defined by Ocean Plan Chapter II B-1.: “Within a zone bounded by shoreline and a distance of 1000 feet from shoreline or the 30-foot depth contour, whichever is further from shoreline…”

Table 3-1 BENEFICIAL USES - Continued

BAYS, ESTUARIES, AND TIDAL PRISMS	BENEFICIAL USE																				Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST	Primary	Secondary
Anaheim Bay – Outer Bay	+					X		X	X					X	X	X	X	X			801.11	
Anaheim Bay – Seal Beach National Wildlife Refuge	+							X[1]	X					X	X	X	X	X		X	801.11	
Sunset Bay – Huntington Harbor	+					X		X	X	X					X	X	X	X			801.11	
Bolsa Bay	+							X	X	X				X	X	X	X	X	X			
Bolsa Chica Ecological Reserve	+							X	X					X	X	X	X	X		X	801.11	
Lower Newport Bay	+					X		X	X	X					X	X	X	X	X		801.11	
Upper Newport Bay	+							X	X	X				X	X	X	X	X	X	X	801.11	
Santa Ana River Salt Marsh	+							X	X					X	X	X		X		X	801.11	
Tidal Prism of Santa Ana River (to within 1000' of Victoria Street) and Newport Slough	+							X	X	X					X	X		X			801.11	
Tidal Prism of San Gabriel River - River Mouth to Marina Drive	+		X					X	X	X					X	X		X	X	X	845.61	
Tidal Prisms of Flood Control Channels Discharging to Coastal or Bay Waters	+							X	X	X					X			X			801.11	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

[1] No access per agency with jurisdiction (U.S. Navy)

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
LOWER SANTA ANA RIVER BASIN																				
Santa Ana River																				
Reach 1 – Tidal Prism to 17th Street in Santa Ana	+							X[2]	X		I				I				801.11	
Reach 2 – 17th Street in Santa Ana to Prado Dam	+	X			X			X	X		X				X	X			801.11	801.12
Aliso Creek	X				X			X	X		X				X	X			845.63	
Carbon Canyon Creek	X				X			X	X		X				X	X			845.63	
Santiago Creek Drainage																				
Santiago Creek																				
Reach 1 – below Irvine Lake	X				X			X[2]	X		X				X				801.12	801.11
Reach 2 – Irvine Lake (see Lakes, pg. 3-23																				
Reach 3 – Irvine Lake to Modjeska Canyon	I				I			I	I		I				I				801.12	
Reach 4 – Modjeska Canyon	X				X			X	X		X				X				801.12	
Silverado Creek	X				X			X	X		X				X				801.12	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

[2] Access prohibited in all or part by Orange County Resources Development and Management Division (RDMD)

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
LOWER SANTA ANA RIVER BASIN																				
Santiago Creek Drainage																				
Black Star	I				I			I	I		I				I				801.12	
Ladd Creek	I				I			I	I		I				I	I			801.12	
San Diego Creek Drainage																				
San Diego Creek																				
Reach 1 – below Jeffrey Road	+							X[2]	X		X				X				801.11	
Reach 2 – above Jeffrey Road to Headwaters	+				I			I	I		I				I				801.11	
Other Tributaries: Bonita Creek, Serrano Creek, Peters Canyon Wash, Hicks Canyon Wash, Bee Canyon Wash, Borrego Canyon Wash, Agua Chinon Wash, Laguna Canyon Wash, Rattlesnake Canyon Wash, Sand Canyon Wash*, and other Tributaries to these Creeks	+				I			I	I		I				I				801.11	
San Gabriel River Drainage																				
Coyote Creek (within Santa Ana Regional boundary	X							X	X		X				X					

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

[2] Access prohibited in all or part by Orange County Resources Development and Management Division (RDMD)
* Sand Canyon Wash also has RARE Beneficial Use

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Hydrologic Unit Primary	Hydrologic Unit Secondary
UPPER SANTA ANA RIVER BASIN																				
Santa Ana River																				
Reach 3 – Prado Dam to Mission Blvd. in Riverside	+	X			X			X	X		X				X	X			801.21	801.21, 801.25
Reach 4 – Mission Blvd. in Riverside to San Jacinto Fault in San Bernardino	+				X			X[3]	X		X				X				801.27	801.44
Reach 5 – San Jacinto Fault in Bernardino to Seven Oaks Dam[t]	X*	X			X			X[3]	X		X				X	X			801.52	801.57
Reach 6 – Seven Oaks Dam to Headwaters (see also Individual Tributary Streams)	X	X			X		X	X	X				X		X		X		801.72	
San Bernardino Mountain Streams																				
Mill Creek Drainage:																				
Reach 1 – Confluence with Santa Ana River to Bridge Crossing Route 38 at Upper Powerhouse	I	I			I			I	I				I		I	I			801.58	
Reach 2 – Bridge Crossing Route 38 at Upper Powerhouse Headwaters	X	X			X		X	X	X				X		X				801.58	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from MUN (see text)

* **MUN** applies upstream of Orange Avenue (Redlands); downstream, water is excepted from **MUN**
t Reach 5 uses are intermittent upstream of Waterman Avenue
3 Access prohibited in some portions by San Bernardino County Flood Control

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Mountain Home Creek	X				X		X	X	X				X		X				801.58	
Mountain Home Creek, East Fork	X				X		X	X	X				X		X		X		801.70	
Monkey Face Creek	X				X			X	X				X		X				801.70	
Alger Creek	X				X			X	X				X		X				801.70	
Falls Creek	X				X		X	X	X				X		X		X		801.70	
Vivian Creek	X				X			X	X				X		X				801.70	
High Creek	X				X			X	X				X		X				801.70	
Other Tributaries: Lost, Oak Cove, Green, Skinner, Momyer, Glen Martin, Camp, Hatchery, Rattlesnake, Slide, Snow, Bridal Veil, and Oak Creeks and other Tributaries to these Creeks	I				I			I	I				I		I				801.71	
Bear Creek Drainage:																				
Bear Creek	X	X			X		X	X	X				X		X		X		801.71	
Siberia Creek	X				X			X	X				X		X		X		801.71	
Slide Creek	I				I			I	I				I		I				801.71	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
All other Tributaries to these Creeks	I				I			I	I				I		I				801.71	
Big Bear Lake (see Lakes, pg. 3-23)																				
Big Bear Lake Tributaries:																				
North Creek	X				X			X	X				X		X		X		801.71	
Metcalf Creek	X				X			X	X				X		X		X		801.71	
Grout Creek	X				X			X	X				X		X		X		801.71	
Rathbone (Rathbun) Creek	X				X			X	X				X		X				801.71	
Meadow Creek	X				X			X	X				X		X				801.71	
Summit Creek	I				I			I	I				I		I				801.71	
Other Tributaries to Big Bear Lake: Knickerbocker, Johnson, Minnelusa, Polique, and Red Ant Creeks and other Tributaries to these Creeks	I				I			I	I				I		I				801.71	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Baldwin Lake (see Lakes, pg. 3-23)																				
Baldwin Lake Drainage:																				
Shay Creek	X				X			X	X				X		X	X			801.73	
Other Tributaries to Baldwin Lake: Sawmill, Green, and Caribou Canyons and other Tributaries to these Creeks	I				I			I	I				I		I				801.73	
Other Streams Draining to Santa Ana River (Mountain Reaches‡)																				
Cajon Creek	X				X			X	X				X		X	X			801.52	801.51
City Creek	X	X			X			X	X				X		X	X	X		801.57	
Devil Canyon Creek	X				X			X	X				X		X				801.57	
East Twin and Strawberry Creeks	X	X			X			X	X				X		X		X		801.57	
Waterman Canyon Creek	X				X			X	X				X		X				801.57	
Fish Creek	X				X			X	X				X		X		X		801.57	
Forsee Creek	X				X			X	X				X		X		X		801.72	
Plunge Creek	X	X			X			X	X				X		X	X			801.72	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Barton Creek	X	X			X			X	X				X		X				801.72	
Bailey Canyon Creek	I				I			I	I				I		I				801.72	
Kimbark Canyon, East Fork Kimbark Canyon, Ames Canyon and West Fork Cable Canyon Creeks	X				X			X	X		X		X		X				801.52	
Valley Reaches‡ of Above Streams	I				I			I	I		I				I				801.52	
Other Tributaries (Mountain Reaches‡): Alder, Badger Canyon, Bledsoe Gulch, Borea Canyon, Breakneck, Cable Canyon, Cienega Seca, Cold, Canyon, Cienega Seca, Cold, Converse, Coon, Crystal, Deer, Elder, Fredalba, Frog, Government, Hamilton, Heart Bar, Hemlock, Keller, Kilpecker, Little Mill, Little Sand Canyon, Lost, Meyer Canyon, Mile, Monroe Canyon, Oak, Rattlesnake, Round Cienega, Sand, Schneider, Staircase, Warm Springs Canyon, and Wild Horse Creeks and other Tributaries to these Creeks	I				I			I	I				I		I				801.72	801.71, 801.57

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
San Gabriel Mountain Streams (Mountain Reaches[‡])																				
San Antonio Creek	X	X	X	X	X		X	X	X				X		X				801.23	
Lytle Creek (South, Middle, and North Forks) and Coldwater Canyon Creek	X	X	X	X	X		X	X	X				X		X	X			801.41	801.42, 801.52, 801.59
Day Creek	X			X	X			X	X				X		X				801.21	
East Etiwanda Creek	X			X	X			X	X				X		X	X			801.21	
Valley Reaches [‡] of Above Streams	I				I			I	I		I				I				801.21	
Cucamonga Creek																				
Reach 1 – Confluence with Mill Creek to 23 rd St. in Upland	+				X			X[3]	X			X			X				801.21	
Reach 2 (Mountain Reach[‡]) - 23 rd St. In Upland to headwaters	X		X	X	X		X	X	X				X		X		X		801.24	
Mill Creek (Prado Area)	+							X	X		X				X	X			801.25	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains
3 Access prohibited in some portions by San Bernardino County Flood Control

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Other Tributaries (Mountain Reaches [‡]): Cajon Canyon, San Sevaine, Deer, Duncan Canyon, Henderson Canyon, Bull, Fan, Demens, Thorpe, Angalls, Telegraph Canyon, Stoddard Canyon, Icehouse Canyon, Cascade Canyon, Cedar, Falling Rock, Kerkhoff, and Cherry Creeks and other Tributaries to these Creeks	I				I			I	I				I		I				801.21	801.23
San Timoteo Area Streams																				
San Timoteo Creek																				
Reach 1A – Santa Ana River Confluence to Barton Road	+	I						I[3]	I		I				I				801.52	
Reach 1B – Barton Road to Gage at San Timoteo Canyon Rd	+	I			I			I[3]	I		I				I				801.52	
Reach 2–Gage at San Timoteo to confluence with Yucaipa Creek	+				X			X	X		X				X				801.61	
Reach 3 – Confluence with Yucaipa Creek to confluence with little San Gorgonio and Noble Creeks (Headwaters of San Timoteo Creek)	+				X			X	X		X				X				801.61	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from MUN (see text)

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains
3 Access prohibited in some portions by San Bernardino County Flood Control

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Oak Glen, Potato Canyon, and Birch Creeks	X				X			X	X		X				X				801.67	
Little San Gorgonio Creek	X				X			X	X				X		X				801.69	801.62, 801.63
Yucaipa Creek	I				I			I	I		I				I				801.67	801.61, 801.62, 801.64
Other Tributaries to these Creeks-Valley Reaches‡	I				I			I	I		I				I				801.62	801.52, 801.53
Other Tributaries to these Creeks-Mountain Reaches‡	I				I			I	I				I		I				801.69	801.67
Anza Park Drain	X							X	X		X				X		X		801.27	
Sunnyslope Channel	X							X	X		X				X		X		801.27	
Tequesquite Arroyo (Sycamore Creek)	+				X			X	X		X				X		X		801.27	
Prado Area Streams																				
Chino Creek																				
Reach 1A – Santa Ana River confluence to downstream of confluence with Mill Creek (Prado Area)	+							X	X		X				X	X			801.21	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Reach 1B – Confluence with Mill Creek (Prado Area) to beginning of concrete lined channel south of Los Serranos Rd.**	+							X	X		X				X	X			801.21	
Reach 2 – Beginning of concrete lined channel south of Los Serranos Rd. to confluence with San Antonio Creek	+				X			X[3]	X			X			X				801.21	
Temescal Creek																				
Reach 1 – Lincoln Ave. to Riverside Canal	+							X[4]	X		X				X				801.25	
Reach 2 – Riverside Canal to Lee Lake	+	I	I		I			I	I			I			I				801.32	801.25
Reach 3 – Lee Lake (see Lakes, Pg. 3-36)																				
Reach 4 – Lee Lake to Mid-Section line of Section 17 (downstream end of freeway cut)	+	I			I			I	I		I				I	X			801.34	
Reach 5 – Mid-section line of Section 17 (downstream end of Freeway cut) to Elsinore Groundwater Subbasin Boundary	+	X			X			X	X		X				X	X			801.35	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

** The confluence of Mill Creek is in Chino Creek, Reach 1B
[3] Access prohibited in some portions by San Bernardino County Flood Control District
[4] Access prohibited in some portions by Riverside County Flood Control District

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Reach 6 – Elsinore Groundwater Subbasin Boundary to Lake Elsinore Outlet	+				I			I	I		I				I				801.35	
Coldwater Canyon Creek	X	X			X			X	X		X				X				801.32	
Bedford Canyon Creek	+				I			I	I		I				I				801.32	
Dawson Canyon Creek	I				I			I	I		I				I				801.32	
Other Tributaries to these Creeks	I				I			I	I		I				I				801.32	
SAN JACINTO RIVER BASIN																				
San Jacinto River																				
Reach 1 – Lake Elsinore to Canyon Lake	I	I			I			I	I		I				I				801.32	802.31
Reach 2 – Canyon Lake (see Lakes Pg. 3-37)																				
Reach 3 – Canyon Lake to Nuevo Road	+	I			I			I	I		I				I				802.11	
Reach 4 – Nuveo Road to North-South Mid-Section Line, T4S/R1W-S8	+	I			I			I	I		I				I				802.14	802.21
Reach 5 – North-South Mid-Section Line, T4S/R1 W-S8, to Confluence with Poppet Creek	+	I			I			I	I		I				I				802.21	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

[1] The confluence of Mill Creek is in Chino Creek, Reach 1B
[2] Access prohibited in some portions by San Bernardino County Flood Control District
[3] Access prohibited in some portions by Riverside County Flood Control District

Table 3-1 BENEFICIAL USES - Continued

INLAND SURFACE STREAMS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE*	SPWN	EST	Primary	Secondary
Reach 6 – Poppet Creek to Cranston Bridge	I	I			I			I	I		I				I				802.21	
Reach 7 – Cranston Bridge to Lake Hemet	X	X			X			X	X				X		X				801.21	
Bautista Creek – Headwaters to Debris Dam	X	X			X			X	X				X		X				802.21	802.23
Strawberry Creek and San Jacinto River, North Fork	X	X			X			X	X				X		X				801.21	
Fuller Mill Creek	X	X			X			X	X				X		X				802.22	
Stone Creek	X	X			X			X	X				X		X				802.21	
Salt Creek	+							I	I		I				I				802.12	
Other Tributaries: Logan, Black Mountain, Juaro Canyon, Indian, Hurkey, Poppet, and Potrero Creeks and other Tributaries to these Creeks	I	I			I			I	I		I				I				802.21	802.22

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

Table 3-1 BENEFICIAL USES - Continued

LAKES AND RESERVOIRS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
UPPER SANTA ANA RIVER BASIN																				
Baldwin Lake	+							I	I		I		I	I	I	I			801.73	
Big Bear Lake	X	X			X			X	X		X		X		X	X			801.71	
Erwin Lake	X							X	X				X	X	X	X			801.73	
Evans, Lake	+							X	X		X		X		X				801.27	
Jenks Lake	X	X			X			X	X				X		X				801.72	
Lee Lake	+	X	X		X			X	X		X				X				802.34	
Mathews, Lake	X	X	X	X	X			X[5]	X		X				X	X			802.33	
Mockingbird Reservoir	+	X						X[6]	X		X				X				802.26	
Norconian, Lake	+							X	X		X				X				802.25	
LOWER SANTA ANA RIVER BASIN																				
Anaheim Lake	+				X			X	X		X				X				801.11	
Irvine Lake (Santiago Reservoir)	X	X						X	X		X		X		X				801.12	
Laguna, Lambert, Peters Canyon, Rattlesnake, Sand Canyon, and Siphon Reservoirs	+	X						X[7]	X		X				X				801.11	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

[5] Access prohibited by the Metropolitan Water District.
[6] Access prohibited by the Gage Canal Company (owner-operator)
[7] Access prohibited by the Irvine Company and/or the Irvine Ranch Water District

Table 3-1 BENEFICIAL USES - Continued

LAKES AND RESERVOIRS	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE*	SPWN	EST	Primary	Secondary
SAN JACINTO RIVER BASIN																				
Canyon Lake (Railroad Canyon Reservoir)	X	X			X			X	X		X				X				802.11	802.12
Elsinore, Lake	+							X	X		X				X				802.31	
Fulmor, Lake	X	X						X	X		X		X		X				802.21	
Hemet, Lake	X	X			X		X	X	X		X		X		X		X		802.22	
Perris, Lake	X	X	X	X	X			X	X		X		X		X				802.11	

X Present or Potential Beneficial Use .
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

Table 3-1 BENEFICIAL USES - Continued

WETLANDS (INLAND)	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
San Joaquin Freshwater Marsh**	+							X	X		X			X	X	X			801.11	801.14
Shay Meadows	I							I	I				I		I				801.73	
Stanfield Marsh**	X							X	X				X		X	X			801.71	
Prado Basin Management Zone@	+							X	X		X				X	X			802.21	
San Jacinto Wildlife Preserve**	+							X	X		X			X	X	X			802.21	802.14
Glen Helen	X							X	X		X				X				801.59	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from MUN (see text)

** This is a created wetland as defined in the wetland discussion
@ The Prado Basin Management Zone includes the Prado Flood Control Basin, a created wetland as defined in the Basin Plan (see Chapter 3, pages 3-4 through 3-7)

Table 3-1 BENEFICIAL USES - Continued

GROUNDWATER MANAGEMENT ZONES	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
UPPER SANTA ANA RIVER BASIN																				
Big Bear Valley	X			X															801.71	801.73
Beaumont	X	X	X	X															801.62	801.63, 801.69
Bunker Hill - A	X	X	X	X															801.52	801.52
Bunker Hill - B	X	X	X	X															802.52	801.53, 801.54, 801.57, 801.58
Colton	X	X	X	X															801.44	801.45
Chino North “maximum benefit”++	X	X	X	X															801.21	481.21, 481.23
Chino 1 – “antidegradation”++	X	X	X	X															801.21	481.21
Chino 2 – “antidegradation”++	X	X	X	X															801.21	
Chino 3 – “antidegradation”++	X	X	X	X															801.21	
Chino East @	X	X	X	X															801.21	801.27
Chino South @	X	X	X	X															801.21	801.25, 801.26
Cucamonga	X	X	X	X															801.24	801.21

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

++ Chino North “maximum benefit” management zone applies unless Regional Board determines that lowering of water quality is not of maximum benefit to the people of the state; in that case, the Chino 1, 2, and 3 “antidegradation” management zones would apply (see also discussion in Chapter 5).

@ Chino East and South are the designations in the Chino Basin Watermaster “maximum benefit” proposal (see Chapter 5) for the management zones identified by Wildermuth Environmental, Inc. (July 2000) as Chino 4 and 5, respectively.

Table 3-1 BENEFICIAL USES - Continued

GROUNDWATER MANAGEMENT ZONES	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Lytle	X	X	X	X															801.59	801.42
Rialto	X	X	X	X															801.44	801.21, 801.43
San Timoteo	X	X	X	X															801.62	801.61
Yucaipa	X	X	X	X															801.61	801.55, 801.63, 801.67
MIDDLE SANTA ANA RIVER BASIN																				
Arlington	X	X	X	X															801.26	
Bedford	X	X	X	X															801.32	481.31
Coldwater	X	X	X	X															801.31	
Elsinore	X	X		X															802.31	
Lee Lake	X	X	X	X															801.34	
Riverside - A	X	X	X	X															801.27	801.44
Riverside – B	X	X	X	X															801.27	801.44
Riverside - C	X	X	X	X															801.27	
Riverside - D	X	X	X	X															801.27	801.26
Riverside - E	X	X	X	X															801.27	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

Table 3-1 BENEFICIAL USES - Continued

GROUNDWATER MANAGEMENT ZONES	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
Riverside - F	X	X	X	X															801.27	
Temescal	X	X	X	X															801.25	
SAN JACINTO RIVER BASIN																				
Garner Valley	X	X																	802.22	
Idyllwild Area	X		X																802.22	802.21
Canyon	X	X	X	X															802.21	
Hemet - South	X	X	X	X															802.15	802.13, 802.21
Lakeview – Hemet North	X	X	X	X															802.14	802.15
Menifee	X	X		X															802.13	
Perris North	X	X	X	X															802.11	
Perris South	X	X																	802.11	802.12, 802.13
San Jacinto - Lower	X	X	X																802.21	802.11
San Jacinto - Upper	X	X	X	X															802.27	802.23

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

Table 3-1 BENEFICIAL USES - Continued

GROUNDWATER MANAGEMENT ZONES	BENEFICIAL USE																		Hydrologic Unit	
	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	EST	Primary	Secondary
LOWER SANTA ANA RIVER BASIN																				
La Habra	X	X																	845.62	
Santiago	X	X	X																801.12	801.11
Orange	X	X	X	X															801.11	801.13, 801.14 845.61, 845.63
Irvine	X	X	X	X															801.11	

X Present or Potential Beneficial Use
I Intermittent Beneficial Use
\+ Excepted from MUN (see text)

CHAPTER 4

WATER QUALITY OBJECTIVES

INTRODUCTION

The Porter-Cologne Act defines water quality objectives as "…the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area" (§13050 (h)). Further, the Act directs (§13241) that:

"Each regional board shall establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses as the prevention of nuisance; however, it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors to be considered by a regional board in establishing water quality objectives shall include, but not necessarily be limited to, all of the following:

(a) Past, present, and probable future beneficial uses of water.

(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

(d) Economic considerations.

(e) The need for developing housing within the region.

(f) The need to develop and use recycled water."

Two important additional factors which were also considered in setting the water quality objectives in this Plan are (1) historic and present water quality, and (2) the antidegradation policies cited in Chapter 2.

The water quality objectives in this plan supersede and replace those adopted in the 1983 Basin Plan. Perhaps the most significant difference between this and the prior Plan is the inclusion of new objectives for un-ionized ammonia and site-specific objectives for the middle Santa Ana River system for copper, cadmium, and lead.

Some of these water quality objectives refer to "controllable sources" or "controllable water quality factors." Controllable sources include both point and nonpoint source discharges, such as conventional discharges from pipes, as well as discharges from land areas or other diffuse sources. Controllable water quality factors are those characteristics of the discharge and/or the receiving water which can be controlled by treatment or management methods. Examples of other activities which may not involve waste discharges, but which also constitute controllable water quality factors, include the percolation of storm water, transport/delivery of water via natural stream channels, and stream diversions.

The water quality objectives in this Plan are specified according to waterbody type: ocean waters; enclosed bays and estuaries; inland surface waters; and groundwaters.

The narrative water quality objectives below are arranged alphabetically. They vary in applicability and scope, reflecting the variety of beneficial uses of water that have been identified (Chapter 3). Where numerical objectives are specified, they generally represent the levels that will protect beneficial uses. However, in establishing waste discharge requirements for specific discharges, the Regional Board may find that more stringent levels are necessary to protect beneficial uses. In other cases, an objective may prohibit the discharge of specific substances, may tolerate natural or "background" levels of certain substances or characteristics but no increases over those values, or may express a limit in terms of not impacting other beneficial uses. An adverse effect or impact on a beneficial use occurs where there is an actual or threatened loss or impairment of that beneficial use.

OCEAN WATERS (Amended by Resolution No. 97-20, April 18, 1997)

Water quality objectives specified in the "Water Quality Control Plan for Ocean Waters of California" (Ocean Plan) and the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan) are incorporated into this Basin Plan by reference. The provisions of the Ocean Plan and Thermal Plan apply to the ocean waters within this Region. **(End of Resolution No. 97-20)**

ENCLOSED BAYS AND ESTUARIES

"Enclosed bays" means indentations along the coast which enclose an area of oceanic water within distinct headlands or harbor works. "Estuaries" means waters, including coastal lagoons, located at the mouths of steams which serve as areas of mixing for fresh and ocean waters. Enclosed bays and estuaries do not include ocean waters or inland surface waters (see definition in the Inland Surface Waters section).

The objectives which are included below apply to all enclosed bays and estuaries within the region. In addition to these parameter-specific objectives, the following narrative objective shall apply:

Enclosed bay and estuarine communities and populations, including vertebrate, invertebrate, and plant species, shall not be degraded as a result of the discharge of waste. Degradation is damage to an aquatic community or population with the result that a balanced community no longer exists. A balance community is one that is (1) diverse, (2) has the ability to sustain itself through cyclic seasonal changes, (3) includes necessary food chain species, and (4) is not dominated by pollution-tolerant *species, unless that domination is caused by physical habitat limitations. A balanced community also (5) may include historically introduced non-native species, but (6) does not include species present because best available technology has not been implemented, or (7) because site-specific objectives have been adopted, or (8) because of thermal discharges.*

Algae

Excessive growth of algae and/or other aquatic plants can degrade water quality. Algal blooms sometimes occur naturally, but they are often the result of excess nutrients (*i.e.,* nitrogen, phosphorus) from waste discharges or nonpoint sources. These blooms can lead to problems with tastes, odors, color, and increased turbidity and can depress the dissolved oxygen content of the water, leading to fish kills. Floating algal scum and algal mats are also an aesthetically unpleasant nuisance.

Waste discharges shall not contribute to excessive algal growth in receiving waters.

Bacteria, Coliform

Fecal bacteria are part of the intestinal flora of warm-blooded animals. Their presence in bay and estuarine waters is an indicator of pollution. Total coliform is measured in terms of the number of coliform organisms per unit volume. Total coliform numbers can include non-fecal bacteria, so additional testing is often done to confirm the presence and numbers of fecal coliform bacterial. Water quality objectives for numbers of total and fecal coliform vary with the uses of the water, as shown below.

Bays and Estuaries

REC-1 *Fecal coliform: log mean less than 200 organisms/100 mL based on five or more samples/30 day period, and not more than 10% of the samples exceed 400 organisms/100 mL for any 30-day period.*

SHEL *Fecal coliform: median concentration not more than 14 MPN (most probable number)/100 ml and not more than 10% of samples exceed 43 mpn / 100 mL*

Chlorine, Residual

Wastewater disinfection with chlorine usually produces a chlorine residual. Chlorine and its reaction products are toxic to aquatic life.

To protect aquatic life, the chlorine residual in wastewater discharged to enclosed bays and estuaries shall not exceed 0.1 mg/L.

Color

Color in water may arise naturally, such as from minerals, plant matter or algae, or may be caused by industrial pollutants. Color is primarily an aesthetic consideration.

Waste discharges shall not result in coloration of the receiving waters which causes a nuisance or adversely affects beneficial uses. The natural color of fish, shellfish or other bay and estuarine water resources used for human consumption shall not be impaired.

Floatables
Floatables are an aesthetic nuisance as well as a substrate for algae and insect vectors.

Waste discharges shall not contain floating materials, including solids, liquids, foam or scum, which cause a nuisance or adversely affect beneficial uses.

Oil and Grease
Oil and grease can be present in water as a result of the discharge of treated wastes and the accidental or intentional dumping of wastes into sinks and storm drains. Oils and related materials have a high surface tension and are not soluble in water, therefore forming a film on the water's surface. This film can result in nuisance conditions because of odors and visual impacts. Oil and grease can coat birds and aquatic organisms, adversely affecting respiration and/or thermoregulation.

Waste discharges shall not result in deposition of oil, grease, wax or other materials in concentrations which result in a visible film or in coating objects in the water, or which cause a nuisance or adversely affect beneficial uses.

Oxygen, Dissolved
Adequate dissolved oxygen (D.O.) is vital for aquatic life. Depression of D.O. levels can lead to fish kills and odors resulting from anaerobic decomposition. Dissolved oxygen content in water is a function of water temperature and salinity.

The dissolved oxygen content of enclosed bays and estuaries shall not be depressed to levels that adversely affect beneficial uses as a result of controllable water quality factors.

pH
pH is a measure of the hydrogen ion concentration of water. pH values generally range from 0 (most acidic) to 14 (most alkaline). Many pollutants can alter the pH, raising or lowering it excessively. These extremes in pH can have adverse effects on aquatic biota and can corrode pipes and concrete. Even small changes in pH can harm aquatic biota.

The pH of bay or estuary waters shall not be raised above 8.6 or depressed below 7.0 as a result of controllable water quality factors; ambient pH levels shall not be changed more than 0.2 units.

Radioactivity
Radioactive materials shall not be present in the bay or estuarine waters of the region in concentrations which are deleterious to human, plant or animal life.

Solids, Suspended and Settleable
Settleable solids are deleterious to benthic organisms and may cause anaerobic conditions to form. Suspended solids can clog fish gills and interfere with respiration in aquatic fauna. They also screen out light, hindering photosynthesis and normal aquatic plant growth and development.

Enclosed bays and estuaries shall not contain suspended or settleable solids in amounts which cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.

Sulfides
Sulfides are generated by many industries and from the anaerobic decomposition of organic matter. In water, sulfides can react to form hydrogen sulfide (H_2S), commonly known for its "rotten egg" odor. Sulfides in ionic form are also toxic to fish.

The dissolved sulfide content of enclosed bays and estuaries shall not be increased as a result of controllable water quality factors.

Surfactants (surface-active agents)
This group of materials includes detergents, wetting agents, and emulsifiers.

Waste discharges shall not contain concentrations of surfactants which result in foam in the course of flow or the use of the receiving water, or which adversely affect aquatic life.

Taste and Odor
Undesirable tastes and odors in water may be a nuisance and may indicate the presence of a pollutant(s).

The enclosed bays and estuaries of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations which cause a nuisance or adversely affect beneficial uses. The natural taste and odor of fish, shellfish or other enclosed bay and estuarine water resources used for human consumption shall not be impaired.

Temperature
Waste discharges can cause temperature changes in the receiving waters which adversely affect the aquatic biota. Discharges most likely to cause these temperature effects are cooling tower and heat exchanger blowdown.

All bay and estuary waters shall meet the objective specified in the Thermal Plan.

Toxic Substances
Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to level which are harmful to human health.

The concentrations of toxic substances in the water column, sediments or biota shall not adversely affect beneficial uses.

Turbidity
Turbidity is a measure of light scattered due to particulates in water.

Increases in turbidity which result from controllable water quality factors shall comply with the following:

Natural Turbidity	*Maximum Increase*
0-50 NTU	*20%*
50-100 NTU	*10 NTU*
Greater than 100 NTU	*10%*

All enclosed bay and estuaries of the region shall be free of changes in turbidity which adversely affect beneficial uses.

INLAND SURFACE WATERS

Inland surface waters include streams, rivers, lakes, and wetlands in the Region. Ocean waters and enclosed bays and estuaries are not considered inland surface waters.

The narrative objectives which are included below apply to all inland surface waters within the region, including lakes, streams, and wetlands. In addition, specific numerical objectives are listed in Table 4-1. Where more than one objective is applicable, the stricter shall apply. In addition to these objectives, the following shall apply:

Inland surface water communities and populations, including vertebrate, invertebrate, and plant species, shall not be degraded as a result of the discharge of waste. Degradation is damage to an aquatic community or population with the result that balanced community no longer exists. A balanced community is one that is (1) diverse, (2) has the ability to sustain itself through cyclic seasonal changes, (3) includes necessary food chain species, and (4) is not dominated by pollution-tolerant species, unless that domination is caused by physical habitat limitations. A balanced community also (5) may include historically introduced non-native species, but (6) does not include species present because best available technology has not been implemented, or (7) because site-specific objectives have been adopted, or (8) because of thermal discharges.

Algae

Excessive growth of algae and/or other aquatic plants can degrade water quality. Algal blooms sometimes occur naturally, but they are often the result of excess nutrients (*i.e.,* nitrogen, phosphorous) from waste discharges or nonpoint sources. These blooms can lead to problems with tastes, odors, color, and increased turbidity and can depress the dissolved oxygen content of the water, leading to fish kills. Floating algal scum and algal mats are also an aesthetically unpleasant nuisance.

Waste discharges shall not contribute to excessive algal growth in inland surface receiving waters.

Ammonia, Un-ionized

Un-ionized ammonia (NH_3, or UIA) is toxic to fish and other aquatic organisms. In water, UIA exists in equilibrium with ammonium (NH_4+) and hydroxide (OH) ions. The proportions of each change as the temperature, pH, and salinity of the water change.

The 1983 Basin Plan specified an UIA objective of 0.8 mg/L for waterbodies designated **WARM**. The SWRCB directed the Regional Board to review the 0.8 mg/L objective because of concerns that it is not stringent enough to protect aquatic wildlife. The USEPA concurred that this review was necessary.

The Regional Board contracted with California State University, Fullerton to conduct a study of un-ionized ammonia in the Santa Ana River and to develop recommendations regarding the UIA objective. This study, which was conducted in 1985-87, was complemented by additional Regional Board staff analysis. The additional staff analysis focused on adjusting EPA's national criteria for **WARM** waters (published in 1984 and amended in 1992), using the recalculation procedure. With this procedure, cold and warmwater species not found in the Santa Ana Region's **WARM** designated waters were deleted from the database used to derive the national criteria, and new criteria were calculated.

Based on these analyses, this Plan specifies UIA objectives for **WARM** and **COLD** designated waterbodies in the Region. **Note:** site-specific objectives have been developed for the Santa Ana River and certain tributaries (see next page).

Acute (1-hour) UIA-N Objectives

For waterbodies designed **COLD**:

Objective = 0.822 [0.52/FT/FPH/2], where

$FT = 10^{(0.03(20-T))}$ $\quad 0 \le T \le 20°C$

$FT = 1$ $\quad 20 \le T \le 30°C$

$FPH = \dfrac{1+10^{(7.4-pH)}}{1.25}$ $\quad 6.5 \le pH \le 8$

$FPH = 1$ $\quad 8 \le pH \le 9$

For waterbodies designated **WARM**:
Objective = 0.822[0.87/FT/FPH/2], where

$FT = 10^{(0.03(20-T))}$ $0 \leq T \leq 25°C$
$FT = 0.7079$ $25 \leq T \leq 30°C$

$FPH = \frac{1+10^{(7.4-pH)}}{1.25}$ $6.5 \leq pH \leq 8$
$FPH = 1$ $8 \leq pH \leq 9$

Chronic (4-day) UIA-N Objectives
For waterbodies designated **COLD**:
Objective = 0.822[0.52/FT/FPH/RATIO], where

$FT = 10^{(0.03(20-T))}$ $0 \leq T \leq 15°C$
$FT = 1.4125$ $15 \leq T \leq 30°C$

$FPH = \frac{1+10^{(7.4-pH)}}{1.25}$ $6.5 \leq pH \leq 8$
$FPH = 1$ $8 \leq pH \leq 9$

$RATIO = \frac{24[10^{(7.7-pH)}]}{1+10^{(7.4-pH)}}$ $6.5 \leq pH \leq 7.7$
$RATIO = 13.5$ $7.7 \leq pH \leq 9$

For waterbodies designed **WARM**:
Objective = 0.822[0.87/FT/FPH/RATIO], where

$FT = 10^{(0.03(20-T))}$ $0 \leq T \leq 20°C$
$FT = 1$ $20 \leq T \leq 30°C$

$FPH = \frac{1+10^{(7.4-pH)}}{1.25}$ $6.5 \leq pH \leq 8$
$FPH = 1$ $8 \leq pH \leq 9$

$RATIO = \frac{24[10^{(7.7-pH)}]}{1+10^{(7.4-pH)}}$ $6.5 \leq pH \leq 7.7$
$RATIO = 13.5$ $7.7 \leq pH \leq 9$

Calculated numerical UIA-N objectives as well as corresponding total ammonia nitrogen concentration for various pH and temperature conditions are shown in Tables

4-2 and 4-3. Table 4-4 lists the above equations in a form that can be entered into a computer or calculator program.

Site-specific Un-ionized Ammonia Objective for the Santa Ana River System
In addition to the un-ionized ammonia (UIA) objectives specified above, this Plan includes a chronic (4-day) site-specific UIA objective for the middle Santa Ana River, Chino Creek, Mill Creek (Prado Area), Temescal Creek, and San Timoteo Creek. This site-specific objective is based on carefully controlled chronic toxicity tests on Santa Ana River water conducted as part of the Santa Ana River Use-Attainability Analysis Study. The Santa Ana River water was spiked with UIA concentrations ranging from 0.0 (control) to 1.0 mg/L. The No Observed Effect Level (NOEL) was found to be at a UIA concentration of 0.24 mg/L (or 0.19 mg/L as UIA-nitrogen). Using a 50% safety factor, the UIA objective developed is 0.12 mg/L (or 0.098 mg/L UIA-nitrogen).

To prevent chronic toxicity to aquatic life in the Santa Ana River, Reaches 2, 3, and 4, Chino Creek, Mill Creek (Prado Area), Temescal Creek and San Timoteo Creek, discharges to these waterbodies shall not cause the concentration of un-ionized ammonia (as nitrogen) to exceed 0.098 mg/L) (NH_3-N) as a 4-day average.

Bacteria, Coliform
Fecal bacteria are part of the intestinal flora of warm-blooded animals. Their presence in surface waters is an indicator of pollution. Total coliform is measured in terms of the number of coliform organisms per unit volume. Total coliform numbers can include non-fecal bacteria, so additional testing is often done to confirm the presence and numbers of fecal coliform bacteria. Water quality objectives for numbers of total and fecal coliform vary with the uses of the water, as shown below.

Lakes and Streams

MUN *Total coliform: less than 100 organisms/100 mL*

REC-1 *Fecal coliform: log mean less than 200 organisms/100 mL based on five or more samples/30 day period, and not more than 10% of the samples exceed 400 organisms/100 mL for any 30-day period*

REC-2 *Fecal coliform: average less than 2000 organisms/100 mL and not more than 10% of samples exceed 4000 organisms/100 mL for any 30-day period*

Boron
Boron is not considered a problem in drinking water supplies until concentrations of 20-30 mg/L are reached. In irrigation, boron is an essential element. However, boron concentrations in excess of 0.75 mg/L may be deleterious to certain crops, particularly citrus. The maximum safe concentration of even the most tolerant plants is about 4.0mg/L of boron.

Boron concentrations shall not exceed 0.75 mg/L in inland surface waters of the region as a result of controllable water quality factors.

Chemical Oxygen Demand (COD)
COD is a measure of the total amount of oxidizable material present in a sample, including stable organic materials which are not measured by the BOD test.

Waste discharges shall not result in increases in COD levels in inland surface waters which exceed the values shown in Table 4-1 or which adversely affect beneficial uses.

Chloride
Excess chloride concentrations lead primarily to economic damage rather than public health hazards. Chlorides are considered to be among the most troublesome anions in water used for industrial or irrigation purposes since they significantly affect the corrosion rate of steel and aluminum and can be toxic to plants. A safe value for irrigation is considered to be less than 175 mg/L of chloride. Excess chlorides affect the taste of potable water, so drinking water standards are generally based on potability rather than on health. The secondary drinking water standard for chloride is 500 mg/L.

The chloride objectives listed in Table 4-1 shall not be exceeded as a result of controllable water quality factors.

Chlorine, Residual
Wastewater disinfection with chlorine usually produces a chlorine residual. Chlorine and its reaction products are toxic to aquatic life.

To protect aquatic life, the chlorine residual in wastewater discharged to inland surface waters shall not exceed 0.1 mg/L.

Color
Color in water may arise naturally, such as from minerals, plant matter, or algae, or may be caused by industrial pollutants. Color is primarily an aesthetic consideration, although it can discolor clothes and food. The secondary drinking water standard for color is 15 color units.

Waste discharges shall not result in coloration of the receiving waters which causes a nuisance or adversely affect beneficial uses. The natural color of fish, shellfish or other inland surface water resources used for human consumption shall not be impaired.

Dissolved Solids, Total (Total Filtrable Residue)
The department of Health Services recommends that the concentration of total dissolved solids (TDS) in drinking water be limited to 1000 mg/L (secondary drinking water standard) due to taste considerations. For most irrigation uses, water should have a TDS concentration under 700mg/L. Quality-related consumer cost analyses

have indicated that a benefit to consumers exist if water is supplied at or below 500mg/L TDS.

The dissolved mineral content of the waters of the region, as measured by the total dissolved solids test ("Standard Methods for the Examination of Water and Wastewater, 16th Ed.," 1985: 209B (180˚C), p. 95), shall not exceed the specific objectives listed in Table 4-1 as a result of controllable water quality factors.

Filtrable Residue, Total
See Dissolved Solids, Total

Floatables
Floatables are an aesthetic nuisance as well as a substrate for algae and insect vectors.

Waste discharges shall not contain floating materials, including solids, liquids, foam or scum, which cause a nuisance or adversely affect beneficial uses.

Fluoride
Fluoride in water supply used for industrial or irrigation purposes has certain detrimental effects. Fluoride in optimum concentrations in water supply (concentrations dependent upon the mean annual air temperature) is considered beneficial for preventing dental caries, but concentrations above approximately 1 mg/L, or its equivalent at a given temperature, are considered likely to increase the risk of occurrence of dental fluorosis.

Fluoride concentrations shall not exceed values specified in the table below in inland surface waters designated **MUN** *as a result of controllable water quality factors.*

Annual Average of Maximum Daily Air Temperature (˚C)	Optimum Fluoride Concentration (mg/L)
12.0 and below	1.2
12.1 to 14.6	1.1
14.7 to 17.6	1.0
17.7 to 21.4	0.9
21.5 to 26.2	0.8
26.3 to 32.5	0.7

Hardness (as $CaCO_3$)
The major detrimental effect of hardness is economic. Any concentration (reported as mg/L $CaCO_3$) greater than 100mg/L results in the increased use of soap, scale buildup in utensils, in domestic uses, and in plumbing. Hardness in industrial cooling waters is generally objectionable above 50mg/L.

The objectives listed in Table 4-1 shall not be exceeded as a result of controllable water quality factors. If no hardness objective is listed in Table 4-1, the hardness of *receiving waters used for municipal supply (**MUN**) shall not be increased as a result of waste discharges to levels that adversely affect beneficial uses.*

Inorganic Nitrogen, Total
see Nitrogen, Total Inorganic

Metals
Metals can be toxic to human and animal life.

In 1990, the Environmental Protection Agency (EPA) placed the Santa Ana River, reaches 2, 3, and 4, and Chino Creek on the §304(1) list of "Waters Not Meeting Applicable Water Quality Standards" based on its review of data on certain metals in POTW discharges to the River.

The Santa Ana River dischargers and the Regional Board disagreed with and objected to EPA's §304(1) designation. To demonstrate whether or not the §304(1) designation is correct and what effects, if any, heavy metal levels may have on aquatic life in the Region, the Santa Ana River Dischargers Association and the Santa Ana Watershed Project Authority agreed to conduct a Use-Attainability Analysis (UAA).

The purpose of a Use-Attainability Analysis is to evaluate the "physical, biological, chemical, and hydrological conditions of a river to determine what specific beneficial uses the waterbody can support." If local conditions preclude full attainment of an aquatic life beneficial use for reasons unrelated to water quality, federal and state authorities may allow variances from the generic water quality criteria.

The UAA began in February 1991 and concluded in March 1992. It provided detailed information on chemical, biological, and hydrologic conditions in the middle Santa Ana River aquatic system. Conclusions and recommendations were presented to the Board in June 1992. The information presented is reflected in the Santa Ana River discussion in Chapter 1 and in the new **LWRM** Beneficial Use designation (Chapter 3). Data provided by the UAA was also used to support the adoption of site-specific objectives for three metals, cadmium (Cd), copper (Cu), and lead (Pb) for the Santa Ana River (Reaches 2, 3, and 4) and the perennial portions of some tributaries (including Chino Creek, Cucamonga/Mill Creek, Temescal Creek, and creeks in the Riverside Narrows area).

In adopting these SSOs the Regional Board found (RWQCB Resolution No. 94-1) that:

a. The Site-Specific Water Quality Objectives (SSOs) will protect the beneficial uses of the Santa Ana River.

b. The SSOs are conservative.

c. The SSOs, which represent higher quality than presently exists, will not result in degradation of water quality.

d. Existing levels of cadmium, copper, and lead in the Santa Ana River do not contribute to toxicity in the Santa Ana River.

The toxicity of these metals varies with water hardness. No fixed hardness value is assumed; objectives are calculated using the hardness of the collected sample.

The following equations represent the SSOs which apply to these waterbodies. These SSOs are expressed as the dissolved form of the metals.

SSO *for cadmium*:

$$\text{Cd SSO} = 0.85[e^{(0.7852 * \ln(TH) - 3.490)}]$$

SSO for Copper

$$\text{Cu SSO} = 0.85[e^{(0.8545 * \ln(TH) - 1.465)}]$$

SSO for lead

$$\text{Pb SSO} = 0.25\ [e^{(1.237 * \ln(TH) - 3.958)}]$$

where TH is the total hardness (as $CaCO_3$) in mg/L.

The SSOs for cadmium and copper are simply the hardness-dependent formulas for calculating the objective (national criteria), corrected by the dissolved-to-total (metal) ratio. The SSO for lead is the recalculated* hardness-dependant formula, corrected by the dissolved-to-total ratio.

*****Recalculation for lead was carried out by EPA-Region IX, using the lowest genus mean acute value (GMAV) as the final acute value (FAV) and an acute-to chronic ratio (ACR) of 51.29, resulting in a final chronic value (FCV) of 2.78 and the SSO formula already shown.

The Table below shows the site-specific objectives for cadmium, copper, and lead that would apply to a water sample with 200 mg/L total hardness (as $CaCO_3$).

Metal	Calculated WQO	Recalculated Value	EPA Correction Factor	SSO
Cd	2.0	NA	0.85	1.7
Cu	21.4	NA	0.85	18.2
Pb	7.7	16.2	0.25	4.1

Toxicity testing performed as part of the Santa Ana River Use-Attainability Analysis (UAA) has demonstrated that the levels of dissolved metal shown below are safe and non-toxic in Santa Ana River water.

Cadmium	4 µg/L
Copper	37 µg/L
Lead	28 µg/L

There is also evidence that levels as much as 100% higher than those shown above do not result in chronic toxicity.

Methylene Blue-Activated Substances (MBAS)

The MBAS test is sensitive to the presence of detergents (see surfactants). Positive results may indicate the presence of wastewater. The secondary drinking water standard for MBAS is 0.05 mg/L.

*MBAS concentrations shall not exceed 0.05mg/L I inland surface waters designated **MUN** as a result of controllable water quality factors.*

Nitrate

High nitrate concentrations in domestic water supplies can be toxic to human life. Infants are particularly susceptible and may develop methemoglobinemia (blue baby syndrome). The primary drinking water standard for nitrate (as NO_3) is 45 mg/L or 10 mg/L (as N) in inland surface waters designated MUN as a result of controllable water quality factors.

*Nitrate-nitrogen concentrations shall not exceed 45 mg/L (as NO_3) or 10 mg/L (as N) in inland surface waters designated **MUN** as a result of controllable water quality factors.*

Nitrogen, Total Inorganic

The objectives listed in Table 4-1 shall not be exceeded as a result of controllable water quality factors.

Oil and Grease
Oil and grease can be present in water as a result of the discharge of treated wastes and the accidental or intentional dumping of wastes into sinks and storm drains. Oils and related materials have a high surface tension and are not soluble in water, therefore forming a film on the water's surface. This film can result in nuisance conditions because of odors and visual impacts. Oil and grease can coat birds and aquatic organisms, adversely affecting respiration and/or thermoregulation.

Waste discharges shall not result in deposition of oil, grease, wax, or other material in concentrations which result in a visible film or in coating objects in the water, or which cause a nuisance or adversely affect beneficial uses.

Oxygen, Dissolved
Adequate dissolved oxygen (D.O.) is vital for aquatic life. Depression of D.O. levels can lead to fish kills and odors resulting from anaerobic decomposition. Dissolved oxygen content in water is a function of water temperature and salinity.

*The dissolved oxygen content of surface waters shall not be depressed below 5mg/L for waters designated **WARM**, or 6mg/L for waters designated **COLD**, as a result of controllable water quality factors. In addition, waste discharges shall not cause the median dissolved oxygen concentration to fall below 85% of saturation or the 95th percentile concentration or fall below 75% of saturation within a 30-day period.*

pH
pH is a measure of the hydrogen ion concentration of water. pH values generally range from 0 (most acidic) to 14 (most alkaline). Many pollutants can alter the pH, raising or lowering it excessively. These extremes in pH can have adverse effects on aquatic biota and can corrode pipes and concrete. Even small changes in pH can harm aquatic biota.

The pH of inland surface waters shall not be raised above 8.5 or depressed below 6.5 as a result of controllable water quality factors.

Radioactivity
*Radioactivity materials shall not be present in the waters of the region in concentrations which are deleterious to human, plant or animal life. Waters designated **MUN** shall meet the limits specified in the California Code of Regulations, Title 22, and listed here:*

Combined Radium-226 and Radium-228	*5*	*pCi/L*
Gross Alpha particle activity	*15*	*pCi/L*
Tritium	*20,000*	*pCi/L*
Strontium-90	*8*	*pCi/L*
Gross Beta particle activity	*50*	*pCi/L*
Uranium	*20*	*pCi/L*

Sodium
The presence of sodium in drinking water may be harmful to persons suffering from cardiac, renal, and circulatory diseases. It can contribute to taste effects, with the taste threshold depending on the specific sodium salt. Excess concentrations of sodium in irrigation water reduce soil permeability to water and air. The deterioration of soil quality because of the presence of sodium in irrigation water is cumulative and is accelerated by poor drainage.

The sodium objectives listed in Table 4-1 shall not be exceeded as a result of controllable water quality factors.

Solids, Suspended and Settleable
Settleable solids are deleterious to benthic organisms and may cause anaerobic conditions to form. Suspended solids can clog fish gill and interfere with respiration in aquatic fauna. They also screen out light, hindering photosynthesis and normal aquatic plant growth and development.

Inland surface waters shall not contain suspended or settleable solids in amounts which cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.

Sulfate

Excessive sulfate, particularly magnesium sulfate ($MgSO_4$) in potable waters can lead to laxative effects, but this effect is temporary. There is some taste effect from magnesium sulfate in the range of 400-600 mg/L as $MgSO_4$. The secondary drinking water standard for sulfate is 500 mg/L. Sulfate concentrations in waters native to this region are normally low, less than 40 mg/L, but imported Colorado River water contains approximately 300 mg/L of sulfate.

The objectives listed in Table 4-1 shall not be exceeded as a result of controllable water quality factors.

Sulfides
Sulfides are generated by many industries and from the anaerobic decomposition of organic matter. In water, sulfides can react to form hydrogen sulfide (H_2S), commonly known for its “rotten egg” odor. Sulfides in ionic form are also toxic to fish.

The dissolved sulfide content of inland surface waters shall not be increased as a result of controllable water quality factors.

Surfactants (surface-active agents)
This group of materials includes detergents, wetting agents, and emulsifiers. See also Methylene Blue-Activated Substances (MBAS).

Waste discharges shall not contain concentrations of surfactants which result in foam in the course of flow or use of the receiving water, or which adversely affect aquatic life.

Taste and Odor
Undesirable tastes and odors in water may be a nuisance and may indicate the presence of a pollutant(s). The secondary drinking water standard for odor (threshold) is about 3 odor units.

The inland surface waters of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations which cause a nuisance or adversely affect beneficial uses. The natural taste and odor of fish, shellfish or other regional inland surface water resources used for human consumption shall not be impaired.

Temperature
Waste discharges can cause temperature changes in the receiving waters which adversely affect the aquatic biota. Discharges most likely to cause these temperature effects are cooling tower and heat exchanger blowdown.

*The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. The temperature of waters designated **COLD** shall not be increased by more than 5˚F as a result of controllable water quality factors. The temperature of waters designated **WARM** shall not be raised above 90˚F June through October or above 78˚F during the rest of the year as a result of controllable water quality factors. Lake temperatures shall not be raised more than 4˚F above established normal values as a result of controllable water quality factors.*

Total Dissolved Solids
See Dissolved Solids, Total

Total Filtrable Residue
See Dissolved Solids, Total

Total Inorganic Nitrogen
See Nitrogen, Total Inorganic

Toxic Substances
Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health.

The concentrations of contaminants in waters which are existing or potential sources of drinking water shall not occur at levels that are harmful to human health.

The concentrations of toxic pollutants in the water column, sediments or biota shall not adversely affect beneficial uses.

Turbidity
Turbidity is a measure of light scattered due to particulates in water. The secondary drinking water standard for turbidity is 5 NTU (nephelometric turbidity units).

Increases in turbidity which result from controllable water quality factors shall comply with the following:

Natural Turbidity	*Maximum Increase*
0-50 NTU	20%
50-100 NTU	10 NTU
Greater than 100 NTU	10%

All inland surface waters of the region shall be free of changes in turbidity which adversely affect beneficial uses.

GROUNDWATERS

The narrative objectives that are included below apply to all groundwaters, as noted. In addition, specific numerical objectives are listed in Table 4-1. With the exception of the "maximum benefit" objective identified in this Table (see further discussion below and in Chapter 5), where more than one objective is applicable, the stricter shall apply.

Arsenic
*Arsenic concentrations shall not exceed 0.05 mg/L in groundwater designated **MUN** as a result of controllable water quality factors.*

Bacteria, Coliform
Fecal bacteria are part of the intestinal flora of warm-blooded animals. Their presence in groundwater is an indicator of pollution. Total coliform is measured in terms of the number of coliform organisms per unit volume. Total coliform numbers can include non-fecal bacteria, so additional testing is often done to confirm the presence and numbers of fecal coliform bacteria. Water quality objectives for numbers of total fecal coliform vary with the uses of the water, as shown below.

*Total coliform numbers shall not exceed 2.2 organism/100 mL median over any seven-day period in groundwaters designated **MUN** as a result of controllable water quality factors.*

Barium
*Barium concentrations shall not exceed 1.0mg/L in groundwaters designated **MUN** as a result of controllable water quality factors.*

Boron
Boron is not considered a problem in drinking water supplies until concentrations of 20-30 mg/L are reached. In irrigation, boron is an essential element. However, boron concentrations in excess of 0.75 mg/L may be deleterious to certain crops, particularly citrus. The maximum safe concentration of even the most tolerant plants is about 4.0 mg/L of boron.

Boron concentrations shall not exceed 0.75 mg/L in groundwaters of the region as a result of controllable water quality factors.

Chloride
Excess chloride concentrations lead primarily to economic damage rather than public health hazards. Chlorides are considered to be among the most troublesome anion in water used for industrial or irrigation purposes since they significantly affect the corrosion rate of steel and aluminum and can be toxic to plants. A safe value for irrigation is considered to be less than 175 mg/L of chloride. Excess chlorides affect the taste of potable water, so drinking water standards are generally based on potability rather than on health. The secondary maximum contaminant level range - upper for chloride is 500 mg/L (CCR, Division 4, Chapter 15, Article 16, § 64449).

Chloride concentrations shall not exceed 500 mg/L in groundwaters of the region designated MUN as a result of controllable water quality factors.

Color
Color in water may arise naturally, such as from minerals, plant matter or algae, or may be caused by industrial pollutants. Color is primarily an aesthetic consideration, although it can discolor clothes and food. The secondary drinking water standard for color is 15 color units.

Waste discharges shall not result in coloration of the receiving waters which causes a nuisance or adversely affects beneficial uses.

Cyanide
*Cyanide concentrations shall not exceed 0.2mg/L in groundwaters designated **MUN** as a result of controllable water quality factors.*

Dissolved Solids, Total (Total Filtrable Residue)
The Department of Health Services recommends that the concentration of total dissolved solids (TDS) in drinking water be limited to 500 mg/L (secondary maximum contaminant level) (CCR, Division 4, Chapter 15, Article 16, § 64449), due to taste considerations. For most irrigation uses, water should have a TDS concentration under 700 mg/L. Quality-related consumer cost analyses have indicated that a benefit to consumers exists if water is supplied at or below 500 mg/L TDS[2].

The dissolved mineral content of the waters of the region, as measured by the total dissolved solids test ("Standard Methods for the Examination of Water and Wastewater, 20th Ed.," 1998: 2540C (180˚C), p.2-56), shall not exceed the specific objectives listed in Table 4-1 as a result of controllable water quality factors. (See also discussion of management zone TDS and nitrate nitrogen water quality objectives).

Filtrable Residue, Total
See Dissolved Solids, Total

Fluoride
Fluoride in water supply used for industrial or irrigation purposes has certain detrimental effects. Fluoride in optimum concentrations in water supply (concentration dependent upon the mean annual air temperature) is considered beneficial for preventing dental caries, but concentrations above approximately 1 mg/L, or its equivalent at a given temperature, are considered likely to increase the risk of occurrence of dental fluorosis.

*Fluoride concentrations shall not exceed 1.0 mg/L in groundwaters designated **MUN** as a result of controllable water quality factors.*

Hardness (as $CaCO_3$)
The major detrimental effect of hardness is economic. Any concentration (reported as mg/L $CaCO_3$) greater than 100mg/L results in the increased use of soap, scale buildup in utensils in domestic uses, and in plumbing. Hardness in industrial cooling waters is generally objectionable above 50 mg/L.

*The hardness of receiving waters used for municipal supply (**MUN**) shall not be increased as a result of waste discharges to levels that adversely affect beneficial uses.*

Metals
Metals can be toxic to human and animal life.

*Metals concentrations shall not exceed the values listed below in groundwaters designated **MUN** as a result of controllable water quality factors.*

[2] These TDS values are noted for information purposes only. For some management zones, the historic ambient quality, on which the TDS objectives are largely based (see also discussion of maximum benefit objectives for specific management zones), exceeds these recommended levels.

Metal	*Concentration (mg/L)*
Cadmium	0.01
Chromium	0.05
Cobalt	0.2
Copper	1.0
Iron	0.3
Lead	0.05
Manganese	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05

Methylene Blue-Activated Substances (MBAS)
The MBAS test is sensitive to the presence of detergents (see surfactants in inland surface waters discussion). Positive results may indicate the presence of wastewater. The secondary drinking water standard for MBAS is 0.05 mg/L.

*MBAS concentrations shall not exceed 0.05 mg/L in groundwaters designated **MUN** as a result of controllable water quality factors.*

Nitrate
High nitrate concentrations in domestic water supplies can be toxic to human life. Infants are particularly susceptible and may develop methemoglobinemia (blue baby syndrome). The primary drinking water standard for nitrate (as NO_3) is 45 mg/L or 10 mg/L (as N).

Nitrate-nitrogen concentrations listed in Table 4-1 shall not be exceeded as a result of controllable water quality factors. (See also discussion of management zone TDS and nitrate nitrogen water quality objectives below).

Oil and Grease
Oil and grease can be present in water as a result of the discharge of treated wastes and the accidental or intentional dumping of wastes into sinks and storm drains. Oils and related materials have a high surface tension and are not soluble in water, therefore forming a film on the water's surface. This film can result in nuisance conditions because of odors and visual impacts.

Waste discharges shall not result in deposition of oil, grease, wax or other materials in concentrations which cause a nuisance or adversely affect beneficial uses.

pH
pH is a measure of the hydrogen ion concentration of water. pH values generally range from 0 (most acidic) to 14 (most alkaline). Many pollutants can alter the pH,

raising or lowering it excessively. These extremes in pH can corrode pipes and concrete.

The pH of groundwater shall not be raised above 9 or depressed below 6 as a result of controllable water quality factors.

Radioactivity
*Radioactive materials shall not be present in the waters of the region in concentrations which are deleterious to human, plant or animal life. Groundwaters designated **MUN** shall meet the limits specified in the California Code of Regulations, Title 22, and listed here:*

Combined Radium-226 and Radium-228	*5*	*pCi/L*
Gross Alpha particle activity	*15*	*pCi/L*
Tritium	*20,000*	*pCi/L*
Strontium-90	*8*	*pCi/L*
Gross Beta particle activity	*50*	*pCi/L*
Uranium	*20*	*pCi/L*

Sodium
The presence of sodium in drinking water may be harmful to persons suffering from cardiac, renal and circulatory diseases. It can contribute to taste effects, with the taste threshold depending on the specific sodium salt (US Geological Survey, Resources Agency of California – State Water Resources Control Board). Excess concentrations of sodium in irrigation water reduce soil permeability to water and air. The deterioration of soil quality because of the presence of sodium in irrigation water is cumulative and is accelerated by poor drainage (California State Water Resources Control Board).

The California Department of Health Services and the U.S. Environmental Protection Agency have not provided a limit on the concentration of sodium in drinking water. Sodium concentrations shall not exceed 180 mg/L in groundwaters designated MUN as a result of controllable water quality factors.

Groundwaters designated AGR shall not exceed a sodium absorption ration (SAR[3]) of 9 as a result of controllable water quality factors.

[3] **Sodium absorption ratio (SAR)=** $$\frac{Na}{\left[\frac{1}{2}(Ca + Mg)\right]^{1/2}}$$

where Sodium (Na), Calcium (Ca) and Magnesium (Mg) are concentrations in milliequivalents per liter

Sulfate

Excessive sulfate, particularly magnesium sulfate ($MgSO_4$) in potable waters can lead to laxative effects, but this effect is temporary. There is some taste effect from magnesium sulfate in the range of 400-600mg/L as MgSO4. The secondary drinking water standard for sulfate is 500mg/L (CCR, Division 4, Chapter 15, Article 16, §64449). Sulfate concentrations in waters native to this region are normally low, less than 40mg/L, but imported Colorado River water contains approximately 300mg/L of sulfate.

Sulfate concentrations shall not exceed 500 mg/L in groundwaters of the region designated MUN as a result of controllable water quality factors.

Taste and Odor

Undesirable tastes and odors in water may be a nuisance and may indicate the presence of a pollutant(s). The secondary drinking water standard for odor (threshold) is 3 odor units.

The groundwaters of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations which cause a nuisance or adversely affect beneficial uses.

Total Dissolved Solids

See Dissolved Solids, Total

Total Filtrable Residue

See Dissolved Solids, Total

Total Inorganic Nitrogen

See Nitrogen, Total Inorganic

Toxic Substances

All waters of the region shall be maintained free of substances in concentrations which are toxic, or that produce detrimental physiological responses in human, plant, animal or aquatic life.

Management Zone TDS and Nitrate-nitrogen Water Quality Objectives (Amended by Resolution No. R8-2004-0001, January 22, 2004)

The TDS and nitrate-nitrogen objectives specified in the 1975 and 1984 Basin Plans, and initially in this 1995 Basin Plan, were based on an evaluation of groundwater samples from the five year period 1968 through 1972. This period represented ambient quality at the time of preparation of the 1975 Basin Plan. As part of the 2004 update of the TDS/Nitrogen management plan in the Basin Plan, historical ambient quality was reviewed using additional data and rigorous statistical procedures.   This update also included characterization of current water quality. A comprehensive description of the methodology employed is published in the “Final Technical Memorandum for Phase 2A of the Nitrogen-TDS Study” (Wildermuth Environmental Inc., July 2000). This effort, coupled with “maximum benefit” demonstrations by certain agencies in the watershed (see further discussion below and in Chapter 5), culminated in the adoption of the TDS and nitrate-nitrogen objectives specified in Table 4-1.

For the most part, the TDS and nitrate-nitrogen water quality objectives for each management zone are based on historical concentrations of TDS and nitrate-nitrogen from 1954 through 1973 and are referred to herein as the “antidegradation” objectives. This period brackets 1968, when the State Board adopted the state’s antidegradation policy in Resolution No. 68-16, “Policy with Respect to Maintaining High Quality Waters”. This Resolution establishes a benchmark for assessing and considering authorization of degradation of water quality. The 20-year period was selected in order to ensure that at least 3 data points in each management zone would be available to calculate historical ambient quality. In general, the following steps were taken to calculate the TDS and nitrate objectives:

a. Annual average TDS and nitrate-nitrogen data from 1954 – 1973 for each well in a management zone were compiled;
b. For each well, the data were statistically analyzed. The mean plus “t” (Student’s t) times the standard error of the mean was calculated;
c. A rectangular grid across all management zones was overlaid. Groundwater storage within each grid was computed; and,
d. The volume-weighted TDS and nitrate-nitrogen concentration for each management zone was computed. These concentrations are the calculated historical ambient quality for each zone. [4]

These volume-weighted TDS and nitrate-nitrogen concentrations for each management zone were typically identified as the appropriate objectives. However, it is important to note that if the calculated nitrate-nitrogen concentration exceeded 10 mg/L, the nitrate-nitrogen objective was set to 10 mg/L to be consistent with the primary drinking water standard, or to current ambient quality if less than 10 mg/L.

Finally, in some cases, certain agencies proposed alternative, less stringent TDS and nitrate-nitrogen objectives for specific management zones, based on additional consideration of antidegradation requirements and the factors specified in Water Code Section 13241 (see below and Chapter 5). Table 4-1 includes both the historical ambient quality TDS and nitrate-nitrogen objectives (the “antidegradation” objectives) and the objectives based on this additional consideration (the “maximum benefit”

[4] In limited cases, data for ammonia-nitrogen and nitrite-nitrogen as well as nitrate-nitrogen were available and included in the analysis. The ammonia-nitrogen and nitrite-nitrogen values were insignificant. The objectives are thus expressed as nitrate-nitrogen, even where ammonia-nitrogen and nitrite-nitrogen data were included in the analysis.

objectives) for specific management zones. Chapter 5 specifies detailed requirements noticed Public Hearing, the Regional Board finds that “maximum benefit” is not being demonstrated, then the “antidegradation” objectives apply for regulatory purposes.

THE SANTA ANA RIVER

Setting objectives for the flowing portions of the Santa Ana River is a significant feature of this Basin Plan. The River provides water for recreation and for aquatic and wildlife habitat. River flows are a significant source of groundwater recharges in lower basin, which provides domestic supplies for more than two million people. These flows account for about 70% of the total recharge.

The dividing line between reaches 2 and 3 of the River, and between the upper and lower Santa Ana Basins, is Prado Dam, a flood control facility built and operated by the U.S. Army Corps of Engineers. The dam includes a subsurface groundwater barrier, and as a result all ground and surface waters form the upper basin are forced to pass through the dam (or over the spillway). For this reason, it is an ideal place to measure flows and monitor water quality.

The Prado Settlement, a stipulated court judgement (Orange County Water District vs. City of Chino, *et al*), which requires that a certain minimum amount of water be released each year from the upper basin, is overseen by the Santa Ana River Watermaster. The U.S. Geologic Survey (USGS) operates a permanent continuous monitoring station immediately below Prado Dam, and the data collected there are utilized by the Watermaster. Orange County Water District (OCWD) samples the river monthly at the USGS gage and determines the water quality. Compliance with the objective for reaches 2 and 3 is monitored by the Regional Board, using the data and information available from the USGS gage and these sources, plus the data from its own specific sampling programs. (see Chapter 6).

The quality of the Santa Ana River is a function of the quantity and quality of the various components of the flows. The two major components of total flow are storm flow and base flow. Storm flow is the water which results directly from rainfall (surface runoff) in the upper basin; it also includes the stormwater runoff form the San Jacinto Basin which may reach the River via Temescal Creek. Most storms occur during the winter rainy season (December through April). Base flow is composed of wastewater discharges, rising groundwater, and nonpoint source discharges. Wastewater discharges are the treated sewage effluents discharged by municipalities to the river and its tributaries. Rising groundwater occurs at a number of locations along the River, including the San Jacinto Fault, Riverside Narrows, and in or near the Prado flood Control Basin. Nonpoint source discharges include uncontrolled runoff from agricultural and urban areas which is not related to storm flows.

Nontributary flow is a third element of total flow. It is generally imported water released in the upper basin, for recharge in the lower basin (Santa Ana Forebay).

The Santa Ana River Watermaster calculates the amount and quality of total flow for each water year (October 1 to September 30). The Watermaster's Annual Report is used to determine compliance with the stipulated judgement referred to earlier, which set quality and quantity limits on the river. The Watermaster's report presents summary data compiled from the continuous monitoring of flow in cfs (cubic feet per second) and salinity as EC (electrical conductivity) at the USGS Prado Gaging Station. The Watermaster's annual determination of total flow quality will be used to determine compliance with the total flow objective in this Plan. In years of normal rainfall, most of the total flow of the river is percolated in the Santa Ana Forebay, and directly affects the quality of the groundwater. For that reason, compliance with the total dissolved solids (TDS) water quality objective for Reach 2 will be based on the five-year moving average of the annual TDS content of total flow. Use of this moving average allows the effects of wet and dry years to be smoothed out over the five-year period.

As was noted earlier, the three components of base flow in the river are wastewater, rising water, and nonpoint source discharges. These three components are present in varying amounts throughout the year, and the contributions and quality of each can be affected by the regulatory activities of the Regional Board. The quantity of storm flow is obviously highly variable; programs to control its quality are in their nascent stages. For these reasons, water quality objectives for controllable constituents are set based on the base flow of the river, rather than on total flow.

The regulatory activities of the Regional Board include setting waste discharge requirements on point source discharges. Waste discharges requirements are developed on the basis of the limited assimilative capacity of the river (see TDS and Nitrogen Wasteload Allocation, Chapter 5). Nonpoint source discharges, generally urban runoff (nuisance water) and agricultural tailwater, will be regulated by requiring compliance with Best Management Practices (BMPs), where appropriate. The rising water component of base flow will be affected by the extraction of brackish groundwater in several subbasins (a Basin Plan implementation action), by regulation of wastewater discharges, and other activities.

In order to determine whether the water quality and quantity objectives for base flow in Reach 3 are being met, the Regional Board will collect a series of grab and composite samples when the influence of storm flows and nontributary flows is at a minimum. This typically occurs during August and September. At this time of year, there is usually no water impounded behind Prado Dam. The volumes of storm flows, rising water and nonpoint source discharges tend to be low. The major component of base flow at this time is municipal wastewater. The results of this sampling will be compared with the continuous monitoring data collected by USGS and data from other sources. These data will be used to evaluate the efficacy of the Regional Board's regulatory approach, including the TDS and nitrogen wasteload allocations (see Chapter 5). Additional sampling in Reach 3 by the Board and other agencies will help evaluate the fate and effects of the various constituents of base flow, including the validity of the 50% nitrogen loss coefficient (discussed in Chapter 5).

Future river flows and quality (TDS and TIN) were projected by computer models. The results indicate that the objectives for TDS and total nitrogen will be met. The objectives for individual mineral constituents are expected to be met if the TDS objective is met.

Prado Basin Surface Water Management Zone

As discussed in Chapter 3 – Beneficial Uses, the Prado Basin Management Zone (PBMZ) is generally defined as a surface water feature within the Prado Basin. It is defined by the 566-foot elevation above mean sea level along the Santa Ana River and the four tributaries to the Santa Ana River in the Prado Basin (Chino Creek, Temescal Creek, Mill Creek and Cucamonga Creek). Nitrogen, TDS and other water quality objectives that have been established for these surface waters that flow within the proposed PBMZ are shown in Table 4-1. For the purpose of regulating discharges that would affect the PBMZ and downstream waters, these surface water objectives apply. This application of the existing surface water objectives assures continued water quality and beneficial use protection for waters within and downstream of the PBMZ.

"MAXIMUM BENEFIT" WATER QUALITY OBJECTIVES

As part of the 2004 update of the TDS/Nitrogen Management plan in the Basin Plan, several agencies proposed that alternative, less stringent TDS and/or nitrate-nitrogen water quality objectives be adopted for specific groundwater management zones and surface waters. These proposals were based on additional consideration of the factors specified in Water Code Section 13241 and the requirements of the State's antidegradation policy (State Board Resolution No. 68-16). Since the less stringent objectives would allow a lowering of water quality, the agencies were required to demonstrate that their proposed objectives would protect beneficial uses, and that water quality consistent with maximum benefit to the people of the state would be maintained (thus, the use of the term "maximum benefit" water quality objectives).

Appropriate beneficial use protection/maximum benefit demonstrations were made by the Chino Basin Watermaster/Inland Empire Utilities Agency, the Yucaipa Valley Water District and the City of Beaumont/San Timoteo Watershed Management Authority to justify alternative "maximum benefit" objectives for the Chino North, Cucamonga, Yucaipa, Beaumont and San Timoteo groundwater management zones. These "maximum benefit" proposals, which are described in detail in Chapter 5 – Implementation, entail commitments by the agencies to implement specific projects and programs. While these agencies' efforts to develop these proposals indicate their strong interest to proceed with these commitments, unforeseen circumstances may impede or preclude it. To address this possibility, this Plan includes both the “antidegradation” and “maximum benefit” objectives for the subject waters (See Table 4-1). Chapter 5 specifies the requirements for implementation of these objectives. Provided that these agencies’ commitments are met, then the agencies have demonstrated maximum benefit, and the “maximum benefit” objectives included in Table 4-1 for these waters apply for regulatory purposes. However, if the Regional Board finds that these commitments are not being met and that “maximum benefit” is thus not demonstrated, then the “antidegradation” objectives for these waters will apply. Chapter 5 also describes the mitigation requirements that will apply should discharges based on “maximum benefit” objectives occur unsupported by the demonstration of “maximum benefit”.

COMPLIANCE WITH OBJECTIVES (Amended by Resolution No. 00-27, May 19, 2000)

“The Regional Board recognizes that immediate compliance with new, revised or newly interpreted water quality objectives adopted by the Regional Board or the State Water Resources Control Board, or with new, revised or newly interpreted water quality criteria promulgated by the U.S. Environmental Protection Agency, may not be feasible in all circumstances. Where the Regional Board determines that it is infeasible for a discharger to comply immediately with effluent limitations specified to implement such objectives or criteria, compliance shall be achieved in the shortest practicable period of time, not to exceed ten years after the adoption or interpretation of applicable objectives or criteria. This provision authorizes schedules of compliance for objectives and criteria that are adopted or revised or newly interpreted after the effective date of this amendment July 15, 2002.

REFERENCES

The “Federal Clean Water Act,” 33 USC 466 *et seq*.

California Water Code, Section 13000 “Water Quality,” *et seq*.

California State Water Resources Control Board, “Water Quality Criteria, Second Edition,” 1963.

US EPA, “Ambient Water Quality Criteria for Ammonia,” 1984.

US EPA Memorandum, “Revised Tables for Determining Average Freshwater Ammonia Concentrations,” 1992.

California State University, Fullerton, “Investigation of Un-ionized Ammonia in the Santa Ana River, Final Project Report,” February 1988.

California Regional Water Quality Control Board, “Public Workshop – Review of the Un-ionized Ammonia Objective – Summary of Findings & Recommendations,” Staff Report, December 1988.

Santa Ana Watershed Project Authority, “Final Report, Santa Ana River Use-Attainability Analysis,” June 1992.

California Regional Water Quality Control Board, Resolution No. 93-64, “Resolution Amending the Water Quality Control Plan to Set Site-Specific Water Quality Objectives for Cadmium, Copper, and Lead in the Middle Santa Ana River,” October 1993.

ENSR Consulting and Engineering, “Short-Term Chronic Toxicity of Un-ionized Ammonia to Fathead Minnows (*Pimephales promelas*) in a Site Water,” September 1993.

California Code of Regulations (CCR), Division 4, Chapter 15, Article 16, § 64449

Wildermuth Environmental, Inc., TIN/TDS – Phase 2A of the Santa Ana Watershed, Development of Groundwater Management Zones, Estimation of Historic and Current TDS and Nitrogen Concentrations in Groundwater, Final Technical Memorandum,” July 2000.

40 Code of Federal Regulations (CFR), Chapter 1, § 143,3

The Resources Agency of California, State Water Resources Control Board, Publication No. 3-1, “Water Quality Criteria”, pages 258-26, 1963

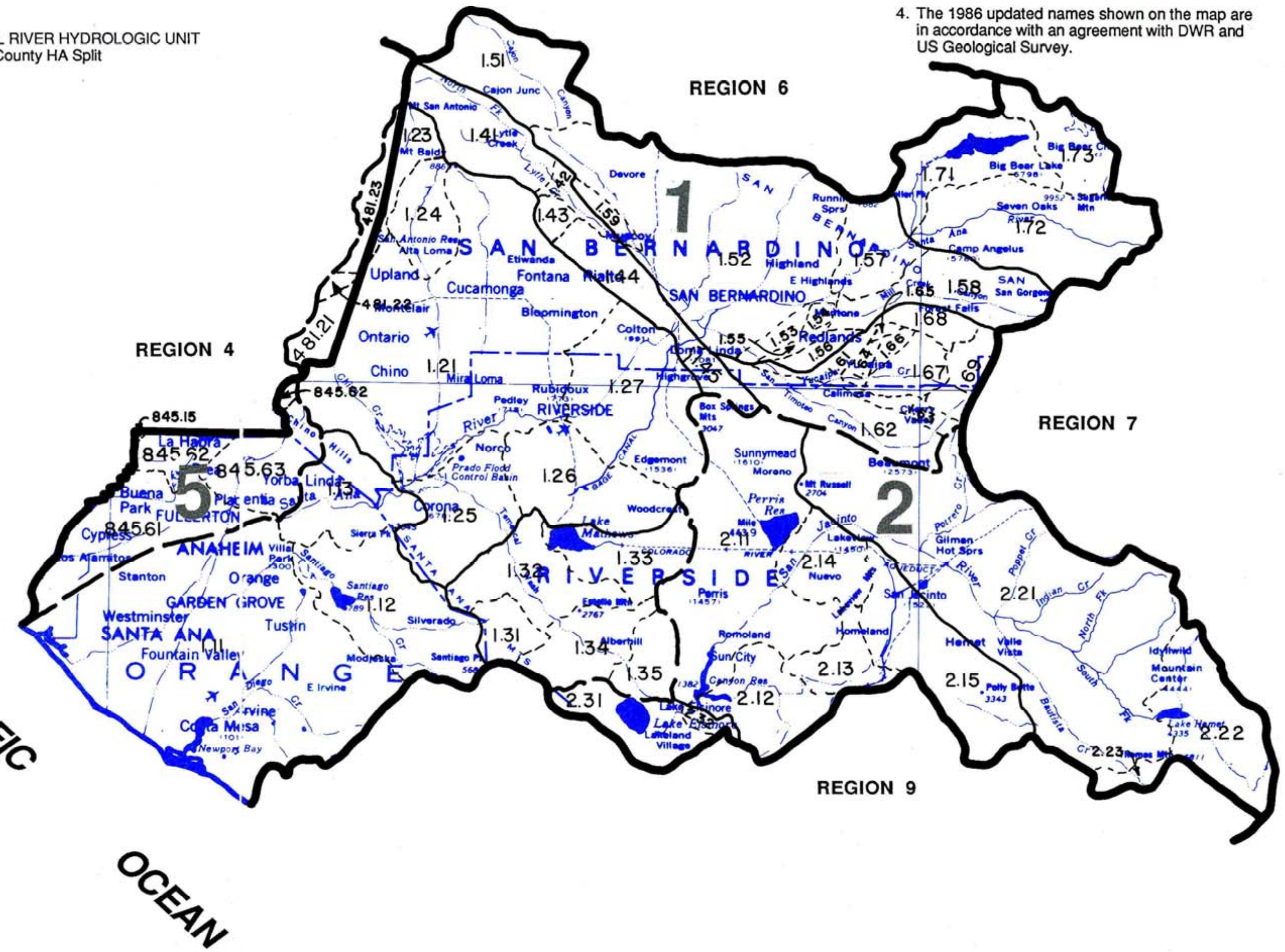
US Geological Survey, “Basic Ground-Water Hydrology”, Water Supply Paper 2220, pages 64-65, 1984

California State Water Resources Control Board, “Irrigation with Reclaimed Municipal Wastewater, A Guidance Manual”, Report No. 84-1, wr, July 1984.

REGION 8 INDEX

NOTE:

1. The names and areas shown on this map are the same as used by the Department of Water Resources (DWR) in their Bulletin 130 Series except as explained below.
2. The numbering system used on this map is an adaptation of the numbering system used in the 130 Series.
3. The boundary between Region 8 and Region 4 follows the boundary between Los Angeles County and Orange or San Bernardino Counties, not the Hydrologic Boundary. The San Bernardino County line splits Hydrologic Unit 1 (Santa Ana River HU) so that Sub-Areas 481.21, 481.22, and 481.23 are legally in Region 4 but drain into Region 8. The Orange County line splits Hydrologic Unit 5 (Los Angeles-San Gabriel River HU) so that Sub-Areas 845.15, 845.61, 845.62 and 845.63 are legally in Region 8 but drain into Region 4. Therefore, a 5 digit number on the map indicates that a regional boundary divides a hydrologic unit, area or subarea. In these cases the second digit is the number of the region from which the hydrologic area has been separated by the regional boundary. All other digits are as described in the legend.
4. The 1986 updated names shown on the map are in accordance with an agreement with DWR and US Geological Survey.



KEY TO REGION

LEGEND

STREAM

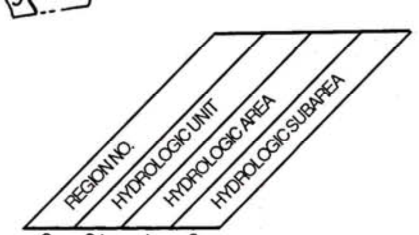
REGIONAL BOUNDARY

HYDROLOGIC UNIT BOUNDARY (HU)

HYDROLOGIC AREA BOUNDARY (HA)

HYDROLOGIC SUBAREA BOUNDARY (SA)

5 HYDROLOGIC UNIT NUMBER



N

April 1973
Revised: July 1976
Revised: August 1986

State Water Resources Control Board
Surveillance and Monitoring Section
T.E. Lavenda, P.E. *TE Lavenda*

State of California

REGIONAL WATER QUALITY CONTROL BOARD

Santa Ana Region (8)

SANTA ANA HYDROLOGIC BASIN PLANNING AREA (SA)

Scale in miles

8 0 8 16 24 32

Scale 1:500,000

Table 4-1 WATER QUALITY OBJECTIVES

OCEAN WATERS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
NEARSHORE ZONE*									
San Gabriel River to Poppy Street in Corona del Mar+	---	---	---	---	---	---	---	801.11	
Poppy Street to Southeast Regional Boundary+	---	---	---	---	---	---	---	801.11	
OFFSHORE ZONE									
Waters Between Nearshore Zone And Limit of State Waters+	---	---	---	---	---	---	---		

* Defined by Ocean Plan Chapter II A.1.: "Within a zone bounded by shoreline and a distance of 1000 feet from shoreline or the 30-foot depth Contour, whichever is further from shoreline…"

\+ Numeric objectives have not been established; narrative objectives apply.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

BAYS, ESTUARIES, AND TIDAL PRISMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solid	Hardness	Sodium	Chloride	Total Inorganic Nitrogen	Sulfate	Chemical Oxygen Demand	Primary	Secondary
Anaheim Bay – Outer Bay+	---	---	---	---	---	---	---	801.11	
Anaheim Bay – Seal Beach National Wildlife Refuge+	---	---	---	---	---	---	---	801.11	
Sunset Bay – Huntington Harbour+	---	---	---	---	---	---	---	801.11	
Bolsa Bay+	---	---	---	---	---	---	---	801.11	
Bolsa Chica Ecological Reserve+	---	---	---	---	---	---	---	801.11	
Lower Newport Bay+	---	---	---	---	---	---	---	801.11	
Upper Newport Bay+	---	---	---	---	---	---	---	801.11	
Santa Ana River Salt Marsh+	---	---	---	---	---	---	---	801.11	
Tidal Prism of Santa Ana River (to within 1000' of Victoria Street) and Newport Slough+	---	---	---	---	---	---	---	801.11	
Tidal Prism of San Gabriel River – River Mouth to Marina Drive+	---	---	---	---	---	---	---	845.61	
Tidal Prisms of Flood Control Channels Discharging to Coastal or Bay Waters+	---	---	---	---	---	---	---	801.11	

\+ Numeric objectives have not been established; narrative objectives apply.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
LOWER SANTA ANA RIVER BASIN									
Santa Ana River									
Reach 1 – Tidal Prism to 17th Street in Santa Ana+	(Flood Flows Only)							801.11	
Reach 2 - 17th Street in Santa Ana to Prado Dam	650[1]	---	---	---	---	---	---	801.11	801.12
Aliso Creek+	---	---	---	---	---	---	---	845.63	
Carbon Canyon Creek+	---	---	---	---	---	---	---	845.63	
Santiago Creek Drainage									
Santiago Creek									
Reach 1 – below Irvine Lake	600	---	---	---	---	---	---	801.12	801.11
Reach 2 - Irvine Lake (see Lakes, Pg. 4-46)		---	---	---	---	---	---		
Reach 3 – Irvine Lake to Modjeska Canyon	350	260	20	12	2	80	---	801.12	
Reach 4 – in Modjeska Canyon	350	260	20	12	2	80	---	801.12	
Silverado Creek	650	450	30	20	1	275	---	801.12	
Black Star Creek+	---	---	---	---	---	---	---	801.12	
Ladd Creek+	---	---	---	---	---	---	---	801.12	

[1] Five-year moving average

\+ Numeric objectives have not been established; narrative objectives apply.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
San Diego Creek Drainage									
San Diego Creek									
Reach 1 – below Jeffrey Road	1500	---	---	---	13	---	90	801.11	
Reach 2 – above Jeffrey Road to Headwaters	720	---	---	---	5	---	---	801.11	
Other Tributaries: Bonita Creek, Serrano Creek, Peters Canyon Wash, Hicks Canyon Wash, Bee Canyon Wash, Borrego Canyon Wash, Agua Chinon Wash, Laguna Canyon Wash, Rattlesnake Canyon Wash, Sand Canyon Wash and other Tributaries to these Creeks+	---	---	---	---	---	---	---	801.11	
San Gabriel River Drainage									
Coyote Creek (within Santa Ana Regional Boundary)+	---	---	---	---	---	---	---		

\+ Numeric objectives have not been established; narrative objectives apply.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
UPPER SANTA ANA RIVER BASIN									
Santa Ana River									
Reach 3 – Prado Dam to Mission Blvd. in Riverside – Base Flow[2]	700	350	110	140	10[3]	150	30	801.21	801.27, 801.25
Reach 4 – Mission Blvd. in Riverside to San Jacinto Fault in San Bernardino	550	---	---	---	10	---	30	801.27	801.44
Reach 5 – San Jacinto Fault in San Bernardino to Seven Oaks Dam	300	190	30	20	5	60	25	801.52	801.57
Reach 6 – Seven Oaks Dam to Headwaters (see also Individual Tributary Streams)	200	100	30	10	1	20	5	801.72	
San Bernardino Mountain Streams									
Mill Creek Drainage:									
Mill Creek									
Reach 1 – Confluence with Santa Ana River to Bridge Crossing Route 38 at Upper Powerhouse	200	100	30	10	1	20	5	801.58	
Reach 2 – Bridge Crossing Route 38 at Upper Powerhouse to Headwaters	110	100	25	5	1	15	5	801.58	

[2] Additional Objectives: Boron: 0.75 mg/l
[3] Total nitrogen, filtered sample

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Mountain Home Creek	200	100	30	10	1	20	5	801.58	
Mountain Home Creek, East Fork	200	---	---	---	---	---	---	801.70	
Monkey Face Creek	200	100	30	10	1	20	5	801.70	
Alger Creek	200	---	---	---	---	---	---	801.70	
Falls Creek	200	100	30	10	1	20	5	801.70	
Vivian Creek	200	---	---	---	---	---	---	801.70	
High Creek	200	---	---	---	---	---	---	801.70	
Other Tributaries: Lost, Oak Cove, Green, Skinner, Momyer, Glen Martin, Camp, Hatchery, Rattlesnake, Slide, Snow, Bridal Veil, and Oak Creeks, and other Tributaries to these Creeks	200	---	---	---	---	---	---	801.70	
Bear Creek Drainage:									
Bear Creek	175	115	10	10	1	4	5	801.71	
Siberia Creek	200	---	---	---	---	---	---	801.71	
Slide Creek	175	---	---	---	---	---	---	801.71	
All other Tributaries to these Creeks+	---	---	---	---	---	---	---	801.71	
Big Bear Lake (see Lakes, pg. 4-46)									

\+ Numeric objectives have not been established; narrative objectives apply. .

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Big Bear Lake Tributaries:									
North Creek	175	---	---	---	---	---	---	801.71	
Metcalf Creek	175	---	---	---	---	---	---	801.71	
Grout Creek	150	---	---	---	---	---	---	801.71	
Rathbone (Rathbun) Creek	300	---	---	---	---	---	---	801.71	
Meadow Creek+	---	---	---	---	---	---	---	801.71	
Summit Creek+	---	---	---	---	---	---	---	801.71	
Other Tributaries to Big Bear Lake: Knickerbocker, Johnson, Minnelusa, Polique, and Red Ant Creeks, and other Tributaries to these Creeks	175	---	---	---	---	---	---	801.71	
Baldwin Lake (see Lakes, pg. 4-46)									
Baldwin Lake Drainage:									
Shay Creek+	---	---	---	---	---	---	---	801.73	
Other Tributaries to Baldwin Lake: Sawmill, Green, and Caribou Canyons and other Tributaries to these Creeks+	---	---	---	---	---	---	---	801.73	

\+ Numeric objectives have not been established; narrative objectives apply. .

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Other Streams Draining to Santa Ana River (Mountain Reaches[1])									
Cajon Creek	200	100	30	10	1	20	5	801.51	
City Creek	200	115	30	10	1	20	5	801.57	
Devil Canyon Creek	275	125	35	20	1	25	5	801.57	
East Twin and Strawberry Creeks	475	---	---	---	---	---	---	801.57	
Waterman Canyon Creek	250	---	---	---	---	---	---	801.57	
Fish Creek	200	100	30	10	1	20	5	801.57	
Forsee Creek	200	100	30	10	1	20	5	801.72	
Plunge Creek	200	100	30	10	1	20	5	801.72	
Barton Creek	200	100	30	10	1	20	5	801.72	
Bailey Canyon Creek	200	---	---	---	---	---	---	801.72	
Kimbark Canyon, East Fork Kimbark Canyon, Ames Canyon And West Fork Cable Canyon Creeks	325	---	---	---	---	---	---	801.52	
Valley Reaches[‡] of Above Streams	(Water Quality Objectives Correspond to Underlying GW Basin Objectives)							801.52	

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Other Tributaries (Mountain Reaches[1]): Alder, Badger Canyon, Bledsoe Gulch, Borea Canyon, Breakneck, Cable Canyon, Cienega Seca, Cold, Converse, Coon, Crystal, Deer, Elder, Fredalba, Frog, Government, Hamilton, Heart Bar, Hemlock, Keller, Kilpecker, Little Mill, Little Sand Canyon, Lost, Meyer Canyon, Mile, Monroe Canyon, Oak, Rattlesnake, Round Cienega, Sand, Schneider, Staircase, Warm Springs Canyon And Wild Horse Creeks, and other tributaries to those Creeks	200	100	30	10	1	20	5	801.72	801.71, 801.57
San Gabriel Mountain Streams (Mountain Reaches‡)									
San Antonio Creek	225	150	20	6	4	25	5	801.23	
Lytle Creek (South, Middle, and North Forks) and Coldwater Canyon Creek	200	100	15	4	4	25	5	801.41	801.42, 801.52, 801.59
Day Creek	200	100	15	4	4	25	5	801.21	
East Etiwanda Creek	200	100	15	4	4	25	5	801.21	
Valley Reaches‡ of Above Streams	(Water Quality Objectives Correspond to Underlying GW Basin Objectives)							801.21	

‡ The division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Cucamonga Creek									
Reach 1 – Confluence with Mill Creek to 23rd St. in Upland+	---	---	---	---	---	---	---	801.21	
Reach 2 (Mountain Reach‡) – 23rd St. in Upland to headwaters	200	100	15	4	4	25	5	801.24	
Mill Creek+	---	---	---	---	---	---	---	801.25	
Other Tributaries (Mountain Reaches+): Cajon Canyon, San Sevaine, Deer, Duncan Canyon, Henderson Canyon, Bull, Fan, Demens, Thorpe, Angalls, Telegraph Canyon, Stoddard Canyon, Icehouse Canyon, Cascade Canyon, Cedar, Failing Rock, Kerkhoff and Cherry Creeks, and other Tributaries to these Creeks	200	---	---	---	---	---	---	801.21	801.23
San Timoteo Area Streams									
San Timoteo Creek **									
Reach 1A – Santa Ana River Confluence to Barton Road	---	---	---	---	---	---	---	801.52	801.53
Reach 1B – Barton Road to Gage at San Timoteo Canyon Rd. u/s of Yucaipa Valley WD discharge	---	---	---	---	---	---	---	801.52	801.53
Reach 2 – Gage at San Timoteo Canyon Road to Confluence with Yucaipa Creek	---	---	---	---	---	---	---	801.52	801.62

\+ Numeric objectives have not been established; narrative objectives apply
‡ The Division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains
** Surface water objectives not established; underlying Management Zone objectives apply. Biological quality protected by narrative objectives

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Reach 2 – Gage at San Timoteo Canyon Road to Confluence with Yucaipa Creek	---	---	---	---	---	---	---	801.52	801.62
Reach 3** – Confluence with Yucaipa Creek to confluence with Little San Gorgonio and Noble Creeks (Headwaters of San Timoteo Creek)	---	---	---	---	---	---	---	801.62	
Oak Glen, Potato Canyon and Birch Creeks	230	125	50	40	3	45	5	801.67	
Little San Gorgonio Creek	230	125	50	40	3	45	5	801.69	801.62, 801.63
Yucaipa Creek	290	175	60	60	6	45	15	801.67	801.61, 801.62 801.64
Other Tributaries to these Creeks – Valley Reaches +‡	---	---	---	---	---	---	---	801.62	801.52, 801.53
Other Tributaries to these Creeks – Mountain Reaches‡	290	---	---	---	---	---	---	801.69	801.67
Anza Park Drain+	---	---	---	---	---	---	---	801.27	
Sunnyslope Channel+	---	---	---	---	---	---	---	801.27	
Tequesquite Arroyo (Sycamore Creek)+	---	---	---	---	---	---	---	801.27	

\+ Numeric objectives have not been established; narrative objectives apply

** Surface water objectives not established; underlying Management Zone objectives apply. Biological quality protected by narrative objectives

‡ The Division between Mountain and Valley reaches occurs at the base of the foothills of the San Bernardino or San Gabriel Mountains

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Prado Area Streams									
Chino Creek									
Reach 1A – Santa Ana River confluence to downstream of confluence with Mill Creek (Prado Area) – Base Flow*	700	350	110	140	10**	150	30	801.21	
Reach 1B – Confluence of Mill Creek (Prado Area) to beginning of concrete-lined channel south of Los Serranos Road	550	240	75	75	8	60	15	801.21	
Reach 2 – Beginning of concrete lined channel south of Los Serranos Road to confluence with San Antonio Creek	---	---	---	---	---	---	---	801.21	
Temescal Creek									
Reach 1 – Lincoln Avenue to Riverside Canal+	---	---	---	---	---	---	---	801.25	
Reach 2 – Riverside Canal to Lee Lake+	---	---	---	---	---	---	---	801.32	801.25
Reach 3 – Lee Lake, (see Lakes, Pg. 4-46)									

* Additional objective: Boron 0.75 mg/l

** Total nitrogen, filtered sample

\+ Numeric objectives have not been established; narrative objectives apply

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Reach 4 – Lee Lake to Mid-section line of Section 17 (downstream end of freeway cut)+	---	---	---	---	---	---	---	801.34	
Reach 5 – Mid-section line of Section 17 (downstream end of freeway cut) to Elsinore Groundwater Subbasin Boundary+	---	---	---	---	---	---	---	801.35	
Reach 6 – Elsinore Groundwater Subbasin Boundary to Lake Elsinore Outlet+	---	---	---	---	---	---	---	801.35	
Coldwater Canyon Creek	250	---	---	---	---	---	---	801.32	
Bedford Canyon Creek+	---	---	---	---	---	---	---	801.32	
Dawson Canyon Creek+	---	---	---	---	---	---	---	801.32	
Other Tributaries to these Creeks	250	---	---	---	---	---	---	801.32	

\+ Numeric objectives have not been established; narrative objectives apply

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
San Jacinto River Basin									
San Jacinto River									
Reach 1 – Lake Elsinore to Canyon Lake	450	260	50	65	3	60	15	802.32	802.31
Reach 2 – Canyon Lake (see Lakes, Pg. 4-47)									
Reach 3 – Canyon Lake to Nuevo Road	820	400	---	250	6	---	15	802.11	
Reach 4 – Nuevo Road to North-South Mid-Section Line, T4S/R1W-38*	500	220	75	125	5	65	---	802.14	802.21
Reach 5 – North-South Mid-Section Line, T4S/R1 W-SB, to Confluence With Poppet Creek	300	140	30	25	3	40	12	802.21	
Reach 6 – Poppet Creek to Cranston Bridge	250	130	25	20	1	30	12	802.21	
Reach 7 – Cranston Bridge to Lake Hemet	150	100	10	15	1	20	5	802.21	
Bautista Creek – Headwaters to Debris Dam	250	130	25	20	1	30	5	802.21	802.23
Strawberry Creek and San Jacinto River, North Fork	150	100	10	15	1	20	5	802.21	

* Note the quality objective for Reach 4 is not intended to preclude transport of water supplies or delivery to Canyon Lake

Table 4-1 WATER QUALITY OBJECTIVES - Continued

INLAND SURFACE STREAMS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
Fuller Mill Creek	150	100	10	15	1	20	5	802.22	
Stone Creek	150	100	10	15	1	20	5	802.21	
Salt Creek+	---	---	---	---	---	---	---	802.12	
Other Tributaries: Logan, Black Mountain, Juaro Canyon, Indian, Hurkey, Poppet and Protrero Creeks, and other Tributaries to these Creeks	150	70	10	12	1	15	5	802.12	802.22

\+ Numeric objectives have not been established; narrative objectives apply.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

LAKES AND RESERVOIRS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
UPPER SANTA ANA RIVER BASIN									
Baldwin Lake*+	---	---	---	---	---	---	---	801.73	
Big Bear Lake**	175	125	20	10	0.15	10	---	801.71	
Erwin Lake+	---	---	---	---	---	---	---	801.73	
Evans Lake	490	---	---	---	---	---	---	801.27	
Jenks Lake	200	100	30	10	1	20	---	801.72	
Lee Lake+	---	---	---	---	---	---	---	801.34	
Mathews, Lake	700	325	100	90	---	290	---	801.33	
Mockingbird Reservoir	650	---	---	---	---	---	---	801.26	
Norconian, Lake	1050	---	---	---	---	---	---	801.25	
LOWER SANTA ANA RIVER BASIN									
Anaheim Lake	600	---	---	---	---	---	---	801.11	
Irvine Lake (Santiago Reservoir)	730	360	110	130	6	310	---	801.12	
Laguna, Lambert, Peters Canyon, Rattlesnake, Sand Canyon, and Siphon Reservoirs	720	---	---	---	---	---	---	801.11	

* Fills occasionally with storm flows; may evaporate completely
** Additional Objective: 0.15 mg/l Phosphorus
\+ Numeric objectives have not been established; narrative objectives apply.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

LAKES AND RESERVOIRS	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
SAN JACINTO RIVER BASIN									
Canyon Lake (Railroad Canyon Reservoir)***	700	325	100	90	8	290	---	802.11	802.12
Elsinore, Lake****	2000	---	---	---	1.5	---	---	802.31	
Fulmor, Lake	150	70	10	12	1	15	---	802.21	
Hemet, Lake	135	---	25	20	1	10	---	802.22	
Perris, Lake	220	110	50	55	1	45	---	802.11	

*** Note: The quality objectives for Canyon Lake is not intended to preclude transport of water supplies or delivery to the Lake.
**** Lake volume and quality highly variable

Table 4-1 WATER QUALITY OBJECTIVES - Continued

WETLANDS (INLAND)	WATER QUALITY OBJECTIVES (mg/l)							Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Total Inorganic Nitrogen**	**Sulfate**	**Chemical Oxygen Demand**	Primary	Secondary
San Jacinto Freshwater Marsh**	2000	---	---	---	13	---	90	801.11	
Shay Meadows+	---	---	---	---		---	---	801.73	
Stanfield Marsh+**	---	---	---	---	---	---	---	801.71	
Prado Basin Management Zone @	---	---	---	---	---	---	---	801.21	
San Jacinto Wildlife Preserve+**	---	---	---	---	---	---	---	802.11	802.14
Glen Helen+	---	---	---	---	---	---	---	801.59	

** This is a created wetlands as defined in the wetlands discussion (see Chapter 3)

\+ Numeric objectives have not been established; narrative objectives apply

@ includes the Prado Flood Control Basin, a created wetland as defined in the wetlands discussion (see Chapter 3). Chino Creek, Reach 1A, Chino Creek, 1B, Mill Creek (Prado Area) and Santa Ana River, Reach 3 TDS and TIN numeric objectives apply (see discussion).

Table 4-1 WATER QUALITY OBJECTIVES - Continued

GROUNDWATER MANAGEMENT ZONES	WATER QUALITY OBJECTIVES (mg/l)						Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Nitrate as Nitrogen**	**Sulfate**	Primary	Secondary
UPPER SANTA ANA RIVER BASIN								
Big Bear Valley	220	225	20	10	5.0	20	801.73	
Beaumont “maximum benefit”++	330	---	---	---	5.0	---	801.62	801.63, 801.69
Beaumont “antidegradation”++	230	---	---	---	1.5	---	801.62	801.63, 801.69
Bunker Hill - A	310	---	---	---	2.7	---	801.51	801.52
Bunker Hill - B	330	---	---	---	7.3	---	801.52	801.53, 801.54, 801.57 801.58
Colton	410	---	---	---	2.7	---	801.44	801.45
Chino – North “maximum benefit”++	420	---	---	---	5.0	---	801.21	481.21, 481.23, 481.22 801.21, 801.23, 801.24
Chino 1 – “antidegradation”++	280	---	---	---	5.0	---	802.21	481.21
Chino 2 – “antidegradation”++	250	---	---	---	2.9	---	801.21	
Chino 3 – “antidegradation”++	260	---	---	---	3.5	---	801.21	
Chino – East @	730	---	---	---	10.0	---	801.21	801.27
Chino – South @	680	---	---	---	4.2	---	801.21	801.26
Cucamonga “maximum benefit”++	380	---	---	---	5.0	---	801.24	801.21

++ “Maximum benefit” objectives apply unless Regional Board determines that lowering of water quality is not of maximum benefit to the people of the state; in that case, “antidegradation” objectives apply (for Chino North, antidegradation objectives for Chino 1, 2, 3 would apply if maximum benefit is not demonstrated). (see discussion in Chapter 5).

@ Chino East and South are the designations in the Chino Basin Watermaster “maximum benefit” proposal (see Chapter 5) for the management Zones identified by Wildermuth Environmental, Inc., (July 2000) as Chino 4 and Chino 5, respectively.

Table 4-1 WATER QUALITY OBJECTIVES - Continued

GROUNDWATER MANAGEMENT ZONES	WATER QUALITY OBJECTIVES (mg/l)						Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Nitrate as Nitrogen**	**Sulfate**	Primary	Secondary
UPPER SANTA ANA RIVER BASIN								
Cucamonga “antidegradation”++	210	---	---	---	2.4	---	801.24	801.21
Lytle	260	---	---	---	1.5	---	801.41	801.42
Rialto	230	---	---	---	2.0	---	801.41	801.42
San Timoteo “maximum benefit”++	400	---	---	---	5.0	---	801.62	
San Timoteo “antidegradation”++	300	---	---		2.7	---	801.62	
Yucaipa “maximum benefit”++	370	---	---	---	5.0	---	801.61	801.55, 801.54, 801.56, 801.63, 801.65, 801.66 801.67
Yucaipa “antidegradation”++	320	---	---	---	4.2	---	801.61	801.55, 801.54, 801.56, 801.63, 801.65, 801.66 801.67
MIDDLE SANTA ANA RIVER BASIN								
Arlington	980	---	---	---	10	---	801.26	
Bedford**	---	---	---	---	---	---	801.32	
Coldwater	380	---	---	---	1.5	---	801.31	
Elsinore	480	---	---	---	1.0	---	802.31	
Lee Lake**	---	---	---	---	---	---	801.34	

.

++ “Maximum benefit” objectives apply unless Regional Board determines that lowering of water quality is not of maximum benefit to the people of the state; in that case, “antidegradation” objectives apply (for Chino North, antidegradation objectives for Chino 1, 2, 3 would apply if maximum benefit is not demonstrated). (see discussion in Chapter 5).

** Numeric objectives not established; narrative objectives apply

Table 4-1 WATER QUALITY OBJECTIVES - Continued

GROUNDWATER MANAGEMENT ZONES	WATER QUALITY OBJECTIVES (mg/l)						Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Nitrate as Nitrogen**	**Sulfate**	Primary	Secondary
Riverside - A	560	---	---	---	6.2	---	801.27	
Riverside - B	290	---	---	---	7.6	---	801.27	
Riverside - C	680	---	---	---	8.3	---	801.27	
Riverside - D	810	---	---	---	10.0	---	801.27	
Riverside - E	720	---	---	---	10.0	---	801.27	
Riverside - F	660	---	---	---	9.5	---	801.27	
Temescal	770	---	---	---	10.0	---	801.25	
SAN JACINTO RIVER BASIN								
Gardner Valley	300	100	65	30	2.0	40	802.22	
Idyllwild Area**	---	---	---	---	---	---	802.22	802.21
Canyon	230	---	---	---	2.5	---	802.21	
Hemet - South	730	---	---	---	4.1	---	802.15	802.21
Lakeview – Hemet North	520	---	---	---	1.8	---	802.14	802.15

.
** Numeric objectives not established; narrative objectives apply

Table 4-1 WATER QUALITY OBJECTIVES - Continued

GROUNDWATER MANAGEMENT ZONES	WATER QUALITY OBJECTIVES (mg/l)						Hydrologic Unit	
	Total Dissolved Solids	**Hardness**	**Sodium**	**Chloride**	**Nitrate as Nitrogen**	**Sulfate**	Primary	Secondary
Menifee	1020	---	---	---	2.8	---	802.13	
Perris North	570	---	---	---	5.2	---	802.11	
Perris South	1260	---	---	---	2.5	---	802.11	802.12, 802.13
San Jacinto - Lower	520	---	---	---	1.0	---	802.21	
San Jacinto - Upper	320	---	---	---	1.4	---	802.21	802.23
LOWER SANTA ANA RIVER BASIN								
La Habra**	---	---	---	---	---	---	845.62	
Santiago**	---	---	---	---	---	---	801.12	
Orange	580	---	---	---	3.4	---	801.11	801.13, 845.61, 801.14
Irvine	910	---	---	---	5.9	---	801.11	

.
** Numeric objectives not established; narrative objectives apply

Table 4-2

4-Day Average Concentration for Ammonia
Salmonids or Other Sensitive Coldwater Species Present
(COLD)

Un-ionized Ammonia (mg/liter N)		Temperature, C						
		0	5	10	15	20	25	30
pH	6.50	0.0004	0.0005	0.0007	0.0010	0.0010	0.0010	0.0010
	6.75	0.0006	0.0009	0.0013	0.0018	0.0018	0.0018	0.0018
	7.00	0.0011	0.0016	0.0022	0.0031	0.0031	0.0031	0.0031
	7.25	0.0020	0.0028	0.0040	0.0056	0.0056	0.0056	0.0056
	7.50	0.0035	0.0050	0.0070	0.0099	0.0099	0.0099	0.0099
	7.75	0.0069	0.0097	0.0137	0.0194	0.0194	0.0194	0.0194
	8.00	0.0080	0.0112	0.0159	0.0224	0.0224	0.0224	0.0224
	8.25	0.0080	0.0112	0.0159	0.0224	0.0224	0.0224	0.0224
	8.50	0.0080	0.0112	0.0159	0.0224	0.0224	0.0224	0.0224
	8.75	0.0080	0.0112	0.0159	0.0224	0.0224	0.0224	0.0224
	9.00	0.0080	0.0112	0.0159	0.0224	0.0224	0.0224	0.0224

Total Ammonia (mg/liter N)		Temperature, C						
		0	5	10	15	20	25	30
pH	6.50	1.36	1.27	1.20	1.15	0.796	0.556	0.393
	6.75	1.36	1.27	1.20	1.15	0.796	0.556	0.393
	7.00	1.36	1.27	1.20	1.16	0.798	0.558	0.395
	7.25	1.36	1.27	1.20	1.16	0.800	0.560	0.397
	7.50	1.36	1.27	1.21	1.16	0.804	0.565	0.402
	7.75	1.49	1.40	1.33	1.28	0.890	0.627	0.448
	8.00	0.974	0.913	0.871	0.844	0.589	0.418	0.302
	8.25	0.551	0.519	0.497	0.484	0.341	0.245	0.179
	8.50	0.313	0.297	0.286	0.282	0.202	0.147	0.111
	8.75	0.180	0.172	0.168	0.169	0.123	0.093	0.072
	9.00	0.105	0.101	0.101	0.105	0.079	0.062	0.050

Table 4-3

4-Day Average Concentration for Ammonia
Salmonids or Other Sensitive Coldwater Species Absent [1]
(WARM)

Un-ionized Ammonia (mg/liter N)		Temperature, C						
		0	5	10	15	20	25	30
pH	6.50	0.0006	0.0008	0.0012	0.0017	0.0024	0.0024	0.0024
	6.75	0.0010	0.0015	0.0021	0.0030	0.0042	0.0042	0.0042
	7.00	0.0019	0.0026	0.0037	0.0053	0.0074	0.0074	0.0074
	7.25	0.0033	0.0047	0.0066	0.0094	0.0132	0.0132	0.0132
	7.50	0.0059	0.0083	0.0118	0.0166	0.0235	0.0235	0.0235
	7.75	0.0115	0.0162	0.0229	0.0324	0.0458	0.0458	0.0458
	8.00	0.0133	0.0188	0.0265	0.0375	0.0530	0.0530	0.0530
	8.25	0.0133	0.0188	0.0265	0.0375	0.0530	0.0530	0.0530
	8.50	0.0133	0.0188	0.0265	0.0375	0.0530	0.0530	0.0530
	8.75	0.0133	0.0188	0.0265	0.0375	0.0530	0.0530	0.0530
	9.00	0.0133	0.0188	0.0265	0.0375	0.0530	0.0530	0.0530

Total Ammonia (mg/liter N)		Temperature, C						
		0	5	10	15	20	25	30
pH	6.50	2.27	2.12	2.01	1.93	1.88	1.31	0.928
	6.75	2.27	2.12	2.01	1.93	1.88	1.31	0.930
	7.00	2.27	2.12	2.01	1.93	1.89	1.32	0.933
	7.25	2.27	2.12	2.01	1.94	1.89	1.32	0.939
	7.50	2.27	2.13	2.02	1.95	1.90	1.33	0.949
	7.75	2.49	2.34	2.22	2.14	2.10	1.48	1.06
	8.00	1.63	1.53	1.46	1.41	1.39	0.987	0.173
	8.25	0.922	0.868	0.831	0.811	0.806	0.578	0.424
	8.50	0.524	0.496	0.479	0.472	0.476	0.348	0.262
	8.75	0.301	0.287	0.281	0.282	0.291	0.219	0.170
	9.00	0.175	0.170	0.170	0.175	0.187	0.146	0.119

1 The values may be conservative, however. If a more refined criterion is desired, EPA recommends a site-specific Criteria modification.

Table 4-4

Equations Used to Calculate UIA-N and Total Ammonia -N Water Quality Objectives for COLD and WARM Waterbodies

COLD-Chronic UIA-N	$0 \le T \le 15$	$15 \le T \le 30$
$6.5 \le pH \le 7.7$	$\frac{0.0223}{10^{(8.3-.03T-pH)}}$	$\frac{0.0158}{10^{(7.7-pH)}}$
$7.7 \le pH \le 8$	$\frac{0.0396}{10^{(0.6-0.03T)}+10^{(8.0-0.03T-pH)}}$	$\frac{0.0280}{1+10^{(7.4-pH)}}$
$8 \le pH \le 9$	$\frac{0.0317}{10^{(0.6-0.03T)}}$	0.0224

WARM-Chronic UIA-N	$0 \le T \le 15$	$15 \le T \le 30$
$6.5 \le pH \le 7.7$	$\frac{0.0372}{10^{(8.3-.03T-pH)}}$	$\frac{0.0372}{10^{(7.7-pH)}}$
$7.7 \le pH \le 8$	$\frac{0.0662}{10^{(0.6-0.03T)}+10^{(8.0-0.03T-pH)}}$	$\frac{0.0662}{1+10^{(7.4-pH)}}$
$8 \le pH \le 9$	$\frac{0.0530}{10^{(0.6-0.03T)}}$	0.0530

Total Ammonia-N Objectives

$$NH_3\text{-}N = UIA\text{-}N * [1+10^{(0.09018+\frac{2729.92}{T+273.15}-pH)}]$$

Note: For all equations, T is the temperature in °C

CHAPTER 5

IMPLEMENTATION

SELECTED CHAPTER CONTENTS

INTRODUCTION

This chapter describes the implementation plan, the actions that are necessary to achieve the water quality objectives specified in Chapter 4 and thereby protect the beneficial uses of the region's surface and groundwaters (Chapter 3). These actions will require the coordinated efforts of the Regional Board and numerous water supply and wastewater management agencies, as well as city and county governments and other planning entities within the Region.

The Implementation chapter of the 1983 Basin Plan focused largely on the mineral imbalance problem in the region and the management of total dissolved solids (TDS) through waste discharges requirements, wastewater reclamation requirements, improvements in water supply quality, recharge projects, and other measures. Since the adoption of the 1983 Basin Plan, the Regional Board's knowledge of the water quality problems in the Santa Ana Region has increased considerably, and the number and variety of water quality programs undertaken to address those problems have increased accordingly. Several new programs are being implemented statewide by each regional board, including broad new responsibilities related to landfill operations and closure, oversight of leaking underground storage tank cleanup activities, and control of nonpoint sources such as urban runoff and stormwater from industrial facilities and construction sites. These new programs are part of the Board's implementation plan and are described in this chapter.

IMPLEMENTATION THROUGH WASTE DISCHARGE REQUIREMENTS

The Regional Board's principal means of achieving the water quality objectives and protecting the beneficial uses specified in this plan is the development, adoption, issuance and enforcement of waste discharge requirements. By regulating the quality of wastewaters discharged, and in other ways controlling the discharge of wastes which may impact surface and groundwater quality, the Regional Board works to protect the Region's water resources.

The Regional Board's regulatory tools include National Pollutant Discharge Elimination System permits, Waste Discharge Requirements, Water Reclamation Requirements, Water Quality Certification and Waste Discharge Prohibition.

National Pollutant Discharge Elimination System (NPDES)

National Pollutant Discharge Elimination System (NPDES) permits are required for discharges of pollutants to "navigable waters" of the United States, which includes any discharge to surface waters – lakes, rivers, streams, bays, the ocean, dry streambeds, wetlands and storm sewers that are tributary to any surface water body. NPDES permits are issued under the federal Clean Water Act, Title IV "Permits and Licenses," Section 402 (33 USC 466 *et seq.*). The Regional Board issues these permits in lieu of direct issuance by the US EPA, subject to review and approval by the US EPA Regional Administrator (EPA Region IX). The terms of these NPDES permits implement pertinent provisions of the federal Clean Water Act and the Act's implementing regulations including pretreatment, sludge management, effluent limitations for specific industries and antidegradation. In general, the discharge of pollutants is to be eliminated or reduced as much as practicable so as to achieve the Clean Water Act's goal of "fishable and swimmable" navigable (surface) waters. Technically, all NPDES permits issued by the Regional Board are also Waste Discharge Requirements issued under the authority of the California Water Code.

In addition to regulating discharges of wastewater to surface waters, NPDES permits also require municipal sewage treatment facilities to implement and monitor industrial pretreatment programs if their design capacity is greater than five million gallons per day (MGD). Smaller municipal treatment systems may also be required to conduct pretreatment programs if there are significant industrial contributions to their systems. The pretreatment programs must comply with the federal regulations specified in 40 CFR 403.

At this time, there are approximately 2,000 NPDES permits in effect in the Santa Ana Region. As shown in Table 5-1, these NPDES permits regulate discharge from publicly owned treatment works (POTWs, or sewage treatment plants), industrial discharges, stormwater runoff, dewatering operations, and groundwater cleanup discharges. NPDES permits are issued for five years or less and are therefore to be updated regularly. The rapid and dramatic population and urban growth in the Santa Ana Region has caused a significant increase in NPDES permit applications for new waste discharges. Because of staff resource limitations, the Board generally focuses its permitting efforts on the issuance of permits for these new discharges. NPDES permit updates are done to the extent feasible, particularly for the more significant discharges. In some cases, if the discharge does not change substantially over the permitting period, administrative extensions of the existing permits are issued by the Regional Board's Executive Officer.

To expedite the permit issuance process, the Regional Board has adopted several general NPDES permits, each of which regulates numerous discharges of similar types of wastes. These general permits address discharges from groundwater cleanup projects (Order No. 91-63) and dewatering activities (Order No. 93-49). Proponents of groundwater cleanup or dewatering projects are required to file individual permit applications, which are reviewed by Regional Board staff to determine whether the requirements of the general permits apply and are sufficient to assure water quality protection. If so, the applicants are authorized by the Regional Board's Executive Officer to discharge in conformance with the general permit. A general permit for boatyard operations is being drafted. Additional general permits will be developed and adopted as appropriate to streamline the permitting process.

Similarly, the State Board has issued general permits for stormwater runoff from industrial facilities and construction sites statewide (see discussion on stormwater runoff). Stormwater discharges from industrial and construction activities in the Santa Ana Region can be covered under these general permits, which are administered jointly by the State Board and Regional Boards.

(Amended by Resolution No. 00-27, May 19, 2000)
Where the Regional Board determines that it is infeasible to achieve immediate compliance with an effluent limitation specified to implement a new, revised or newly interpreted water quality objective, whether numeric or narrative, adopted by the Regional Board or State Water Resources Control Board, or with a new, revised or newly interpreted water quality criterion promulgated by the U.S. Environmental Protection Agency, the Regional Board may establish a schedule of compliance in a discharger's waste discharge requirements (NPDES permit). The schedule of compliance shall include a time schedule for completing specific actions that demonstrate reasonable progress toward attainment of the effluent limitation and, thereby, the objective or criterion. The schedule shall contain a final compliance date, based on the shortest practicable time (determined by the Regional Board at a public hearing) required to achieve compliance. In no event shall an NPDES permit include a schedule of compliance that allows more than ten years from the date of adoption or interpretation of the applicable objective or criterion. Schedules of compliance are authorized by this provision only for those effluent limitations that implement objectives and criteria adopted, revised or newly interpreted after the effective date of this provision, July 15, 2002.

To document the need for and justify the duration of any such compliance 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) documentation of source control efforts currently underway or completed, including compliance with any Pollution Prevention programs that have been established; (3) a proposed schedule for additional source control measures or waste treatment; (4) the discharge quality that can reasonably be achieved until final compliance is attained; and (5) a demonstration that the proposed schedule is as short as possible, 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. **(End of Resolution No. 00-27)**

Table 5-1

Representative NPDES Permitted Facilities in the Santa Ana Region
(as of November 3, 1993)[1]

Facility Type	Number Requested
Boatyards	10
Dewatering Operations	31
Groundwater Cleanup Projects	150
Stormwater Discharges 39 individually regulated by RWQCB; 1800 regulated by SWRCB's general permits	1839
Publicly Owned Treatment Works	
TOTAL	**2054**

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

Table 5-2

Representative WDR Permitted Facilities in the Santa Ana Region
(as of November 3, 1993) [2]

Facility Type	Number Regulated
Brine Evaporation	24
Composing	19
Groundwater Cleanup	32
Dairies	468
Landfills	43
Mobile Home Parks (community septic systems)	22
Publicly Owned Treatment Works	37
TOTAL	**645**

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

Where the terms of these general permits are not sufficient to protect water quality, the Board issues individual permits for these discharges.

Waste Discharge Requirements

Waste Discharge Requirements (WDRs) are issued by the Regional Board under the provisions of the California Water Code, Division 7 "Water Quality," Article 4 "Waste Discharge Requirements." These requirements regulate the discharge of wastes which are not made to surface waters but which may impact the region's water quality by affecting underlying groundwater basins. Such WDRs are issued for POTWs' wastewater reclamation operations, discharges of wastes from industries, subsurface waste discharges such as septic systems, sanitary landfills, dairies and a variety of other activities which can affect water quality. There are approximately 550 WDRs in place, as indicated in Table 5-2.

Table 5-2 shows that most WDRs have been issued to dairies. To streamline the permit process, the Regional Board has developed a general permit for dairies and other animal confinement facilities (Order No. 94-7). To implement the federal stormwater requirements, this permit will be issued as an NPDES permit.

Waivers

The California Water Code allows Regional Boards to waive waste discharge requirements (WDRs) for a specific discharge or types of discharges where it is not against the public interest (Section 13269). These waivers are conditional and may be terminated at any time.

On May 11, 1984, the Regional Board adopted Resolution No. 84-48, which waives WDRs for certain types of discharges. Resolution No. 84-48 was amended by Resolution No. 91-75 in 1991. Resolution No. 84-48 and Resolution No 91-75 are incorporated into the Basin Plan by reference and are included in Appendix IV. Only discharges which comply with the conditions contained in Resolution No. 84-48 as amended by Resolution No. 91-75, qualify for this waiver. Even though a discharge may qualify for a waiver, dischargers are still required to file Reports of Waste Discharge (ROWD), together with the appropriate filing fees. Regional Board staff determines if the effort expended in reviewing the ROWD justifies retaining any portion of the fee. If not, the fee is fully refunded.

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 and is therefore considered a valuable resource. The State Board adopted the Reclamation Policy to encourage development of water reclamation facilities to increase the availability of reclaimed water to help meet the growing water requirements of the State (Chapter 2). The State Board is authorized to provide loans for the development of water reclamation facilities, or for studies and investigations in connection with water reclamation.

Section 13521 of the California Water Code requires the State Department of Health Services to establish statewide reclamation criteria for each type of use of reclaimed water, where such use involves the protection of public health. These regulations, contained in Title 22 of the California Code of Regulations, are the basic regulations governing the use of reclaimed water in California. The existing Title 22 regulations were adopted in 1978; proposed new regulations are currently under review.

The Regional Board implements the provisions of Title 22 by issuing Water Reclamation Requirements (WRRs) to the producer, the user of reclaimed water, or both. WRRs are issued for a variety of uses, including, but not limited to, landscape irrigation, fodder crop irrigation, duck ponds, freeway landscape irrigation, groundwater recharge, injection for seawater intrusion barrier, use in toilet flushing, and other non-domestic uses in high rises or nonresidential buildings.

The Santa Ana Regional Board currently has 76 WRRs issued to producers and/or users of reclaimed water. Some of the producers have received or applied for Master Reclamation Requirements (MRR) which would allow the producer to distribute their reclaimed water to various users without additional user reclamation requirements for the Regional Board. With the water shortage in southern California, there is an increase in the demand for reclaimed water. With sophisticated treatment technologies, reclaimed water could be used for almost anything, except domestic supply.

The detailed requirements, conditions, prohibitions, and other specifications included within NPDES, WDR, and WRR permits are developed on the basis of existing state and federal law, Sate Board Water Quality Control Plans and Policies (*e.g.*, the Ocean Plan), and the contents of this Basin Plan. The foremost consideration is the protection of water quality. The quality of the discharge specified through the limitations in the permit is calculated to allow the water quality objectives of the receiving water to be met or maintained, and in some cases, the water quality is improved.

When the limits included in the NPDES, WDR or WRR permits cannot be met because treatment facilities are inadequate or the water supply is inferior, these permits may include a time schedule for compliance and interim discharger a period of time to make the necessary changes and/or improvements.

Waste Discharge Prohibitions

The Regional Board also implements this Basin Plan through the adoption of waste discharge prohibitions as necessary. Section 13243 of the California Water Code states that a Regional Board may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted. The Regional Board implements this section of the Water Code by adopting waste discharge requirements issued to individual discharges and in the Basin Plan itself.

A. General Prohibitions

1. Unless regulated by appropriate waste discharge requirements, the discharge to surface or groundwaters of waste which contains the following substances is prohibited.

    - Toxic substances or materials;
    - Pesticides;
    - PCB's (polychlorinated biphenyls);
    - Mercury or mercury compounds;
    - Radioactive substances or material in excess of levels allowed by the California Code of Regulations.

    This list is not necessarily all-inclusive. The Regional Board may modify or update this list as appropriate.

B. Prohibitions Applying to Inland Surface Waters

1. The discharge of untreated sewage to any surface water stream, natural or man-made, or to any drainage system intended to convey stormwater runoff to surface water streams is prohibited.

2. The discharge of treated sewage to streams, lakes or reservoirs, or to tributaries thereto, which are designated **MUN** and which are used as a domestic water supply is prohibited unless approved by the California Department of Health Services. The discharge of treated sewage to waterbodies which are excepted from **MUN** (see Table 3-1) but which are tributary to waters designated **MUN** and are used as a domestic water supply is prohibited unless the discharge of treated sewage to the drinking water supply is precluded or approved by the California Department of Health Services.

C. Prohibitions Applying to Oceans, Bays, and Estuary Waters

    The prohibitions included in the California Ocean Plan, Thermal Plan, and the Policy for Enclosed Bays and Estuaries are hereby incorporated into this plan by reference.

D. Prohibitions Applying to Groundwaters

1. The discharge of the following materials to the ground, other than into impervious facilities, is prohibited:

    a. Acids or caustics, whether neutralized or not, and

    b. Excessively saline wastes (electrical conductivity greater than 2000 μmhos/cm)

2., Prohibitions Applying to Subsurface Leaching Percolation Systems

In 1973, the Regional Board adopted prohibitions on the use of subsurface disposal systems in the following areas:

a. Grand Terrace (CSA 70, Improvement Zone H);

b. Yucaipa-Calimesa (Yucaipa Valley County Water District);

c. Lytle Creek above 2600 foot elevation;

d. Mill Creek above 2600 foot elevation; and

e. Bear Valley (includes Baldwin Lake Drainage Area);

In 1982, the Regional Board adopted prohibition on the use of subsurface disposal systems for the Homeland-Green Acres area and Romoland areas (exact boundaries for these prohibition areas are shown on maps on file at the Regional Board office).

The Board adopted specified dates for final compliance with these prohibitions. In some cases, these dated have been revised via Basin Plan amendments. The compliance dates are as follows:

a. Grand Terrace: February 1, 1988

b. Yucaipa-Calimesa – February 1, 1988

c. Lytle Creek – July 1, 1978

d. Mill Creek - July 1, 1978

e. Bear Valley – July 1, 1980

f. Homeland-Green Acres – July 1, 1990

g. Romoland – July 1, 1990

Exemptions from these prohibitions may be granted if certain criteria are satisfied (exemption criteria are described in Appendix V).

Quail Valley On-site Septic Tank-Subsurface Disposal System Prohibition
(Amended by Resolution No. R8-2006-0024, October 3, 2006)

On October 3, 2006, the Board adopted a Basin Plan amendment prohibiting the use of septic tank-subsurface disposal systems in the Quail Valley area of Riverside County in accordance with the following:

Effective Date: August 20, 2007

(1) The discharge of waste from new on-site septic tank-subsurface disposal systems in the Quail Valley area of Riverside County is prohibited, if a sewer system is available to serve the lot. Except as provided in (2) below, the discharge of waste from existing on-site septic tank-subsurface disposal systems in the Quail Valley area of Riverside County is prohibited, if a sewer system is available to serve the lot.

(2) All existing septic tank-subsurface disposal systems shall connect to the sewer designed to serve the lot within one year of sewer installation. New septic tank-subsurface disposal systems shall not be permitted in Quail Valley if a sewer system is available to serve the lot.

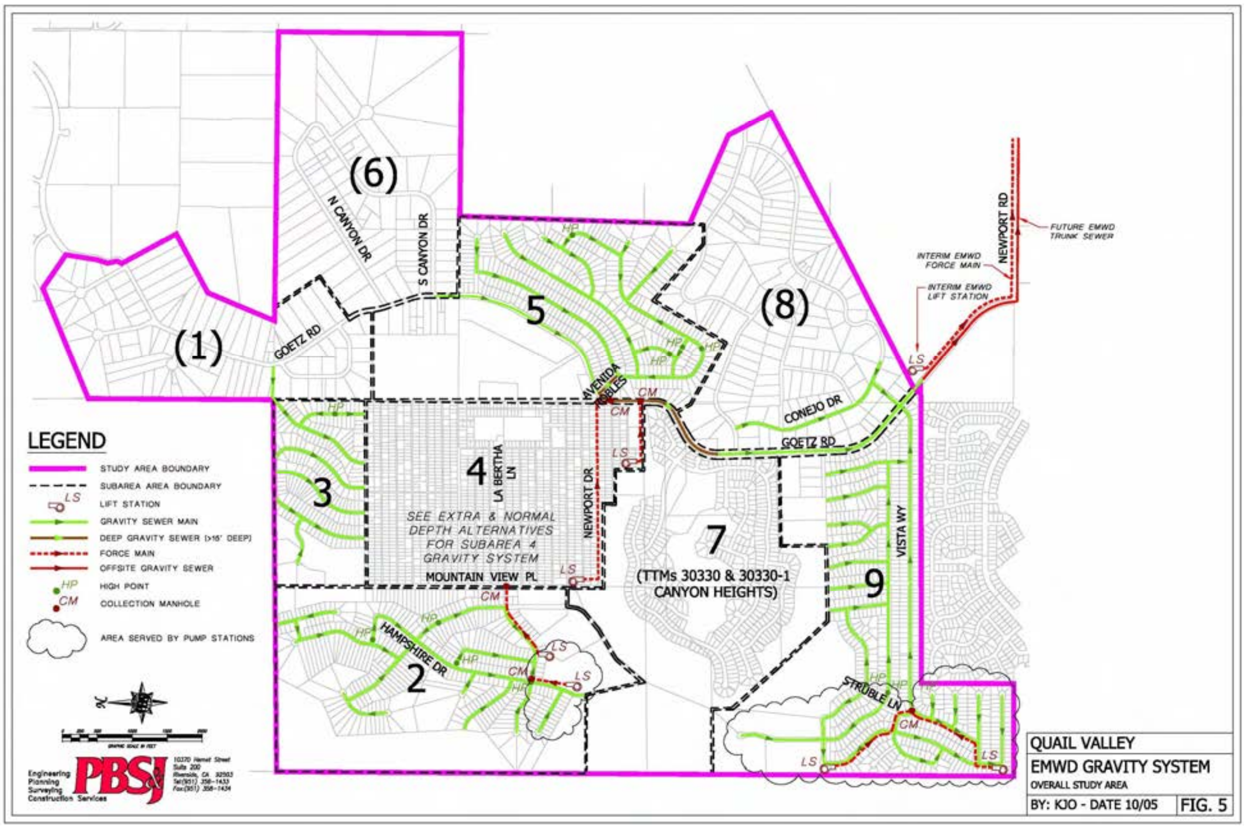
(3) This prohibition applies to all areas within Quail Valley as depicted on a detailed map maintained in the Regional Board office (Quail Valley Septic Tank Prohibition Boundary Map). A copy of the boundary map is attached as Attachment "A".

(4) Upon the effective date of this prohibition, new septic systems in Quail Valley (see Attachment "A") shall not be permitted, except as follows:

(a) For areas in Quail Valley other than areas 4 and 9, new systems may be permitted, provided the Regional Board finds that the sewering agency proposes, and is on schedule, to provide sewer service for areas 4 and 9 within five years of the effective date of this amendment, and if the lot proposed for a septic system meets all Board and Riverside County requirements.

(b) If the Board finds that the sewering agency cannot meet the schedule identified in 1(4)(a), above, but that design of the project proceeds nonetheless, then, upon completion of the sewer system design, new systems may be permitted in areas other than 4 and 9, if all Board and Riverside County requirements are met.

ATTACHMENT "A": MAP OF QUAIL VALLEY PROHIBITION AREA
FIGURE 5-1a



Water Quality Certification (Section 401)

In addition to the issuance of NPDES permits or waste discharge requirements, the Regional Board acts to protect the quality of surface waters through water quality certification as specified in Section 401 of the Clean Water Act (33 USC 466 *et seq.*). Section 401 requires that any person applying for a federal permit or license for an activity which may result in a discharge of pollutants into waters of the nation must obtain a state water quality certification verifying that the activity complies with the state's water quality standards.

No license or permit can be granted until certification required by Section 401 has been obtained or waived. Further, no license or permit can be granted if certification has been denied by the state. Similarly, coastal states must concur that the activity meets the requirements of the Coastal Zone Management Program of the state or waive their right to concur by not taking action by a specified time.

The following permits or licenses require 401 Certification:

- NPDES permits issued by US EPA under Section 402 of the CWA (33 USC 466 *et seq.*);
- CWA Section 404 (33 USC 466 *et seq.*) permits issued by the U.S. Army Corps of Engineers;
- Permits issued under Sections 9 and 10 of the Rivers and Harbors Act (33 USC 466 *et seq.*) (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.

To date, 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 U.S. Army Corps of Engineers (Section 404 permits) subject to any conditions imposed by the Regional Board.

The Section 404 program is administered at the federal level by the U.S. Army Corps of Engineers and the US EPA. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have important advisory roles. The U.S. Army Corps of Engineers has the primary responsibility for the permit program and is authorized, after notice and opportunity for a public hearing, to issue permits of the discharge of dredged or fill material. US EPA developed the regulations under which permits may be granted. States may assume the responsibility for implementation of the 404 permit program, however, California has not done so.

The Regional Board evaluates the projects for which 404 permits are requested and determines whether to deny water quality certification, issue a certification with conditions, or waive the certification. A certification is usually denied if the activity violates any water quality standard; if the activity may violate standards, a conditional certification is given; when the activity does not violate any standard, a 401 waiver may be given.

Presently, the executive Director of the State Board issues all water quality certifications in accordance with recommendations from the Regional Board.

MONITORING AND ENFORCEMENT

Waste discharge requirements issued by the Regional Board include requirements for monitoring of discharges. In some cases, the receiving waters must 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 waste discharge requirements (see Chapter 6).

The California Water Code provides the Regional Board with a number of enforcement remedies for violations of requirements. Enforcement actions include Time Schedules, Cease and Desist Orders, Cleanup and Abatement Orders, and the issuance of Administrative Civil Liability Complaints.

Time Schedules

When a discharge is taking place or threatening to occur that will cause a violation of a Regional Board requirement, a discharger may be required to submit a detailed compliance plan and schedule (California 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 Schedules are adopted by the Regional Board after a public hearing or by the Executive Officer pursuant to his or her authority.

Cease and Desist Order

If discharge prohibitions or requirements of the State Board or Regional Board are violated or threatened to be violated, the Regional Board may adopt a Cease and Desist order (California Water Code Section 13301) requiring the discharger 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.

Cleanup and Abatement Order

The Board may order *any* person who has discharged, is discharging or is threatening to discharge wastes that will result in a violation of waste discharge requirements or other order or prohibition of the State Board or Regional Board, to cleanup and abate the effects of the discharge or to take appropriate remedial action (California Water Code 13304). The Regional Board has delegated issuance of these orders to its Executive Officer; Cleanup and Abatement orders do not require Board action, but are often brought before the Regional Board for consideration.

Administrative Civil Liability

The Regional Board may also issue Administrative Civil Liability complaints (ACLs) to those 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 (California Water Code Sections 13350). ACLs may also be issued in cases where a person fails to submit reports requested by the Board (California Water Code Sections 13261 and13268) or when a person discharges waste without first having filed the appropriate Report of Waste Discharge (ROWD) (California Water Code Section113265). ACLs may be issued pursuant to California 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, without showing intent or negligence. Issuance of ACLs is delegated to the Board's Executive Officer, but, all administrative civil liability settlements must be affirmed by the Board. 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.

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. 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 (California Water Code Sections 13331 and 13340).

TOTAL DISSOLVED SOLIDS AND NITROGEN MANAGEMENT
(Amended by Resolution No. R8-2004-0001, December 22, 2004)

1. Background

The 1975 and 1983 Basin Plans for the Santa Ana River Basin reported that the most serious problem in the basin was the build up of dissolve minerals, or salts, in the ground and surface waters. Sampling and computer modeling of groundwaters showed that the levels of dissolved minerals, generally expressed as total dissolved solids (TDS) or total filterable residue (TFR), were exceeding water quality objectives or would do so in the future unless appropriate controls were implemented. Nitrogen levels in the Santa Ana River, largely in the form of nitrate, were likewise projected to exceed objectives. As was discussed in Chapter 4, high levels of TDS and nitrate adversely affect the beneficial uses of ground and surface waters. The mineralization of the Region's waters, and its impact on beneficial uses, remains a significant problem.

Each use of water adds an increment of dissolved minerals. Significant increments of salts are added by municipal and industrial use, and the reuse and recycling of the wastewater generated as it moves from the hydrologically higher areas of the Region to the ocean. Wastewater and recycled water percolated into groundwater management zones is typically pumped and reused a number of times before reaching the ocean, resulting in increased salt concentrations. The concentration of dissolved minerals can also be increased by evaporation or evapotranspiration. One of the principal causes of the mineralization problem in the Region is historic irrigated agriculture, particularly citrus, which in the past required large applications of water to land, causing large losses by evaporation and evapotranspiration. TDS and nitrate concentrations are increased both by this reduction in the total volume of return water and by the direct application of these salts in fertilizers. Dairy operations, which began in the Region in the 1950's and continue today, also contribute large amounts of salts to the basin.

The implementation chapters of the 1975 and 1983 Basin Plans focused on recommended plans to address the mineralization problem. The 1975 Plan initiated a total watershed approach to salt source control. Both Plans called for controls on salt loadings from all water uses including residential, commercial, industrial and agricultural (including dairies). The plans included: measures to improve water supply quality, including the import of high quality water from the State Water Project; waste discharge regulatory strategies (e.g., wasteload allocations, allowable mineral increments for uses of water); and recharge projects and other remedial programs to correct problems in specific areas. These Plans also carefully limited reclamation activities and the recycling of wastewaters into the local groundwater basins.

These salt management plans were developed using a complex set of groundwater computer models and programs, known collectively as the Basin Planning Procedure (BPP).

The modeling work focused on the upper Santa Ana Basin and, to a lesser extent, on the San Jacinto Basin, where the BPP was less developed and refined. The constituent modeled in those Plans was TDS.

For the salt management plan specified initially in the 1995 Basin Plan, when the Plan was adopted and approved in 1994 and 1995, modeling was conducted with the BPP for both the upper Santa Ana and San Jacinto Basins. However, most of the attention was again directed to the upper Santa Ana Basin, for which significant improvements to the BPP were made under a joint effort by the Santa Ana Watershed Project Authority, the Santa Ana River Dischargers Association, the Metropolitan Water District of Southern California, and the Regional Board. The most significant change to the BPP was the addition of a nitrogen modeling component so that projections of the nitrogen (nitrate) quality of groundwaters could be made, in addition to TDS. This enabled the development of a management plan for nitrogen, as well as TDS.

The BPP has not been used to model groundwater quality conditions in the lower Santa Ana Basin. For that Basin, the Regional Board's TDS and nitrogen management plans have relied, in large part, on the control of the quality of the Santa Ana River flows, which are a major source of recharge in the Basin. As discussed in Chapter 4, most of the baseflow (80-90%) is composed of treated sewage effluent; it also includes nonpoint source inputs and rising groundwater. Baseflow generally provides 70% or more of the water recharged in the Orange County Management Zone. In rare wet years, baseflow accounts for a smaller, but still significant, percentage (40%) of the recharge on an annual basis. Therefore, to protect Orange County groundwater, it is essential to control the quality of baseflow. To do so, baseflow TDS and nitrogen objectives are specified in this Plan for Reach 3 of the River. Wasteload allocations have been established and periodically revised to meet those and other Santa Ana River objectives.

For the 1983 Basin Plan, QUAL-II, a surface water model developed initially by the US EPA, was calibrated for the Santa Ana River and used to make detailed projections of River quality (TDS and nitrogen) and flow. The model was used to develop wasteload allocations for TDS and nitrogen discharges to the River that were approved as part of that Plan. (Wasteload allocations are discussed in detail in Section III of this Chapter). An updated version of the model, QUAL-2e, was used to revise these wasteload allocations, which were included as part of the initial salt management plan in the 1995 Basin Plan. The models were used to integrate the quantity and quality of inputs to the River from various sources, including the headwaters, municipal wastewater treatment plant discharges, and rising groundwater, based on the water supply and wastewater management plans used in the BPP. Data on rising groundwater quality and quantity were provided to the QUAL-II/2e models by the BPP. As with the BPP, the QUAL-II/2e model projections were used to identify water quality problems and to assess the effectiveness of changes in TDS and nitrogen management strategies.

II. Update of the Total Dissolved Solids/Nitrogen Management Plan

The studies conducted to update the TDS/Nitrogen Management Plans in the 1983 and 1995 Basin Plans were not designed to validate or revise the TDS or nitrate-nitrogen objectives for groundwater. Rather, the focus of the studies was to determine how best to meet those established objectives. During public hearings to consider adoption of the 1995 Basin Plan, a number of water supply and wastewater agencies in the region commented that the TDS and nitrate-nitrogen objectives for groundwater should be reviewed, considering the estimated cost of complying with them (several billion dollars). In response, the Regional Board identified the review of these objectives as a high Basin Plan triennial review priority, and stakeholders throughout the Region agreed to provide sufficient resources to perform the necessary studies. In December 1995, these agencies, under the auspices of the Santa Ana Watershed Project Authority (SAWPA), formed the Nitrogen/Total Dissolved Solids (TDS) Task Force (Task Force) to undertake a watershed-wide study (Nitrogen/TDS Study) to review the groundwater objectives and the TDS/Nitrogen Management Plan in the Basin Plan as a whole. SAWPA managed the study, and Risk Sciences and Wildermuth Environmental, Inc., served as project consultants. Major tasks included review of the groundwater subbasin boundaries, development of recommendations for revised boundaries, development of appropriate TDS and nitrate-nitrogen objectives for the subbasins (management zones), and update of the TDS and TIN wasteload allocations to ensure compliance with both the established objectives for the Santa Ana River and tributaries and the recommended groundwater objectives. A complete list of all tasks completed in Phases 1A & 1B and 2A & 2B is included in the Appendix. The Task Force effort resulted in substantive proposed changes to the Basin Plan, including new groundwater management zones (Chapter 3) and new nitrate-nitrogen and TDS objectives for the management zones (Chapter 4). These changes necessitated the update and revision of the TDS/Nitrogen Management Plan, which is described below.

The Task Force studies, including the technical methods employed, are documented in a series of reports (Ref. 1-5). The Task Force studies differed from prior efforts to review the TDS and nitrogen management plans in that the BPP was not utilized. A revised model approach, not involving use of the QUAL-2e model, was used to update the wasteload allocations for the Santa Ana River. The Task Force concluded that the BPP no longer remained a viable tool for water quality planning purposes, and also concluded that the development of a new model was beyond the scope and financial capabilities of the Task Force. The efficacy of modeling to formulate and update salt management plans in this Region has been well demonstrated; in the future, priority should be given to the development of a new model that would assist with future Basin Plan reviews.

III. TDS/Nitrogen Management Plan

TDS and nitrogen management in this Region involves both regulatory actions by the Regional Board and actions by other agencies to control and remediate salt problems. Regulatory actions include the adoption of appropriate TDS and nitrogen limitations in requirements issued for waste disposal and municipal wastewater recycling, and the adoption of waste discharge prohibitions. These regulatory steps are described earlier in this Chapter. Actions by other agencies include projects to improve water supply quality and the construction of groundwater desalters and brine lines to remove highly saline wastes from the watershed. The following sections discuss these programs in greater detail.

A. Water Supply Quality

Water supply quality has a direct affect on the quality of discharges from municipal wastewater treatment plants, discrete industrial discharges, returns to groundwater from homes using septic tank systems, returns from irrigation of landscaping in sewered and unsewered areas, and returns to groundwater from commercial irrigated agriculture. Water supply quality is an important determinant of the extent to which wastewater can be reused and recycled without resulting in adverse impacts on affected receiving waters. This is particularly true for TDS, since it is a conservative constituent, less likely than nitrogen to undergo transformation and loss as wastewater is discharged or recycled, and typically more difficult than nitrogen to treat and remove.

Water supplies cannot be directly regulated by the Regional Board; however, limitations in waste discharge requirements, including NPDES permits, may necessitate efforts to improve source water quality. These efforts may include drilling new wells, implementing alternative blending strategies, importing higher quality water when it is available, and constructing desalters to create or augment water supplies.

Imported water supplies are an important part of salt management strategies in the region from both a quantity and quality standpoint. Imported water is needed by many agencies to supplement local sources and satisfy ever-increasing demands. The import of high quality State Water Project water, with a long-term TDS average less than 300 mg/L, is particularly essential. The use of State Water Project water allows maximum reuse of water supplies without aggravating the mineralization problem. It is also used for recharge and replenishment to improve the quality of local water supply sources, which might otherwise be unusable. Thus, the use of high quality State Water Project water in the Region has water supply benefits that extend far beyond the actual quantity imported.

In some cases, the TDS quality of water supplies in a wastewater treatment service area may make it infeasible for the discharger to comply with TDS limits specified in waste discharge requirements. In other cases, the discharger may add chemicals that enable compliance with certain discharge limitations, but also result in TDS concentrations in excess of waste discharge requirements. The Board recognizes these problems and incorporates provisions in waste discharge requirements to address them. These and other aspects of the Board's regulatory program are described next.

B. TDS and Nitrogen Regulation

As required by the Water Code (Section 13263), the Regional Board must assure that its regulatory actions implement the Basin Plan. Waste discharge requirements must specify limitations that, when met, will assure that water quality objectives will be achieved. Where the quality of the water receiving the discharge is better than the established objectives, the Board must assure that the discharge is consistent with the state's antidegradation policy (SWRCB Resolution No. 68-16). The Regional Board must also separately consider beneficial uses, and where necessary to protect those uses, specify limitations more stringent than those required to meet established water quality objectives. Of course, these obligations apply not only to TDS and nitrogen but also to other constituents that may adversely affect water quality and/or beneficial uses.

As indicated previously, the Regional Board's regulatory program includes the adoption of waste discharge prohibitions. The Board has established prohibitions on discharges of excessively saline wastes and, in certain areas, on discharges from subsurface disposal systems (see "Waste Discharge Prohibitions," above). The Board has also adopted other requirements pertaining to the use of subsurface disposal system use, both to assure public health protection and to address TDS and nitrogen-related concerns. These include the Regional Board's "Guidelines for Sewage Disposal from Land Developments" [Ref. 6], which are hereby incorporated by reference, and the minimum lot size requirements for septic system use (see Nonpoint Source section of this Chapter).

However, the principal TDS and nitrogen regulatory tool employed by the Regional Board is the issuance of appropriate discharge requirements, in conformance with the legal requirements identified above. Several important aspects of this permitting program warrant additional discussion:

1. Salt assimilative capacity
2. Mineral increments
3. Nitrogen loss coefficients
4. TDS and nitrogen wasteload allocations
5. Wastewater reclamation
6. Special considerations – subsurface disposal systems

1. Salt Assimilative Capacity

Some waters in the Region have assimilative capacity for additions of TDS and/or nitrogen; that is, wastewaters with higher TDS/nitrogen concentrations than the receiving waters are diluted sufficiently by natural processes, including rainfall or recharge, such that the TDS and nitrogen objectives of the receiving waters are met. The amount of assimilative capacity, if any, varies depending on the individual characteristics of the waterbody in question.

The adoption of new groundwater management zone boundaries (Chapter 3) and new TDS and nitrate-nitrogen objectives for these management zones (Chapter 4), pursuant to the work of the Nitrogen/TDS Task Force, necessitated the re-evaluation of the assimilative capacity findings initially incorporated in the 1995 Basin Plan. To conduct this assessment, the Nitrogen-TDS study consultant calculated current ambient TDS and nitrate-nitrogen water quality using the same methods and protocols as were used in the calculation of historical ambient quality (see Chapter 4). The analysis focused on representing current water quality as a 20-year average for the period from 1978 through 1997. [Ref. 1]. For each management zone, current TDS and nitrate-nitrogen water quality were compared to water quality objectives (historical water quality)[1]. Assimilative capacity was also assessed relative to the "maximum benefit" objectives established for certain management zones. If the current quality of a management zone is the same as or poorer than the specified water quality objectives, then that management zone does not have assimilative capacity. If the current quality is better than the specified water quality objectives, then that management zone has assimilative capacity. The difference between the objectives and current quality is the amount of assimilative capacity available.

[1] As noted in Chapter 4, ammonia-nitrogen and nitrite-nitrogen data were also included in the analysis, where available. This occurred for a very limited number of cases and ammonia-nitrogen and nitrite-nitrogen concentrations were insignificant.

Tables 5-3 and 5-4 show the water quality objectives and the current ambient quality for TDS and nitrate-nitrogen, respectively, for each management zone. These tables also list the TDS and nitrate-nitrogen assimilative capacity of the management zones, if any. Of the thirty-seven (37) management zones, twenty-seven (27) lack assimilative capacity for TDS, and thirty (30) lack assimilative capacity for nitrate-nitrogen (this assumes the “maximum benefit” objectives are in effect). There are five (5) management zones for which there were insufficient data to calculate TDS and/or nitrate-nitrogen water quality objectives and, therefore, assimilative capacity. For regulatory purposes, these 5 management zones are assumed to have no assimilative capacity. Dischargers to these management zones may demonstrate that assimilative capacity for TDS and/or nitrate-nitrogen is available. If the Regional Board approves this demonstration, then the discharger would be regulated accordingly.

As indicated in Table 5-3, it will be assumed for most regulatory purposes that there is no assimilative capacity for TDS in the Orange County groundwater management zone. The 20 mg/L of management zone-wide TDS assimilative capacity calculated for this zone will be allocated to discharges resulting from groundwater remediation and other legacy contaminant removal projects implemented within the Orange County Management Zone.

Tables 5-3 and 5-4 show the assimilative capacity available in management zones for which “maximum benefit” objectives have been specified. As described in Chapter 4 and later in this Chapter, the application of these objectives is contingent on the implementation of certain projects and programs by specific dischargers as part of their maximum benefit demonstrations. Assimilative capacity created by these projects/programs will be allocated to the party(-ies) responsible for implementing them.

Chapter 3 delineates the Prado Basin Management Zone, and Chapter 4 identifies the applicable TDS and nitrogen objectives for this Zone (the objectives for the surface waters that flow in this Zone). No assimilative capacity exists in this zone.

These assimilative capacity findings are significant from a regulatory perspective. If there is assimilative capacity in the receiving waters for TDS, nitrogen or other constituents, a waste discharge may be of poorer quality than the objectives for those constituents for the receiving waters, as long as the discharge does not cause violation of the objectives and provided that antidegradation requirements are met. However, if there is no assimilative capacity in the receiving waters, such as the management zones identified in Tables 5-3 and 5-4, the numerical limits in the discharge requirements cannot exceed the receiving water objectives or the degradation process would be accelerated.[2] This rule was expressed clearly by the State Water Resources

[2] A discharger may conduct analyses to demonstrate that discharges at levels higher than the objectives would not cause or contribute to the violation of the established objectives. See, for example, the discussion of wasteload allocations for discharges to the Santa Ana River and its tributaries (Section III. B. 4.) If the Regional Board approves this demonstration, then the discharger would be regulated accordingly.

Control Board in a decision regarding the appropriate TDS discharge limitations for the Rancho Caballero Mobilehome park located in the Santa Ana Region (Order No. 73-4, the so called "Rancho Caballero decision") [Ref. 7]. However, this rule is not meant to restrict overlying agricultural irrigation, or similar activities, such as landscape irrigation. Even in management zones without assimilative capacity, groundwater may be pumped, used for agricultural purposes in the area and returned to the management zone from which it originated.

In regulating waste discharges to waters with assimilative capacity, the Regional Board will proceed as follows. (see also Section III.B.6., Special Considerations – Subsurface Disposal Systems).

If a discharger proposes to discharge wastes that are at or below (i.e., better than) the current ambient TDS and/or nitrogen water quality, then the discharge will not be expected to result in the lowering of water quality, and no antidegradation analysis will be required. TDS and nitrogen objectives are expected to be met. Such discharges clearly implement the Basin Plan and the Board can permit them to proceed. Of course, other pertinent requirements, such as those of the California Environmental Quality Act (CEQA) must also be satisfied. For groundwater management zones, current ambient quality is as defined in Table 5-3 and Table 5-4, or as these Tables may be revised (through the Basin Plan amendment process) pursuant to the detailed monitoring program to be conducted by dischargers in the watershed (see Section V., Salt Management Plan – Monitoring Program Requirements).

If a discharger proposes to discharge wastes that exceed the current ambient TDS and/or nitrogen quality, then the Board will require the discharger to conduct an appropriate antidegradation analysis. The purpose of this analysis will be to demonstrate whether and to what extent the proposed discharge would result in a lowering of ambient water quality in affected receiving waters. That is, to what extent, if any, would the discharge use available assimilative capacity. If the discharger demonstrates that no lowering of water quality would occur, then antidegradation requirements are met, water quality objectives will be achieved, and the Regional Board can permit such discharges to proceed. If the analysis indicates that a lowering of current ambient water quality would occur, other than on a minor or temporally or spatially limited basis, then the discharger must demonstrate that: (1) beneficial uses would continue to be protected and the established water quality objectives would be met; and (2) that the resultant water quality would be consistent with maximum benefit to the people of California; and, (3) that best practicable treatment or control has been implemented. Best practical treatment or control means levels that can be achieved using best efforts and reasonable control methods. For affected receiving waters, the discharger must estimate the amount of assimilative capacity that would be used by the discharger. The Regional Board would employ its discretion in determining the amount of assimilative capacity that would be allocated to the discharger. Rather than allocating assimilative capacity, the Regional Board may require the discharger to mitigate or offset discharges that would result in the lowering of water quality.

Again, discharges to waters without assimilative capacity for TDS and/or nitrogen must be held to the objectives of the affected receiving waters (with the caveat identified in footnote 3 previous page). In some cases, compliance with management zone TDS objectives for discharges to waters without assimilative capacity may be difficult to achieve. Poor quality water supplies or the need to add certain salts during the treatment process to achieve compliance with other discharge limitations (e.g., addition of ferric chloride) could render compliance with strict TDS limits very difficult. The Regional Board addresses such situations by providing dischargers with the opportunity to participate in TDS offset programs, such as the use of desalters, in lieu of compliance with numerical TDS limits. These offset provisions are incorporated into waste discharge requirements. Provided that the discharger takes all reasonable steps to improve the quality of the waters influent to the treatment facility (such as through source control or improved water supplies), and provided that chemical additions are minimized, the discharger can proceed with an acceptable program to offset the effects of TDS discharges in excess of the permit limits.

Similarly, compliance with the nitrate-nitrogen objectives for groundwaters specified in this Plan would be difficult in many cases. Offset provision may apply to nitrogen discharges as well.

An alternative that dischargers might pursue in these circumstances is revision of the TDS or nitrogen objectives, through the Basin Plan amendment process. Consideration of less stringent objectives would necessitate comprehensive antidegradation review, including the demonstrations that beneficial uses would be protected and that water quality consistent with maximum benefit to the people of the State would be maintained. As discussed in Chapter 4 and later in this Chapter, a number of dischargers have pursued this “maximum benefit objective” approach, leading to the inclusion of “maximum benefit” objectives and implementation strategies in this Basin Plan. Discharges to areas where the “maximum benefit” objectives apply will be regulated in conformance with these implementation strategies. Any assimilative capacity created by the maximum benefit programs will be allocated to the parties responsible for implementing them.

Table 5-3
Total Dissolved Solids (TDS) Assimilative Capacity Findings

Management Zone	Water Quality Objective (mg/L)	Current Ambient (mg/L)	Assimilative Capacity (mg/L)
UPPER SANTA ANA RIVER BASIN			
Beaumont – “max benefit” [3]	330	290	40
Beaumont – “antideg”	230	290	None
Bunker Hill A	310	350	None
Bunker Hill B	330	260	70
Colton	410	430	None
Chino North – “max benefit”	420	300	120
Chino 1 – “antideg”	280	310	None
Chino 2 – “antideg”	250	300	None
Chino 3 – “antideg”	260	280	None
Chino South	680	720	None
Chino East	730	760	None
Cucamonga – “max benefit” [3]	380	260	120
Cucamonga – “anti-deg”	210	260	None
Lytle	260	240	20
Rialto	230	230	None
San Timoteo – “max benefit” [3]	400	300	100
San Timoteo – “anti-deg”	300	300	None
Yucaipa – “max benefit” [3]	370	330	40
Yucaipa – “antideg”	320	330	None
MIDDLE SANTA ANA RIVER BASIN			
Arlington	980	--[1]	None
Bedford	--[1]	--[1]	None
Coldwater	380	380	None
Elsinore	480	480	None
Lee Lake	--[1]	--[1]	None
Riverside A	560	440	120
Riverside B	290	320	None
Riverside C	680	760	None
Riverside D	810	--[1]	None
Riverside E	720	720	None
Riverside F	660	580	80
Temescal	770	780	None
Warm Springs	--[1]	--[1]	None
SAN JACINTO RIVER BASINS			
Canyon	230	220	10
Hemet South	730	1030	None
Lakeview – Hemet North	520	830	None
Menifee	1020	3360	None
Perris North	570	750	None
Perris South	1260	3190	None
San Jacinto Lower	520	730	None
San Jacinto Upper	320	370	None
LOWER SANTA ANA RIVER BASINS			
Irvine	910	910	None
La Habra	--[1]	--[1]	None
Orange County[2]	580	560	None[2]
Santiago	--[1]	--[1]	None

[1] Not enough data to estimate TDS concentrations; management zone is presumed to have no assimilative capacity. If assimilative capacity is demonstrated by an existing or proposed discharger, that discharge would be regulated accordingly.

[2] For the purposes of regulating discharges other than those associated with projects implemented within the Orange County Management Zone to facilitate remediation projects and/or to address legacy contamination, no assimilative capacity is assumed to exist

.[3] Assimilative capacity created by “maximum benefit” objectives is allocated solely to agency(ies) responsible for “maximum benefit” implementation (see Section VI.).

Table 5-4

Nitrate Nitrogen (NO_3-N) Assimilative Capacity Findings

Management Zone	Water Quality Objective (mg/L)	Current Ambient (mg/L)	Assimilative Capacity (mg/L)
UPPER SANTA ANA RIVER BASINS			
Beaumont – “max benefit” [3]	5.0	2.6	2.4
Beaumont – “antideg”	1.5	2.6	None
Bunker Hill A	2.7	4.5	None
Bunker Hill B	7.3	5.5	1.8
Colton	2.7	2.9	None
Chino North – “max benefit” [3]	5.0	7.4	None
Chino 1 – “antideg”	5.0	8.4	None
Chino 2 – “antideg”	2.9	7.2	None
Chino 3 – “antideg”	3.5	6.3	None
Chino South	4.2	8.8	None
Chino East	10	29.1	None
Cucamonga – “max benefit” [3]	5.0	4.4	0.6
Cucamonga – “anti-deg”	2.4	4.4	None
Lytle	1.5	2.8	None
Rialto	2.0	2.7	None
San Timoteo – “max benefit” [3]	5.0	2.9	2.1
San Timoteo – “anti-deg”	2.7	2.9	None
Yucaipa – “max benefit” [3]	5.0	5.2	None
Yucaipa – “antideg”	4.2	5.2	None
MIDDLE SANTA ANA RIVER BASINS			
Arlington	10.0	--[1]	None
Bedford	--[1]	--[1]	None
Coldwater	1.5	2.6	None
Elsinore	1.0	2.6	None
Lee Lake	--[1]	--[1]	None
Riverside A	6.2	4.4	1.8
Riverside B	7.6	8.0	None
Riverside C	8.3	15.5	None
Riverside D	10.0	--[1]	None
Riverside E	10.0	14.8	None
Riverside F	9.5	9.5	None
Temescal	10.0	13.2	None
Warm Springs	--[1]	--[1]	None
SAN JACINTO RIVER BASINS			
Canyon	2.5	1.6	0.9
Hemet South	4.1	5.2	None
Lakeview – Hemet North	1.8	2.7	None
Menifee	2.8	5.4	None
Perris North	5.2	4.7	0.5
Perris South	2.5	4.9	None
San Jacinto Lower	1.0	1.9	None
San Jacinto Upper	1.4	1.9	None
LOWER SANTA ANA RIVER BASINS			
Irvine	5.9	7.4	None
La Habra	--[1]	--[1]	None
Orange County	3.4	3.4	None
Santiago	--[1]	--[1]	None

[1] Not enough data to estimate nitrate nitrogen concentrations

[2] Assimilative capacity created by “maximum benefit” objectives is allocated solely to agency(ies) responsible for “maximum benefit” implementation (see Section VI.).

2. Mineral Increments

The fundamental philosophy of TDS management plans in Santa Ana Region Basin Plans to date has been to allow a reasonable use of the water, to treat the wastewater generated appropriately, and to allow it to flow downstream (or to lower groundwater basins) for reuse. "Reasonable use" is defined in terms of appropriate mineral increments that can be applied to water supply quality in setting discharge limitations.

The Department of Water Resources has recommended values for the maximum use incremental additions of specific ions that should be allowed through use, based on detailed study of water supplies and wastewater quality in the Region [Ref. 8]. Their recommendations are as follows:

Sodium	70 mg/L
Sulfate	40 mg/L
Chloride	65 mg/L
TDS	250 mg/L
Total Hardness	30 mg/L

These mineral increments were incorporated into the 1983 Basin Plan. They will be incorporated into waste discharge requirements when appropriate and necessary.

3. Nitrogen Loss Coefficients

The Regional Board's regulatory program has long recognized that some nitrogen transformation and loss can occur when wastewater is discharged to surface waters or reused for landscape irrigation. For example, the Total Inorganic Nitrogen (TIN) wasteload allocation adopted for the Santa Ana River in 1991 included unidentified nitrogen losses in the surface flows in Reach 3 of the River. Waste discharge requirements have allowed for nitrogen losses due to plant uptake when recycled water is used for irrigation.

In contrast, nitrogen has been considered a conservative constituent in the subsurface, not subject to significant transformation or loss, and no such losses have been identified or assumed for regulatory purposes.

One of the tasks included in the Nitrogen/TDS Task Force studies leading to the 2004 update of the N/TDS Management Plan was the consideration of subsurface transformation and loss. One objective of this task was to determine whether dischargers might be required to incur costs for additional treatment to meet the new groundwater management zone nitrate-nitrogen objectives (Chapter 4), or whether natural, subsurface nitrogen losses could achieve any requisite reductions. The second objective was to develop a nitrogen loss coefficient that could be used with certainty to develop appropriate limits for nitrogen discharges throughout the Region.

To meet these objectives, the Nitrogen/TDS study consultant, Wildermuth

Environmental, Inc. (WEI), evaluated specific recharge operations (e.g., the Orange County Water District recharge ponds overlying the Orange County Forebay), wastewater treatment wetlands (e.g., the Hidden Valley Wildlife Area, operated by the City of Riverside) and Santa Ana River recharge losses (for the Santa Ana River, water quality in reaches where recharge is occurring ("losing" reaches) was compared with local well data). In each case, WEI evaluated long-term (1954 to 1997) nitrogen surface water quality data and compared those values to long-term nitrogen data for adjacent wells.

Based on this evaluation, a range of nitrogen loss coefficients was identified. [Ref. 1] In light of this variability, the N/TDS Task Force recommended that a conservative approach to be taken in establishing a loss coefficient. The Task Force recommended that a region-wide default nitrogen loss of 25% be applied to all discharges that affect groundwater in the Region. The Task Force also recommended that confirmatory, follow-up monitoring be required when a discharger requested and was granted the application of a nitrogen loss coefficient greater than 25%, based on site-specific data submitted by that discharger.

The City of Riverside also presented data to the Task Force regarding nitrogen transformation and losses associated with wetlands. These data support a nitrogen loss coefficient of 50%, rather than 25%, for the lower portions of Reach 3 of the Santa Ana River that overlie the Chino South groundwater management zone. [Ref. 9]. In fact, the data indicate that nitrogen losses from wetlands in this part of Reach 3 can be greater than 90%. However, given the limited database, the Task Force again recommended a conservative approach, i.e., 50% in this area, with confirmatory monitoring.

The 25% and, where appropriate, 50% nitrogen loss coefficients will be used in developing nitrogen discharge limits. These coefficients will be applied to discharges that affect groundwater management zones with and without assimilative capacity.

For discharges to groundwater management zones with assimilative capacity, the TIN discharge limitation would be calculated as follows:

$$\text{TIN Discharge Limit (mg/)} = \frac{\text{management zone nitrate-nitrogen current ambient water quality}}{(1 - \text{nitrogen loss coefficient})}$$

The Regional Board will employ its discretion in specifying a higher TIN limit that would allocate some of the available assimilative capacity.

For discharges to groundwater management zones without assimilative capacity, the TIN discharge limitation would be calculated as follows:

$$\text{TIN Discharge Limit (mg/)} = \frac{\text{management zone nitrate-nitrogen water ambient water quality}}{\text{(1- nitrogen loss coefficient)}}$$

These coefficients do not apply to discharges specifically addressed by the TIN wasteload allocation, described in the next section, since surface and subsurface nitrogen losses were accounted for in developing this allocation.

4. TDS and Nitrogen Wasteload Allocations for the Santa Ana River

Wasteload allocations for regulating discharges of TDS and total inorganic nitrogen (TIN) to the Santa Ana River, and thence to groundwater management zones recharged by the River, are an important component of salt management for the Santa Ana Basin. As described earlier, the Santa Ana River is a significant source of recharge to groundwater management zones underlying the River and, downstream, to the Orange County groundwater basin. The quality of the River thus has a significant effect on the quality of the Region's groundwater, which is used by more than 5 million people. Control of River quality is appropriately one of the Regional Board's highest priorities.

Sampling and modeling analyses conducted in the 1980's and early 1990's indicated that the TDS and total nitrogen water quality objectives for the Santa Ana River were being violated or were in danger of being violated. Under the Clean Water Act (Section 303(d)(1)(c); 33 USC 466 *et seq.*), violations of water quality objectives for surface waters must be addressed by the calculation of the maximum wasteloads that can be discharged to achieve and maintain compliance. Accordingly, TDS and nitrogen wasteload allocations were developed and included in the 1983 Basin Plan. The nitrogen wasteload allocation was updated in 1991; an updated TDS wasteload allocated was included in the 1995 Basin Plan when it was adopted and approved in 1994/1995.

The wasteload allocations distribute a share of the total TDS and TIN wasteloads to each of the discharges to the River or its tributaries. The allocations are implemented principally through TDS and nitrogen limits in waste discharge requirements issued to municipal wastewater treatment facilities (Publicly Owned Treatment Works or POTWs) that discharge to the River, either directly or indirectly[3]. Nonpoint source inputs of TDS and nitrogen to the River are also considered in the development of these wasteload allocations. Controls on these inputs are more difficult to identify and achieve and may be addressed through the areawide stormwater permits issued to the counties by the Regional Board or through other programs. For example, the Orange County Water District has constructed and operates more than 400 acres of wetlands ponds in the

[3] With some exceptions that may result from groundwater pumping practices, the ground and surface waters in the upper Santa Ana Basin (upstream of Prado Dam) eventually enter the Santa Ana River and flow through Prado Dam. Discharges to these waters will therefore eventually affect the quality of the River and must be regulated so as to protect both the immediate receiving waters and other affected waters, including the River.

Prado Basin Management Zone to remove nitrogen in flows diverted from, and then returned to, the Santa Ana River.

Because of the implementation of these wasteload allocations, the Orange County Water District wetlands and other measures, the TDS and TIN water quality objectives for the Santa Ana River at Prado Dam are no longer being violated, as shown by annual sampling of the River at the Dam by Regional Board staff [Ref. 10A]. However, as part of the Nitrogen/TDS Task Force studies to update the TDS/nitrogen management plan for the Santa Ana Basin, a review of the TDS and TIN wasteload allocations initially contained in this Basin Plan was conducted. In part, this review was necessary in light of the new groundwater management zones and TDS and nitrate-nitrogen objectives for those zones recommended by the N/TDS Task Force (and now incorporated in Chapters 3 and 4). The wasteload allocations were evaluated and revised to ensure that the POTW discharges would assure compliance with established surface water objectives and would not cause or contribute to violation of the groundwater management zone objectives. The Task Force members also recognized that this evaluation was necessary to determine the economic implications of assuring conformance with the new management zone objectives. Economics is one of the factors that must be considered when establishing new objectives (Water Code Section 13241).

WEI performed the wasteload allocation analysis for both TDS and TIN [Ref. 3, 5], In contrast to previous wasteload allocation work, the QUAL-2e model was not used for this analysis. Further, the Basin Planning Procedure (BPP) was not used to provide relevant groundwater data. Instead, WEI developed a projection tool using a surface water flow/quality model and a continuous-flow stirred-tank reactor (CFSTR) model for TDS and TIN. The surface water Waste Load Allocation Model (WLAM) is organized into two major components – RUNOFF (RU) and ROUTER (RO). RU computes runoff from the land surface and RO routes the runoff estimated with RU through the drainage system in the upper Santa Ana watershed. Both the RU and RO models contain hydrologic, hydraulic and water quality components.

To ensure that all hydrologic regimes were taken into account, hydrologic and land use data from 1950 through 1999 were used in the analysis. The analysis took into account the TDS and nitrogen quality of wastewater discharges, precipitation and overland runoff, instream flows and groundwater. Off-stream and in-stream percolation rates, rising groundwater quantity and quality, and the 25% and 50% nitrogen loss coefficients described in the preceding section were also factored into the analysis. The purpose of the modeling exercise was to estimate discharge, TDS and TIN concentrations in the Santa Ana River and tributaries and in stream bed recharge. These data were then compared to relevant surface and groundwater quality objectives to determine whether changes in TDS and TIN regulation were necessary.

Discharges from POTWs to the Santa Ana River or its tributaries were the focus of the analysis. POTW discharges to percolation ponds were not considered. The wasteload allocation analysis assumed, correctly, that these direct groundwater discharges will be regulated pursuant to the management zone objectives, findings of assimilative capacity and nitrogen loss coefficients identified in Chapter 4 and earlier in this Chapter.

The surface waters evaluated included the Santa Ana River, Reaches 3 and 4, ChinoCreek, Cucamonga/Mill Creek and San Timoteo Creek. Management zones that are directly under the influence of these surface waters and that receive wastewater discharges were evaluated. These included the San Timoteo, Riverside A, Chino South, and Orange County Management Zones[4]. In addition, wastewater discharges to the Prado Basin Management Zone were also evaluated.

WEI performed three model evaluations in order to assess wasteload allocation scenarios through the year 2010. These included a “baseline plan” and two alternative plans (“2010-A” and “2010-B”). The baseline plan generally assumed the TDS and TIN limits and design flows for POTWs specified in waste discharge requirements as of 2001. These limits implemented the wasteload allocations specified in the 1995 Basin Plan when it was approved in 1995. A TDS limit of 550 mg/L was assumed for the Rapid Infiltration and Extraction Facility (RIX) and the analysis assumed a 540 mg/L TDS for the City of Beaumont. The baseline plan also assumed reclamation activities at the level specified in the 1995 Basin Plan, when it was approved. The purpose of the baseline plan assessment was to provide an accurate basis of comparison for the results of evaluation of the two alternative plans. For alternative 2010-A, it was generally assumed that year 2001 discharge effluent limits for TDS and TIN applied to POTW discharges, but projected year 2010 surface water discharge amounts were applied. TDS limits of 550 mg/L and 540 mg/L were again assumed for RIX and the City of Beaumont discharges. The same limited reclamation and reuse included in the baseline plan was assumed (see Table 5-7 in Section III.B.5.). For alternative 2010-B, POTW discharges were also generally limited to the 2001 TDS and TIN effluent limits (RIX was again held to 550 mg/L and Beaumont to 540 mg/L). However, in this case, large increases in wastewater recycling and reuse were assumed (Table 5-7), resulting in the reduced surface water discharges projected for 2010.

Analysis of the model results demonstrated that the TDS and nitrogen objectives of affected surface waters would be met and that water quality consistent with the groundwater management zone objectives would be achieved under both alternatives. It is likely that water supply and wastewater agencies will implement reclamation projects with volumes that are in the range of the two alternatives. The wasteload allocations would be protective throughout the range of surface water discharges identified. The year 2010 flow values are not intended as limits on POTW flows; rather, these flows were derived from population assumptions and agency estimates and are

[4] The City of Beaumont discharges to Coopers Creek in a subunit of the Beaumont Management Zone. However, for analytical and regulatory purposes, it is considered a discharge to the San Timoteo Management Zone since it enters that Management Zone essentially immediately. Recharge of wastewater discharges by YVWD and Beaumont in downgradient management zones that may be affected by surface water discharges (e.g., Bunker Hill B, Colton), is not expected to be significant. Therefore, these management zones were not evaluated as part of the wasteload allocation analysis.

used in the models for quality projections. Surface water discharges significantly different than those projected will necessitate additional model analyses to confirm the propriety of the allocations.

The wasteload allocations for TDS and TIN are specified in Table 5-5. Allocations based on the 2010-A and 2010-B alternatives are shown for both TDS and TIN to reflect the expected differences in surface water discharge flows that would result from variations in the amount of wastewater recycling actually accomplished in the Region. As shown in this Table, irrespective of these differences, the TDS and TIN allocations remain the same.

It is essential to point out that the wasteload allocations in Table 5-5 will be not be used to specify TDS and TIN effluent limitations for wastewater recycling (reuse for irrigation) and recharge by the listed POTWs, but will be applied only to the surface water discharges by these POTWs to the Santa Ana River and its tributaries. TDS and TIN limitations for wastewater recycling and recharge by these POTWs will be based on the water quality objectives for affected groundwater management zones or, where appropriate, surface waters. These limitations are likely to be different than the wasteload allocations specified in Table 5-5.

For most dischargers, the allocations specified in Table 5-5 are the same as those specified in the prior 1995 Basin Plan TDS and TIN wasteload allocations. However, for certain dischargers, two sets of TDS and TIN wasteload allocations are shown in Table 5-5. One set is based on the assumption that the “maximum benefit” objectives defined in Chapter 4 for the applicable groundwater management zones are in effect. The other set of wasteload allocations applies if maximum benefit is not demonstrated and the antidegradation objectives for these management zones are therefore in effect. Maximum benefit implementation is described in Section VI. of this Chapter.

In addition, in contrast to the prior wasteload allocations, a single wasteload allocation for TDS and TIN that would be applied on a flow-weighted average basis to all of the treatment plants operated by the Inland Empire Utilities Agency as a whole is specified. These allocations are based on the water quality objectives for Chino Creek, Reach 1B (550 mg/L TDS and 8 mg/L TIN), to which the IEUA discharges occur, directly or indirectly. As described in Section VI, IEUA proposes to implement a “maximum benefit” program to support the implementation of the “maximum benefit” TDS and nitrate-nitrogen objectives for the Chino North and Cucamonga Management Zones. Separate “maximum benefit” and “antidegradation” wasteload allocations are not necessary for IEUA, as they are for YVWD and Beaumont. This is because the IEUA wasteload allocations are based solely on the Chino Creek objectives and are not contingent on “maximum benefit” objectives or implementation. The IEUA surface water discharges do not affect the groundwater management zones for which “maximum benefit” objectives are to be implemented.

Finally, the TDS wasteload allocation for the RIX facility is less stringent (550 mg/L) than the prior wasteload allocation. The new allocation will assure beneficial use protection and will not result in a significant lowering of water quality. As such, it is consistent with antidegradation requirements. Given this, the less stringent effluent limitation can be specified pursuant to the exception to the prohibition against backsliding established in the Clean Water Act, Section 303(d)(4)(a).

In most cases, the surface water discharges identified in Table 5-5 will affect or have the potential to affect groundwater management zones without assimilative capacity for TDS and/or nitrogen. As discussed earlier in this section, the lack of assimilative capacity normally dictates the application of the water quality objectives of the affected receiving waters as the appropriate waste discharge limitations. However, as shown in Table 5-5, the TIN and, in some cases, TDS wasteload allocations for these discharges exceed the objectives for these management zones. This is because the wasteload allocation analysis conducted by WEI demonstrated that POTW discharges at these higher-than-objective levels will not result in violations of the TDS and nitrate-nitrogen objectives of the affected management zones, or surface waters. Accordingly, these wasteload allocations will be used for surface water discharge regulatory purposes, rather than the underlying groundwater management zone objectives. If the extensive monitoring program to be conducted by the dischargers (see Salt Management Plan – Monitoring Program Requirements, below) indicates that this strategy is not effective, then this regulatory approach will be revisited and revised accordingly.

Table 5-5

Alternative Wasteload Allocations through 2010
based on “Maximum Benefit” or “Antidegradation” Water Quality[1]

Publicly Owned Treatment Works (POTW)	Alternative 2010A – Reclamation in 1995 Basin Plan			Alternative 2010B – Reclamation Plans Advocated by POTWs/others		
	Surface Water Discharge (MGD)	TDS (mg/L)	TIN (mg/L)	Surface Water Discharge (MGD)	TDS (mg/L)	TIN (mg/L)
Beaumont – “max benefit” [2]	2.3	490	6.0	1.0	490	6.0
Beaumont – “antideg” [2, 3]	2.3	320[3]	4.1[3]	1.0	320[3]	4.1[3]
YVWD – Wochholz – “max benefit”	5.7	540	6.0	0.0	540	6.0
YVWD – Wochholz – “antideg” [3]	5.7	320[3]	4.1[3]	0.0	320[3]	4.1[3]
Rialto	12.0	490	10.0	10.0	490	10.0
RIX	49.4	550	10.0	28.2	550	10.0
Riverside Regional WQCP	35.0	650	13.0	26.1	650	13.0
Western Riverside Co. WWTP	4.4	625	10.0	3.3	625	10.0
EMWD[4]	43	650	10.0	6.0	650	10.0
EVMWD – Lake Elsinore Regional	7.2	700	13.0	2.0	700	13.0
Lee Lake WRF	1.6	650	13.0	1.6	650	13.0
Corona WWTP # 1	3.6	700	10.0	2.0	700	10.0
Corona WWTP # 2	0.2	700	10.0	0.5	700	10.0
Corona WWTP # 3	2.0	700	10.0	0.5	700	10.0
IEUA Facilities [5]	80.0	550	8.0	37.4	550	8.0

1. “Antidegradation” wasteload allocation is the default allocation if the Regional Board determines that “maximum benefit” commitments are not being met.
2. Beaumont discharges to Coopers Creek, a tributary of San Timoteo Creek, Reach 4, it is a *de facto* discharge to San Timoteo Creek/San Timoteo Management Zone.
3. “Antidegradation” wasteload allocations for City of Beaumont and YVWD based on additional model analysis performed by WEI (WEI, October 2002).
4. EMWD discharges are expected to occur only during periods of wet weather.
5. IEUA facilities include the RP#1, Carbon Canyon WRP, RP#4 and RP#5; These facilities are to be regulated as a bubble (see text).

Ammonia

Total inorganic nitrogen is used for regulatory purposes in wasteload allocations and surface water discharge limits. It is the sum of nitrate, nitrite and ammonia. Ammonia dissociates under certain conditions to the toxic un-ionized form. Thus, nitrogen discharges to the Santa Ana River and other surface waters pose a threat to aquatic life and instream beneficial uses, as well as to the beneficial uses of affected groundwater.

Un-ionized ammonia objectives are specified in Chapter 4 of this Basin Plan for warmwater aquatic habitats, such as the Santa Ana River system. Table 5-6 specifies the ammonia limits necessary to achieve these objectives. These limits were derived using QUAL2E, the Colorado Ammonia Model, water quality data on the River and effluent quality.

The un-ionized ammonia objectives have not been approved by the United States Environmental Protection Agency (USEPA), which recommends that the objectives be reviewed and revised based on the Agency's revised national ammonia criteria. A review of the un-ionized ammonia objectives is included in the Regional Board's 2002 Triennial Review Priority List. Any revised objectives and revised ammonia effluent limits needed to achieve the revised objectives will be incorporated in future amendments to this Plan once the requisite review is completed.

Table 5-6
Effluent Limits for Total Ammonia Nitrogen[1]

Discharge Location	Effluent Limit - Total Ammonia Nitrogen[2] (mg/L)	
	Year 1995	Year 2000
San Timoteo Wash	5.0	4.5
Santa Ana River - Reach 4	5.0	4.5
Santa Ana River - Reach 3	5.0	5.0
Chino Creek	5.0	4.5
Mill Creek (Prado Area)	5.0	4.5
Temescal Creek	5.0	4.5
Other **WARM** designated waterbodies	Determined on a case-by-case basis	

1 Total Ammonia Nitrogen Wasteload Allocation is specified in order to meet the site-specific Santa Ana River un-ionized ammonia objective (See Chapter 4).

2 Total Ammonia Nitrogen = Un-ionized Ammonia Nitrogen (NH_3-N) Ammonium Nitrogen (NH_4^+-N).

5. Wastewater Reclamation

Reclamation of wastewater for reuse (recycled water) is an important feature of wastewater and water management for the Santa Ana Region. The California Legislature has declared the primary interest of the people of California in the development of facilities to recycle wastewater to supplement existing water supplies and to meet future water demands (Water Code Section 13510-13512). State policy (State Board Resolution No. 77-1) affirms this commitment to encourage recycled water use. However, because reclamation projects tend to add to the salt balance problem in the Region, they must be carefully planned and implemented. The significant benefits that result from such projects, include:

- The total water supply can be effectively increased, reducing the need for imports;

- Wastewater treatment costs can be reduced in some cases. Meeting the level of treatment required for discharge to surface waters may be more expensive than treating the effluent for use in irrigation;

- Stream flows can be established or enhanced, providing aquatic riparian habitat and allowing recreation and other beneficial uses of the stream;

- Downstream delivery commitments can often be met by discharges of appropriately treated wastewater.

Concerns related to wastewater reclamation projects include:

1. Mineral Quality Effects

The mineral quality of the receiving water (surface or groundwater) can be adversely affected. Each cycle of water use increases the salinity of the water. The amount of the increase depends on the type of use; normal domestic use generally adds 200-300mg/L of TDS to the initial concentration. Agricultural use generally doubles the salinity, while industrial uses most often degrade water quality to a level where it may be unsuitable for discharge. Therefore, it is important that the type of reclaimed wastewater use and the likely effects on water quality be evaluated carefully prior to initiating such reuse. Certain waters in the upper Santa Ana Basin do not have assimilative capacity to accept the additional salinity that would be expected to result from reclamation.

2. Public Health Effects

Municipal wastewaters contain significant concentrations of bacteria, viruses, and organics. These wastewaters must be treated extensively to remove pathogens before they can be reclaimed. Stable organics in reclaimed water are also cause for considerable concern. Chlorination of treated wastewater effluents can produce chlorinated hydrocarbons, some of which are carcinogenic. For this reason, the California State Department of Health Services is concerned with proposals that would return a high proportion of treated wastewater effluent into domestic water supply aquifers. Adequate treatment and dilution of the wastewater is essential. The Department is developing guidelines for the purposed use of reclaimed wastewater for groundwater recharge.

Because of the high percentage of wastewater in river baseflow, the Santa Ana River Water Quality and Health (SARWQH) Study was initiated by OCWD in 1994 to evaluate the use of the Santa Ana River to recharge the Orange County groundwater basin. The goal of the SARWQH Study was to characterize the quality of the Santa Ana River water and the quality of the groundwater basin it recharges. The study included an examination of hydrogeology, microbiology, water chemistry, toxicology and public health. The results of the study indicate that current recharge practices using Santa Ana River water are protective of public health.

3. Land Use Considerations

One of the major problems facing the future of wastewater reclamation is a decrease in the total amount of agricultural land in the basin. As the population of the basin increases, commercial and residential developments eliminate agricultural land and the need for irrigation waters. Some reclaimed wastewater may be used for irrigating landscaping in the new developments, but the volume utilized will almost certainly be reduced.

4. The Prado Settlement

On October 18, 1963, the Orange County Water District filed a class action lawsuit against the water users in the upper Santa Ana Basin, seeking an adjudication of water rights against substantially all the water users in the area tributary to Prado Dam in the Santa Ana River watershed. As a result of the 1969 settlement of this case, the wastewater dischargers in the upper basin are required to provide 42,000 acre-feet at Prado Dam. This can consist of treated wastewater effluent or imported water as well as certain natural flows (*e.g.,* rising water); stormflows are not included. The amount of flow delivered is subject to adjustment based upon the TDS content of the water. Reclamation uses within the upper basin are thus limited to a degree by the need to ensure compliance with this settlement.

Wastewater is presently being reclaimed in the Santa Ana Watershed in a number of different ways:

1. Irrigation of Agricultural Land and Landscaping

Most of the direct reclamation of wastewater in the Region occurs as part of commercial agricultural and landscape irrigation, although this will change as recharge projects using recycled water are implemented (see below). This use is conducted under water reclamation requirements issued by the Regional Board, typically as part of Waste Discharge Requirements and NPDES permits. In the San Jacinto Watershed, most of the wastewater is reclaimed for agricultural uses.

2. Discharge to the Santa Ana River

Although it is not widely considered as such, discharges of treated wastewater to Reaches 3, 4 and 5 of the Santa Ana River constitute the largest single reclamation activity in the Region. These discharges make up as much as 95 percent of the river's dry weather flow and enhance the in-stream beneficial uses of the river throughout its 26-mile length (San Bernardino to Prado Dam). Essentially all of this water is recharged into the groundwater basin in Orange County

3. Groundwater Recharge by Percolation

This type of reclamation is common throughout the Region. Most wastewater treatment plants that do not discharge directly to the River discharge their effluent to percolation ponds. All of the treated wastewater in the upper Santa Ana Basin that is not directly reclaimed for commercial agricultural and landscape irrigation purposes, or discharged directly to the Santa Ana River, is returned to local or downstream groundwater management zones by percolation. In Orange County, reclaimed water is used for greenbelt and landscape irrigation, and injected into coastal aquifers to control sea water intrusion.

Significant additional reclamation activities are planned in the Region, as reflected in Table 5-7. The Chino Basin Watermaster, Inland Empire Utilities Agency, Yucaipa Valley Water District, the City of Beaumont and the San Timoteo Watershed Management Authority propose to implement extensive groundwater recharge projects using recycled water. To accommodate these projects and other water and wastewater management strategies, these agencies have made the requisite demonstrations necessary to support the "maximum benefit" TDS and nitrate-nitrogen water quality objectives specified in this Plan for certain groundwater management zones (see Chapter 4). The recharge projects will provide reliable sources of additional water supply needed to support expected development within the agencies' areas of jurisdiction. These agencies' "maximum benefit" programs are described in detail in Section VI. of this Chapter.

In Orange County, significant reclamation activities include the implementation of the Groundwater Replenishment System, a joint effort of the Orange County Water District and Orange County Sanitation District. Treated wastewater provided by the Sanitation District will receive extensive advanced treatment, including microfiltration, reverse osmosis, and disinfection using ultraviolet light and hydrogen peroxide. In the first phase of the project, approximately 70,000 acre-feet per year of highly treated recycled water will be produced and distributed to groundwater recharge facilities and to injection wells used to maintain a seawater intrusion barrier. The System will enhance both the quality and quantity of groundwater resources, the major source of water supply in the area. It will reduce the need for imported water and prevent, or at least delay, the need for an additional ocean outfall for disposal of the wastewater treated by the Sanitation District. Implementation of the GWR System will be phased. Operation of Phase 1 will begin in 2007. Future phases to expand the capacity of the GWR System are possible.

4. Dual Water Supply Systems

Given increasing demands for water supply but diminishing resources, there is great interest in using reclaimed water in office buildings and the like for flushing toilets and urinals. Clearly, the addition of this water supply source must be carefully planned and overseen to prevent public health problems. No dual systems have been implemented as yet in the upper basin; in Orange County, the Irvine Ranch Water District has implemented dual systems (a reclaimed water system in addition to a potable supply) in a number of office buildings in its service area, with the approval of the Department of Health Services and the Regional Board.

The Salt Management Plan draws a balance between the benefits and problems of reclamation by including carefully planned reclamation activities in the watershed. The Recommended Plan provides for reclamation within the upper basin, as shown in Table 5-7. All recycled water recharge projects will be regulated pursuant to the process identified in the discussion regarding assimilative capacity, and in accordance with the "maximum benefit" implementation strategies identified later in this Chapter (see section VI., Maximum Benefit Implementation Plans for Salt Management).

Recycled water used for landscape irrigation deserves special regulatory consideration. As discussed in the section on nitrogen loss coefficients, the Regional Board does not regulate nitrogen in recycled water used for landscape irrigation, recognizing the nitrogen losses that will occur as the result of plant uptake. The Nitrogen /TDS Task Force sponsored update of the TDS/Nitrogen Management Plan demonstrated that it is appropriate also to apply a 25 percent nitrogen loss coefficient to recycled water discharges applied to land to account for subsurface transformation and loss. Nitrogen losses due to plant uptake and subsurface transformation justify the Board's regulatory approach. With respect to TDS, the water quality effects of recycled water used for landscape irrigation will be evaluated on a case-by-case basis and regulated accordingly.

6. Special Considerations – Subsurface Disposal Systems

In addition to establishing prohibitions and minimum lot size requirements for the use of subsurface disposal systems for sanitary wastes, the Regional Board issues waste discharge requirements where necessary to assure the protection of water quality and public health. In most cases, these requirements have been issued for commercial and industrial facilities, including mobile home parks, RV parks and truck washing operations, where the volume of waste is high and/or there is the potential for the discharge of wastes other than domestic sewage. Waste discharge requirements for individual residential systems and low volume (less than 500 gallons per day) domestic waste discharges from industrial and commercial facilities have been largely waived, pursuant to the waiver provisions of the Water Code (see discussion of waivers in the "Implementation through Waste Discharge Requirements" section, above). These waivers are conditional and may be revoked by the Regional Board at any time.

The Board has included TDS limitations in these waste discharge requirements in order to assure that the discharges are consistent with the TDS objectives of the affected receiving waters. These limits are expressed as both a maximum value that is based on the TDS objective of the receiving water, and a value that allows a reasonable use increment of 250 mg/L TDS above water supply quality. The more restrictive of the two TDS limits controls the allowed quality of the discharges.

TDS and nitrogen contributions from domestic waste discharges to existing commercial, industrial and residential subsurface disposal systems are reflected in the determinations of current ambient ground water quality and assimilative capacity (see preceding section – B.1.) on salt assimilative capacity). These determinations were made as part of the N/TDS Task Force sponsored update of the TDS/nitrogen management plan in this Basin Plan. These contributions are expected to decline over time as these discharges are eliminated through the expansion of regional sewer systems.

Compliance with TDS limits by these facilities is particularly problematic, since these facilities typically have little or no control over the TDS quality of water supplied to them, unlike POTWs. Further, sewering of the discharges is often not an option, at least at the present time, although this is changing as rapid new development in many parts of the region continues to drive the expansion of sewer facilities. As systems expand, many of these discharges will be eliminated as they are connected to the sewers. Finally, the offset provisions that are applied to POTWs are unnecessary for existing residential commercial and industrial domestic waste discharges, given that they are addressed as part of the Regional Board's minimum lot size program for subsurface disposal systems and through the updated TDS and nitrogen management plan in this Basin Plan as part of the overlying land-use considerations and ambient water quality determinations.

Taking these factors into consideration, the waste discharge requirements that have been issued and will be updated periodically for domestic waste discharges from these existing residential, commercial and industrial facilities will include TDS requirements that specify a maximum mineral increment of 250 mg/L TDS to the water supply quality. This will assure reasonable use and prevent the disposal of highly saline wastes. Existing facilities are defined as those for which waste discharge requirements have been issued, or that have been built as of December 23, 2004.

Table 5-7
Wastewater Reclamation

Subbasin (Management Zone) Receiving Reclaimed Water	Source	Amount AF/Y 2010-A[1]	Amount AF/Y 2010-B[2]
Beaumont MZ	Beaumont, City of	250	1,500
Yucaipa MZ	Yucaipa Valley Water District	--	6,400
Bunker Hill B MZ	San Bernardino, City of and Colton, City of	117	26,200
Colton MZ	Rialto, City of	200	
Chino North MZ	IEUA RP-1	1,200	48,000
Chino North MZ	IEUA RP-2A	2,470	
Chino North MZ	IEUA RP-4	3,300	
Chino North MZ	California Institute for Men	650	650
Chino North MZ	Upland Golf Course	31	31
Temescal MZ	Corona, City of	1,000	3,100
	TOTAL	**9,218**	**86,000**

[1] wastewater reclamation assumed in 2010-A is the same as that assumed in the 1995 Basin Plan when approved in 1994/1995 (also known as Table 5-7)

[2] wastewater reclamation assumed in 2010-B as identified by POTWs (see Ref. 3, 5).

V. Other Projects and Programs

In addition to the regulatory efforts of the Regional Board described in the preceding section, water and wastewater purveyors and other parties in the watershed have implemented, and propose to implement, facilities and programs designed to address salt problems in the groundwater of the Region. These include the construction of brine lines and groundwater desalters, implementation of programs to enhance the recharge of high quality stormwater and imported water, where available, and re-injection of recycled water to maintain salt water intrusion barriers in coastal areas. These projects and programs are motivated by the need to protect and augment water supplies, as well as to facilitate compliance with waste discharge requirements.

A. Brine Lines

There are two brine line systems in the Region, the Santa Ana Regional Interceptor (SARI) and the older Chino Basin Non-Reclaimable Line (NRL). These lines are used to transport brine wastes out of the basin for treatment and disposal to the ocean. They are a significant part of industrial waste management and essential for operation of desalters in the upper watersheds. The SARI Line was constructed and is owned by SAWPA. It is approximately 93 miles of 16 inch to 84 inch pipeline connected to the Orange County Sanitation District treatment facilities. SAWPA owns capacity rights in SARI downstream of Prado Dam. The line extends from the Orange County Line near Prado Dam northeast to the San Bernardino area. Recently, the SARI Line has been extended to serve the San Jacinto Watershed. SARI Reach 5 extends up the Temescal Canyon from the City of Corona to the Eastern Municipal Water District (EMWD) brine line terminus in the Lake Elsinore area. EMWD's Menifee Desalter and other high salinity discharges from EMWD and Western Municipal Water District now have access to the brine line.

The Chino Basin Non-Reclaimable Line (NRL) is connected to the Los Angeles County Sanitation District sewer system in the Pomona area. The NRL, which is owned and operated by Inland Empire Utilities Agency, exports non-reclaimable industrial wastes and brine from the Chino Basin. It extends eastward from the Los Angeles County Line to the City of Fontana. It was originally built to serve industries including the Kaiser Steel Company and Southern California Edison Power Plants.

B. Groundwater Desalters

The studies leading to the development of the TDS/Nitrogen management plan included in this Basin Plan when it was approved in 1995 demonstrated that it was not realistic to achieve compliance with all the nitrogen and TDS objectives for the groundwater subbasins then identified within the Region. Long-term historic land use practices, particularly agriculture, have left an enormous legacy of salts that are now in the unsaturated soils overlying the groundwater subbasins (now, newly defined groundwater management zones). A significant amount of these salts will, over time, degrade groundwater quality. The programs of groundwater extraction, treatment, an replenlishment needed to completely address these historic salt loads were shown to far exceed the resources available to implement them.

While the boundaries of the groundwater management zones have been revised and new TDS and nitrate-nitrogen water quality objectives established, the salt legacy problem remains. The construction and operation of groundwater desalters to extract and treat poor quality groundwater continues to be an essential component of salt management in the Region. Such projects will be increasingly important to protect local water supplies and to provide supplemental, reliable sources of potable supplies.

A number of groundwater desalters have already been constructed, and more are planned. These facilities are described below.

1. Upper Santa Ana Basin

In the Upper Santa Ana Basin, the Santa Ana Watershed Project Authority constructed and operates the Arlington desalter. This desalter, with a capacity of about 7 MGD, treats water extracted from the Arlington Management Zone, which was heavily impacted by historic agricultural activities.

In the Chino Basin, the Chino Desalter Authority operates the Chino 1 desalter, which is planned for expansion from 8 MGD to 13 MGD capacity. Additional desalters and desalter capacity will be constructed as part of a "maximum benefit" proposal by the Chino Basin Watermaster and the Inland Empire Utilities Agency (see Section VI., Maximum Benefit Implementation Plans for Salt Management).

The City of Corona began operation of the Temescal desalter in late 2001. The desalter has a capacity of 10 MGD. The City is currently expanding the desalter by 5 MGD. It is expected to be operational in the early 2004. The product water is used to supplement current municipal supplies. The improved TDS quality of these supplies is an important part of the City's efforts to assure compliance with waste discharge requirements.

In the San Timoteo Watershed areas, desalters will be implemented as necessary for the Yucaipa and Beaumont areas, as discussed in detail in Section VI., Maximum Benefit San Timoteo Watershed Salt Management Plan.

2. San Jacinto Watershed

EMWD operates the Menifee desalter, which has a capacity of about 3 MGD. Product water is added to the EMWD municipal supply system, and the waste brine is discharged to a non-reclaimable waste disposal system that is ultimately connected to the SAWPA SARI system. The desalter extracts groundwater from the Perris South and Menifee Management Zones, both of which are adversely affected by historic salt loads contributed largely by agricultural activities.

EMWD plans to construct a desalter with capacity of about 4.5 MGD to treat poor quality water extracted from the Perris South and Lakeview/Hemet North Management Zones. The purpose of this facility is to stop subsurface migration of poor quality groundwater from the Perris South Management Zone into the Lakeview/Hemet North Management Zone.

3. Orange County

The Tustin Nitrate Removal project, which began operation in 1996, added approximately 3,000 acre-feet of water annually to Tustin's domestic water supply. Treatment systems employing reverse osmosis and ion exchange are operating at two wells that had been shut down because of excessive nitrate concentrations. The Orange County Water District and Irvine Ranch Water District (IRWD) are moving forward with the Irvine Desalter, a dual-purpose regional groundwater remediation and water supply project located in the City of Irvine and its sphere of influence. The project consists of an extensive seven-well groundwater extraction and collection system, a treatment system, a five-mile brine disposal pipeline, a finished water delivery system, and ancillary facilities. While providing approximately 6,700 acre-feet per year to IRWD for potable supply, the desalter will extract and treat brackish groundwater and capture an overlapping regional plume of TCE-contaminated groundwater demonstrated to have originated from the U.S. Marine Corps Air Station-El Toro.

C. Recharge of Stormwater and/or Imported Water

The Orange County Water District, San Bernardino Valley Water Conservation District and other agencies in the Region operate extensive facilities designed to enhance the capture and recharge of high quality stormwater. More such facilities are planned as part of "maximum benefit" proposals by the Chino Basin Watermaster/Inland Empire Utilities Agency, Yucaipa Valley Water District, San Timoteo Watershed Management Authority and the City of Beaumont (Section VI., Maximum Benefit Implementation Plans for Salt Management). These proposals also include efforts to import and recharge high quality State Water Project water, when it is available. These activities increase both the quantity and quality of available groundwater resources.

D. Sea Water Intrusion Barriers

The Orange County Water District operates advanced facilities designed to provide significantly enhanced tertiary treatment of secondary treated municipal wastewater from the Orange County Sanitation District's (Sanitation District) Fountain Valley Reclamation Plant No. 1. The recycled water is injected into a series of wells located along Ellis Avenue in the City of Fountain Valley to maintain the Talbert Gap Seawater Intrusion Barrier. The treatment facility, currently known as Water Factory 21, will be supplanted by the Groundwater Replenishment System (GWRS) being constructed jointly by Orange County Water District and the Sanitation District (see preceding section on wastewater reclamation).

V. Salt Management Plan -- Monitoring Program Requirements

California Water Code Section 13242 specifies that Basin Plan implementation plans must contain a description of the monitoring and surveillance programs to be undertaken to determine compliance with water quality objectives. The adoption of new groundwater TDS and nitrate-nitrogen water quality objectives (Chapter 4) in response to the studies sponsored by the N/TDS Task Force triggered the need to develop and implement a new, watershed-wide nitrogen/TDS monitoring program. The Task Force provided additional impetus for this comprehensive monitoring program. The Task Force recommended that future review and update of the salt management plan, including findings of assimilative capacity, appropriate changes to the wasteload allocations, etc., should be based on real-time data obtained through a rigorous monitoring program, rather than on model projections. As discussed earlier (see Section II., Update of the Total Dissolved Solids/Nitrogen Management Plan), the Task Force concluded that the development of new, workable modeling tools to assist in this review was beyond the scope and financial capability of the Task Force.

The monitoring program must consist of both surface water and groundwater components. Some of these are already being implemented, including the annual sampling of the Santa Ana River, Reach 3 at Prado Dam by Regional Board staff (see Chapter 4 and below). Certain agencies have committed to conduct monitoring of specific water bodies as part of their "maximum benefit" proposals (see Section VI., Maximum Benefit Implementation Plans for Salt Management, below). The N/TDS Task Force members, and other parties as appropriate, will be required to propose a comprehensive monitoring program that would integrate these existing commitments with other monitoring recommendations. These parties will be required to implement this program upon approval by the Regional Board.

A. Surface Water Monitoring Program Requirements for TDS and Nitrogen

Implementation of a surface water monitoring program is needed to determine compliance with the nitrogen and TDS objectives of the Santa Ana River, and thereby, the effectiveness of the wasteload allocations. It is also needed to provide data required to evaluate the effects of surface water discharges on affected groundwater management zones. In particular, data are needed to confirm the validity of the 50% nitrogen loss coefficient that will be applied in regulating discharges to that part of Reach 3 of the River that overlies the Chino South groundwater management zone (see Section III.B.3., Nitrogen loss coefficients).

As discussed in Chapter 4, the Basin Plan specifies baseflow TDS and total nitrogen objectives for Reach 3 of the River. For Reach 2, a TDS objective based on a five-year moving average of the annual TDS concentration is specified. Use of this moving average allows the effects of wet and dry years to be integrated over the five-year period and reflects the actual long-term quality of water recharged by Orange County Water District downstream of Prado Dam.

The Basin Plan specifies a monitoring program to determine compliance with the Reach 3 baseflow objectives at Prado Dam (see Chapter 4). As noted above, Regional Board staff conducts this program on an annual basis. Measurement of baseflow quality, rather than the quality of flows in Reach 2, has long been used to indicate the effects of recharge of Santa Ana River flows on Orange County groundwater. The efficacy of this approach was evaluated as part of the 2004 update of the TDS/nitrogen management plan in the Basin Plan. Insufficient data were available to draw a direct correlation between the long-term TDS and nitrogen quality of River flows at Prado Dam and that of affected Orange County groundwater. However, the conclusion drawn was that reliance on the Reach 3 baseflow objectives to protect Orange County groundwater, and the existing monitoring program designed to measure compliance, is adequate.

In addition to this baseflow sampling program and the surface water monitoring commitments associated with certain agencies' "maximum benefit" programs, the comprehensive monitoring program to be proposed and implemented by the Task Force members, and other agencies as appropriate, must include an evaluation of compliance with the TDS and nitrogen objectives for Reaches 2, 4 and 5 of the Santa Ana River. Compliance with the Reach 2 TDS objective can be determined by evaluation of data collected by the Santa Ana River Watermaster, Orange County Water District, the United States Geological Survey, and others.

Surface water monitoring program requirements for TDS and nitrogen are as follows:

1. No later than March 23, 2005, Orange County Water District, Inland Empire Utilities Agency, Chino Basin Watermaster, City of Riverside, City of Corona, Elsinore Valley Municipal Water District, Eastern Municipal Water District, City of Colton, City of San Bernardino Municipal Water Department, Jurupa Community Services District, Western Riverside County Regional Wastewater Authority, Lee Lake Water District, Yucaipa Valley Water District, City of Beaumont, the San Timoteo Watershed Management Authority and the City of Rialto shall submit to the Regional Board for approval, a proposed surface water TDS and nitrogen

monitoring program that will provide an evaluation of compliance with the TDS and nitrogen objectives for Reaches 2, 4 and 5 of the Santa Ana River.

In lieu of this coordinated monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group monitoring plan. Any such individual or group monitoring plan shall also be submitted no later than March 23, 2005.

2. By April 15th of each year, the Orange County Water District, Inland Empire Utilities Agency, City of Riverside, City of Corona, Elsinore Valley Municipal Water District, Eastern Municipal Water District, Lee Lake Water District, City of Colton, City of San Bernardino Municipal Water Department, Jurupa Community Services District, Western Riverside County Wastewater Agency, Yucaipa Valley Water District, City of Beaumont, the San Timoteo Watershed Management Authority and the City of Rialto, shall submit an annual report of Santa Ana River, Reach 2 , 4 and 5 water quality. Data evaluated shall include that collected by the Santa Ana River Watermaster, Orange County Water District, and the US Geologic Survey, at a minimum.

   In lieu of this coordinated annual report, one or more of the parties identified in the preceding paragraph may submit an individual or group annual report. Any such individual or group report shall also be submitted by April 15th of each year.

Additional surface water monitoring programs may be specified by the Regional Board depending upon watershed conditions, waste discharge specifications and/or any special studies related to TDS and nitrogen.

B. Groundwater Monitoring Program for TDS and Nitrogen

Implementation of a watershed-wide TDS/nitrogen groundwater monitoring program is necessary to assess current water quality, to determine whether TDS and nitrate-nitrogen water quality objectives for management zones are being met or exceeded, and to update assimilative capacity findings. Groundwater monitoring is also needed to fill data gaps for those management zones with insufficient data to calculate TDS and nitrate-nitrogen historical quality and current quality. Finally, groundwater monitoring is needed to assess the effects of POTW discharges to surface waters on affected groundwater. In particular, monitoring is needed to confirm the 50% nitrogen loss coefficient for discharges to that part of the Santa Ana River, Reach 3 that affect the Chino South Management Zone.

Groundwater monitoring requirements for TDS and nitrogen are as follows:

1. No later than June 23, 2005, Orange County Water District, Irvine Ranch Water District, Inland Empire Utilities Agency, Chino Basin Watermaster, City of Riverside, City of Corona, Elsinore Valley Municipal Water District, Eastern Municipal Water District, City of Colton, City of San Bernardino Municipal Water Department, City of

Redlands, Jurupa Community Services District, Western Riverside County Regional Wastewater Authority , Lee Lake Water District, Yucaipa Valley Water District, City of Beaumont, the San Timoteo Watershed Management Authority and the City of Rialto shall submit to the Regional Board for approval, a proposed watershed-wide TDS and nitrogen monitoring program that will provide data necessary to review and update the TDS/nitrogen management plan. Data to be collected and analyzed shall address, at a minimum: (1) determination of current ambient quality in groundwater management zones; (2) determination of compliance with TDS and nitrate-nitrogen objectives for the management zones; (3) evaluation of assimilative capacity findings for groundwater management zones; and (4) assessment of the effects of recharge of surface water POTW discharges on the quality of affected groundwater management zones. The determination of current ambient quality shall be accomplished using methodology consistent with that employed by the Nitrogen/TDS Task Force (20-year running averages) to develop the TDS and nitrogen water quality objectives included in this Basin Plan. [Ref. 1] The determination of current ambient groundwater quality throughout the watershed must be reported by July 1, 2005, and, at a minimum, every three years thereafter.

In lieu of this coordinated monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group monitoring plan. Any such individual or group monitoring plan shall also be due no later than June 23, 2005.

Details to be included in the proposed monitoring program shall include, but not be limited to, the following:

- Monitoring program goals
- responsible agencies
- groundwater water sampling locations
- surface water sampling locations (if appropriate)
- water quality parameters
- sampling frequency
- quality assurance/quality control
- database management
- data analysis and reporting

Within 30 days of Regional Board approval of the proposed monitoring plan, the monitoring plan must be implemented.

2. No later than June 23, 2005, the City of Colton, City of San Bernardino Municipal Water Department, City of Riverside, Jurupa Community Services District and the City of Rialto, shall submit to the Regional Board for approval, a monitoring program that will be utilized to confirm the 50% Santa Ana River, Reach 3 nitrogen loss coefficient.

In lieu of this coordinated monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group monitoring plan. Any such individual or group monitoring plan shall also be due no later than June 23, 2005.

Within 30 days of Regional Board approval of the monitoring plan, the monitoring program must be implemented.

Additional groundwater monitoring programs may be specified by the Regional Board depending upon watershed conditions, waste discharge specifications and/or any special studies related to TDS and nitrogen.

VI. Maximum Benefit Implementation Plans for Salt Management

As discussed in Chapter 4, with some limited exceptions, TDS and nitrate-nitrogen objectives for groundwater management zones in the Santa Ana Region were established to ensure that historical quality is maintained, pursuant to the State's antidegradation policy (State Board Resolution No. 68-16). However, alternative, less stringent "maximum benefit" objectives are also specified in Chapter 4 for certain groundwater management zones. These "maximum benefit" objectives, which would allow the lowering of water quality, were established based on demonstrations by the agencies recommending them that antidegradation requirements were satisfied. First, these agencies demonstrated that beneficial uses would continue to be protected. Second, these agencies showed that water quality consistent with maximum benefit to the people of the state would be maintained. Other factors, such as economics, the need to use recycled water, and the need to develop housing in the area were also taken into account in establishing the objectives (see Chapter 4).

The demonstrations of "maximum benefit" by these agencies are contingent on the implementation of specific projects and programs by the agencies. As discussed in Chapter 4, if these projects and programs are not implemented to the Regional Board's satisfaction, then the alternative "antidegradation" objectives apply to these waters for regulatory purposes.

This section identifies the specific commitments by the Chino Basin Watermaster and Inland Empire Utilities Agency, the Yucaipa Valley Water District, the City of Beaumont and the San Timoteo Water Management Authority to implement projects and programs to support the "maximum benefit" objectives established for groundwater management zones affected by their wastewater and water management practices.

A. Salt Management – Chino Basin and Cucamonga Basin

As shown in Chapter 4, both "antidegradation" and "maximum benefit" objectives for TDS and nitrate-nitrogen are specified in this Plan for certain parts of the Chino Basin and the Cucamonga groundwater Management Zone. The application of the "maximum benefit" objectives relies on the implementation by the Chino Basin Watermaster and the Inland Empire Utilities Agency of a specific program of projects and requirements [Ref. 10B], which are an integral part of the Chino Basin Optimum Basin Management Program (OBMP) [Ref. 10C]. The OBMP was developed by the Watermaster under the supervision of the San Bernardino County Superior Court. The OBMP is a comprehensive, long-range water management plan for the Chino Basin as a whole, including the Chino North (or Chino 1, 2, and 3) and Cucamonga Management Zones. The OBMP includes the use of recycled water for basin recharge, initially in the Chino North Management Zone. Recycled water recharge in the Cucamonga Management Zone may be pursued in the future. The OBMP also includes the capture of increased quantities of high quality storm water runoff, recharge of imported water when its TDS concentrations are low, improvement of water supply by desalting poor quality groundwater, and enhanced wastewater pollutant source control programs. The OBMP maps a strategy that will provide for enhanced yield for the Chino Basin and seeks to provide reliable water supplies for development expected to occur within the Basin. The OBMP also includes the implementation of management activities that would result in the hydraulic isolation of Chino Basin groundwater from the Orange County Management Zone, thus insuring the protection of downstream beneficial uses and water quality.

Table 5-8a identifies the projects and requirements that must be implemented to demonstrate that water quality consistent with maximum benefit to the people of the state will be maintained. An implementation schedule is also specified. The Regional Board will revise IEUA's waste discharge requirements, issue appropriate permits to the Chino Basin Watermaster, and utilize the authority provided by Section 13267 of the Water Code as necessary to require that these commitments be met. It is assumed that maximum benefit is demonstrated, and that the "maximum benefit" TDS and nitrate-nitrogen objectives apply to the Chino North and Cucamonga Management Zones as long as the schedule is being met. If the Regional Board determines that the maximum benefit program is not being implemented effectively in accordance with the schedule shown in Table 5-8a, then maximum benefit is not demonstrated, and the "antidegradation" TDS and nitrate-nitrogen objectives for the Chino 1, 2, and 3 and Cucamonga Management Zones apply. In this situation, the Regional Board will require mitigation for TDS and nitrate-nitrogen discharges to these management zones that took place in excess of limits based on the "antidegradation" objectives.

Table 5-8a

Chino Basin Maximum Benefit Commitments

Description of Commitment	**Compliance Date – as soon as possible, but no later than**
1. Surface Water Monitoring Program	
a. Submit Draft Monitoring Program to Regional Board	a. January 23, 2005
b. Implement Monitoring Program	b. Within 30 days from date of Regional Board approval of monitoring plan
c. Quarterly data report submittal	c. April 15, July 15, October 15, January 15
d. Annual data report submittal	d. February 15th
2. Groundwater Monitoring Program	
a. Submit Draft Monitoring Program to Regional Board	a. January 23, 2005
b. Implement Monitoring Program	b. Within 30 days from date of Regional Board approval of monitoring plan
c. Annual data report submittal	c. February 15th
3. Chino Desalters	
a. Chino 1 desalter expansion to 10 MGD	a. Prior to recharge of recycled water
b. Chino 2 desalter at 10 MGD design	b. Recharge of recycled water allowed once award of contract and notice to proceed issued for construction of desalter treatment plant
4. Future desalters plan and schedule submittal	October 1, 2005 Implement plan and schedule upon Regional Board approval
5. Recharge facilities (17) built and in operation	June 30, 2005
6. IEUA wastewater quality improvement plan and schedule submittal	60 days after agency-wide 12 month running average effluent TDS quality equals or exceeds 545 mg/L for 3 consecutive months or agency-wide 12 month running average TIN equals or exceeds 8 mg/L in any month. Implement plan and schedule upon approval by Regional Board.

Table 5-8a

Chino Basin Maximum Benefit Commitments (cont.)

Description of Commitment	**Compliance Date – as soon as possible, but no later than**
7. Recycled water will be blended with other recharge sources so that the 5-year running average TDS and nitrate-nitrogen concentrations of water recharged are equal to or less than the “maximum benefit” water quality objectives for the affected Management Zone (Chino North or Cucamonga).	Compliance must be achieved by end of 5th year after initiation of recycled water recharge operations.
a. Submit a report that documents the location, amount of recharge, and TDS and nitrogen quality of stormwater recharge before the OBMP recharge improvements were constructed and what is projected to occur after the recharge improvements are completed	a. Prior to initiation of recycled water recharge
b. Submit documentation of amount, TDS and nitrogen quality of all sources of recharge and recharge locations. For stormwater recharge used for blending, submit documentation that the recharge is the result of CBW/IEUA enhanced recharge facilities.	b. Annually, by February 15th, after initiation of construction of basins/other facilities to support enhanced stormwater recharge.
8. Hydraulic Control Failure	
a. Plan and schedule to correct loss of hydraulic control	a. 60 days from Regional Board finding that hydraulic control is not being maintained
b. Achievement and maintenance of hydraulic control	b. In accordance with plan and schedule approved by Regional Board. The schedule shall assure that hydraulic control is achieved as soon as possible but no later than 180 days after loss of hydraulic control is identified.
c. Mitigation plan for temporary failure to achieve/maintain hydraulic control	c. By January 23, 2005. Implement plan upon Regional Board determination that hydraulic control is not being maintained.
9. Ambient groundwater quality determination	July 1, 2005 and every 3 years thereafter

Description of Chino Basin Watermaster and Inland Empire Utilities Agency Commitments

1. Surface Water Monitoring Program (Table 5-8a #1)

The Chino Basin Watermaster (Watermaster), in conjunction with staff of the Orange County Water District and Regional Board, has developed a proposed surface water monitoring program. By January 23, 2005 and prior to the discharge of recycled water to the Chino Basin, Watermaster shall submit the recommended surface water monitoring program to the Regional Board for approval. The monitoring program must be implemented within 30 days of Regional Board approval, and six months of data must be generated prior to the discharge of recycled water to the Chino Basin.

At a minimum, the surface water monitoring program shall include the collection of bi-weekly measurements of general minerals and nitrogen components at the locations listed in Table 5-8b. Data reports shall be submitted to the Regional Board Executive Officer by April 15, July 15, October 15, and January 15 each year. An annual report summarizing all data collected for the year and evaluating compliance with relevant surface water objectives shall be submitted by February 15th of each year.

2. Groundwater Monitoring Program (Table 5-8a, #2)

The purpose of the Groundwater Monitoring Program is to (1) identify potential impacts from implementation of the Chino Basin "maximum benefit" water quality objectives on water levels and water quality within the Chino Basin and in downgradient basins and (2) determine whether hydraulic control (see # 8, below) is being achieved and maintained. By January 23, 2005 and prior to the discharge of recycled water to the Chino Basin, Watermaster shall submit to the Regional Board for approval a proposed groundwater monitoring program to determine hydraulic control and ambient water quality in the Chino North and Cucamonga Management Zones. Within 30 days of Regional Board approval of the monitoring plan, the groundwater monitoring program must be implemented.

An annual report, including all raw data and summarizing the results of the approved groundwater monitoring program, shall be submitted to the Regional Board by February 15th of each year.

3. Chino 1 and Chino 2 Desalters (Table 5-8a, # 3)

Prior to the recharge of recycled water in the Chino Basin, the Chino 1 desalter must be expanded and in operation at a capacity of 10 million gallons per day (MGD). Also, contracts for the construction of the Chino 2 desalter treatment plant must be awarded and a notice to proceed with the construction must be given prior to recharge of recycled water.

4. Future Desalter Development (Table 5-8a, # 4)

No later than October 1, 2005, the schedule for implementation of the next 20 MGD of desalter capacity, pursuant to the Peace Agreement that implements the Chino Basin OBMP, and as required by the San Bernardino Superior Court, must be submitted to the Regional Board by the Chino Basin Watermaster. IEUA and/or the Chino Basin Watermaster and/or other responsible parties deemed acceptable by the Executive Officer, will initiate building of the next desalter when the 12-month running average effluent concentration (measured as an average for all IEUA wastewater treatment facilities) reaches 545 mg/L TDS for three consecutive months.

Table 5-8b

Surface Water Monitoring Sites for Monitoring of Surface Water and Groundwater Quality Near the River to Determine the Presence and Source of Rising Groundwater

Site Name	Discharge	Owner	Type	Discharge Monitoring		Water Quality Monitoring		
				Frequency	Period	Frequency	Period	Analyses
11066460	Santa Ana Riv.	USGS	Total Discharge	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
11072100	Temescal Cr.	USGS	Total Discharge	Bi-weekly	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
11073495	Cucamonga Cr.	USGS	Total Discharge	Bi-weekly	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
11073440	Chino Cr.	USGS	Total Discharge	Bi-weekly	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
11074000	Santa Ana Riv.	USGS	Total Discharge	Bi-weekly	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
RWQCP Direct	Recycled Water	Riverside	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
RWQCP Hidden Valley	Recycled Water	Riverside	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
Corona RW	Recycled Water	Corona	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
RP1 Cucamonga	Recycled Water	IEUA	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
RP1 Prado	Recycled Water	IEUA	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
RP2	Recycled Water	IEUA	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
Carbon Canyon	Recycled Water	IEUA	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
RP5	Recycled Water	IEUA	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
WRCRWTP	Recycled Water	WR-JPA	Recycled Water	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-MWDXING	Santa Ana Riv.	OCWD	Total Discharge	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-HOLELK-01	Hole Lake	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-VANBUREN	Santa Ana Riv.	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-ETIWANDA-01	Santa Ana Riv.	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-HAMNER-01	Santa Ana Riv.	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-RIV.RD	Santa Ana Riv.	OCWD	Total Discharge	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-DIV-PRADOWTLNDS	Santa Ana Riv.	OCWD	Total Discharge	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
SAR-BELOWDAM-01	Santa Ana Riv.	OCWD	Total Discharge	Daily	Jan - Dec	Bi-weekly	Jan - Dec	Gen. Min. & Physical
CK-CHINO	Chino Cr.	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical
CK-MILL	Cucamonga Cr.	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical
CK-TEMESCAL	Temescal Cr.	OCWD	Total Discharge	Bi-weekly	May-Sep	Bi-weekly	Jan - Dec	Gen. Min. & Physical

(Source: Ref. 10B)

5. Recharge Facilities (Table 5-8a, # 5)

By June 30, 2005, or no later than one year from the start of discharge of recycled water, the 17 recharge facilities identified in the August 2001 Watermaster Recharge Master Plan and as updated by the Watermaster and IEUA, must be completed and operated to maximize the capture of storm water in the Chino Basin. The Watermaster has also committed to optimize the recharge of imported water in the Chino Basin based on the goal of maximizing recharge of State Project water when the TDS of that water is lowest.

The Watermaster proposal recognizes the importance and necessity of recharge of both storm water and imported water to meet the water supply demands on the Chino Basin. Recharge of high quality supplies to the Chino Basin is necessary to offset the quality effects of recycled water and to achieve an ambient water quality equal to or better than the “maximum benefit” TDS and nitrate-nitrogen water quality objectives.

6. IEUA Wastewater Effluent Quality (Table 5-8a, # 6)

Within 60 days after the IEUA 12-month running average effluent concentration (measured as an average for all IEUA wastewater treatment facilities) for TDS exceeds 545 mg/L for 3 consecutive months, or the 12-month running average total inorganic nitrogen (TIN) concentration (measured as an average for all IEUA wastewater treatment facilities) exceeds 8 mg/L in any month, the IEUA shall submit to the Regional Board a plan and time schedule for implementation of measures to insure that the12-month running average agency wastewater effluent quality does not exceed 550 mg/L and 8 mg/L for TDS and TIN, respectively. The Plan and schedule are to be implemented upon Regional Board approval.

7. Recycled Water Use (Table 5-8a, # 7)

The use and recharge of recycled water within the Chino Basin is a critical component of the Watermaster OBMP and is necessary to maximize the use of the water resources of the Chino Basin. The demonstration of maximum benefit, and the continued application of the “maximum benefit” TDS and nitrate-nitrogen water quality objectives, depends on the recharge to the Chino North Management Zone of 5-year annual average (running average) TDS and nitrogen concentrations of no more than 420 mg/L and 5 mg/L, respectively. If and when recycled water recharge in the Cucamonga Management Zone is pursued, the application of the “maximum benefit” objectives will depend on the recharge to that zone of 5-year running average TDS and nitrogen concentrations no greater than 380 mg/L and 5 mg/L, respectively. IEUA has committed to meeting these levels and recognizes that the maximum benefit objectives depend on achieving these 5-year running average concentrations.

Accordingly, the use of recycled water for groundwater recharge shall be limited to the amount that can be blended on a volume-weighted basis with other sources of recharge to the management zone to achieve a 5-year running average concentration equal to or less than the "maximum benefit" TDS and nitrogen water quality objectives of the affected Management Zone (Chino North or Cucamonga). The 25% nitrogen loss coefficient will be applied to calculate recycled water nitrogen quality when determining the amount of recharge of other water sources that must be achieved to meet the 5-year running averages.

8. Hydraulic Control (Table 5-8a, # 8)

"Hydraulic Control" is defined as eliminating groundwater discharge from the Chino Basin to the Santa Ana River, or controlling the discharge to *de minimis* levels. The surface water and groundwater monitoring programs described above are intended to demonstrate whether hydraulic control is achieved and maintained. In the event that the Regional Board finds that hydraulic control is not being accomplished, the Watermaster shall submit to the Regional Board within 60 days of that finding a plan and time schedule to correct (within 180 days from the Regional Board approval of the plan and schedule) the failure to achieve and maintain hydraulic control.

By January 23, 2005, the Watermaster and IEUA shall prepare a proposed plan and schedule to mitigate temporary losses of hydraulic control. These agencies must implement this plan upon a determination by the Regional Board that hydraulic control is not being achieved or maintained.

9. Ambient Groundwater Quality Determination (Table 5-8a, # 9)

By July 1, 2005, and every three years thereafter, Watermaster shall submit a determination of ambient TDS and nitrate-nitrogen quality in the Chino North and Cucamonga Management Zones. This determination shall be accomplished using methodology consistent with the determinations (20-year running averages) used by the TDS/Nitrogen Task Force to develop the "antidegradation" TDS and nitrate-nitrogen water quality objectives for groundwaters subbasins within the Region. [Ref. 1].

<u>Implementation by Regional Board</u>

1. Revision of the Inland Empire Utilities Agency NPDES Permits

To implement the "maximum benefit" objectives, the Regional Board will revise the NPDES permits for IEUA wastewater discharges to reflect the commitments described above, as appropriate. This includes the following. TDS and TIN (includes nitrate-nitrogen) limits of 550 mg/L and 8 mg/L, respectively, will be specified as an agency-wide, volume weighted-average. The limits will be expressed as 12-month running averages. These limits implement the wasteload allocations for IEUA surface water discharges (see Table 5-5), and are not contingent on the “maximum benefit” objectives or demonstration[5]. IEUA will be required to implement measures to improve effluent quality when the 12 month running average effluent concentration (measured as an average for all IEUA treatment facilities) exceeds 545 mg/L for 3 consecutive months, or when the 12-month running average total inorganic nitrogen concentration (also measured as an average for all IEUA treatment facilities) exceeds 8 mg/L in any month. The permits will require that recycled water used for recharge shall be limited to the amount that can be blended in the management zone with other water sources, such as stormwater or imported water, to achieve 5-year running average concentrations equal to or less than the “maximum benefit” TDS and nitrate-nitrogen objectives for the affected management zone (Chino North or Cucamonga). Recycled water recharge is not currently contemplated in other parts of the Chino Basin. Alternative TDS and nitrate-nitrogen limitations based on the “antidegradation” objectives will also be specified for recycled water recharge in the Chino 1, 2 and 3 and Cucamonga Management Zones. These limits will apply should the Regional Board find that maximum benefit is not demonstrated. If recharge projects are implemented elsewhere in the Chino Basin, TDS and TIN limits will be based on the TDS and nitrate-nitrogen objectives of the affected management zones.

The effluent limits for IEUA, which establish an upper limit on TDS and TIN concentrations of recycled water discharged in the basin, are a cornerstone of the maximum benefit demonstration. The cap on effluent TDS and TIN concentrations provides a controlling point for management of TDS and nitrogen water quality in the Chino Basin. The TDS in IEUA’s effluent is expected to reach 550 mg/L before the groundwater in the Chino North Management Zone or the Cucamonga Management Zone reaches the “maximum benefit” objectives of 420 mg/L and 380 mg/L, respectively. The IEUA/Chino Basin Watermaster maximum benefit proposal commits to the initiation of construction of another Chino Basin desalter when the TDS in IEUA’s effluent reaches 545 mg/L for three consecutive months. This desalter may be constructed by IEUA and/or Chino Basin Watermaster and/or other responsible parties deemed acceptable by the Executive Officer. Further, IEUA will immediately implement a salt management program to reduce the salts, including nitrogen, entering IEUA’s wastewater treatment plants. This salt management program will include: 1) connection of new industries that have wastewater discharges with TDS greater than 550 mg/L to the brine line; 2) regulation of the use of new and existing water softeners to the extent allowed by law, with incentives provided for the removal of on-site regenerative water softeners and the use of exchange canisters or other off-site regenerative systems; 3) connection of existing domestic system industries with high TDS waste discharges to the brine lines; 4) percolation of State Water Project water into the Chino Basin when that water is low in TDS; and 5) development of a plan for sewering areas presently served by septic

[5] Surface water discharges by IEUA do not affect the groundwater management zones for which “maximum benefit” objectives are specified. Thus, the wasteload allocations do not vary depending on whether or not the “maximum benefit” objectives apply.

tanks to reduce the nitrogen loading into the Chino and Cucamonga Management Zones. IEUA's permits will reflect these commitments.

Implementing these measures will assure that the groundwater quality remains at or below the Chino North Management Zone objective of 420 mg/L and the Cucamonga Management Zone objective of 380 mg/L. Maintenance of this ambient groundwater quality is necessary, in turn, to assure that IEUA's wastewater treatment facilities are able to meet the effluent TDS limits. Chino Basin groundwater is a significant component of the water supplied in IEUA's service area and its quality thus has an important effect on effluent quality. Poor ambient water quality will preclude IEUA from meeting effluent limits, without desalting. IEUA can revise treatment plant operations to assure that the TIN limit is achieved. These TDS and TIN limitations assure beneficial use protection for Chino Basin and downstream Orange County groundwater, as well as surface waters (including Chino Creek and the Santa Ana River) affected by IEUA discharges.

IEUA's revised permits will also reflect the surface and groundwater monitoring program requirements described above.

2. Issuance of permits to Chino Basin Watermaster

The Regional Board will issue appropriate permits to the Watermaster, individually or jointly with IEUA, for the recharge of recycled water in the Basin. These permits will implement the commitments described above for recharge of other water sources to offset the quality of the recycled water. The parties will be required to document the amount, quality and location of recharge of these other sources, and to demonstrate that stormwater recharge used for blending purposes occurred as the result of the parties' efforts to enhance such recharge. Other "maximum benefit" commitments will be reflected in these permits, or in other orders of the Regional Board, as appropriate.

3. Review of Project Status

No later than 2005, and every three years thereafter (to coincide with the Regional Board's triennial review process), the Regional Board intends to review the status of the activities planned and executed by the Watermaster and IEUA to demonstrate maximum benefit and to justify continued implementation of the "maximum benefit" water quality objectives. This review is intended to determine whether the commitments specified above and summarized in Table 5-8a are met. If, as a result of this review and after consideration at a duly noticed Public Hearing, the Regional Board finds that the Watermaster and IEUA commitments are not met, the Regional Board will make a finding that the lowering of water quality associated with TDS and nitrate-nitrogen water quality objectives that are higher than historical water quality (the "antidegradation" objectives") is not of maximum benefit to the people of the state. By default, the scientifically derived, "antidegradation objectives" for the Chino 1, 2 and 3 and Cucamonga Management Zones would become effective (280 mg/L, 250 mg/L, 260 mg/L and 210 mg/L TDS respectively; 5.0 mg/L, 2.9 mg/L, 3.5 mg/L and 2.4 mg/L for nitrate-nitrogen – see Chapter 4).

The Watermaster and IEUA have made clear commitments to the implementation of projects and management strategies to achieve the "maximum benefit" objectives. A finding of "maximum benefit to the people of the state" is also a very strong commitment of support by the Regional Board for the goals, vision and future plans of the Watermaster and IEUA. Watermaster and IEUA have indicated that the supervision of the Watermaster program by the San Bernardino County Superior Court will ensure that the Watermaster and IEUA commitments are met. However, people change, commitments may be changed, and public agency decisions may certainly change. If the commitments are not met and "maximum benefit" is not demonstrated, then the Regional Board will require that Watermaster and IEUA mitigate the effects of discharges of recycled and imported water that took place under the maximum benefit objectives. Under this circumstance, mitigation will be required such that, after mitigation, the salt and nitrogen loads to the basin from imported water, newly captured stormwater inputs under the Watermaster enhanced stormwater interception program, and recycled water are made to be equivalent to the salt loads that would have been allowed to the Chino Basin under the antidegradation objectives. Discharges in excess of the antidegradation objectives that must be considered for mitigation include both recycled water and imported water at TDS concentrations in excess of the antidegradation objectives. Mitigation by groundwater extraction and desalting must be adjusted to address concentrations of salt and nitrogen in the basin, not simply salt load. (Desalting will be an effective mitigation strategy, but desalting removes water, as well as salt, and the resulting salt concentrations in the groundwater will not completely mitigate the effects of the maximum benefit discharges, if mitigation is considered simply on a salt load, rather than concentration, basis.) This remediation will be required of the agencies that were responsible for the discharge of recycled and imported water (waste discharge permit holders) under the maximum benefit objectives. The remediation must be completed within a 10-year period following the finding by the Regional Board that the antidegradation objectives apply. The Regional Board will also require mitigation of any adverse effects on water quality downstream of the Chino Basin that result from failure to implement the "maximum benefit" commitments.

B. Salt Management - San Timoteo Watershed

1. San Timoteo and Yucaipa Management Zone - Yucaipa Valley Water District

Two sets of objectives have been adopted for the San Timoteo and Yucaipa Management Zones; the "maximum benefit" objectives and objectives based on historic ambient quality ("antidegradation" objectives) (see Chapter 4). The application of the "maximum benefit" objectives relies on the implementation by the Yucaipa Valley Water District (YVWD) (and in the case of the San Timoteo Management Zone, by the City of Beaumont/STWMA (see discussion below)) of a specific program of projects and requirements [Ref. 10D]. This program is a part of a watershed-scale water resources management plan designed by YVWD and other members of the San Timoteo Watershed Management Authority (STWMA) (the City of Beaumont, the Beaumont-Cherry Valley Water District and the South Mesa Water Company) to assure reliable supplies to meet present and anticipated demands. The projected water demands for the Yucaipa area for the year 2030 require approximately an additional 10,000 AF/Y of supplemental water, including State Water Project water, water imported from local sources, recharged storm water and recycled water. YVWD is in the process of implementing the water resources management plan, which includes enhanced recharge of stormwater and recycled water, optimizing direct use of recycled and imported water, and conjunctive use.

In addition to its water supply responsibilities, YVWD provides sewage collection and treatment services within its service area. YVWD operates a wastewater treatment facility that currently discharges tertiary treated wastewater to San Timoteo Creek, Reach 3. This unlined reach of the Creek overlies and recharges the San Timoteo groundwater management zone.

Table 5-9a identifies the projects and requirements that must be implemented by YVWD to demonstrate that water quality consistent with maximum benefit to the people of the state will be maintained. An implementation schedule is also specified. The Regional Board will revise YVWD's waste discharge requirements to require that these commitments be met. It is assumed that maximum benefit is demonstrated, and that the "maximum benefit" water quality TDS and nitrate-nitrogen objectives apply to the Yucaipa and San Timoteo Management Zones, as long as the schedule is being met[6]. If the Regional Board determines that the maximum benefit program is not being implemented effectively in accordance with the schedule shown in Table 5-9a (and in the case of the San Timoteo Management Zone, the commitments and schedule shown in Table 5-10a (see next section)), then maximum benefit is not demonstrated and the "antidegradation" TDS and nitrate-nitrogen objectives apply. In this situation, the Regional Board will require mitigation for TDS and nitrate-nitrogen

[6] Application of "maximum benefit" objectives for the San Timoteo Management Zone is also contingent on the timely implementation of the commitments by the City of Beaumont and the San Timoteo Watershed Management Authority which are discussed in the next section.

discharges affecting these management zones that took place in excess of limits based on the “antidegradation” objectives. As for Chino Basin Watermaster and Inland Empire Utilities Agency, discharges in excess of the antidegradation objectives that must be considered for mitigation include both recycled water and imported water, at TDS concentrations in excess of the antidegradation objectives. Mitigation by groundwater extraction and desalting must be adjusted to address concentrations of salt and nitrogen in the basin, not simply salt load.

Table 5-9a

Yucaipa Valley Water District Maximum Benefit Commitments

Description of Commitment	**Compliance Date – as soon as possible, but no later than**
1. Surface Water Monitoring Program a. Submit Draft Monitoring Program to Regional Board b. Implement Monitoring Program c. Quarterly data report submittal d. Annual data report submittal	 a. January 23, 2005 b. Within 30 days from Regional Board approval of monitoring plan c. April 15, July 15, October 15, January 15 d. February 15th
2. Groundwater Monitoring Program a. Submit Draft Monitoring Program to Regional Board b. Implement Monitoring Program c. Annual data report submittal	 a. January 23, 2005 b. Within 30 days from Regional Board approval of monitoring plan c. February 15th
3. Desalter(s) and Brine Disposal Facilities a. Submit plan and schedule for construction of desalter(s) and brine disposal facilities. Facilities are to operational as soon as possible but no later than 7 years from date of Regional Board approval of plan/schedule. b. Implement the plan and schedule	 a. Within 6 months of either of the following: i. When YVWD's effluent 5-year running average TDS exceeds 530 mg/L; and/or ii.. When volume weighted average concentration in the Yucaipa MZ of TDS exceeds 360 mg/L b. Within 30 days from Regional Board approval of monitoring plan
4. Non-potable water supply Implement non-potable water supply system to serve water for irrigation purposes. The non-potable supply shall comply with a 10-year running average TDS concentration of 370 mg/L or less	 December 23, 2014

Description of Commitment	Compliance Date – as soon as possible, but no later than
5. Recycled water recharge The recharge of recycled water in the Yucaipa or San Timoteo Management Zones shall be limited to the amount that can be blended with other recharge sources to achieve a 5-year running average equal to or less than the "maximum benefit" objectives for TDS and nitrate-nitrogen for the relevant Management Zone(s). a. Submit baseline report of amount, locations, and TDS and nitrogen quality of stormwater/imported water recharge. b. Submit documentation of amount, TDS and nitrogen quality of all sources of recharge and recharge locations. For stormwater recharge used for blending, submit documentation that the recharge is the result of YVWD enhanced recharge facilities/programs	Compliance must be achieved by end of 5th year after initiation of recycled water use/recharge operations. a. Prior to initiation of construction of basins/other facilities to support enhanced stormwater/imported water recharge. b. Annually, by January 15th, after initiation construction of facilities/implementation of programs to support enhanced recharge.
6. Ambient groundwater quality determination	July 1, 2005 and every 3 years thereafter
7. Replace denitrification facilities (necessary to comply with TIN wasteload allocation specified in Table 5-5)	New facilities shall be operational no later than December 23, 2007
8. YVWD recycled water quality improvement plan and schedule a. Submit plan and schedule b. Implement plan and schedule	a. 60 days after the TDS 12-month running average effluent quality equals or exceeds 530 mg/L for 3 consecutive months and/or the 12-month running average TIN concentration equals or exceeds 6 mg/L in any month (once replacement denitrification facilities are in place) b. Upon approval by Regional Board

Description of Commitment	Compliance Date – as soon as possible, but no later than
9. Remove/reduce the discharge of YVWD effluent from the unlined portion of San Timoteo Creek a. Submit proposed plan/schedule b. Implement plan/schedule	 a. June 23, 2005 b. Upon Regional Board approval
10. Construct the Western Regional Interceptor for Dunlap Acres a. Submit proposed construction plan and schedule. The schedule shall assure the completion of construction as soon as possible but no later than January 1, 2010. b. Implement plan and schedule	a. June 23, 2005 b. Upon Regional Board approval

A. Description of Yucaipa Valley Water District Commitments

1. Surface Water Monitoring Program (Table 5-9a, # 1)

The YVWD shall develop and submit for Regional Board approval a surface water monitoring program for San Timoteo Creek and the Santa Ana River Reaches 4 and 5. The monitoring program must be implemented within 30 days of Regional Board approval of the monitoring plan, and six months of data must be generated prior to the implementation of any changes made to the effluent discharge points and before any recycled water is used in the Yucaipa or San Timoteo Management Zones.

At a minimum, the surface water monitoring program shall include the collection of monthly measurements of TDS and nitrogen components in San Timoteo Creek and Santa Ana River, Reaches 4 and 5 (see Table 5-9b). Data reports shall be submitted to the Regional Board's Executive Officer by April 15, July 15, October 15 and January 15 each year. An annual report summarizing all data collected for the year and evaluating compliance with relevant surface water objectives shall be submitted by February 15th of each year.

2. Groundwater Monitoring Program (Table 5-9a, #2)

The purpose of the Groundwater Monitoring Program is to identify the effects of the implementation of the San Timoteo and Yucaipa Management Zones maximum benefit water quality objectives on water levels and water quality within the San Timoteo and Yucaipa Management Zones. Prior to discharge of recycled water to the San Timoteo and/or Yucaipa Management Zones, YVWD shall submit to the Regional Board for approval a groundwater monitoring program to determine ambient water quality in the San Timoteo and Yucaipa Management Zones . The groundwater monitoring program must be implemented within 30 days of approval by the Regional Board.

An annual report, including all raw data and summarizing the results of the approved groundwater monitoring program, shall be submitted to the Regional Board by February 15th of each year.

3. Desalters and Brine Disposal (Table 5-9a, #3)

YVWD anticipates that demineralization of groundwater or recycled water will be necessary in the future. YVWD is committed to construct and operate desalting and brine disposal facilities when:

1) The 5-year running average TDS concentration in recycled water produced at the YVWD wastewater treatment plant exceeds 530 mg/L; or

2) The volume-weighted TDS concentration in the Yucaipa Management Zone reaches or exceeds 360 mg/L

The construction of these facilities will be in accordance with a plan and schedule submitted by YVWD and approved by the Regional Board. The schedule shall assure that these facilities are in place within 7 years of Regional Board approval. These facilities shall be designed to stabilize or reverse the degradation trend evidenced by effluent and/or management zone quality.

4. Non-potable water supply distribution system (Table 5-9a, # 4)

A key element of the YVWD's water resources management plan is the construction of a non-potable supply system to serve a mix of recycled water and un-treated imported water for irrigation uses. The intent of blending these sources is to minimize the impact of recycled water use on the Yucaipa and San Timoteo Management Zones.

Parts of this system are under design and construction. A higher proportion of State Project water will be used in wet, surplus years, while larger amounts of recycled water will be used in dry, deficit years. YVWD will produce a non-potable supply with a running ten-year average TDS concentration less than the "maximum benefit" objective for the Yucaipa Management Zone (370 mg/L).

This space has been intentionally left blank

Table 5 – 9b

Surface Water Monitoring Sites for Monitoring Water Quality and Quantity
Yucaipa Valley Water District

Site Name	Discharge	Owner	Type	Discharge Frequency	Monitoring Period	Water Quality Monitoring Frequency	Period	Analyses
11057500, Gage	San Timoteo Creek	USGS	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
At Barton Rd.	San Timoteo Creek	YVWD	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
At San Timoteo Canyon Rd.	San Timoteo Creek	YVWD	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
Above confluence Yucaipa Creek	San Timoteo Creek	YVWD	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
Above YVWD Discharge	San Timoteo Creek	YVWD	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
11059300 Gage	Santa Ana River	USGS	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
At Waterman Ave	Santa Ana River	YVWD	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
Recharged to Yucaipa MZ	State Water Project	YVWD	Total Discharge	Monthly	Jan-Dec	Monthly	Jan-Dec	TDS, Nitrate-N
Recharged to Yucaipa MZ	Storm water	YVWD	Total Discharge	Monthly	Jan-Dec	Monthly	Jan-Dec	TDS, Nitrate-N

5. Recycled Water Use (Table 5-9a, # 5)

The use and recharge of recycled water within the Yucaipa Management Zone is a critical component of the YVWD water management plan and is necessary to maximize the use of the water resources of the Yucaipa area. The demonstration of “maximum benefit” and the continued application of the “maximum benefit” objectives depends on the combined recharge (recycled water, imported water, storm water) to the Yucaipa Management Zone of a 5-year annual average (running average) TDS concentration of 370 mg/L and nitrate-nitrogen concentration of 5 mg/L. If recycled water recharge in the proposed San Timoteo Management Zone is pursued, then the application of the “maximum benefit” objectives will depend on the combined recharge to that Zone of 5-year annual average (running average) concentrations of 400 mg/L or less TDS, and 5 mg/L or less nitrate-nitrogen.

To meet this requirement, YVWD will establish a fund to purchase imported water from local sources and/or the State Water Project and will recharge water with a TDS concentration less than 300 mg/L (recent long term historical average of water delivered from the State Project). YVWD will also pursue implementation, with the City of Yucaipa and the San Bernardino County Flood Control District, of the *Yucaipa Water Capture and Resource Management Complex* by December 31, 2010.

Accordingly, the use of recycled water for groundwater recharge in the Yucaipa or San Timoteo Management Zone shall be limited to the amount that can be blended in the management zone on a volume-weighted basis with other sources of recharge to achieve 5-year running average concentrations less than or equal to the "maximum benefit" objectives for the affected groundwater management zone. The 25% nitrogen loss coefficient will be applied in determining the amount of recharge of other water sources that must be achieved to meet the 5-year running average nitrogen concentrations.

6. Ambient Groundwater Quality Determination (Table 5-9a, # 6)

By July 1, 2005, and every three years thereafter, YVWD shall submit a determination of ambient TDS and nitrate-nitrogen quality in the San Timoteo and Yucaipa Management Zones. This determination shall be accomplished using methodology consistent with the calculation (20-year running averages) used by the Nitrogen/TDS Task Force to develop the TDS and nitrate-nitrogen "antidegradation" water quality objectives for groundwater management zones within the region. [Ref. 1].

7. Replacement of Denitrification Facilities (Table 5-9a, #7)

YVWD shall replace existing denitrification facilities to provide effluent total inorganic nitrogen quality (6 mg/L) needed to assure compliance with the "maximum benefit" nitrate-nitrogen objective of the San Timoteo and Yucaipa Management Zones (see Wasteload Allocation section of this Chapter). A maximum three year schedule for completion of these facilities will be required. This schedule will be specified in a revised NPDES permit for YVWD's discharges to San Timoteo Creek.

8. YVWD Recycled Water Management (Table 5-9a, #8)

YVWD expects to limit the TDS concentration in its effluent to less than or equal to 540 mg/L by using a low TDS source water supply for potable uses, selective desalting of either source water and/or recycled waters, and minimizing the TDS waste increment. YVWD is currently constructing a 12-MGD treatment plant to treat and serve State Project Water. The plant will also be able to treat low TDS Mill Creek and Santa Ana River water. When necessary, YVWD will construct desalters to reduce either the TDS concentration in water supplied to customers or the TDS concentration in the effluent. YVWD will also use best efforts to enact ordinances and other requirements to minimize the TDS use increment.

Within 60 days after the YVWD 12-month running average concentration for TDS equals or exceeds 530 mg/L for 3 consecutive months, or the 12-month running average TIN concentration equals or exceeds 6 mg/L in any month (once replacement denitrification facilities are in place), YVWD shall submit to the Regional Board a plan and time schedule for implementation of measures to insure that the average agency wastewater effluent quality does not exceed 540 mg/L and 6 mg/L for TDS and TIN, respectively. The plan and schedule are to be implemented upon approval by the Regional Board.

9. Relocation of San Timoteo Creek Discharge (Table 5-9a, #9)

YVWD has established the goal of eliminating its discharge to the unlined reach of San Timoteo Creek by 2008. First priority will be given to the direct reuse and limited recharge of this recycled water in the YVWD service area (principally the area overlying the Yucaipa Management Zone). The District may construct a pipeline to convey the recycled water to the San Jacinto watershed for reuse. The District is also planning the construction of a pipeline to convey recycled water downstream to the lined reach of the Creek (Reach 1A) to minimize recycled water effects on the San Timoteo Management Zone. In the long-term, discharges to this area of the Creek are likely to be infrequent and limited to the wintertime, when the recycled water cannot be used in the YVWD (or potentially, the San Jacinto) service areas. However, YVWD is obligated to maintain flows in the Creek to support existing riparian habitat (State Board Order No. WW-26) and may need to continue recycled water discharges at some level. Groundwater and imported State Project water may also be used as alternative water sources.

Whole or partial removal of the discharge from the unlined reach of San Timoteo Creek would improve the quality of groundwater in the San Timoteo Management Zone and supplement recycled water supplies available for reuse elsewhere in the service area.

By June 23, 2005, YVWD shall submit a proposed plan and schedule to remove/reduce the discharge of recycled water to the unlined reach of San Timoteo Creek. The plan and schedule shall be implemented upon Regional Board approval.

10. Construction of Western Regional Interceptor (Table 5-9a, # 10)

YVWD will construct the Western Regional Interceptor to provide wastewater collection and treatment services to Dunlap Acres in order to mitigate what has been identified as a poor quality groundwater area due to prior agricultural use and existing septic systems. The Dunlap Acres area was inadvertently omitted from the Yucaipa-Calimesa septic tank subsurface disposal system prohibition established by the Regional Board in 1973. The interceptor includes the construction of a major wastewater interceptor pipeline, a force main and pump station. YVWD committed to complete construction of these facilities prior to 2010. Regional Board action may be necessary to require connection of properties to the wastewater collection system, when it is completed.

By June 23, 2005, YVWD shall submit a plan and schedule for construction of the

Interceptor. The Interceptor is to be complete no later than January 1, 2010. YVWD shall implement the plan and schedule upon Regional Board approval.

B. Implementation by Regional Board

1. Revision to Yucaipa Valley Water District NPDES Permit

To implement the "maximum benefit" objectives, the Regional Board will revise the NPDES permit for YVWD wastewater discharges to reflect the commitments described above, as appropriate. This includes the following.

The discharge limits for TDS and TIN will be specified as an annual volume-weighted average not to exceed 540 mg/L TDS and 6 mg/L TIN. These limits are based on the "maximum benefit" wasteload allocations shown in Table 5-5. A schedule not to exceed December 23, 2007 for compliance with this TIN limit shall be included in the permit. This schedule will enable YVWD to replace its existing denitrification facilities. Alternative TDS and nitrate-nitrogen limitations based on the "antidegradation" objectives will also be specified and will apply should the Regional Board find that maximum benefit is not demonstrated. These alternative limits are also specified in Table 5-5. Compliance schedules for these alternative limits will be specified in YVWD's waste discharge requirements, as necessary.

YVWD will be required to implement measures to improve effluent quality when the 12-month running average effluent TDS quality equals or exceeds 530 mg/L for 3 consecutive months, and/or when the 12-month running average TIN concentration equals or exceeds 6 mg/L in any month (once replacement denitrification facilities are in place).

YVWD's waste discharge requirements will require that recycled water used for recharge shall be limited to the amount that can be blended with other water sources, such as stormwater or imported water, to achieve 5-year running average concentrations equal to or less than the "maximum benefit" TDS and nitrate-nitrogen objectives for the affected management zone (Yucaipa or San Timoteo). Alternative TDS and nitrate-nitrogen limitations based on the "antidegradation" objectives will also be specified for recycled water recharge in these management zones.

The effluent limits for YVWD, which establish an upper limit on TDS and TIN concentrations of recycled water discharged in the Yucaipa and/or San Timoteo Management Zones, are a cornerstone of the maximum benefit demonstration. The cap on effluent TDS and TIN concentrations provides a controlling point for management of TDS and nitrogen water quality. YVWD will be required to initiate the building of a desalter and brine disposal line when the 5-year running average TDS in YVWD's effluent reaches 530 mg/L, or when the volume weighted-average TDS concentration in the Yucaipa Management Zone reaches 360 mg/L. YVWD will immediately implement a salt management program to reduce the salts entering the District's wastewater treatment plant. This salt management program will include: 1) provision of incentives for the removal of on-site regenerative water softeners and the use of off-site regenerative systems; and 2) percolation of State Water Project water into the Yucaipa Management Zone when State Water Project water has low TDS. Implementing these measures will assure that the groundwater quality remains at or below the Yucaipa Management Zone objective of 360 mg/L TDS. Maintenance of this ambient groundwater quality is necessary, in turn, to assure that YVWD's wastewater treatment facility is able to meet the effluent TDS limits. Yucaipa Management Zone groundwater is a significant component of the water supplied in YVWD's service area, and its quality thus has an important effect on effluent quality. Poor ambient quality will preclude YVWD from meeting effluent limits without desalting.

YVWD will be required to submit proposed plans and schedules for the removal/reduction of its wastewater discharges from the unlined reach of San Timoteo Creek and for the construction of the Western Regional Interceptor. YVWD's revised permit will also reflect the surface and groundwater monitoring program requirements described above. This includes the determination of ambient quality in the San Timoteo and Yucaipa Management Zones.

2. Review of Project Status

No later than 2005, and every three years thereafter (to coincide with the Regional Board's triennial review process), the Regional Board intends to review the status of the activities planned and executed by the YVWD to demonstrate maximum benefit and justify continued implementation of the "maximum benefit" water quality objectives. This review is intended to determine whether the commitments specified above and summarized in Table 5-9a are met. As indicated above, if, as a result of this review, the Regional Board finds that the YVWD commitments are not met and after consideration at a duly noticed Public Hearing, the Regional Board will make a finding that the lowering of water quality associated with TDS and nitrate-nitrogen water quality objectives that are higher than historical water quality (the "antidegradation" objectives) is not of maximum benefit to the people of the state. By default, the scientifically derived "antidegradation" objectives for the San Timoteo (300 mg/L for TDS, 2.7 mg/L for nitrate-nitrogen) and Yucaipa (320 mg/L for TDS and 4.2 mg/L for nitrate-nitrogen Management Zones would become effective (see Chapter 4).

Furthermore, in the event that the projects and actions specified in Table 5-9a are not implemented, the Regional Board will require that the YVWD mitigate the adverse water quality effects, both on the immediate and downstream waters, that resulted from the recycled water discharges based on the "maximum benefit" objectives.

2. San Timoteo and Beaumont Management Zones – City of Beaumont and San Timoteo Watershed Management Authority (STWMA)

As shown in Chapter 4, two sets of TDS and nitrate-nitrogen objectives have been adopted for both the San Timoteo and Beaumont Management Zones: the “maximum benefit” objectives and objectives based on historic ambient quality (the “antidegradation” objectives). The application of the “maximum benefit” objectives for these Management Zones is contingent on the implementation of commitments by the City of Beaumont/STWMA (and, in the case of the San Timoteo Management Zone, by the Yucaipa Valley Water District (YVWD; see preceding discussion)) to implement a specific water and wastewater resources management program [Ref. 10E]. This program is part of a coordinated effort by the member agencies of STWMA to develop and implement projects that will assure reliable water supplies to meet rapidly increasing demands in this area. The San Timoteo Watershed Management Program (STWMP) developed by STWMA entails enhanced recharge of native and recycled water, maximizing the direct use of recycled water, optimizing the direct use of imported water, recharge and conjunctive use.

Wastewater collection and treatment services in the STWMA service area are provided by the City of Beaumont, as well as YVWD. Beaumont discharges tertiary treated wastewater to Coopers Creek, a tributary of San Timoteo Creek, Reach 3. This unlined reach of the Creek overlies and recharges the San Timoteo groundwater management zone.

Table 5-10a identifies the projects and requirements that must be implemented by Beaumont/STWMA to demonstrate that water quality consistent with maximum benefit to the people of the state will be maintained. STWMA, acting for all its member agencies, has committed to conduct the regional planning and monitoring activities necessary to implement these “maximum benefit” commitments, and the San Timoteo Watershed Management Program as a whole. Table 5-10a also specifies an implementation schedule. The Regional Board will revise the City of Beaumont’s waste discharge requirements and take other actions as necessary to require that these commitments be met. It is assumed that maximum benefit is demonstrated, and that the “maximum benefit” water quality TDS and nitrate-nitrogen objectives apply to the Beaumont and San Timoteo Management Zones, as long as the schedule is being met[7]. If the Regional Board determines that the maximum benefit program is not being implemented effectively in accordance with the schedule shown in Table 5-10a (and in the case of the San Timoteo Management Zone, the commitments and schedule shown in Table 5-9a (see preceding section)), then maximum benefit is not demonstrated, and the “antidegradation” TDS and nitrate-nitrogen objectives apply. In this situation, the Regional Board will require mitigation for TDS and nitrate-nitrogen discharges

[7] Application of “maximum benefit” objectives for the San Timoteo Management Zone is also contingent on the timely implementation of the commitments by the Yucaipa Valley Water District which are discussed in the preceding section.

affecting these management zones that took place in excess of limits based on the "antidegradation" objectives.

This space has been intentionally left blank

Table 5-10a

City of Beaumont and San Timoteo Watershed Management Authority
Maximum Benefit Commitments

Description of Commitment	Compliance Date – as soon as possible, but no later than
1. Surface Water Monitoring Program a. Submit Draft Monitoring Program to Regional Board b. Implement Monitoring Program c. Quarterly data report submittal d. Annual data report submittal	a. January 23, 2005 b. Within 30 days from Regional Board approval of monitoring plan c. April 15, July 15, October 15, January 15 d. February 15th
2. Groundwater Monitoring Program a. Submit Draft Monitoring Program to Regional Board b. Implement Monitoring Program c. Annual data report submittal	a. January 23, 2005 b. Within 30 days from Regional Board approval of monitoring plan c. February 15th
3. Desalter(s) and Brine Disposal Facilities Submit plan and schedule for construction of desalter(s) and brine disposal facilities. Facilities are to be operational as soon as possible but no later than 7 years from date of Regional Board approval of plan/schedule. b. Implement the plan and schedule	a. Within 6 months of either of the following: i. When Beaumont's effluent 5-year running average TDS exceeds 480 mg/L; and/or ii. When volume weighted average concentration in the Yucaipa MZ of TDS exceeds 320 mg/L b. Within 30 days from Regional Board approval of monitoring plan
4. Non-potable water supply Implement non-potable water supply system to serve water for irrigation purposes. The non-potable supply shall comply with a 10-year running average TDS concentration of 330 mg/L or less	December 23, 2014

Description of Commitment	Compliance Date – as soon as possible, but no later than
5. Recycled water recharge The recharge of recycled water in the Beaumont or San Timoteo Management Zones shall be limited to the amount that can be blended with other recharge sources to achieve a 5-year running average equal to or less than the "maximum benefit" objectives for TDS and nitrate-nitrogen for the relevant Management Zone(s). a. Submit baseline report of amount, locations, and TDS and nitrogen quality of stormwater/imported water recharge. b. Submit documentation of amount, TDS and nitrogen quality of all sources of recharge and recharge locations. For stormwater recharge used for blending, submit documentation that the recharge is the result of City of Beaumont/STWMA enhanced recharge facilities/programs	Compliance must be achieved by end of 5th year after initiation of recycled water use/recharge operations. a. Prior to initiation of construction of basins/other facilities to support enhanced storm/water imported water recharge . b. Annually, by January 15th, after initiation construction of facilities/implementation of programs to support enhanced recharge.
6. Ambient groundwater quality determination	July 1, 2005 and every 3 years thereafter
7. Replace denitrification facilities (if necessary to comply with TIN wasteload allocation specified in Table 5-5)	Compliance with 6 mg/L TIN limitation to be achieved by December 23, 2007
8. City of Beaumont recycled water quality Improvement plan and schedule a. Submit plan and schedule b. Implement plan and schedule	a. 60 days after the TDS 12-month running average effluent quality equals or exceeds 480 mg/L for 3 consecutive months and/or the 12-month running average TIN concentration equals or exceeds 6 mg/L in any month (once facility/operational changes needed to achieve 6 mg/L TIN are in place) b. Upon approval by Regional Board
9. Remove/reduce the discharge of Beaumont Effluent From the unlined portion of San Timoteo Creek a. Submit proposed plan/schedule b. Implement plan/schedule	 a. June 23, 2005 b. Upon Regional Board approval

A. Description of City of Beaumont, San Timoteo Watershed Authority Commitments

1. Surface Water Monitoring Program (Table 5-10a, #1)

The City of Beaumont and the STWMA shall develop and submit for Regional Board approval a surface water monitoring program for San Timoteo, Little San Gorgonio and Noble Creeks at the locations listed in Table 5-10b. The monitoring program must be implemented within 30 days of Regional Board approval of the monitoring plan, and six months of data must be generated prior to the implementation of any changes to the effluent discharge points and before any recycled water is used in the Beaumont or San Timoteo Management Zones.

At a minimum, the surface water monitoring program shall include the collection of monthly measurements of TDS and nitrogen components at locations in San Timoteo, Little San Gorgonio and Noble Creeks (see Table 5-10b). Data reports shall be submitted to the Regional Board's Executive Officer by April 15, July 15, October 15 and January 15 each year. An annual report summarizing all data collected for the year and evaluating compliance with relevant surface water objectives shall be submitted February 15th of each year.

2. Groundwater Monitoring Program (Table 5-10a. #2)

The purpose of the groundwater monitoring program is to identify the effects of the implementation of the Beaumont and San Timoteo Management Zone maximum benefit TDS and nitrate-nitrogen water quality objectives on water levels and water quality within the Beaumont and San Timoteo Management Zones. Prior to discharge of recycled water to the Beaumont and/or San Timoteo Management Zone, the City of Beaumont and the STWMA shall submit to Regional Board for approval a groundwater monitoring program to determine ambient water quality in the Beaumont and San Timoteo Management Zones. The groundwater monitoring program must be implemented within 30 days of approval by the Regional Board.

An annual report, including all raw data and summarizing the results of the approved groundwater monitoring program, shall be submitted to the Regional Board by February 15th of each year.

3. Desalters and Brine Disposal (Table 5-10a. #3)

The City of Beaumont and the STWMA shall construct and operate desalting facilities and brine disposal facilities when:

a. The 5-year running average TDS concentration in recycled water produced at the City of Beaumont wastewater treatment plant exceeds 480 mg/L, or

b. The volume-weighted TDS concentration in the Beaumont Management Zone equals or exceeds 320 mg/L.

The construction of these facilities will be in accordance with a plan and schedule submitted by Beaumont/STWMA and approved by the Regional Board. The schedule shall assure that these facilities are in place within 7 years of Regional Board approval. These facilities shall be designed to stabilize or reverse the degradation trend evidenced by effluent and/or management zone quality.

Table 5 – 10b

Surface Water Monitoring Sites for Monitoring Water Quality and Quantity
City of Beaumont & San Timoteo Watershed Management Authority

Site Name	Discharge	Owner	Type	Discharge Frequency	Monitoring Period	Water Quality Monitoring Frequency	Water Quality Monitoring Period	Water Quality Monitoring Analyses
Above confluence With Coopers Cr.	San Timoteo Creek	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
Near Hinda Sec.35 T2S,R2W	San Timoteo Creek	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
Above confluence With San Timoteo Creek	Coopers Creek	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
At Freeway 10	Little San Gorgonio Cr.	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
At Freeway 10	Noble Creek	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Bi-weekly	Jan-Dec	TDS, TIN, Physical
Recharged to Beaumont MZ	State Water Project	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Monthly	Jan-Dec	TDS, Nitrate-N
Recharged to Beaumont MZ	Storm water	Beaumont & STWMA	Total Discharge	Bi-weekly	Jan-Dec	Monthly	Jan-Dec	TDS, Nitrate-N

4. Non-potable water supply distribution system (Table 5-10a, #4)

Like YVWD, the City of Beaumont is constructing a non-potable water system that will convey untreated State Project water and recycled water for irrigation within its service area. The intent of blending these sources is to minimize the impact of recycled water use on groundwater quality in the proposed Beaumont and San Timoteo Management Zones. A higher proportion of State Project water will be used in wet, surplus years, while larger amounts of recycled water will be used in dry, deficit years.

5. Recycled Water Use (Table 5-10a, #5)

The use of recycled water within the Beaumont Management Zone is a critical component of the City of Beaumont and STWMA water management plan and is necessary to maximize the use of the water resources of the Beaumont area.

The demonstration of "maximum benefit" and the continued application of the "maximum benefit" objectives depends on the combined recharge (recycled water, imported water, storm water) to the Beaumont Management Zone of a 5-year annual average (running average) TDS concentration of 330 mg/L and a nitrate-nitrogen concentration of 5 mg/L. If recycled water recharge in the San Timoteo Management Zone is pursued, then the application of the "maximum benefit" objectives will depend on the combined recharge to that Zone of 5-year annual average (running average) concentrations of 400 mg/L or less TDS, and 5 mg/L or less nitrate-nitrogen.

To comply with this requirement, the STWMA member agencies are developing plans to recharge and store State Project water in the proposed Beaumont Management Zone. The Beaumont-Cherry Valley Water District (BCVWD) is developing a new 80-acre groundwater recharge project that will increase storm water recharge in the Beaumont Basin by 4,100 acre-ft/yr. This facility will also be used to recharge State Water project water. The City of Beaumont is also developing storm water recharge in facilities in newly developing areas, which is expected to result in the recharge of an additional 2,400 acre-ft/yr of stormwater runoff.

Accordingly, the use of recycled water for use or recharge in the Beaumont or San Timoteo Management Zone shall be limited to the amount that can be blended on a volume-weighted basis with other sources of recharge to achieve 5-year running average concentrations less than or equal to the "maximum benefit" objectives for the affected groundwater management zone. The 25% nitrogen loss coefficient will be applied in determining the amount of recharge of other water sources that must be achieved to meet the 5-year running average nitrogen concentrations.

6. Ambient Groundwater Quality Determination (Table 5-10a, # 6)

By July 1, 2005, and every three years thereafter, the City of Beaumont and STWMA shall submit a determination of ambient TDS and nitrate-nitrogen quality in the Beaumont and San Timoteo Management Zones. This determination shall be accomplished using methodology consistent with the calculation (20-year running averages) used by the Nitrogen /TDS Task Force to develop the TDS and nitrate-nitrogen "antidegradation" water quality objectives for groundwater management zones within the region [Ref. 1].

7. Replacement/modification of denitrification facilities (Table 5-10a, #7)

The City of Beaumont has committed to produce recycled water with a 12-month average TIN concentration of 6 mg/L or less by 2008. This may be accomplished via operational changes, or may require the installation/modification of facilities. This TIN effluent quality is specified in the TIN wasteload allocation (see Table 5-5) and is necessary to assure compliance with the proposed "maximum benefit" nitrate-nitrogen objective for the Beaumont and San Timoteo Management Zones (5 mg/L). An appropriate schedule, not to exceed December 23, 2007 for compliance with this effluent limit will be specified in a revised NPDES permit for the City.

8. City of Beaumont Wastewater Management (Table 5-10a, #8)

Beaumont expects to limit the TDS concentration in its effluent to less than or equal to 490 mg/L by using a low TDS source water supply for potable uses, selective desalting of either source water and/or recycled waters, and minimizing the TDS waste increment.

Within 60 days after the Beaumont 12-month running average concentration for TDS equals or exceeds 480 mg/L for 3 consecutive months, or the 12-month running average TIN concentration equals or exceeds 6 mg/L in any month (once facility/operational changes needed to achieve 6 mg/L TIN are in place), the City of Beaumont shall submit to the Regional Board a plan and time schedule for implementation of measures to insure that the average agency wastewater effluent quality does not exceed 490 mg/L and 6 mg/L for TDS and TIN, respectively. The plan and schedule are to be implemented upon approval by the Regional Board.

9. Relocation of San Timoteo Creek Discharge (Table 5-10a, #9)

Like YVWD, Beaumont has established the goal of eliminating its discharge to the unlined reach of San Timoteo Creek by 2008 to minimize the impacts of these discharges on the San Timoteo Management Zone. The STWMP anticipates that Beaumont's recycled water will be almost completely reused within the Beaumont area for landscape irrigation, habitat enhancement, and potentially for groundwater recharge. Like YVWD, Beaumont and STWMA are also considering the export of a portion of Beaumont's surplus recycled water to the San Jacinto basin, where the

TDS objectives are higher than those for the Beaumont Management Zone and recycled water demands are greater than supplies. Some limited recycled water discharge to Coopers Creek and thence /San Timoteo Creek may need to be continued to support existing riparian habitat.

Whole or partial removal of the discharge from the unlined reach of San Timoteo Creek would improve the quality of groundwater in the San Timoteo Management Zone and supplement recycled water supplies available for reuse elsewhere in the service area.

By June 23, 2005, Beaumont/STWMA shall submit a proposed plan and schedule to remove/reduce the discharge of recycled water to the unlined reach of San Timoteo Creek. The plan and schedule shall be implemented upon Regional Board approval.

B. Implementation by Regional Board

1. Revision of City of Beaumont NPDES Permit

To implement the "maximum benefit" objectives, the Regional Board will revise the NPDES permit for the City of Beaumont wastewater discharge to reflect the commitments described above, as appropriate. This includes the following.

The discharge limits for TDS and TIN will be specified as an annual volume-weighted average not to exceed 490 mg/L TDS and 6 mg/L TIN. These limits are based on the wasteload allocation shown in Table 5-5. A schedule not to exceed December 23, 2007 for compliance with this TIN limit shall be included in the permit. This schedule will enable Beaumont to make the necessary facility/operational changes. Alternative TDS and nitrate-nitrogen limitations based on the "antidegradation" objectives will also be specified and will apply should the Regional Board find that maximum benefit is not demonstrated. These alternative limits are also specified in Table 5-5. Compliance schedules for these alternative limits will be specified in Beaumont's waste discharge requirements, as necessary.

Beaumont will be required to implement measures to improve effluent quality when the 12-month running average effluent TDS quality equals or exceeds 480 mg/L for 3 consecutive months, and/or when the 12-month running average TIN concentration equals or exceeds 6 mg/L in any month (once the facility/operational changes necessary to assure compliance with the 6 mg/L limit are in place).

Beaumont's waste discharge requirements will require that recycled water used for recharge shall be limited to the amount that can be blended with other water sources, such as stormwater or imported water, to achieve 5-year running average concentrations equal to or less than the "maximum benefit" TDS and nitrate-nitrogen objectives for the affected management zone (Beaumont or San Timoteo).

The effluent limits for the City of Beaumont, which establish an upper limit on TDS and TIN concentrations of recycled water discharged in the management zones, are a key part of the maximum benefit demonstration. The cap on effluent TDS and TIN concentrations provides a controlling point for management of TDS and nitrogen water quality. The City of Beaumont has committed to initiate the building of a groundwater desalter and brine disposal line when the TDS in the City's effluent reaches 480 mg/L. Further, the City will immediately implement a salt management program to reduce the salts entering the City's wastewater treatment plant. This salt management program will include: 1) provision of incentives for the removal of on-site regenerative water softeners and the use of off-site regenerative systems; and 2) percolation of State Water Project water into the Beaumont Management Zone when State Water Project water has low TDS. Implementing these measures will assure that the groundwater quality remains at or below the Beaumont management zone objective of 330 mg/L TDS. Maintenance of this ambient groundwater quality is necessary, in turn, to assure that the City's wastewater treatment facility is able to meet the effluent TDS limits. Beaumont Management Zone groundwater is a component of the water supplied to the City and its quality thus has an important effect on the effluent quality. Poor ambient quality will preclude the City from meeting effluent limits without desalting.

Beaumont will be required to submit a proposed plan and schedule for the removal/reduction of its wastewater discharges from the unlined reach of San Timoteo Creek. Beaumont's revised permit will also reflect the surface and groundwater monitoring program requirements described above. This includes the determination of ambient quality in the San Timoteo and Beaumont Management Zones.

2. Review of Project Status

No later than 2005, and every three years thereafter (to coincide with the Regional Board's triennial review process), the Regional Board intends to review the status of the activities planned and executed by the City of Beaumont and STWMA to demonstrate maximum benefit and justify continued implementation of the "maximum benefit" water quality objectives. This review is intended to determine whether the commitments specified above and summarized in Table 5-10a are met. As indicated above, if, as a result of this review, the Regional Board finds that the City of Beaumont and STWMA commitments are not met and after consideration at a duly noticed Public Hearing, the Regional Board will make a finding that the lowering of water quality associated with TDS and nitrate-nitrogen water quality objectives that are higher than historical water quality (the "antidegradation" objectives) is not of maximum benefit to the people of the state. By default, the scientifically derived "antidegradation" objectives for the Beaumont and San Timoteo Management Zones would become effective (230 mg/L TDS and 1.5 mg/L nitrate-nitrogen for the Beaumont Management Zone; 300 mg/L TDS and 2.7 mg/L nitrate-nitrogen for the San Timoteo Management Zone (see Chapter 4).

Furthermore, in the event that the projects and actions specified in Table 5-10a are not implemented, the Regional Board will require that the City of Beaumont and STWMA mitigate the adverse water quality effects, both on the immediate and downstream waters, that resulted from the recycled water discharges based on the "maximum benefit' objectives. As for CBW/IEUA and YVWD, discharges in excess of the antidegradation objectives that must be considered for mitigation include both recycled water and imported water, at TDS concentrations in excess of the antidegradation objectives. Mitigation by groundwater extraction and desalting must be adjusted to address concentrations of salt and nitrogen in the basin, not simply salt load.

(End of Salt Management Plan Section) (End of Resolution R8-2004-0001)

NONPOINT SOURCE PROGRAM

Considerable improvements in water quality have been achieved in the nation through the control of point source discharges such as those from sewage treatment plants or industrial facilities. It is now recognized that in many areas, nonpoint source inputs, such as urban nuisance flows and stormwater runoff, are the principal sources of contaminant inputs to surface and groundwaters.

In contrast to point sources, which discharge wastewater of predictable quantity and quality at a discrete point (usually at the end of a pipe), nonpoint source inputs are diffuse in origin and variable in quality. Management of nonpoint source inputs is in many ways more difficult to achieve, since it requires an array of control techniques customized to local watershed conditions.

Nonpoint Source Management Plan

Section 319 of the 1987 amendments to the Clean Water Act (33 USC 466 *et seq.*), established the framework for nonpoint source activities. Section 319 requires each state to prepare a Nonpoint Source Management Plan and to conduct an assessment of the impact nonpoint sources have on the state's waterbodies. In response to these requirements, the State Board adopted the Nonpoint Source Management Plan (NPSMP) in 1988 and the Water Quality Assessment in 1990 (see Chapter 6 for a discussion of the Water Quality Assessment). The NPSMP establishes a statewide policy for managing nonpoint source inputs to California's waters and is part of this Basin Plan.

The State Board defined six objectives of the Nonpoint Source Management Plan, four of which apply to activities in the Santa Ana Region:

1. Initiate and institutionalize activities for control of nonpoint source pollution (drainage from urban activities, agriculture, silviculture, abandoned mines construction, grazing, hydrologic modification, and individual disposal systems). These activities include outreach, education, public participation, technical assistance, financial assistance, interagency coordination, and demonstration projects.

A major part of the Regional Board staff's nonpoint source activities is participation in outreach activities. Board staff attend committee meetings to exchange information and to coordinate planning efforts among the various agencies in the region. Staff also coordinates with other public agencies and citizens' groups engaged in protecting water quality form nonpoint source impacts, generally by participating in technical advisory committees. Regional outreach activities are also beginning to include identification of best management practices such as education, information dissemination, and structural and nonstructural water quality controls.

2. Fund contracts for nonpoint source projects selected for nonpoint source grant funding in State Fiscal Year 1992-93. Regional water Board staff will also participate in these projects and provide technical assistance.

   Regional Board staff has managed or acted in an advisory capacity for a number of nonpoint source grant funded contracts. These projects have included Newport Bay studies to develop a hydrodynamic model of the Bay as well as a study to monitor sources of toxics into the Bay.

3. Initiate nonpoint source watershed pilot programs on nine watersheds in the state.

   San Diego Creek was designated as the region's pilot watershed project. The Creek's water quality has been impaired by excessive sedimentation, nitrates, pesticides, and metals originating from point and nonpoint sources (see the following discussion on the Newport Bay Watershed). In addition, the Upper Newport Bay Dredging Project was identified as the Region's focused nonpoint source watershed project. The U.S. Army Corps of Engineers, under Congressional authorization, is investigating dredging Upper Newport Bay to deepen the channel. The Army Corps of Engineers' activities could modify the Upper Bay's water quality and currents. Regional Board staff are aiding the Army Corps of Engineers in their development of preliminary ideas so as to prevent potential water quality degradation.

4. Implement the requirements of the 1990 Reauthorization of the Coastal Zone Management Act (CZMA) which requires the State Water Board and the California Coastal Commission to develop and implement an enforceable nonpoint source program in the coastal zone.

   The reauthorization of the CZMA, together with specific guidance from the US EPA and the National Oceanic & Atmospheric Administration (NOAA), requires coastal states to develop coastal nonpoint pollution control programs. These programs are to implement management measures for the control of land uses which contribute nonpoint source pollution to coastal waters. Management measures, which include specific measures for mitigating water quality impacts, are specified for the following land uses: agriculture; gazing; confined animal facilities; forestry; urban development; roads; marinas and recreational boating; hydromodification; and mines. The state's coastal program is to be considered for approval by the US EPA and NOAA in July 1995.

Revision of the NPSMP has been initiated. The revised NPSMP will go beyond the requirements of the Coastal Zone Management Act by specifying management measures that are applicable throughout the state. There will also be more of an emphasis placed on watershed based nonpoint source controls in the revised NPSMP. To develop these management measures, the State Board is forming Task Force Committees composed of experts in the various nonpoint source categories. The management measures developed by the Task Force Committee will be reviewed by an oversight committee made up of State and Regional Board staff prior to inclusion in the revised NPSMP. The anticipated date of completion of the revised NPSMP is in 1995.

Some major nonpoint source problems which have been addressed in the Santa Ana Region include:

- Urban runoff: addressed through the stormwater permitting program;
- Animal confinement facilities: addressed through the Dairy Regulatory Strategy;
- On-site disposal system: addressed through prohibitions and the Minimum Lot-Size Criteria; and
- Erosion/sedimentation in the Newport Bay watershed: addressed through the implementation of the Areawide 208 Plan.

Stormwater Program

The 1987 Clean Water Act amendments required the U.S. Environmental Protection Agency (US EPA) to establish regulations to control stormwater discharges associated with industrial activity, and discharges from large and medium municipal separate storm sewer systems. Large municipal separate storm sewer systems serve a population of 250,000 or more and medium municipal separate storm sewer systems serve a population of more than 100,000 but less than 250,000. On November 16, 1990, EPA published the final regulations that established the National Pollutant Discharge Elimination System (NPDES) permit requirements for discharges of stormwater from large and medium municipal separate storm sewer systems and stormwater discharges associated with industrial activities, including construction activities.

The stormwater NPDES permitting program is administered by the State Board and the Regional Boards.

A. Municipal Stormwater Discharge Permits

Prior to the promulgation of EPA's final regulations, the Santa Ana Regional Water Quality Control Board adopted areawide urban NPDES stormwater permits for each of the three counties in the Region. As shown in Table 5-9, as part of the areawide urban permits, the counties are named as the principal permittee and the incorporated cities are named as co-permittees. These permits require the development and implementation of programs to identify and eliminate illegal/illicit discharges to municipal stormwater conveyance systems, the development and implementation of best management practices (BMPs) to reduce pollutants in stormwater and urban runoff, and the development and implementation of monitoring programs.

Table 5-9
Municipal
Stormwater Permits
Santa Ana Region

Municipality	Order Number	Date Issued
Orange County Environmental Management Agency, the County of Orange, and 23 incorporated cities	90-071 NPDES - CA8000180	7/12/90
Riverside County Flood Control and Water Conservation District, the County of Riverside, and 13 incorporated cities	90-104 NPDES - CA8000192	7/13/90
San Bernardino County Transportation and Flood Control Department, the County of San Bernardino, and 16 incorporated cities	90-136 NPDES - CA8000200	10/19/90

B. Industrial and Construction Stormwater Discharge Permits

The federal regulations identify eleven industrial categories which are subject to stormwater discharge permitting:

1. Facilities subject to stormwater effluent guidelines (40 CFR Subchapter N);
2. Manufacturing facilities;
3. Mining and Oil and Gas facilities;
4. Hazardous waste treatment, storage or disposal facilities;
5. Landfills, land application sites, and open dumps that receive industrial waste;
6. Recycling facilities such as metal scrap yards, battery reclaimers, salvage yards, and automobile yards;
7. Steam electric generating facilities;
8. Transportation facilities;
9. Sewage treatment plants;
10. Construction activities; and
11. Certain facilities if materials are exposed to stormwater.

As shown these categories include construction activities (#10), which are covered by a separate permit in the State of California (see below).

To satisfy the federal requirements, the State Board issued two general permits: the General Industrial Activities Stormwater Permit (State Board Order No. 91-13-DWQ as amended by State Board Order No. 92-12-DWQ); and the General Construction Activity Stormwater Permit (State Board Order No. 92-08-DWQ). Industrial facilities and proponents of construction projects must file a Notice of Intent (NOI) with the State Board to be covered under the applicable general permit.

The General Industrial Activities Stormwater Permit requires dischargers to comply with federal regulations to reduce or eliminate industrial stormwater pollution, to develop and implement a stormwater pollution prevention plan, and to perform monitoring of stormwater discharges. This permit covers stormwater discharges from all the listed categories of industrial activity, except construction activities.

The General Construction Activity Stormwater Permit addresses stormwater discharges associated with a construction activity where grading, clearing, and excavation results in a land disturbance of five acres of more. A stormwater discharge from a construction resulting in a land disturbance of less than five acres also requires a permit if the construction is a part of a larger common plan of development or sale.

The use of general permits to regulate these various types of stormwater discharges streamlines the permitting process, which greatly benefits the Regional Board. It is also the least costly way for a discharger to obtain a permit and comply with federal and state regulations.

For industrial and construction activities in the Region, it is the Regional Board's responsibility to enforce the General Industrial Activities and General Construction Activity stormwater permits. In addition to these general permits, the Regional Board has issued and will continue to issue individual permits for stormwater dischargers if warranted by the character of the discharges and/or sensitivity of the receiving waters.

Animal Confinement Facilities (Dairies)

As described earlier in this chapter, one of the most significant water quality problems confronting the region is increasing concentrations of TDS and nitrates in the groundwater. This problem is particularly acute in those groundwater subbasins without assimilative capacity, including the Chino II and III Groundwater Subbasins (Subbasins changed by December 22, 2004 amendment).

In 1989-90, the Regional Board conducted a special investigation of the salt balance problem in the Chino Basin, described in "Dairies and Their Relationship to Water Quality Problems in the Chino Basin" or Dairy Report [Ref. 10]. The findings of this study showed that while irrigated agriculture and municipal wastewater disposal are contributors to the degradation, wastes form dairies and other animal confinement facilities play an overwhelmingly significant role.

Dairy operations began in the Chino Basin about 40 years ago and continue intensively today. In fact, the Chino Basin contains the highest concentration of dairy animals found anywhere in the world. Within an area of about 15,000 acres, there are approximately 300 dairies, housing about 300,000 animals. These animals produce approximately 0.5 million tons (dry weight) per year of manure. Significant quantities of water are used to wash the cows prior to milking. Both this wastewater and the manure contain significant quantities of salts (TDS and nitrogen). The Regional Board's studies showed that close to 30,000 tons of salts reach Chino Basin groundwater every year as a result of the disposal of these dairy wastes.

Dairy operations and waste disposal practices can also affect the quality of surface waters. Discharges of washwater and/or runoff of stormwater which has come into contact with manure contribute salts and other pollutants to receiving streams, which ultimately flow into the Santa Ana River. While the Regional Board prohibits these discharges (with the exception of stormwater under certain conditions), these discharges do occur as a result of inadequate construction and maintenance of containment facilities. Drainage from upstream urban areas exacerbates this problem.

The quality of the Santa Ana River is affected indirectly as well: significant quantities of the poor quality groundwater in the Chino Basin rise to the surface and enter the River just upstream of Prado Dam. The TDS and nitrogen problems in the Santa Ana River, which are addressed by the implementation of wasteload allocations, have been described previously. The failure to address and correct the water quality problems in the Chino Basin could compromise the effectiveness of the water quality improvements implemented by the sewage treatment plants in response to those allocations.

The Regional Board initiated a regulatory program to address the water quality impacts of the salt loads from dairy operations in 1972. Waste discharge requirements are issued to all dairies and other significant animal confinement facilities. (See the Dairy Report for a detailed description of the Regional Board's waste discharge requirements). However, the Regional Board's studies demonstrated that changes in this regulatory program were necessary.

The Regional Board developed a revised regulatory strategy, working closely with dairy industry representatives. As described in the Dairy Report, it consists of a comprehensive, three part program. Part I is designed to address the present and future impacts from ongoing dairy activities. Part II addresses the impacts from past dairy activities, and Part III addresses the need for improved drainage facilities upstream of and within the dairy area. Although termed a "dairy" regulatory strategy, the strategy is intended to apply to <u>all</u> animal confinement facilities within the Chino Basin. The term "dairy" is used here for simplicity.

Part I. Dairy Waste Discharge Requirements: Impacts of Ongoing Operations

The first part of the strategy addresses dairy waste discharge requirements and the impacts of ongoing operations. Four specific changes to the dairy regulatory program are included: an improved manure tracking system; inclusion of groundwater monitoring requirements for dairy operators; submittal of engineered waste management plans; and revision of waste discharge requirements to prohibit dairy waste disposal unless suitable offset programs are implemented.

1. Implementation of Manure Tracking and Reporting System

The Regional Board determined that the manure tracking system in use was not adequate to determine the full effects of dairy waste management practices on groundwater quality nor was it adequate to determine compliance with waste discharge requirements related to manure disposal.

In response, a new manure tracking manifest form was developed and is now being used. Dairy operators are required to complete the form and submit it annually in a report to the Regional Board.

2. Implementations of Groundwater Monitoring Requirements

Comprehensive groundwater quality data is necessary for planning mitigation activities in the Chino Basin. Groundwater monitoring requirements will be included in the waste discharge requirements for all dairy operators in the Chino Basin. The WDRs will provide the operators with the option of participating in an established, comprehensive groundwater monitoring program in lieu of their individual monitoring efforts. Such a monitoring program is now being conducted by the Chino Basin Watermaster.

3. Preparation of an Engineered Waste Management Plan as part of the Report of Waste Discharge

Historically, the Regional Board has required that dairy operators provide a general description of their proposed containment controls as part of the Report of Waste Discharge (ROWD). Experience has shown, however, that this is not adequate and that illegal discharges of manured water occur due to improper design, construction, and maintenance of containment controls.

To address this problem, the Regional Board now requires that a waste management plan be prepared by a registered engineer, member of the Soil Conservation Service or others who are suitably qualified. This plan must address containment of all washwater and stormwater runoff, as well as protection of the facility from inundation, as required by the waste discharge requirements. For any given property, the engineering plan must address necessary containment controls for the property as a whole, even in situations where some portion of that property is leased, subleased or operated by another party (for example, cultivation of agricultural crops by a farmer on a portion of dairy property).

Engineered waste management plans are required to be submitted as part of the ROWD for new or substantially modified dairy operations. These plans are also required when the containment controls at facilities are known or suspected to be inadequate.

4. Revision of the Manure and Washwater Disposal Requirements

As noted earlier, the Chino II and III Groundwater Subbasins lack assimilative capacity for additional salt inputs. In basins without assimilative capacity, mineral increments are not permitted when regulating waste discharges (see preceding section on salt balance and assimilative capacity, State Board Order No. 73-4, the Rancho Caballero decision [Ref. 7]). To meet the Chino Basin groundwater objectives, the discharge of manure and dairy washwater and their application as fertilizer and irrigation water cannot be legally permitted.

The implications of prohibiting manure and washwater disposal are significant. Recognizing this, the strategy allows for the implementation of programs to offset the salt loads contributed by ongoing manure/washwater disposal. An offset program would work as follows: for every ton of salt that will reach groundwater as a result of continued disposal/application of manure or washwater within the Chino Basin, the dairy operator must remove an equivalent amount of salt from the Basin through participation in a desalter or other appropriate means. The offsets required of the dairy industry would depend on the industry's success in identifying acceptable methods of manure and wastewater disposal; the more manure and washwater that is removed form the basin, the less need there is for offset.

The strategy calls for the waste discharge requirements for dairy operators in the Chino Basin to "prohibit the disposal of manure and washwater, and their application as fertilizer or irrigation water in the Chino Basin unless the dairy operator participates in an offset program. The offset program must ensure that water quality impacts of continued manure and/or washwater disposal/application practices are mitigated."

Implementation of this element of the dairy regulatory strategy has been withheld since acceptable mitigation projects are now being developed. As described in the preceding section the selected TDS and nitrogen management plan (Alternative 5C) includes two desalters in the Chino Basin, which are being built by the Santa Ana Watershed Project Authority and other participating agencies. These desalters, though not designed or implemented specifically to address ongoing dairy salt loading, will provide sufficient groundwater treatment and salt loads identified in Alternative 5C. This includes the salt loads from present and future dairy operations and other agriculture, unsewered areas, and other sources.

Part II. Impacts of Past Dairy Operations

This part of the dairy regulatory strategy addresses the mitigation of water quality impacts caused by past discharges of dairy waste in the Chino Basin.

While the two desalters mentioned above should be adequate to offset present and future salt wasteloads, they will not provide sufficient groundwater treatment to address the historic contributions of salts from long-term dairy or other agricultural activities, municipal wastewater disposal, etc. These historic salt inputs must be addressed to protect the beneficial uses of the Basin's groundwaters and to prevent long-term adverse impacts to the Santa Ana River.

Additional desalters or other treatment facilities and strategies will be necessary. The implementation of these measures may have significant costs. To be equitable, each of the sources of TDS and nitrogen input to the Basin, including dairies, other types of agriculture, and municipalities, should assume its fair share of the Chino Basin cleanup costs. The dairy regulatory strategy incorporates the concept of shared responsibility and directs the use of this concept to develop an equitable approach to water quality correction in the Chino Basin.

A comprehensive study of water resources management in the Chino Basin is now being conducted. The study, the Chino Basin Water Resources Management Study, is funded by a task force which includes representatives of the Chino Basin Watermaster (composed of water users in the Chino Basin including the agricultural industry), Chino Basin Municipal Water District, Western Municipal Water District, the Santa Ana Watershed Project Authority, Metropolitan Water District, and the Regional Board. The goal of this study is to identify a water resources management plan which will provide for water quality protection, water demands are met, and the quality of the Santa Ana River is not adversely affected by outflow from the Basin.

Part III. Surface Water Quality Impacts: Control of Drainage in the Chino Agricultural Preserve

The third part of the dairy strategy addresses surface water drainage problems in the Chino Agricultural Preserve, where most of the dairies are located. These problems are caused both by inadequate and poorly maintained drainage facilities within the Preserve, and by inadequate controls on drainage from upstream urban areas.

Runoff from the rapidly developing areas upstream of the dairy area creates additional difficulties for many dairy operators in complying with the manured water containment requirements specified in their waste discharge requirements. A number of studies have been conducted to determine the best method of preventing urban stormwater runoff impacts in the dairy area. The most recent study, "Chino Agricultural Preserve Drainage and Land Use Study"[Ref. 11], was conducted with federal 205(j) planning funds and was completed in 1987. The recommended solution to these urban drainage problems was the construction of a trapezoidal earth swale at the northern boundary of the dairy area (roughly, at Riverside Avenue, between Campus Avenue and the Cucamonga Creek flood control channel, just west of Archibald Avenue). This swale would intercept flows from upstream urban areas (cities of Ontario and Chino) and convey these flows to the Lower Cucamonga Spreading Grounds, adjacent to the Cucamonga Creek Channel.

To alleviate drainage problems in the dairy area and reduce surface water quality problems which result from dairy waste inputs, the following measures need to be implemented:

1. Riverside Avenue interceptor swale – San Bernardino County and/or the cities of Ontario and Chino should pursue the funding and implementation of the interceptor swale project at Riverside Avenue.
2. Other drainage controls – Both San Bernardino and Riverside counties and the cities tributary to the dairy area should identify and implement a coordinated program of drainage controls necessary to supplement the interceptor swale and prevent drainage problems within the dairy area.

These recommendations are directed to the counties and cities, rather than to the dairy industry. The counties are required to implement such best management practices (BMPs) as part of their NPDES stormwater permits.

Dairy Operations Outside the Chino Basin

Since the greatest concentration of dairies occurs in the Chino Basin, the dairy strategy has appropriately focused on mitigating the problems in this area. However, in recent years, many new dairies have been established elsewhere in the Region, specifically in the San Jacinto Basin, and this trend appears to be continuing. To prevent the recurrence of the groundwater quality problem now confronting the Region in the Chino Basin, an appropriate dairy waste management strategy for the San Jacinto Basin must be developed and implemented. The pattern of dairy land use, the quality of underlying groundwater, and the availability of assimilative capacity in the San Jacinto Groundwater Subbasins should be considered in more detail before recommending a complete dairy strategy. However, it is anticipated that the wastewater management plan, the manure tracking system, and the groundwater monitoring elements of the strategy recommended for the Chino Basin will also apply in the San Jacinto Basin.

Minimum Lot Size Requirements and Exemption Criteria for New Developments Using On-Site Septic Tank-Subsurface Leaching/Percolation Systems

The Santa Ana Region is characterized by dramatic population growth. Most of this population is concentrated in urban areas, where high density development on small lots is typical. Sanitary sewers are not available in many areas where rapid growth is occurring, so many of these high density developments use on-site septic tank-subsurface disposal systems for sewage disposal.

In 1989, the Regional Board investigated the relationship between these high density developments and the nitrate problems found in the groundwater of the Region [Ref. 12]. The findings showed that the use of high density subsurface disposal systems would cause or add to nitrate quality problems. To control these impacts, the Board found that it was necessary to limit the density of new subsurface systems.

On October 13, 1989, the Regional Board adopted Resolution No. 89-157, amending the Water Quality Control Plan to add a one-half acre minimum lot size requirement for new developments using on-site septic tank-subsurface leaching/percolation systems region-wide. Certain exemptions from the minimum lot size requirement were specified in Resolution No. 89-157. On December 7, 1990, the Regional Board adopted Resolution No. 90-158, which revised the exemption criteria. However, on June 7, 1991, the Regional Board adopted Resolution No. 91-51, rescinding Resolution No. 90-158 and revising the exemption criteria in Resolution No. 89-157. On July 16, 1993, the Regional Board adopted Resolution No. 93-40, revising the requirements and exemption criteria in Resolution No. 89-157, as amended by Resolution No. 91-51. Resolution No. 89-157, as amended by Resolution No. 93-40, stipulates the following:

1. A minimum lot size of one-half acre (average gross) per dwelling unit is required for <u>new</u> developments in the Region using on-site septic tank-subsurface leaching/percolation systems.

    A. The term "one-half acre" specified as the minimum lot size requirement means an average gross area of land of one-half acre per dwelling unit. Easements (including streets, curbs, commons, and greenbelts), or those portions thereof which are part of the property proposed for development shall be included in the calculation of the average gross area of land.

    B. A "new" development is defined as a proposed tract, parcel, industrial or commercial development for which:

        1. One or more of the following has not been granted on or prior to September 7, 1989:

            a. Conditional approval or approval of a tentative parcel or tract map by the local agency such as the county/city Planning Commission, City Council or the Board of Supervisors.

            b. A conditional use permit.

            c. Conditional approval or approval by the San Bernardino County Department of Environmental Health Services, Riverside County Department of Health Care Agency or other local agency; or

2. One or more of the conditional approvals or approvals listed under B.1., above, were granted on or prior to September 7, 1989 but had expired prior to September 7, 1989.

C. The minimum lot size requirement does not apply to existing developments where septic tank-subsurface disposal systems have been installed on or prior to September 7, 1989. Replacement of the existing septic tank-subsurface disposal systems shall be exempt from the minimum lot size requirements under the following conditions:

   1. <u>For Residential, Commercial and Industrial Developments</u>

      Replacement of the existing septic tank-subsurface disposal systems is necessary to bring the system up to code as required by the local health care agencies and/or the building and safety departments.

   2. <u>For Single-Family Residential Only</u>

      Replacement of the existing septic tank-subsurface disposal systems is proposed to allow additional flows resulting from additions to the existing dwelling unit. (This does not include any free-standing additional structures.)

      (Note: Board staff does not consider the number of bedrooms and/or bathrooms for existing or proposed single-family dwelling units in determining compliance with the exemption criteria.)

      a. An existing development on land zoned single-family residential will be considered as a new development if the addition of any free-standing structures which result in additional wastewater flows to the septic system is proposed. Commercial and/or industrial developments will be considered as new development if any additions to the existing structures are proposed which will result in additional wastewater flows to the septic system.

      b. For single-family residential developments, if the existing septic system could accommodate additional wastewater flows, then additional installations (rooms/bathroom) to these developments shall be exempt from the minimum lot size requirements.

D. Those tracts, parcels, industrial or commercial developments which have received one or more of the approvals listed in B.1., above, on or prior to September 7, 1989 are exempt from minimum lot size requirements for use of septic tank-subsurface disposal systems. However, those tracts, parcels, industrial or commercial developments which had received one or more of the approvals listed in B.1., above, but for which the approval had expired prior to

September 7, 1989 are considered as new development and are subject to the minimum lot size requirements.

E. Industrial/commercial developments are developments other than single-family residential developments. For new industrial commercial developments utilizing septic tank-subsurface disposal systems, the wastewater flow for each one-half acre gross area of land may not exceed that from a three-bedroom, two bathroom single-family dwelling unit. For determining compliance with this criterion, a flow rate of 300 gallons per day shall be considered as the flow equivalent to that from a 3-bedroom, 2-bathroom single-family dwelling. For industrial/commercial developments with lots smaller than one-half acre, this flow rate requirement shall be prorated. (For example, an industrial/commercial development on a one-quarter (1/4) acre parcel will be in compliance with this requirement if the wastewater flow does not exceed 150 gallons per day.)

F. This minimum lot size requirement does not affect the lot size criterion for continuing exemptions in prohibition areas (1 acre minimum).

G. This minimum lot size requirement does not preclude the prescription of more stringent lot size requirements in specific areas if it is determined necessary to protect water quality.

H. No exemptions shall be granted for new developments on lots less than one-half acre which are 200 feel or less from a sewer which could serve that tract/parcel, barring legal impediments to such use. All other developments shall be considered on sliding scale, *e.g.,* for each additional unit (any development which is more than a single-family dwelling), this requirement should be increased by 100 feet per dwelling unit. For example, a 10-lot subdivision shall be required to connect to a sewer if the sewer is within 1,100 feet (200 + 9 x 100 feet = 1,100 feet) of the proposed development barring legal impediments to connection to the sewer. For this subsection, a commercial/industrial development which produces a wastewater flow of up to 300 gallons per day would be considered equivalent to a single-family dwelling unit.

I. New lots of less than one-half acre may be formed by combining two or more lots which have received one of the approvals specified in Section B.1., above on or prior to September 7, 1989. Individually, these existing lots would be eligible for an exemption from the minimum lot size requirement. Developments on the combined lots may also be granted an exemption provided that the total number of units proposed for the new parcel is equal to or less than the total number of units proposed for the existing parcel. For the purposes of this subsection, a combined lot of less than one-half acre formed from two or more existing lots shall not be considered a new development.

J. Exemptions from the minimum lot size requirements for the use of septic tank-subsurface disposal systems on lots smaller than one-half acre may be granted if the following conditions are met:

   1. The project proponent implements an acceptable offset program. Under an offset program, the project proponent can proceed with development using septic systems on lots smaller than one-half acre if the proponent connects an equivalent number of septic systems to the sewer. The unsewered developments must be those which would not otherwise be required to connect to the sewer.

   2. If the septic systems (developments) proposed are not identical to the ones connected to the sewer (the offset), an engineering report shall be submitted certifying that the nitrogen loading rate from the proposed development(s) is(are) equivalent to or less than the nitrogen loading rate from the septic systems in the offset program.

   3. The proposed use of septic tank-subsurface disposal systems complies with the Regional Board's "Guidelines for Sewage Disposal from Land Developments,"

K. The project proponent may propose an alternative treatment system for sewage disposal as the basis for an exemption from the minimum lot size requirement. Each request for use of an alternative treatment system shall be reviewed on a case-by-case basis and submitted to the Regional Board for consideration.

Newport Bay Watershed

Water quality problems in Newport Bay were described in detail in reports prepared in response to Senate Concurrent Resolutions 38 and 88 [Ref. 16, 17]. These problems are essentially nonpoint source problems and fall into four major categories: 1) TMDL for sediment; 2) bacterial contamination; 3) eutrophication and 4) toxic substances contamination. Each of these problems have been or is being addressed by either local or state agencies. A brief description follows:

1.a Phase 1 of the TMDL for Sediment (Amended by Resolution 98-101)

The Total Maximum Daily Load for sediment in the Newport Bay/San Diego Creek Watershed includes the following quantifiable targets and Load Allocations that shall be implemented by the Cities (Irvine, Tustin, Lake Forest, Costa Mesa, Santa Ana and Newport Beach) and County responsible for the sediment discharged into stormwater and flood control conveyances under their control which discharge into San Diego Creek and/or Newport Bay.

1. Sediment control measures shall be implemented and maintained to ensure that sediment discharges into Newport Bay will not significantly change the existing acreages of aquatic, wildlife, and rare and endangered species habitat, and to maintain the navigational and non-contact recreational beneficial uses of the bay. The existing aquatic and wildlife habitat of the Upper Bay, which is comprised of approximately 210 acres of marine aquatic habitat, 214 acres of mudflat habitat, 277 acres of salt marsh, and 31 acres of riparian habitat within, and adjacent to, the 700 acre Upper Newport Bay Ecological Reserve and the existing navigational and recreational uses of Newport Bay, will be used by the Regional Board as a performance standard of the effectiveness of the sediment TMDL. If these acreages are changed by more than 1% as the result of sediment deposition, if the in-bay sediment basins or the in-channel sediment basins are not maintained, or if there are impacts to navigational and recreational uses, this will indicate that the local sediment control measures are not adequate to protect the beneficial uses provided by these areas, and the Board will reevaluate the sediment TMDL for Newport Bay and San Diego Creek. Since the intent of the sediment TMDL is to protect these beneficial uses, this quantifiable target will be used as the primary measurement of the success of the TMDL. In order to maintain the marine aquatic habitat of the Unit 1 and 2 Sediment Basins in Upper Newport Bay, a minimum depth of 7 feet below mean sea level shall be maintained. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall conduct bathymetric and vegetation surveys of Newport Bay no less than once every three years or as agreed upon by the Executive Officer. This information will be used to evaluate compliance with the acreage and depth targets. If these acreages are changed by more than 1% as the result of sediment deposition, if the minimum depth is not maintained, and if the 50% target sediment reduction described below is not achieved, the Regional Board may consider appropriate enforcement action.

2. It is recognized that the Department of Fish and Game, which is responsible for the management of the Reserve, may wish to modify the habitat composition and acreages of the Reserve to address wildlife needs. The habitat acreages identified above will be revised accordingly through the Basin Plan Amendment process.

3. The second quantifiable target is to reduce the annual average sediment load in the watershed from a total of approximately 250,000 tons per year to 125,000 tons per year, thereby reducing the sediment load to Newport Bay to approximately 62,500 tons per year and limiting sediment deposition in the drainages to approximately 62,500 tons per year. Sediment control measures shall be implemented and maintained to result in a 50% reduction in the current load of sediment in the Newport Bay/San Diego Creek Watershed within 10 years. The Regional Board will determine compliance with this target by calculating the annual average amount of suspended solids measured in San Diego Creek at Jamboree Boulevard and Campus Drive over a ten year period, and by evaluating the scour studies of the creek channels and topographic surveys of all the sediment control basins in the watershed to estimate the amount of deposition. Given that annual sediment deposition can vary widely based on weather and other conditions, it is appropriate to evaluate compliance with

the sediment reduction target as a 10 year running annual average of the suspended solids load measured in San Diego Creek at Jamboree Boulevard and Campus Drive. The Regional Board will compare this information to the bathymetric and scour studies information to determine if the monitoring data accurately reflects sediment deposition in the bay and creek channels and to determine compliance with this target.

4. Sediment control measures shall be implemented and maintained to comply with the following Load Allocations (implemented as 10-year running annual averages) for discharges of sediment to Newport Bay: 1) no more than 28,000 tons per year of sediment shall be discharged to Newport Bay from open space areas within the watershed, 2) no more than 19,000 tons per year shall be from agricultural land, 3) no more than 13,000 tons per year from construction sites, 4) no more than 2,500 tons per year discharged from urban areas. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall be required to provide a proposal for evaluating compliance with these individual land use type load allocations that is subject to the approval of the Executive Officer. This proposal shall be implemented upon approval of the Executive Officer.

5. Sediment control measures shall be implemented and maintained to comply with the following Load Allocations (implemented as 10-year running annual averages) in addition to the load allocations specified above for Newport Bay for discharges of sediment to tributaries of Newport Bay: 1) no more than 28,000 tons per year of sediment shall be discharged to San Diego Creek and its tributaries from open space areas within the watershed, 2) no more than 19,000 tons per year shall be discharged to San Diego Creek and its tributaries from agricultural land, 3) no more than 13,000 tons per year discharged to San Diego Creek and its tributaries from construction sites, 4) no more than 2,500 tons per year discharged to San Diego Creek and its tributaries from urban areas. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall be required to provide a proposal for evaluating compliance with these individual land use type load allocations that is subject to the approval of the Executive Officer. This proposal shall be implemented upon approval of the Executive Officer.

6. Sediment control measures shall be implemented such that Upper Newport Bay, including In-Bay Sediment Basins 1 and 2, need not be dredged more frequently than about once every 10 years, and the long term goal of Phase 1 of the TMDL for sediment is to reduce the frequency of dredging to once every 20 to 30 years. It is recognized that extreme rainfall conditions may necessitate more frequent dredging of the in-bay basins. The Regional Board will adopt waste discharge requirements for such dredging projects as the means of recommending Clean Water Act Section 401 Water Quality Certification for the dredging, and to ensure proper disposal of the dredged sediment.

7. Waste Discharge Requirements will be waived for maintenance dredging of flood control channels and drainages throughout the watershed in order to maintain flood control capacity, under the following conditions; 1) any vegetation removal or earthwork conducted between March 1 and September 1 shall be supervised by a

qualified biologist, approved by the Department of Fish and Game, to ensure compliance with the Endangered Species Act and Migratory Bird Treaty Act (this monitor shall have the authority to the stop or divert work to avoid impacts as necessary); and 2) the information in a complete application (report of waste discharge) demonstrates that the waiver criteria specified herein and in Regional Board Resolution No. 96-9, Waiver of Waste Discharge Requirements for Certain Types of Discharges, are met.

8. All in-channel and foothill sediment control basins throughout the drainages in the watershed shall be maintained to have at least 50% of design capacity available prior to November 15 of each year. Waste Discharge Requirements will be waived for sediment control basin maintenance activities under the following conditions: 1) any vegetation removal or earthwork conducted between March 1 and September 1 shall be supervised by a qualified biologist, approved by the Department of Fish and Game, to ensure compliance with the Endangered Species Act and Migratory Bird Treaty Act (this monitor shall have the authority to the stop or divert work to avoid impacts as necessary); 2) the use of herbicides for the control of vegetation within channels shall be avoided to the greatest extent practicable; and 3) the information in a complete application (report of waste discharge) demonstrates that the waiver criteria specified herein and in Regional Board Resolution No. 96-9, Waiver of Waste Discharge Requirements for Certain Types of Discharges, are met.

9. Waste Discharge Requirements will be waived for drainage channelization and stabilization projects on drainages within the watershed between the foothill sediment basins and Upper Newport Bay, under the following conditions: 1) while modifying the channels, no native riparian wetland vegetation shall be removed from within the basins or adjacent to the basins during the period between April 1 and September 1 of each year, in order to protect the federally listed least Bell's vireo, unless one to one mitigation is provided for the loss of the riparian and aquatic habitat; 2) any vegetation removal or earthwork conducted between March 1 and September 1 shall be supervised by a qualified biologist, approved by the Department of Fish and Game, to ensure compliance with the Endangered Species Act and Migratory Bird Treaty Acts (this monitor shall have the authority to stop or divert work to avoid impacts as necessary); and 3) the information in a complete application (report of waste discharge) demonstrates that the waiver criteria specified herein and in Regional Board Resolution No. 96-9, Waiver of Waste Discharge Requirements for Certain Types of Discharges, are met. The Regional Board will continue to work with the U.S. Army Corps of Engineers and other appropriate agencies towards the adoption of a Special Area Management Plan (or comparable plan) and General Permit for channel stabilization and flood control projects in accordance with Section 404 and 401 of the Clean Water Act. If a plan for completing the Special Area Management Plan by June 1, 1999 is not submitted to the Executive Officer by January 1, 1999, then the Executive Officer is directed to require, as an additional condition for obtaining a waiver, the completion of a comprehensive delineation of all the wetlands in the watershed and an evaluation of the cumulative impacts of projects to control sediment and the build-out of the watershed on the beneficial uses of these waters

of the State. This evaluation of the cumulative impacts must be completed, according to a plan acceptable to the Executive Officer, by June 1, 1999. Staff intends to use the delineation to propose a general permit to the Regional Board that will cover the kind of activities described in the amendment. Until the SAMP, or, alternatively, the comprehensive delineation described above, is completed, staff will continue to process individual permit applications for each project.

10. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall evaluate: 1) the amount of sediment being discharged from areas that contribute sediment to the total load discharged to Newport Bay; and 2) the effectiveness of the local sediment control plan (the 208 Plan). Where areas that contribute sediment are not under the jurisdiction of entities that are currently part of the Newport Bay Watershed Executive Committee, the Cities and County shall recommend to the Regional Board, if necessary, a new formula for allocating sediment loads and sharing of the costs of implementing the sediment control measures that will provide a 50% reduction in the current load of sediment. This evaluation shall, at a minimum, address the sediment loads from the Santa Ana-Delhi Channel, Bonita Creek, the federal lands within the watershed, and the City of Lake Forest.

These conditions shall not supersede more restrictive conditions of other agencies, such as the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, the State Department of Fish and Game, or other local agencies.

1.b Phase 2 of the TMDL for Sediment: Monitoring and Reassessment

The Newport Bay Watershed Executive Committee has developed an agreement whereby the County of Orange conducts the monitoring of sediment discharge within the watershed, with the costs shared by all parties, except the Department of Fish and Game. There has been no site specific monitoring of the various sources of sediment, so it is impossible to determine the effectiveness of specific BMPs. It is also too soon to reach any conclusions about the overall effectiveness of the local sediment control measures.

Since 1983, the County has monitored flow and total suspended solids at three locations and conducts periodic scour studies to evaluate sediment transport and deposition in the drainages within the watershed. In addition, the County has conducted two topographic surveys of the Upper Bay to determine sediment accumulation in the Upper Bay. The County intends to continue this monitoring program on behalf of the Newport Bay Watershed Executive Committee.

In addition, the Newport Bay Watershed Executive Committee shall:

1. Propose monitoring stations and schedules to be established to monitor the discharge of sediment from the Santa Ana-Delhi Channel and Bonita Canyon Creek into the Upper Bay and to evaluate the effectiveness of the BMPs being implemented in the watershed. This monitoring plan shall also propose monitoring to evaluate compliance with the Load Allocations for various land use types. This

monitoring plan will not become effective until approved by the Regional Board at a duly noticed public hearing as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

2. Propose monitoring stations and schedules to conduct the scour studies for the drainages in the watershed to be conducted annually. These surveys shall determine the amount of sediment accumulated in San Diego Creek and its tributaries, the in-channel sediment basins, the foothill sediment basins, and any other sediment basins in the watershed. The survey report shall be used to demonstrate whether the sediment basins have at least 50% capacity prior to November 15 of each year. This monitoring plan will not become effective until approved by the Regional Board at a duly noticed public hearing as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

3. Conduct topographic and vegetation surveys of Upper Newport Bay at least every three years, or as agreed upon by the Executive Officer, and after any year in which the monitoring for total suspended solids at Campus Drive shows that more than 250,000 tons of sediment were discharged to the Bay. In any year in which these surveys are required, the surveys shall be conducted by July 1. The results of these surveys shall be submitted as part of an annual report by December 31 of each year. The topographic and vegetation surveys shall be conducted to determine the amount of sediment deposition in the two In-Bay basins and the other marine aquatic habitat areas and to determine changes in the areal extent of the existing aquatic, wildlife and endangered species habitat areas.

4. Submit an annual report by December 31 of each year providing the monitoring data and information collected by the Newport Bay Watershed Executive Committee, including the flow and suspended solids monitoring data, the scour studies, the bathymetric and vegetation surveys, (and any additional information collected by the Committee). The monitoring shall be completed prior to July 1 of each year and this information shall be used to determine the maintenance requirements of all sediment basins in the watershed. Additionally, the Newport Bay Watershed Executive Committee shall submit a report by November 15 of each year certifying whether the sediment basins in the watershed have at least 50% capacity. The Regional Board will use the information collected by this monitoring program to evaluate the effectiveness of the sediment TMDL and will reevaluate the sediment TMDL as part of the Regional Board's Basin Planning process.

5. The monitoring data and information collected by the Newport Bay Watershed Executive Committee, including the flow and suspended solids monitoring data, the scour studies, the bathymetric surveys and the vegetation surveys, (and any additional information collected by the Newport Bay Watershed Executive Committee) shall be submitted in an annual report by December 31 of each year. The monitoring shall be completed prior to July 1 of each year and this

information shall be used to determine the maintenance requirements of all sediment basins in the watershed. Additionally, the Newport Bay Watershed Executive Committee shall submit a report by November 15 of each year certifying whether the sediment basins in the watershed have at least 50% capacity. The Regional Board will use the information collected by this monitoring program to evaluate the effectiveness of the sediment TMDL and will reevaluate the sediment TMDL as part of the Board's Basin Planning process. (End of Amendment Resolution No. 98-101)

2. Bacterial Contamination

Bacterial contamination of the waters of Newport Bay can directly affect two designated beneficial uses: water-contact recreation (**REC-1**) and shellfish harvesting (**SHEL**). The Orange County Health Care Agency (OCHCA) conducts routine bacteriological monitoring and more detailed sanitary surveys as necessary, and is responsible for closure of areas to recreational and shellfish harvesting uses if warranted by the results.

Because of consistently high levels of total coliform bacteria, the upper portion of Upper Newport Bay (Upper Bay) has been closed to these uses since 1974. In 1978, the shellfish harvesting prohibition area was expanded to include all of the Upper Bay, and the OCHCA generally advises against the consumption of shellfish harvested anywhere in the Bay. Bacterial objectives established to protect shellfish harvesting activities are rarely met in the Bay. (Fecal coliform objectives for the protection of shellfish harvesting and water-contact recreation are shown in Chapter 4, “Enclosed Bays and Estuaries”. The OCHCA has relied on total coliform standards specified in the California Health and Safety Code. Fecal coliform are a subset of total coliform.). Certain areas in the lower parts of the Upper Bay and in Lower Newport Bay (Lower Bay) are also closed to water-contact recreation on a temporary basis, generally in response to storms. In these areas, there is generally good compliance with water-contact recreation bacterial objectives in the summer.

Data collected by the OCHCA demonstrate that tributary inflows, composed of urban and agricultural runoff, including stormwater, are the principal sources of coliform input to the Bay. As expected, there are more violations of bacterial standards in the Bay during wet weather, when tributary flows are higher, than in dry weather. There are few data on the exact sources of the coliform in this runoff. Coliform has diverse origins, including: manure fertilizers which may be applied to agricultural crops and to commercial and residential landscaping; the fecal wastes of humans, household pets and wildlife; and other sources. Special investigations by OCHCA have demonstrated that food wastes are a significant source of coliform. Many restaurants wash down equipment and floor mats into storm drains tributary to the Bay and may improperly dispose of food waste such that it eventually washes into the Bay. Such discharges likely contribute to the chronic bacterial quality problems in certain parts of the Bay.

Another source of bacterial input to the Bay is the discharge of vessel sanitary wastes. Newport Bay has been designated a no-discharge harbor for vessel sanitary wastes since 1976. Despite this prohibition, discharges of these wastes have continued to occur. Since these wastes are of human origin, they pose a potentially significant public health threat.

The Regional Board, the City of Newport Beach (City), the County of Orange, the City of Newport Beach Harbor Quality Committee, and other parties have taken or stimulated actions to enforce the vessel waste discharge prohibition. The principal focus of these efforts has been to make compliance with the prohibition convenient and therefore more likely. Vessel waste pumpouts have been installed at key locations around the Bay and are inspected routinely by the OCHCA. A City ordinance addresses people-intensive boating activities to ensure proper disposal of sanitary wastes. The ordinance requires that sailing clubs, harbor tour, and boat charter operations install pumpouts for their vessels. Another City ordinance addresses vessel waste disposal by persons living on their boats. Efforts have also been made to ensure that there are adequate public rest rooms onshore. The City also sponsors an extensive public education campaign designed to advise both residents and visitors of the discharge prohibition, the significance of violations, and of the location of pumpouts and rest room facilities. The effectiveness of these extensive vessel waste control efforts is not known.

As noted, the fecal waste of wildlife, including waterfowl that inhabit the Bay and its environs, is a source of coliform input. The fecal coliform from these natural sources may contribute to the violations of water quality objectives and the loss of beneficial uses, but it is currently unknown to what extent these natural sources contribute to, or cause, the violations of bacterial quality objectives in Newport Bay.

Reports prepared by Regional Board staff describe the bacterial quality problems in the Bay in greater detail and discuss the technical basis for the fecal coliform TMDL that follows (21, 22). Implementation of this TMDL is expected to address these bacterial quality problems and to assure attainment of water quality standards, that is, compliance with water quality objectives and protection of beneficial uses.

3.a. Fecal Coliform TMDL (Amended by Resolution No. 99-10)

A prioritized, phased approach to the control of bacterial quality in the Bay is specified in this TMDL. This approach is appropriate, given the complexity of the problem, the paucity of relevant data on bacterial sources and fate, the expected difficulties in identifying and implementing appropriate control measures, and uncertainty regarding the nature and attainability of the SHEL use in the Bay. The phased approach is intended to allow for additional monitoring and assessment to address areas of uncertainty and for future revision and refinement of the TMDL as warranted by these studies.

Table 5-9f summarizes the TMDL, Waste Load Allocations (WLAs) for point sources of fecal coliform inputs and Load Allocations (LAs) for nonpoint source inputs. As shown, the TMDL, WLAs and LAs are established to assure compliance with water contact recreation standards no later than December 30, 2014 and with shellfish standards no later than December 30, 2019. WLAs are specified for vessel waste and urban runoff, including stormwater, the quality of which is regulated under a County-wide NPDES permit issued by the Regional Board. This runoff is thus regulated as a point source, even though it is diffuse in origin. LAs are specified for fecal coliform inputs from agricultural runoff, including stormwater, and natural sources. The TMDL is to be adjusted, as appropriate, based upon completion of the studies contained in Table 5-9g. Upon completion of these studies, an updated TMDL report will be prepared summarizing the results of the studies and making recommendations regarding implementation of the TMDL. The results of the studies may lead to recommendations for changes to the TMDL specified in Table 5-9f to assure compliance with existing Basin Plan standards (objectives and beneficial uses). The study results may also lead to recommendations for changes to the Basin Plan objectives and/or beneficial uses. If such standards changes are approved through the Basin Plan amendment process, then appropriate changes to the TMDL would be required to assure attainment of the revised standards. Revision of the TMDL, if appropriate, would also be considered through the Basin Plan amendment process.

Upon completion and consideration of the studies and any appropriate Basin Plan amendments, a plan for compliance with the TMDL specified in Table 5-9f, or with an approved amended TMDL, will be established. It is expected that this plan will specify a phased compliance approach, based on consideration of such factors as geographic location, the priority assigned by the Regional Board to specific locations for control actions (see Section 3.a.ii, “Beneficial Use Assessment”), season, etc. Interim WLAs, LAs and compliance dates that lead to ultimate compliance with the TMDL will be established.

The TMDL and its allocations contain a significant margin of safety. The margin of safety can be either incorporated implicitly through analytical approaches and assumptions used to develop the TMDL or added explicitly as a separate component of the TMDL. A substantial margin of safety is implicitly incorporated in the TMDL in the fact that the TMDL does not apply criteria for dilution, natural die-off, and tidal flushing. The TMDL, WLAs, and LAs are established at concentrations equivalent to the water quality objectives.

Table 5-9f: Total Maximum Daily Load, Waste Load Allocations, and Load Allocations for Fecal Coliform in Newport Bay

Total Maximum Daily Load for Fecal Coliform In Newport Bay	Waste Load Allocations for Fecal Coliform in Urban Runoff, including stormwater, Discharges to Newport Bay	Load Allocations for Fecal Coliform in Agricultural Runoff, including stormwater, Discharges to Newport Bay	Load Allocations for Fecal Coliform from Natural Sources in all Discharges to Newport Bay	Waste Load Allocations for Vessel Waste
As soon as possible but no later than (14 years after State TMDL Approval)*			**In Effect**	**In Effect**
5-Sample/30-days Geometric Mean less than 200 organisms/100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	5-Sample/30-days Geometric Mean less than 200 organisms/100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	5-Sample/30-days Geometric Mean less than 200 organisms/ 100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	5-Sample/30-days Geometric Mean less than 200 organisms/100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	0 MPN/100 mL No discharge.
As soon as possible but no later than (20 years after State TMDL Approval)*				**In Effect**
Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	0 MPN/100 mL No discharge.

Table 5-9g: Fecal Coliform Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
Task 1	Routine Monitoring Program (Section 3.a.ii.a) a) Submit Proposed Routine Monitoring Plan(s)[1] b) Implement Routine Monitoring Plan(s) c) Submit Monthly and Annual Reports (Reporting Period: April 1-March 31)	 a) (Within 30 days)[2] b) Upon Regional Board Approval of Plan(s) c) Monthly within 30 days, Annual Report by September 1
Task 2	Water Quality Model for Bacterial Indicators (Section 3.a.ii.b) a) Submit Proposed Model Development Plan b) Submit Calibrated Model and Model Documentation	 a) (Within 30 days)[2] b) 13 months after Regional Board approval of plan(s)
Task 3	Beneficial Use Assessment Plan (Section 3.a.ii.c) Submit Proposed Assessment Plan for: a) REC-1 b) SHEL	 a) (Within 30 days)[2] b) (Within 13 months)[2]
Task 4	Beneficial Use Assessment Report (3.a.ii.c) Submit Beneficial Use Assessment Report for: a) REC-1 b) SHEL	 a) 13 months after Regional Board approval of plan(s) b) 13 months after Regional Board approval of plan(s)
Task 5	Source Identification and Characterization Plan(s) (Section 3.a.ii.d) Submit Proposed Source Identification Plans for: a) The Dunes Resort b) Urban Runoff (including stormwater) c) Agriculture (including stormwater) d) Natural Sources	 a) (Within 60 days)[2] b) (Within 60 days)[2] c) (Within 3 months)[2] d) (Within 3 months)[2]

Table 5-9g: Fecal Coliform Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As Soon As Possible but No Later Than
Task 6	Source Identification and Characterization Reports (Section 3.a.ii.d) Submit Source Identification and Characterization Reports for: a) The Dunes Resort b) Urban Runoff (including stormwater) c) Agriculture (including stormwater) d) Natural Sources	 a) 7 months after Regional Board approval of plan(s) b) 13 months after Regional Board approval of plan(s) c) 16 months after Regional Board approval of plan(s) d) 16 months after Regional Board approval of plan(s)
Task 7	Evaluation of Vessel Waste Program (Section 3.a.ii.e) a) Submit Proposed Plan for Evaluating the Current Vessel Waste Program b) Submit Report on the Evaluation of the Vessel Waste Program	 a) (Within 3 months) [2] b) 12 months after Regional Board approval of plan
Task 8	TMDL, WLA, and LA Evaluation and Source Monitoring Program (Section 3.a.ii.f) a) Submit Proposed Evaluation and Source Monitoring Program Plan(s) b) Implement Evaluation and Source Monitoring Plan(s) c) Submit Monthly and Annual Reports (Reporting Period: April 1-March 31)	 a) 3 months after completion of Tasks 2, 4a, and 6 b) Upon Regional Board approval of plan(s) c) Monthly within 30 days, Annual Report by September 1
Task 9	Updated TMDL Report Submit updated TMDL report for: a) REC-1 b) SHEL	 a) 6 months after completion of Tasks 2, 4a, 6, and 7 b) 6 months after completion of Tasks 2, 4b, 6, and 7

Table 5-9g: Fecal Coliform Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As Soon As Possible but No Later Than
Task 10	Adjust TMDL, if necessary; adopt interim WLAs, LAs, and Compliance Dates (Section 3.a.ii.h) a) REC-1 b) SHEL	a) 12 months after completion of Updated TMDL Report for REC-1 (Task 9.a) b) 12 months after completion of Updated TMDL Report for SHEL (Task 9.b)
[1]Note: Provided that the monitoring program plan(s) fulfills the minimum requirements specified in this TMDL, approval of the TMDL shall constitute Regional Board approval of the monitoring program plan(s).		
[2]Note: Within specified time periods of State TMDL approval (i.e., approval by the Regional Board, the State Water Resources Control Board, and the Office of Administrative Law). Upon State TMDL approval, this parenthetical “formula” will be replaced by the date certain, based upon the date of approval.		

3.a.i. TMDL Implementation

As soon as possible but no later than the dates specified in Table 5-9g, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach and agricultural operators in the Newport Bay watershed shall submit the plans and schedules shown in Table 5-9g and described in Section 3.a.ii. Subsequent phases of TMDL implementation shall take into account the results of the monitoring and assessment efforts required by the initial study phase of the TMDL implementation plan and other relevant studies.

The following sections describe the requirements for the submittal of plans by dischargers in the Newport Bay watershed to complete specific monitoring, investigations and analyses. In each and every case, the plans submitted by the named dischargers will be considered for approval by the Regional Board at a duly noticed public hearing as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.). The plans are to be implemented upon Regional Board approval and completed as specified in Table 5-9g.

3.a.ii. Monitoring and Assessment

Routine monitoring and special investigations and analyses are an important part of this phased TMDL. Routine monitoring is necessary to assess compliance with the bacterial quality objectives in the Bay and with the WLAs and LAs specified in the TMDL. Special investigations and analyses are needed to identify and characterize sources of fecal coliform input and to determine their fate in the Bay so that appropriate control measures can be developed and implemented. The effectiveness of current and future bacterial control measures needs to be evaluated. The results of these studies may warrant future changes to this TMDL.

3.a.ii.a. Routine Monitoring

By January 30, 2000, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed shall propose a plan for routine monitoring to determine compliance with the bacterial quality objectives in the Bay.

At a minimum, the proposed plan shall include the collection of five (5) samples/30-days at the stations specified in Table 5-9h and shown in Figure 5-1 and analysis of the samples for total and fecal coliform and enterococci. Reports of the collected data shall be submitted monthly. An annual report summarizing the data collected for the year and evaluating compliance with the water quality objectives shall be submitted by September 1 of each year.

In lieu of this coordinated, regional monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group plan to conduct routine monitoring in areas solely within their jurisdiction to determine compliance with the bacterial objectives in the Bay (if appropriate). Any such individual or group plans shall also be submitted by January 30, 2000. Reports of the data collected pursuant to approved individual/group plan(s) shall be submitted monthly and an annual report summarizing the data and evaluating compliance with water quality objectives shall be submitted by September 1 of each year.

The monitoring plan(s) shall be implemented upon Regional Board approval.

Table 5-9h

Newport Bay Sampling Stations for Routine Compliance Monitoring with Bacterial Quality Objectives (see Figure 1 for Station Locations)

Ski Zone	33rd Street	Park Avenue
Vaughns Launch	Rhine Channel	Via Genoa
Northstar Beach	De Anza	Alvarado/Bay Is.
Abalone Avenue	Promontory Pt.	10th Street
Dunes East	Bayshore Beach	15th Street
Dunes Middle	Onyx Avenue	19th Street
Dunes West	Garnet Avenue	Lido Island Yacht Club
Dunes North	Ruby Avenue	Harbor Patrol
43rd Street	Sapphire Avenue	N Street Beach
38th Street	Newport Blvd. Bridge	Rocky Point
San Diego Creek @ Campus Dr.	Santa Ana Delhi Channel	Big Canyon Wash
Backbay Dr. Drain		

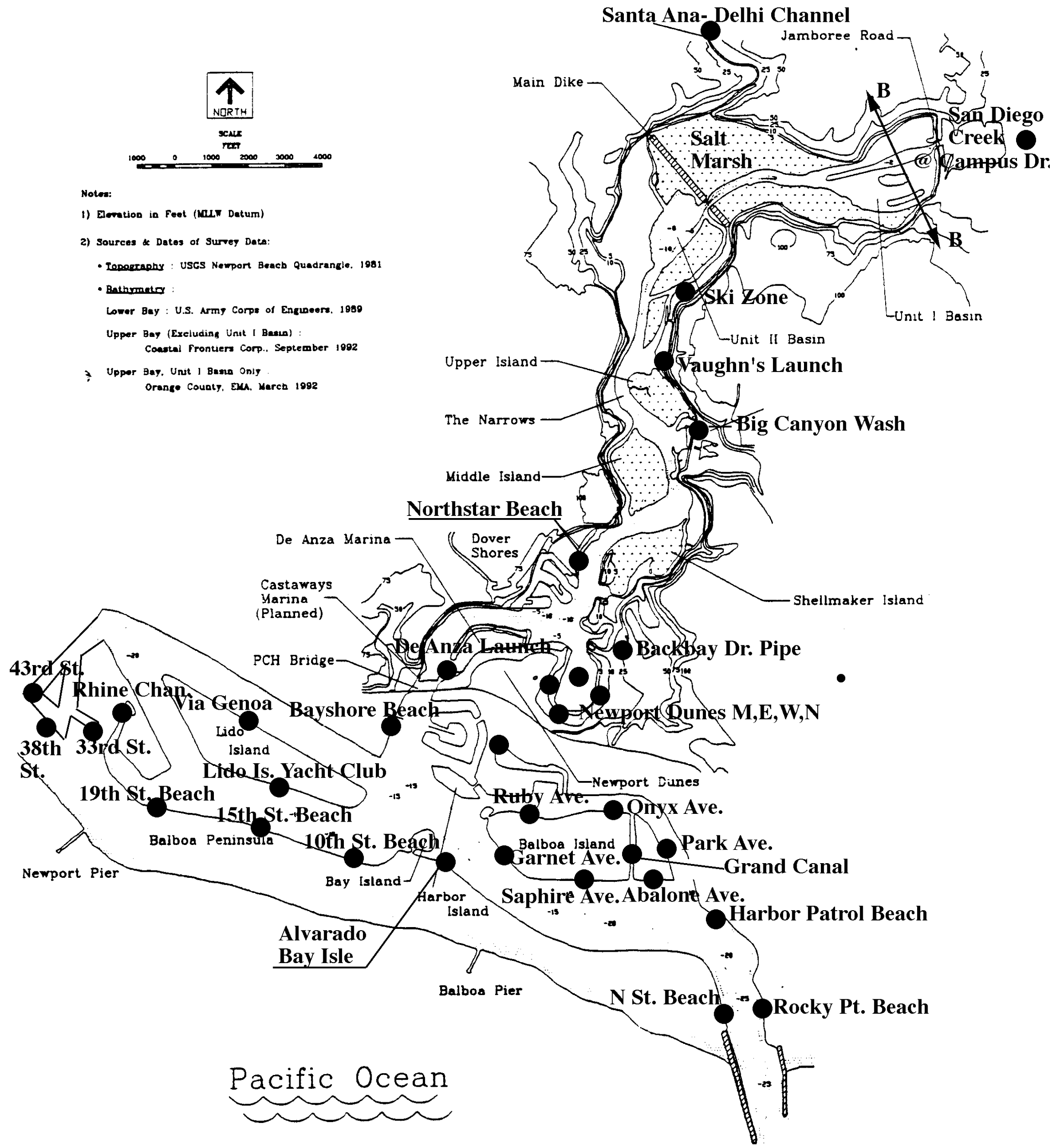


Figure 5-1: Newport Bay Bacterial Quality Monitoring Stations

3.a.ii.b. Fate of Bacterial Inputs

By January 30, 2000, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest, and Newport Beach and the agricultural operators in the Newport Bay watershed shall submit a plan for the development and submittal of a water quality model to be completed by 13 months after Regional Board approval of the plan. The model shall be capable of analysis of fecal coliform inputs to Newport Bay, the fate of those inputs, and the effect of those inputs on compliance with bacterial quality objectives in the Bay.

3.a.ii.c. Beneficial Use Assessment

By January 30, 2000, the County of Orange , the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach shall submit a plan to complete, by 13 months after Regional Board approval of the plan, a beneficial use assessment to identify and quantify water contact recreation activities in Newport Bay. By 13 months after Regional Board approval of the beneficial use assessment plan, these parties shall submit a report of the results of the water contact recreation beneficial use assessment.

By March 1, 2001, the County of Orange , the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach shall submit a plan to complete, by 13 months after Regional Board approval of the plan, a beneficial use assessment to identify and quantify shellfish harvesting activities in Newport Bay. By 13 months after Regional Board approval of the beneficial use assessment plan, these parties shall submit a report of the results of the shellfish harvesting beneficial use assessment.

The beneficial use assessment reports shall contain recommendations for prioritizing areas within Newport Bay for purposes of evaluation and implementation of cost-effective and reasonable control actions as part of the TMDL process. The Regional Board will consider these recommendations and make its determinations regarding high priority water contact recreation and shellfish harvesting areas at a duly noticed public hearing. These determinations will be considered in establishing interim WLAs and LAs and compliance dates (Task 10, Table 5-9g).

3.a.ii.d. Source Identification and Characterization

By March 1, 2000 the County of Orange and the City of Newport Beach shall submit a proposed plan for a program, to be completed within 7 months after Regional Board approval of the plan to identify and characterize fecal coliform inputs to The Dunes Resort. In lieu of this coordinated plan, each of these parties may submit an individual plan to identify and characterize fecal coliform inputs to The Dunes Resort. Any such individual plan shall also be submitted by March 1, 2000 and completed within 7 months after Regional Board approval of the plan(s).

By (60 days after State TMDL approval),* the County of Orange and the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest, and Newport Beach shall submit a proposed plan for a program, to be completed within 13 months after Regional Board approval of the plan to identify and characterize fecal coliform inputs to Newport Bay from urban runoff, including stormwater. In lieu of this coordinated, regional plan, one or more of these parties may submit an individual or group plan to identify and characterize fecal coliform inputs to the Bay from urban runoff from areas within its jurisdiction. Any such individual or group plan shall also be submitted by (60 days after State TMDL approval)* and completed within 13 months after Regional Board approval of the plan(s).

By April 1, 2000, the agricultural operators in the Newport Bay watershed shall submit a proposed plan for a program, to be completed within 16 months after Regional Board approval of the plan, to identify and characterize fecal coliform inputs to Newport Bay from agricultural runoff, including stormwater. In lieu of this coordinated plan, one or more of the agricultural operators may submit an individual or group plan to identify and characterize fecal coliform inputs to the Bay from agricultural runoff from areas within their jurisdiction. Any such individual or group plan shall also be submitted by April 1, 2000, and completed within 16 months after Regional Board approval of the plan(s).

By April 1, 2000, the County of Orange and the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest, and Newport Beach shall submit a proposed plan for a program, to be completed within 16 months after Regional Board approval of the plan, to identify and characterize fecal coliform inputs to Newport Bay from natural sources. In lieu of this coordinated, regional plan, one or more of these parties may submit an individual or group plan to identify and characterize fecal coliform inputs to the Bay from natural sources from areas within its jurisdiction. Any such individual or group plan shall also be submitted by April 1, 2000 and completed within 16 months after Regional Board approval of the plan(s).

3.a.ii.e. Evaluation of Vessel Waste Control Program

By April 1, 2000 the County of Orange and the City of Newport Beach shall submit a plan to complete, by one year after Regional Board approval of the plan, an assessment of the effectiveness of the vessel waste control program implemented by those agencies in Newport Bay. The plan shall be implemented upon approval by the Regional Board. A report of the study results shall be submitted, together with recommendations for changes to the vessel waste program necessary to ensure compliance with this TMDL.

The Regional Board will consider appropriate changes to the vessel waste control program. These changes shall be implemented in accordance with a schedule to be established by the Regional Board.

3.a.ii.f. TMDL, WLA and LA Evaluation and Source Monitoring Program

By (3 months after completion of Tasks 2, 4a, and 6 as shown in Table 5-9g)* the County of Orange, the Cities of Tustin, Irvine, Costa Mesa Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed shall propose a plan for evaluation and source monitoring to determine compliance with the WLAs and LAs specified in Table 5-9f. In lieu of this coordinated, regional plan, one or more of these parties may submit an individual or group plan to conduct TMDL, WLA, LA and Source Evaluation monitoring from areas solely within their jurisdiction. Any such individual or group plan shall also be submitted by (3 months after completion of Tasks 2, 4a, and 6 as shown in Table 5-9g).* Reports of the data collected pursuant to approved individual/group plan(s) shall be submitted monthly and an annual report summarizing the data and evaluating compliance with WLAs and LAs shall be submitted by September 1 of each year. The annual report shall also include an evaluation of the effectiveness of control measures implemented to control sources of fecal coliform, and recommendations for any changes to the control measures needed to ensure compliance with the TMDL, WLAs, and LAs.
The evaluation and source monitoring plan(s) shall be implemented upon Regional Board approval.

3.a.ii.g. Updated TMDL Report

The County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed shall submit Updated TMDL Reports as specified in Table 5-9g. These updated TMDL reports shall, at a minimum, integrate and evaluate the results of the studies required in Table 5-9g (Task 1 – 7). The reports shall include recommendations for revisions to the TMDL, if appropriate and for interim WLAs, LAs and compliance schedules

3.a.ii.h. Adjust TMDL; Adopt Interim WLA, LAs and Compliance Dates

Based on the results of the studies required by Table 5-9g and recommendations made in the Updated TMDL Reports, changes to the TMDL for fecal coliform may be warranted. Such changes would be considered through the Basin Plan Amendment process. Upon completion and consideration of the studies and any appropriate Basin Plan amendments, interim WLAs and LAs that lead to ultimate compliance with the TMDL specified in Table 5-9f, or with an approved amended TMDL, will be established with interim compliance dates. Schedules will also be established for submittal of implementation plans for control measures to achieve compliance with these WLAs, LAs, and compliance dates. These implementation plans will be considered by the Regional Board at a duly noticed public hearing.

The Regional Board is committed to the review of this TMDL every three years or more frequently if warranted by these or other studies. The County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Lake Forest, and Newport Beach, The Irvine Company and the Irvine Ranch Water District have undertaken to prepare a health risk assessment for Newport Bay for water contact recreation and shellfish harvesting beneficial uses. This study will evaluate whether exceedances of fecal coliform objectives correlates with actual impairment of beneficial uses and may recommend revisions to the Basin Plan objectives and/or beneficial use designations. Because this study is in progress, it is not required by this TMDL implementation plan, but will be considered in conjunction with the studies required by the implementation plan.
(End of Resolution No. 99-10)

4. **Eutrophication (Amended by Resolution No. 98-9)**

Nutrient loading to the Bay, particularly from the San Diego Creek watershed, contributes to seasonal algal blooms which can create a recreational and aesthetic nuisance. These algal blooms may also adversely affect wildlife.

The nutrient TMDL for the Newport Bay/San Diego Creek Watershed distributes the portions of the waterbody's assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost effective way to achieve pollution reduction benefits.

While there are a number of sources of nutrient input, tailwaters from the irrigation of agricultural crops and from several commercial nurseries in the watershed have been the predominant source. The Regional Board issued Waste Discharge Requirements to the three nurseries, requiring substantial reductions in their nutrient loads. Significant improvements have been achieved by these nurseries, largely due to the implementation of drip irrigation systems (which greatly reduce the amount of tailwater) and/or recycle systems. Installation of drip irrigation systems for other agricultural crops has also significantly reduced the volume of nutrient-laden tailwaters. These improvements, coupled with the increased tidal flushing caused by the in-bay basins, appears to have resulted in a substantial downward trend in nitrate concentrations in the Bay. However, algal blooms are still occurring in Newport Bay and San Diego Creek. As a result, Newport Bay and San Diego Creek are listed as water quality impaired due to nutrients pursuant to Section 303(d) of the Clean Water Act. A nutrient TMDL to address this problem for Newport Bay and San Diego Creek is described in the following sections.

The hydrodynamic, sediment transport, and water quality models of Newport Bay being jointly developed by the U.S. Army Corps of Engineers and the Regional Board will be used in the future to further refine the algae and nutrient relationships in the Bay. These refinements will be considered in future reviews and revisions of the nutrient TMDL.

2.a. Quantifiable Nutrient Targets

The annual loading of total nitrogen and phosphorus to Newport Bay shall be reduced by 50% by 2012. The seasonal and annual loading targets are listed in Table 5-9a.

Table 5-9a Summary of Loading Targets and Compliance Time Schedules.

TMDL	December 31, 2002[5]	December 31, 2007[5]	December 31, 2012[5]
Newport Bay Watershed Total Nitrogen - Summer Load[1]	200,097 lbs.	153,861 lbs.	
Newport Bay Watershed Total Nitrogen - Winter Load[2]			144,364 lbs.
Newport Bay Watershed Total Phosphorus - Annual Load[3]	86,912 lbs.	62,080 lbs.	
San Diego Creek, Reach 2 Total Nitrogen - Daily Load[4]			14 lbs.

1 Total nitrogen summer loading limit applies between April 1 and September 30.

2 Total nitrogen winter loading limit applies between October 1 and March 31 when the mean daily flow rate at San Diego Creek at Campus Drive is below 50 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Campus Drive is above 50 cubic feet per second (cfs), but not as the result of precipitation.

3 Total phosphorus annual loading is the sum of summer and winter loading during all daily flow rates.

4 Total nitrogen daily loading limit applies when the mean daily flow rate at San Diego Creek at Culver Drive is below 25 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Culver Drive is above 25 cubic feet per second (cfs), but not as the result of precipitation.

5 Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

The margin of safety of the nutrient TMDL is implicit through the use of conservative assumptions. These conservative assumptions include controlling all forms of nitrogen and phosphorus and controlling seasonal and annual loading.

Load Allocations

The 5, 10, and 15 year seasonal load allocations of total nitrogen for the Newport Bay Watershed are presented in Table 5-9b. The 5 and 10-year annual total phosphorus load allocations for the Newport Bay Watershed are presented in Table 5-9c. The 15 year daily total nitrogen load allocations for San Diego Creek, Reach 2 are presented in Table 5-9d. The nutrient load reduction targets will be incorporated into waste discharge requirements as effluent limits, load allocations, and waste load allocations as necessary to ensure that:

a. the total inorganic nitrogen and narrative water quality objectives for Newport Bay and San Diego Creek are achieved

b. Clean Water Act requirements for the implementation of a TMDL are satisfied

Table 5-9b Seasonal Load Allocations of Total Nitrogen for the Newport Bay Watershed.

Nutrient TMDL	1990-1997 Loading	2002 Allocation[8]	2002 Summer Allocation (April-Sept)[8]	2007 Allocation[8]	2007 Summer Allocation (April-Sept)[8]	2012 Allocation[8]	2012 Winter Allocation (Oct-Mar)[7, 8, 11]
Newport Bay Watershed	lbs/year TN[2]	lbs/day TN[10]	lbs/season TN	lbs/day TN[10]	lbs/season TN	lbs/day TN[10]	lbs/season TN
Wasteload Allocation							
Hines Nurseries	96,360 TIN[1]	224	40,992	211	38,613	211	14,227
Bordiers Nursery	30,660 TIN	71	12,993	67	12,261	67	4,518
El Modeno Gardens	18,250 TIN	43	7,869	40	7,320	40	2,697
Unpermitted nurseries	-----[3]	30	5,490	24	4,392	24	1,618
Nursery subtotal			67,344		62,586		23,060
IRWD WWSP (permanent discharge)[9]	0	62		62		62	4,181
Silverado Constructors ETC[4]	0	141	25,671	141	25,671	141	9,459
Urban runoff	277,131[6]		20,785		16,628		55,442
Wasteload Allocation			113,800		104,885		92,142
Load Allocation							
Agricultural discharges	328,040[6]		22,963		11,481		38,283
Undefined sources (Open space, atmospheric deposition, rising groundwater, groundwater cleanup/dewatering, in-bay nitrogen)	-----[3]		63,334		37,495		13,939
Load Allocation			86,297		48,976		52,222
Total	1,087,000[5]		200,097		153,861		144,364
			5 year target		10 year target		15 year target

1 TIN = (NO3+NH3).
2 TN = (TIN + Organic N).
3 Unknown.
4 Wasteload allocation of a 50% reduction in nitrogen concentration upon commencement of discharge
5 1990-1997 annual average (summer loading and winter loading).
6 Estimated annual average (summer and winter loading).
7 Total nitrogen winter loading limit applies between October 1 and March 31 when the mean daily flow rate at San Diego Creek at Campus Drive is below 50 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Campus Drive is above 50 cubic feet per second (cfs), but not as the result of precipitation.
8 Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.
9 Daily load limit applies upon commencement of discharge.
10 Lbs/day TN (monthly average).
11 Assumes 67 non-storm days.

Table 5-9c Annual Total Phosphorous Load Allocations For The Newport Bay Watershed.

	2002 Allocation lbs/year TP[1]	**2007 Allocation lbs/year TP[1]**
TMDL	86,912	62,080
Urban areas	4,102	2,960
Construction sites	17,974	12,810
Waste Load Allocation	22,076	15,770
Agricultural areas	26,196	18,720
Open space	38,640	27,590
Load Allocation	64,836	46,310

1 Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

Table 5-9d Annual Total Nitrogen Load Allocations For San Diego Creek, Reach 2 During Non-Storm Conditions.[1]

	2012 Allocation lbs/day TN[2]
TMDL	14 lbs/day (TN)
Waste Load Allocation (Urban runoff)	5.5 lbs/day (TN)
Load Allocation (Nurseries, agriculture, undefined sources)	8.5 lbs/day (TN)

1 Total nitrogen loading limit applies when the mean daily flow rate at San Diego Creek at Culver Drive is below 25 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Culver Drive is above 25 cubic feet per second (cfs), but not as the result of precipitation.

2 Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

2.b. Phase I of the Nutrient TMDL

1. Review and Revision of Water Quality Objectives

By December 31, 2000, the Regional Board shall review, and revise as necessary, the numeric water quality objectives for total inorganic nitrogen for San Diego Creek, Reaches 1 and 2. The Regional Board shall also examine the appropriateness of establishing numeric water quality objectives for phosphorus for San Diego Creek, Reaches 1 and 2.

2. Establish New Waste Discharge Requirements

By December 31, 1999, the Regional Board shall issue new Waste Discharge Requirements (WDRs) to nursery operations of 5 acres or greater which currently are not regulated by WDRs (as of the effective date of this amendment) but discharge nutrients in excess of 1 mg/L TIN to storm channels which are tributary to Newport Bay. The new WDRs shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the WDRs

3. Revision of Existing Waste Discharge Requirements

a. By December 31, 1998, the Regional Board shall revise existing WDRs for nursery operations which currently (as of the effective date of this amendment) discharge nutrients in excess of 1 mg/L TIN to drainages which are tributary to Newport Bay. The revised WDRs shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load reduction targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the WDRs.

b. By December 31, 1998, the Regional Board shall revise existing NPDES permits for discharges which currently (as of the effective date of this amendment) discharge nutrients in excess of 1 mg/L TIN to drainages which are tributary to Newport Bay. The revised NPDES permits shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load reduction targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the NPDES permits.

c. By March 31, 1999, the Regional Board shall revise the Monitoring and Reporting Programs of existing NPDES permits and WDRs for groundwater dewatering and cleanup operations which discharge to drainages which are tributary to Newport Bay to include requirements for phosphorus and total nitrogen sampling and analysis. This monitoring will generate the data necessary to develop appropriate wasteload allocations for these discharges.

4. Agricultural Activities

A watershed-wide nutrient management program for agricultural activities shall be developed by the Orange County Farm Bureau, University of California Cooperative Extension, and the affected growers, in conjunction with Regional Board staff. The proposed management program shall be submitted by July 1, 1999. The nutrient management program will not become effective until approved by the Regional Water Quality Control Board at a duly noticed public meeting as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

5. Urban Stormwater

Co-permittees of the Orange County Areawide Urban Stormwater Permit (Order No. 96-31) shall be required to submit for approval by the Regional Board's Executive Officer an analysis of appropriate Best Management Practices which will be additionally implemented through the Drainage Area Management Plan (DAMP) to achieve the short term (5-year) interim targets and final nutrient load reduction targets for the Newport Bay Watershed. The co-permittees shall also be required to provide a proposal for 1) evaluating the effectiveness of control actions implemented and 2) evaluating compliance with the nutrient load allocation. The proposal and analysis shall be submitted by July 1, 1999, and shall be implemented upon approval of the Executive Officer as specified by Section IV.1.a.ii.A of Order No. 96-31.

6. Phosphorus

The primary reduction of phosphorus loading is expected to be achieved by the implementation of the total maximum daily load for sediment in the Newport Bay/San Diego Creek watershed. The sediment TMDL is incorporated into the nutrient TMDL for the Newport Bay/San Diego Creek watershed by reference (Note - the sediment TMDL will be appropriately referenced once it is approved by OAL). Limits on phosphorus discharges shall be incorporated into the new and revised Waste Discharge Requirements previously listed, as necessary.

2.c. Phase II of the Nutrient TMDL

1. Monitoring

The Regional Board will establish and oversee a regional monitoring program (RMP) for the Newport Bay watershed. The new and revised WDRs, NPDES permits, DAMP, and agricultural nutrient management plans shall have include requirements to conduct self-monitoring, or in lieu of self-monitoring, to participate in the RMP. Participation in the RMP could result in the reduction of self-monitoring requirements. The RMP will not become effective until approved by the Regional Water Quality Control Board at a duly noticed public meeting as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

The RMP shall be designed by the Regional Board to assess the attainment of the goals of the nutrient TMDL. The objectives of the monitoring program shall be the quantification of the three endpoints of the nutrient TMDL: (1) the seasonal nutrient loading from the watershed; (2) the nutrient concentration in San Diego Creek, Reaches 1 and 2; and (3) the extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay. The monitoring plan shall be implemented by March 1999.

The Regional Board will initiate investigations into the currently unknown sources of nutrients in the Newport Bay Watershed. The Regional Board, in cooperation with other agencies and entities, will investigate the occurrence of rising shallow groundwater in the Newport Bay Watershed. The study will focus on the contributions of rising groundwater to the loading of nutrients to drainage channels which are tributary to Newport Bay. Additionally, the study of the nutrient and algae processes of Newport Bay and San Diego Creek will be encouraged and supported by the Regional Board. Regional Board support could include financial resources, personnel, agency coordination, and scientific review.

2. Actions and Schedule to Achieve Water Quality Objectives

The actions and schedule to achieve water quality objectives is outlined in Table 5-9e. Meeting load reduction targets is highly dependent upon the effectiveness of individual actions; therefore, the Regional Board will review the TMDL, WDRs and compliance schedule at least once every 3 years. Any or all of these may be revised in order to meet water quality standards.

Table 5-9e Schedule of Actions to Achieve Water Quality Objectives.

Program Actions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Review and revision of water quality objectives			X													
New nursery permits		X														
Revise existing permits	X															
Nurseries	X															
NPDES permit	X															
Groundwater cleanup/dewatering		X														
Agricultural nutrient management plans		X														
Urban runoff BMP plan		X														
Sediment TMDL implementation	X															
Monitoring		X														
Newport Bay Watershed total nitrogen - summer TMDL targets					X					X						
Newport Bay Watershed total nitrogen - winter TMDL target															X	
Newport Bay Watershed total phosphorus - annual TMDL targets					X					X						
San Diego Creek, Reach 2 total nitrogen - daily target															X	
Evaluation of TMDL			X			X			X		X			X		X

2.d. Estimated Costs of Agricultural Water Quality Control Programs and Potential Sources of Financing

The estimates of capital and operational costs to achieve the nutrient targets of the nutrient TMDL for the San Diego Creek/Newport Bay watershed range from $0.69 million/year to $4.73 million/year.

Potential funding sources include:

1. Private financing by individual sources.

2. Bonded indebtedness or loans from governmental institutions.

3. Surcharge on water deliveries to lands contributing to the drainage problem.

4. Ad Valorem tax on lands contributing to the drainage problem.

5. State or federal grants or low-interest loan programs.

6. Single-purpose appropriations from federal or State legislative bodies (including land retirement programs).

4. Toxic Substance Contamination (Amended by Resolution No. R8-2003-0039)

San Diego Creek and Newport Bay are not attaining water quality standards with respect to certain classes of toxic pollutants. On June 14, 2002, USEPA established Total Maximum Daily Loads (TMDLs) for selenium, heavy metals (cadmium, copper, lead, and zinc), organochlorine pesticides (chlordane, dieldrin, DDT, and toxaphene), PCBs, and organophosphate pesticides (diazinon and chlorpyrifos). In addition, USEPA established a separate TMDL for the Rhine Channel in Lower Newport Bay. Table 5-9i shows these TMDLs, the constituents addressed, and the waterbodies affected.

USEPA's TMDLs do not specify implementation plans, which are the responsibility of the Regional Board. The Regional Board has adopted or will adopt Basin Plan amendments to incorporate the USEPA TMDLs, revised if and as appropriate, into the Basin Plan. These amendments will include implementation plans. The anticipated schedule for these Basin Plan amendments is also shown in Table 5-9i.

Table 5-9i. USEPA TMDLs Established June 14, 2002

TMDL	Basin Plan Schedule	Location	Constituents
Organophosphate Pesticides	2003	SDC	Diazinon, chlorpyrifos
		UNB	Chlorpyrifos
Selenium	2007	SDC, UNB LNB	Selenium
Metals	2007	SDC	Cd, Cu, Pb, Zn
		UNB	Cd, Cu, Pb, Zn
		LNB	Cu, Pb, Zn
Organochlorine Compounds	2007	SDC	Chlordane, dieldrin, DDT, PCBs, toxaphene
		UNB	Chlordane, DDT, PCBs
		LNB	Chlordane, dieldrin, DDT, PCBs
Rhine Channel	2007	Rhine Channel	Se, Cr, Hg, Cu, Pb, Zn Chlordane, dieldrin, DDT, PCBs

SDC= San Diego Creek; UNB=Upper Newport Bay; LNB=Lower Newport Bay

4.a Diazinon and Chlorpyrifos TMDL

Aquatic toxicity in San Diego Creek and Upper Newport Bay causes adverse impacts to the established beneficial uses of those waterbodies.

A report prepared by Regional Board staff describes the aquatic life toxicity problems in San Diego Creek and Upper Newport Bay in greater detail and discusses the technical basis for the TMDL that follows[1]. This TMDL is the same as that promulgated by the USEPA on June 14, 2002, but an implementation plan is also specified (see Section 4.a.i.). The USEPA TMDL was, in fact, based on a draft TMDL prepared by Regional Board staff. The TMDL addresses toxicity due to diazinon and chlorpyrifos in San Diego Creek and chlorpyrifos in Upper Newport Bay. Implementation of this TMDL is expected to address, to a significant extent, the occurrence of aquatic life toxicity in these waterbodies. Reduction in aquatic life toxicity will help assure attainment of water quality standards; that is, compliance with water quality objectives and protection of beneficial uses.

Table 5-9j shows the TMDL and the allocations for diazinon and chlorpyrifos in San Diego Creek.

[1] Diazinon and Chlorpyrifos TMDL, Upper Newport Bay and San Diego Creek, April 4, 2003

Table 5-9j. Diazinon and Chlorpyrifos Allocations for San Diego Creek

Category	Diazinon (ng/L)		Chlorpyrifos (ng/L)	
	Acute	Chronic	Acute	Chronic
Wasteload Allocation	72	45	18	12.6
Load allocation	72	45	18	12.6
MOS	8	5	2	1.4
TMDL	**80**	**50**	**20**	**14**

MOS = Margin of Safety; Chronic means 4-consecutive day average

Table 5-9k shows the TMDL and the allocations for chlorpyrifos in Upper Newport Bay.

Table 5-9k. Chlorpyrifos Allocations for Upper Newport Bay

Category	Acute (ng/L)	Chronic (ng/L)
Wasteload allocation	18	8.1
Load allocation	18	8.1
MOS	2	0.9
TMDL	**20**	**9**

MOS = Margin of Safety; Chronic means 4-consecutive day average

The TMDL and its allocations contain an explicit 10% margin of safety. In addition, a substantial margin of safety is implicitly incorporated in the TMDL through use of conservative assumptions.

4.a.i TMDL Implementation

Table 5-9l outlines the tasks and schedules to implement the TMDL.

Table 5-9l. TMDL Task Schedule

Task No.	Task	Schedule	Description
1	USEPA Re-Registration Agreements	12/2001 to 12/2006	Phase-out of uses specified in the re-registration agreements. Should end over 90% of usage. [2]
2	Revise Discharge Permits	2005	WDR and NPDES permits will be revised to include the TMDL allocations, as appropriate.
3	Pesticide Runoff Management Plan	2004	A pesticide runoff management plan will be developed
4	Monitoring	2003	Modify existing regional monitoring program to include analysis for organophosphate pesticides and toxicity
	Special Studies		
5a	Atmospheric deposition	2003	Quantify atmospheric deposition of chlorpyrifos loading to Upper Newport Bay
5b	Mixing volumes in Upper Newport Bay	2003	Model mixing and stratification of chlorpyrifos in Upper Newport Bay during storm events

Task 1: <u>USEPA Re-Registration Agreements</u>

The re-registration agreements negotiated by USEPA with the manufacturers of diazinon and chlorpyrifos are the most significant factor affecting the implementation plan. Usage of both diazinon and chlorpyrifos in the Newport Bay Watershed is expected to be reduced by over 90 percent.

Task 2: <u>Revise Discharge Permits</u>

The TMDL allocates wasteloads to all dischargers in the watershed. Since the TMDL is concentration-based, these wasteloads are concentration limits. The concentration limits will be incorporated into existing and future discharge permits in the watershed. Compliance schedules would be included in permits only if they are demonstrated to be necessary. Compliance would be required as soon as possible, but no later than December 1, 2007.

Task 3: <u>Pesticide Runoff Management Plan</u>

A pesticide runoff management plan will be developed for the watershed as a cooperative project between the Regional Board and stakeholders.

Task 4: <u>Monitoring</u>

Routine monitoring is necessary to assess compliance with the allocations specified in the TMDL. The County of Orange, the Cities of Tustin, Irvine, Costa

[2] This task is not within the purview of the Regional Board, but is nevertheless of critical significance for implementation of the TMDL.

Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed will be required to propose a plan by January 30, 2004 for routine monitoring to determine compliance with the TMDL allocations for diazinon and chlorpyrifos. At a minimum, the proposed plan must include the collection of monthly samples at the stations specified in Table 5-9m and shown in Figure 5-2 and analysis of the samples for diazinon and chlorpyrifos. Monthly toxicity tests should also be conducted at several locations in the watershed. Data summaries will be required monthly. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

Table 5-9m. Minimum Required Monthly Sampling Stations

Station Code	Location
BARSED	Peters Canyon Wash
WYLSED	San Diego Creek at Harvard Dr.
SDMF05	San Diego Creek at Campus Dr.
SADF01, or CMCG02	Santa Ana Delhi Channel, or Costa Mesa Channel

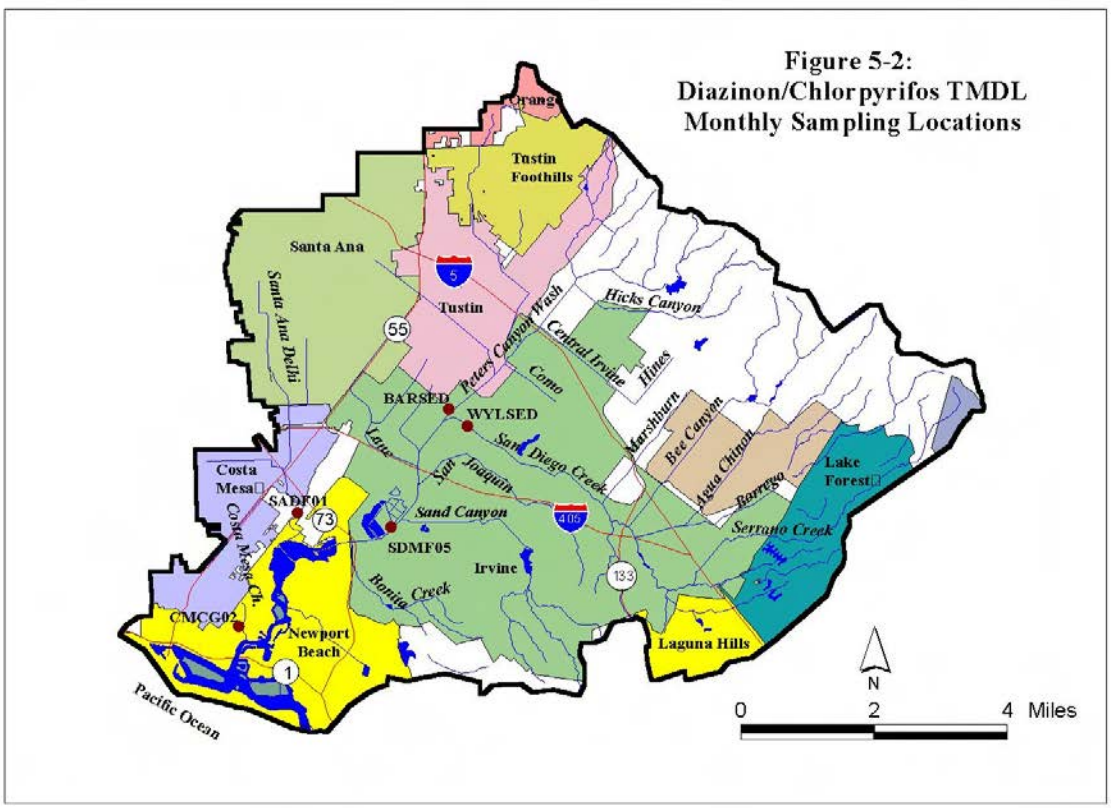


Figure 5-2:
Diazinon/Chlorpyrifos TMDL
Monthly Sampling Locations

In lieu of this coordinated, regional monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group plan to conduct routine monitoring in areas solely within their jurisdiction to determine compliance with the TMDL. Any such individual or group plans must also be submitted by January 30, 2004. Reports of the data collected pursuant to approved individual/group plan(s) will be required to be submitted monthly, and an annual report summarizing the data and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

It is likely that implementation of these requirements will be through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 5: Special Studies

With the anticipated assistance of stakeholders in the watershed, the Regional Board will conduct investigations to (1) quantify the significance of atmospheric deposition of chlorpyrifos to Upper Newport Bay, and (2) determine the adequacy of the freshwater allocations for chlorpyrifos in the tributaries to Upper Newport Bay in achieving the lower saltwater allocations. The existing hydrodynamic model for Newport Bay is being used to perform simulations that predict contaminant concentrations in the Bay based on various flow and management scenarios. The model results will be used to verify whether the TMDL allocations for chlorpyrifos in the watershed will be sufficient to achieve the TMDL allocations in Upper Newport Bay. One of the questions to be addressed is the magnitude of toxic exposure that could result from development of a freshwater lens associated with the discharge of stormwater to Upper Newport Bay.

4.a.ii Adjust TMDL

Based on the results of the special studies and recommendations made in the Pesticide Runoff Monitoring reports, changes to the TMDL may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies.**(End of Resolution No. RB-2003-0039)**

Anaheim Bay/Huntington Harbour

As in Newport Bay, bacteria and toxics threaten the water quality and beneficial uses of Anaheim Bay/Huntington Harbour. As shown in Table 5-10, the presence of toxic metals and pesticides/herbicides has resulted in the designation of Anaheim Bay and Huntington Harbour as a Toxic Hot Spot for some constituents and a Potential Toxic Hot Spot for other constituents. Two major storm drains, the Bolsa Chica Channel and the East Garden Grove Wintersburg Channel, as well as their tributaries, drain in to the Anaheim Bay/Huntington Harbour complex. Inputs of stormwater and urban nuisance flows via these channels appear to be significant sources of pollutants. The Count of Orange's general stormwater permit requires the implementation of best management practices (BMPs) and other measures in the watershed to control these inputs to the maximum extent practicable.

During 1992-93, the Regional Board contracted with UC Irvine and UC Davis to evaluate the occurrence and impacts of these toxics in Huntington Harbour [Ref. 21, 22]. Results of the study indicated that concentrations of trace metals have decreased over a 13 year period and 1992/93 measurements met established water quality criteria. However, an unidentified nonpolar organic compound was found to be acutely toxic to test species.

Anaheim Bay (inland of Pacific Coast Highway bridge) and Huntington Harbour are designated as no discharge areas for vessel sanitary wastes. Pumpout facilities are in place throughout the Harbour to facilitate compliance. Additional discussion of the activities of the Huntington Harbour Waterways Committee is provided in Chapter 7.

Big Bear Lake (Amended by Resolution No. R8-2006-0023)

Big Bear Lake, located in the San Bernardino Mountains, was created by the construction of the Bear Valley Dam in 1884. The Lake has a surface area of approximately 3,000 acres, a storage capacity of 73,320 acre-ft and an average depth of 24 feet. The lake reaches its deepest point of 72 feet at the dam. The Big Bear Lake drainage basin encompasses 37 square miles and includes more than 10 streams. Local stream runoff and precipitation on the Lake are the sole source of water supply to the Lake. The spillway altitude is 6,743.2 feet. The major inflows to the lake are creeks, including Rathbone (Rathbun) Creek, Summit Creek, and Grout Creek. Outflow from the Lake is to Bear Creek, which is tributary to the Santa Ana River at about the 4,000-foot elevation level. Twelve percent of Big Bear Lake's drainage basin consists of the Lake itself. The US Forest Service is the largest landowner in the Big Bear area. Two ski resorts, Bear Mountain and Snow Summit, lease land from the Forest Service.

The beneficial uses of Big Bear Lake include cold freshwater habitat (COLD), warm freshwater habitat (WARM), water contact recreation (REC1), non-contact water recreation (REC2), municipal and domestic supply (MUN), agriculture supply (AGR), groundwater recharge (GWR), wildlife habitat (WILD) and rare, threatened or endangered species (RARE).

Big Bear Lake is moderately eutrophic. During the summer months, deeper water may exhibit severe oxygen deficits. Nutrient enrichment has resulted in the growth of aquatic plants, which has impaired the fishing, boating, and swimming uses of the lake. To control this vegetation, mechanical harvesters are used to remove aquatic plants, including the roots.

Toxics may be entering the Big Bear Lake watershed and accumulating in aquatic organisms and bottom sediments at concentrations that are of concern, not only for the protection of aquatic organisms, but for the protection of human health as well. Past Toxic Substances Monitoring Program data have indicated the presence of copper, lindane, mercury, zinc, and PCBs in fish tissue.

During 1992-93, the Regional Board conducted a Phase I Clean Lakes study (Section 314 of the Clean Water Act) to evaluate the current water quality condition of the lake and its major tributaries [Ref. 20]. The focus of the study was to identify the tributaries responsible for inputs of toxics and nutrients. As a result of data collected in the Clean Lakes Study, Big Bear Lake and specific tributaries were placed on the 1994 Clean Water Act Section 303(d) List of Water Quality Limited Segments for the reasons indicated in Table 5-9a-b.

Table 5-9a-b

Big Bear Lake Watershed Waterbodies on the
1994 303(d) List of Impaired Waters

WATERBODY	STRESSOR
Big Bear Lake	nutrients
	noxious aquatic plants
	sedimentation/siltation
	metals
	copper
	mercury
Rathbone (Rathbun) Creek	nutrients
	sedimentation/siltation
Grout Creek	metals
	nutrients
Summit Creek	nutrients
Knickerbocker Creek	metals
	pathogens

In 2000, the Regional Board convened a TMDL workgroup to assist in the development of Total Maximum Daily Loads for the Big Bear Lake watershed. The Big Bear Municipal Water District, a key contributor to the workgroup, created the Big Bear Lake TMDL Task Force, including representatives of the District, Regional Board staff, the San Bernardino County Flood Control District, the City of Big Bear Lake, the Big Bear Area Regional Wastewater Authority, the State of California, Department of Transportation (Caltrans), the US Forest Service and the Big Bear Mountain Resorts. Initial TMDL development efforts were focused on nutrients, leading to Regional Board adoption of a nutrient TMDL for dry hydrological conditions for Big Bear Lake in 2006. Nutrient TMDLs for wet and/or average hydrological conditions will be incorporated in the Basin Plan when these TMDLs are developed in the future. As shown in Table 5-9a-f, the development of these TMDLs is a requirement of the adopted TMDL implementation plan for the nutrient TMDL for dry hydrological conditions.

1. Big Bear Lake Nutrient Total Maximum Daily Loads (TMDLs)

Past studies, starting in 1968/1969, have shown that Big Bear Lake is moderately eutrophic and that the limiting nutrient is generally phosphorus. In Big Bear Lake, nutrients (nitrogen and phosphorus) are available in the water column and sediment and are taken up by aquatic macrophytes and algae. Nutrients are also bound in living and dead organic material, primarily macrophytes and algae. Decomposition of this organic material, as well as macrophyte and algal respiration, consumes dissolved oxygen, resulting in the depletion of dissolved oxygen from the water column. Oxygen depletion in the hypolimnion results in anoxic conditions, leading to periodic fish kills in Big Bear Lake. Oxygen depletion also results in the release of nutrients from the sediment into the water column, promoting more algae and aquatic macrophyte production. Nutrients released by plant decomposition are cycled back into a bioavailable form.

Although aquatic macrophytes provide protection from shoreline erosion, habitat for fish and other aquatic biota and waterfowl habitat, excessive growth of noxious and nuisance species, particularly Eurasian watermilfoil (*Myriophyllum spicatum*) impairs recreational uses of the Lake and reduces plant and animal species and habitat diversity.

As stated above, development of nutrient TMDLs to address these problems was initiated in 2000. In this process, it was recognized that insufficient data for wet or average hydrological conditions were available to allow calibration of the lake water quality model used to calculate the TMDL. Accordingly, a TMDL was developed to address dry hydrologic conditions only (see Section 1.B., below). This TMDL was adopted by the Regional Board in 2006 and became effective on August 21, 2007. The implementation plan included with this TMDL specifies a requirement for the development of nutrient TMDLs for wet and/or average hydrological conditions.

A key step in the development of the nutrient TMDL was the identification of the numeric targets to be achieved. The numeric targets, identified in Section 1.A., below, do not vary based upon hydrological condition. Like the approved TMDL for dry hydrological conditions, the TMDLs for wet and/or average hydrological conditions that will be developed are expected to assure also that these numeric targets are achieved. Indeed, since the TMDL for dry hydrological conditions was developed to meet the targets under the critical, worst-case conditions, consistent compliance with these targets is expected to be achieved even in the absence of TMDLs for wet/average hydrological conditions, given the greater lake volume and dilution anticipated under wetter conditions. It is recognized that future modifications to the targets may be found necessary.

1. A. Numeric Targets

As shown in Table 5-9a-c, both “causal and response” numeric targets are specified for Big Bear Lake. The causal target is for phosphorus. Phosphorus is the primary limiting nutrient in Big Bear Lake[1] Response targets include macrophyte coverage, percentage of nuisance aquatic vascular plant species and chlorophyll *a* concentration. These response targets are more direct indicators of impairment and are specified to assess and track water quality improvements in Big Bear Lake

A weight of evidence approach will be used to assess compliance with the TMDL, which means that data pertaining to all the numeric targets will be evaluated and non-compliance with one target will not automatically imply non-compliance with the TMDL.

[1]There is evidence that nitrogen is a limiting nutrient under certain conditions. However, given data and analytical limitations, no nitrogen targets are specified. Nitrogen monitoring is required as part of this TMDL. The data will be used to specify nitrogen targets in the future, as warranted.

Table 5-9a-c
Big Bear Lake Nutrient TMDL Numeric Targets[a]

Indicator	Target Value
Total P concentration	Annual average[b] no greater than 35 µg/L; to be attained no later than 2015 (dry hydrological conditions), 2020 (all other times)[c]
Macrophyte Coverage	30-40% on a total lake area basis; to be attained by 2015 (dry hydrological conditions), 2020 (all other times)[c, d]
Percentage of Nuisance Aquatic Vascular Plant Species	95% eradication on a total area basis of Eurasian Watermilfoil and any other invasive aquatic plant species; to be attained no later than 2015 (dry hydrological conditions), 2020 (all other times)[c, d]
Chlorophyll *a* concentration	Growing season[e] average no greater than 14 µg/L; to be attained no later than 2015 (dry hydrological conditions), 2020 (all other times)[c]

[a] Compliance with the targets to be achieved as soon as possible, but no later than the date specified

[b] Annual average determined by the following methodology: the nutrient data from both the photic composite and discrete bottom samples are averaged by station number and month; a calendar year average is obtained for each sampling location by averaging the average of each month; and finally, the separate annual averages for each location are averaged to determine the lake-wide average. The open-water sampling locations used to determine the annual average are MWDL1, MWDL2, MWDL6, and MWDL9 (see 1.B.4. Implementation, Task 4.2, Table 5-9a-i).

[c] Compliance date for wet and/or average hydrological conditions may change in response to approved TMDLs for wet/average hydrological conditions.

[d] Calculated as a 5-yr running average based on measurements taken at peak macrophyte growth as determined in the Aquatic Plant Management Plan (see 1.B.4. Implementation, Task 6C)

[e] Growing season is the period from May 1 through October 31 of each year. The open-water sampling locations used to determine the growing season average are MWDL1, MWDL2, MWDL6 and MWDL9 (see 1.B.4. Implementation, Task 4.2, Table 5-9a-i). The chlorophyll *a* data from the photic samples are averaged by station number and month; a growing season average is obtained for each sampling location by averaging the average of each month; and finally, the separate growing season averages for each location are averaged to determine the lake-wide average.

1.B. Big Bear Lake Nutrient Total Maximum Daily Load (TMDL) for Dry Hydrological Conditions

The TMDL technical report [Ref. #25] describes in detail the technical basis for the TMDL for Dry Hydrological Conditions that follow.

1. B. 1. Nutrient TMDL, WLAs and LAs and Compliance Dates – Dry Hydrological Conditions

A TMDL, and the WLAs and LAs necessary to achieve it, are established for total phosphorus for dry hydrological conditions only. As stated above, phosphorus and nitrogen are the nutrients that cause beneficial use impairment in Big Bear Lake. Dry hydrological conditions are defined by the conditions observed from 1999-2003; that is, average tributary inflow to Big Bear Lake ranging from 0 to 3,049 AF, average lake levels ranging from 6671 to 6735 feet and annual precipitation ranging from 0 to 23 inches. TMDLs, WLAs and LAs for wet and/or average hydrological conditions will be established as part of the TMDL Phase 2 activities once additional data have been collected (see 1.B.4. TMDL Implementation, Task 9).

The phosphorus TMDL for Big Bear Lake for dry hydrological conditions is shown in Table 5-9a-d. Wasteload allocations for point source discharges and load allocations for nonpoint source discharges are shown in Table 5-9a-e.

Table 5-9a-d

Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions

	Total Phosphorus (lbs/yr) [b]
TMDL[a]	26,012

[a] Compliance to be achieved as soon as possible, but no later than December 31, 2015.
[b] Specified as an annual average for dry hydrological conditions only.

Table 5-9a-e

Big Bear Lake
Phosphorus Wasteload and Load Allocations for Dry Hydrological Conditions

Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions	**Total Phosphorus Load Allocation (lbs/yr)[a, b]**
TMDL	26,012
WLA	475
Urban	475
LA	25,537
Internal Sediment	8,555
Internal macrophyte	15,700
Atmospheric Deposition	1,074
Forest	175
Resort	33

[a] Allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.
[b] Specified as an annual average for dry hydrological conditions only.

1.B.2. Margin of Safety

The Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions includes an implicit margin of safety (MOS) as follows:

1. The derivation of numeric targets based on the 25th percentile of nutrient data;
2. The use of conservative assumptions in modeling the response of Big Bear Lake to nutrient loads.

1. B.3. Seasonal Variations/Critical Conditions

The critical condition for attainment of aquatic life and recreational uses in Big Bear Lake occurs during the summer and during dry years, when nutrient releases from the sediment are greatest and water column concentrations increase. Macrophyte biomass peaks in the summer/early fall. Recreational uses of the lake are also highest during the summer. This nutrient TMDL for Big Bear Lake is focused on the critical dry hydrological conditions and, in particular, on the control of the internal sediment loads that dominate during these periods. This is the first phase of TMDLs needed to address eutrophication in Big Bear Lake. The next phase will include collection of data needed to refine the in-lake and watershed models (see

1.B.4. TMDL Implementation, Task 6A) and to develop TMDLs that address other hydrological conditions (see 1.B.4. TMDL Implementation, Task 9). TMDLs for wet and average hydrological conditions will be developed to address external loading that contributes to the nutrient reservoir in the lake and thus eutrophic conditions, particularly during the critical dry periods. However, it is important to note again that since the TMDL for dry hydrological conditions was developed to meet the numeric targets under the critical, worst-case conditions, consistent compliance with these targets is expected to be achieved even in the absence of TMDLs for wet/average hydrological conditions, given the greater lake volume and dilution anticipated under wetter conditions.

The TMDL recognizes that different nutrient inflow and cycling processes dominate the lake during different seasons. These processes were simulated in the in-lake model using data collected during all seasons over a multi-year period**.** Thus, the model results reflect all seasonal variations. The phosphorus numeric target is expressed as an annual average, while the chlorophyll *a* numeric target is expressed as a growing season average. The intent is to set targets that will, when achieved, result in improvement of the trophic status of Big Bear Lake year-round.

Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.

<u>1.B.4. TMDL Implementation</u>

Table 5-9a-f outlines the tasks and schedules to implement the TMDL for Dry Hydrological Conditions. Each of these tasks is described below.

Table 5-9a-f

Big Bear Lake Nutrient TMDL Implementation
Plan/Schedule Report Due Dates

Task	**Description**	**Compliance Date-As soon As Possible but No Later Than**
TMDL Phase 1		
Task 1	Establish New Waste Discharge Requirements for Nutrient Sources	February 29, 2008
Task 2	Establish New Waste Discharge Requirements for Lake Restoration Activities	February 28, 2009
Task 3	Revise Existing Waste Discharge Requirements	February 29, 2008
Task 4	Nutrient Water Quality Monitoring Program 4.1 Watershed-wide Nutrient Monitoring Plan(s) 4.2 Big Bear Lake Nutrient Monitoring Plan(s)	Plan/schedule due November 30, 2007. Annual reports due February 15
Task 5	*Atmospheric Deposition Determination*	Plan/schedule due August 31, 2008
Task 6	*Big Bear Lake – Lake Management Plan, including:* *6A. Big Bear Lake and Watershed Model Updates* 6B. Big Bear Lake In-Lake Sediment Nutrient Reduction Plan 6C. Big Bear Lake Aquatic Plant Management Plan	Plan/schedule due August 31, 2008. Annual reports due February 15
TMDL Phase 2		
Task 7	Review/Revision of Big Bear Lake Water Quality Standards 7.1 Review/Revise Nutrient Water Quality Objectives 7.2 Development of biocriteria 7.3 Development of natural background definition	December 31, 2015
Task 8	Review Big Bear Lake Tributary Data	December 31, 2008
Task 9	Develop TMDLs, WLAs and LAs for wet and/or average hydrological conditions	December 31, 2012
Task 10	Review of TMDL/WLAs/Las	Once every 3 years

Task 1: Establish New Waste Discharge Requirements for Nutrient Sources

On or before February 29, 2008, the Regional Board shall issue the following new waste discharge requirements

1.1 Waste Discharge Requirements (WDRs) or Conditional Waiver of WDRs to the US Forest Service to incorporate the nutrient load allocations, compliance schedule and monitoring and reporting requirements for Forested Areas.

Other nutrient discharges will be addressed and permitted as appropriate.

Task 2: Establish New Waste Discharge Requirements for Lake Restoration Activities

On or before February 28, 2009, the Regional Board shall issue the following new waste discharge requirements

NPDES Permit to the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake, and Big Bear Mountain Resorts for Lake restoration activities, including, but not limited to alum treatment and/or herbicide treatment. Requirements specified in these Waste Discharge Requirements, shall be developed using the Aquatic Plant Management Plan and Schedule submitted pursuant to Task 6C.

Task 3: Review and/or Revise Existing Waste Discharge Requirements

Waste Discharge Requirements (WDRs) have been issued by the Regional Board regulating discharge of various types of wastes in the Big Bear Lake watershed. On or before February 29, 2008, these WDRs shall be reviewed and revised as necessary to incorporate the nutrient wasteload allocations, compliance schedule and TMDL monitoring and reporting requirements.

3.1 Waste Discharge Requirements for the San Bernardino County Flood Control and Transportation District, the County of San Bernardino and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618036 (Regional Board Order No. R8-2002-0012). The current Order has provisions to address TMDL issues. In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

3.2 State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program are required to be submitted to the State Water

Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. As part of the annual update of the SWMP and Regional Workplan, Caltrans shall submit plans and schedules for conducting the monitoring and reporting requirements specified in Task 4 and the special studies required in Task 6.

Task 4:   Monitoring

4.1 Watershed-wide Nutrient Water Quality Monitoring Program

No later than November 30, 2007, the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake and Big Bear Mountain Resorts shall, as a group, submit to the Regional Board for approval a proposed watershed-wide nutrient monitoring program that will provide data necessary to review and update the Big Bear Lake Nutrient TMDL, to determine specific sources of nutrients and to develop TMDLs for other hydrological conditions. Data to be collected and analyzed shall address, at a minimum, determination of compliance with the phosphorus dry condition TMDL, including the WLAs and LAs, and with the existing total inorganic nitrogen (TIN) objective.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9a-g and shown in Figure 5-7, at the frequency specified in Table 5-9a-h. Modifications to the required sampling stations, sampling frequencies and constituents to be monitored (see below) will be considered upon request by the stakeholders, accompanied by a report that describes the rationale for the proposed changes and identifies recommended alternatives. In addition to water quality samples, every two weeks on a year-round basis, visual monitoring (including documenting flow type and stage) determinations shall be made at all stations shown in Table 5-9a-g. Flow measurements will be required each time water quality samples are obtained.

At a minimum, samples shall be analyzed for the following constituents:

- Total nitrogen
- Ammonia nitrogen
- Nitrate + nitrite nitrogen
- Total dissolved nitrogen
- Total phosphorus
- Ortho-phosphate (SRP)
- Total dissolved phosphorus
- Temperature
- Suspended sediment concentration
- Turbidity
- Chlorophyll *a*
- pH
- Dissolved oxygen
- Conductivity
- Alkalinity
- Hardness
- Bedload concentration
- Grain size
- Total nitrogen in sediment
- Total phosphorus in sediment

Note: Chlorophyll *a* to be collected and analyzed only from May 1- October 31 of each year at the frequencies described in Table 5-9a-h; chlorophyll *a* sampling not required at Bear Creek outlet.

In addition, the proposed plan shall include a proposed plan and schedule for development of a Big Bear Lake Sedimentation Processes Plan for the determination of nutrient loads associated with sediment. At a minimum, the proposed plan shall include the placement of sediment traps at the mouths of Rathbun, Knickerbocker, Grout and Boulder Creeks to determine the rate of influx of sediment and particulate nutrients to Big Bear Lake, as specified in Table 5-9a-g and shown in Figure 5-7, at the specified frequency indicated in Table 5-9a-h. Modifications to the required sampling stations, sampling frequencies and constituents to be monitored will be considered upon request by the stakeholders, accompanied by a report that describes the rationale for the proposed changes and identifies recommended alternatives. The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs shall be submitted by February 15 of each year.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than November 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by February 15 of each year. The report shall summarize the data and evaluate compliance with the TMDL/WLAs/LAs.

Table 5-9a-g
Big Bear Lake Watershed
Minimum Required Sampling Station Locations

Station Number	**Station Description**
MWDC2	Bear Creek Outlet
MWDC3	Grout Creek at Hwy 38
MWDC4	Rathbun Creek at Sandalwood Ave.
MWDC5	Summit Creek at Swan Dr.
MWDC6	Rathbun Creek below the Zoo
MWDC8	Knickerbocker Creek at Hwy 18
MWDC13	Boulder Creek at Hwy 18

Note: Bear Creek outlet to be sampled monthly from March – November. At a minimum, samples shall be analyzed at the frequencies specified in Table 5-9a-h:

Table 5-9a-h
Big Bear Lake Watershed
Sampling Frequency

Flow type	**Months monitoring is required**	**Frequency**
Baseflow	January 1 – December 31	Once/month when baseflow is present;
Snowmelt	January 1 – May 31[1]	Varied -See note 2 below
Storm events	January 1 – December 31	3 storms per year[3]

[1] Sampling to begin after the first substantial snowfall resulting in an accumulation of 1.0 inch or more of snow

[2] Samples to be collected daily for the first three days of the snowmelt period. If ambient air temperatures remain above freezing after three days have passed, snowmelt sampling will then be performed once a week for the following three weeks or until the snowmelt period ceases. Snowmelt cessation will be determined by one of the following: a) ambient air temperatures drop below freezing during most of the day; or b) a storm/rain precipitation event occurs after the snowmelt event was initiated. Beginning March 15th of each year, snowmelt flows will most likely be continuous since ambient air temperatures will usually remain above freezing. From March 15th through May 31 of each year, snowmelt sampling events will be conducted daily for the first two days of a snowmelt event and then once a week thereafter until the spring runoff period has ended or the tributary station location shows no signs of daily flows for one week. Flow status will be evaluated in the afternoon, when ambient air temperatures are highest and flow potential is greatest.

[3] Two storm events to be sampled during October – March; 1 storm event to be sampled during April – September. For each storm event, eight samples across the hydrograph are to be collected.

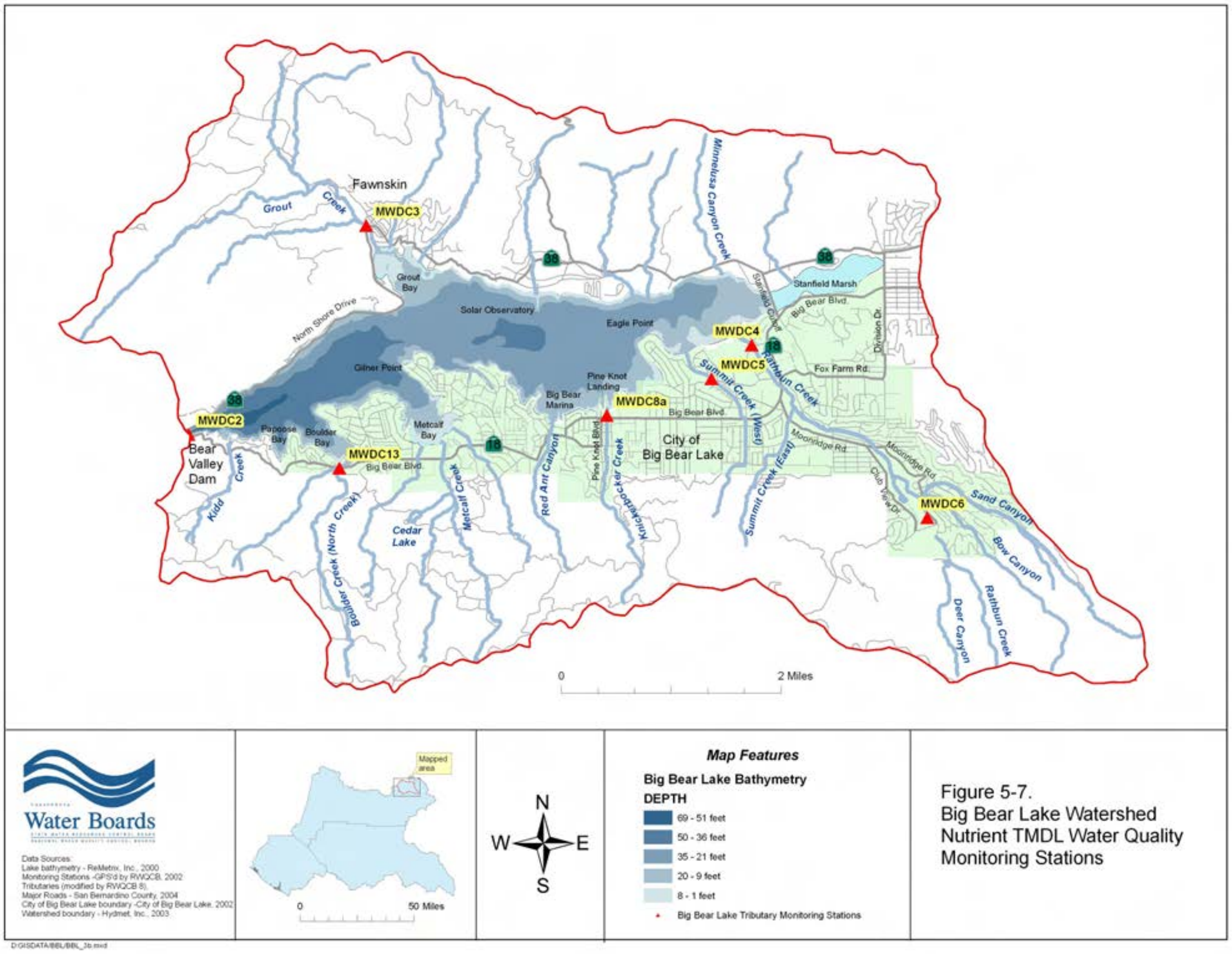


Figure 5-7 – Big Bear Lake Watershed Nutrient TMDL Water Quality Stations

4.2 Big Bear Lake: In-Lake Nutrient Monitoring Program

No later than November 30, 2007, the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake, and Big Bear Mountain Resorts shall, as a group, submit to the Regional Board for approval a proposed Big Bear Lake nutrient monitoring program that will provide data necessary to review and update the Big Bear Lake Nutrient TMDL, and to develop TMDLs for other hydrological conditions. Data to be collected and analyzed shall address, at a minimum: (1) determination of compliance with phosphorus and chlorophyll *a* numeric targets; (2) determination of compliance with the existing total inorganic nitrogen (TIN) objective; and (3) refinement of the in-lake model for the purposes of TMDL review and development.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9a-i and shown in Figure 5-8, at the specified frequency indicated in Table 5-9a-i. Modifications to the required sampling stations, sampling frequencies and constituents to be monitored (see below) will be considered upon request by the stakeholders, accompanied by a report that describes the rationale for the proposed changes and identifies recommended alternatives. With the exception of hardness, alkalinity, total organic carbon (TOC), dissolved organic carbon (DOC), and chlorophyll *a,* each sample to be analyzed shall be collected as a photic zone composite (from the surface to 2 times the secchi depth) and as a bottom discrete (0.5 meters off the surface bottom) sample. Hardness, alkalinity, TOC, DOC, and chlorophyll *a* shall be collected as photic zone composites. Dissolved oxygen, water temperature, turbidity, specific conductance, and pH shall be measured at 1-meter intervals from the surface to 0.5 meters from the bottom using a multi-parameter water quality meter. Water clarity shall be measured with a secchi disk.

At a minimum, in-lake samples must be analyzed for the following constituents:

- Specific conductance
- Water temperature
- Chlorophyll *a*
- Total nitrogen
- Nitrate +nitrite nitrogen
- Total phosphorus
- Total hardness
- Total dissolved phosphorus
- Dissolved organic carbon(DOC)
- Total dissolved nitrogen
- Dissolved oxygen
- Water clarity (secchi depth)
- Ammonia nitrogen
- Alkalinity
- Turbidity
- Ortho-phosphate (SRP)
- Total suspended solids (TSS)
- pH
- Total dissolved solids (TDS)
- Total organic carbon (TOC)

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs and numeric targets shall be submitted by February 15 of each year.

Table 5-9a-i

Big Bear Lake Minimum Required Sampling Station Locations

Station Number	Station Description
MWDL1	Big Bear Lake – Dam
MWDL2	Big Bear Lake – Gilner Point
MWDL6	Big Bear Lake – Mid Lake Middle
MWDL9	Big Bear Lake – Stanfield Middle

Frequency of sampling at all stations: for all constituents except TOC and DOC, monthly from March – November; bi-weekly (i.e., every other week) from June 1 through October 31. TOC and DOC to be monitored four times per year (quarterly) from January through December.

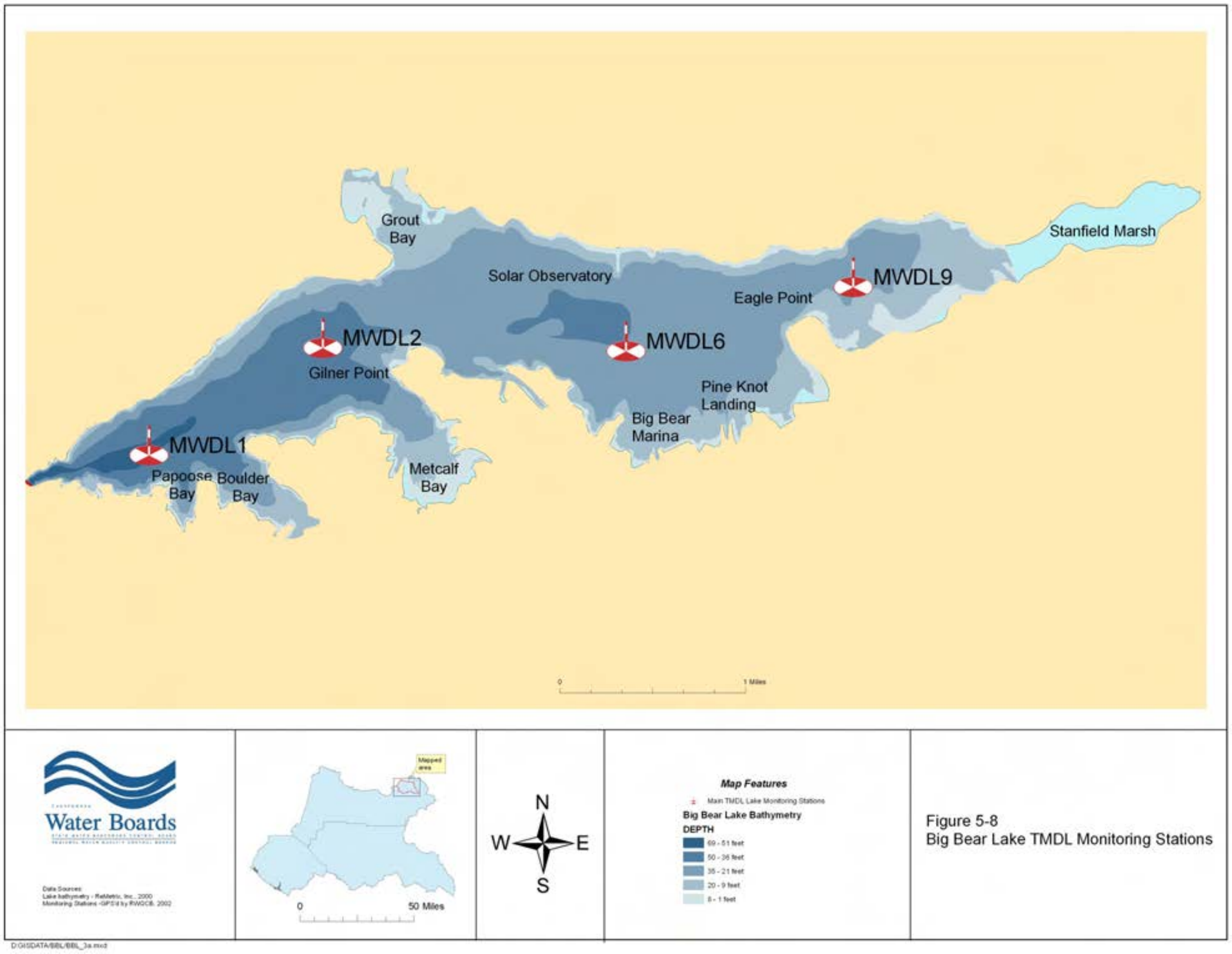


Figure 5-8 Big Bear Lake TMDL Monitoring Stations

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than November 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s), shall be submitted by February 15 of each year. The report shall summarize the data and evaluate compliance with the TMDL/WLAs/LAs and numeric targets.

Task 5: Atmospheric Deposition Determination

No later than August 31, 2008, the Regional Board, in coordination with local stakeholders, the South Coast Air Quality Management District and the California Air

Resources Board, shall develop a plan and schedule for quantifying atmospheric deposition of nutrients in the Big Bear Lake watershed.

Task 6: Big Bear Lake-Lake Management Plan

No later than August 31, 2008, the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake, and Big Bear Mountain Resorts, shall, as a group, submit to the Regional Board for approval a proposed Lake Management Plan for Big Bear Lake. The purpose of the plan is to identify a coordinated and comprehensive strategy for management of the lake and surrounding watershed to address restoration and protection of the lake's beneficial uses.The plan shall include the following:

A) A proposed plan and schedule for updating the existing Big Bear Lake watershed nutrient model and the Big Bear Lake in-lake nutrient model. The plan and schedule must take into consideration additional data and information that are or will be generated from the required TMDL monitoring programs (Tasks 4.1 and 4.2, above).
B) A proposed plan and schedule for in-lake sediment nutrient reduction for Big Bear Lake. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to support development of a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies implemented.
C) The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to control noxious and nuisance aquatic plants. The plan shall also include a description of the monitoring conducted and proposed to track aquatic plant diversity, coverage, and biomass. Data to be collected and analyzed shall address, at a minimum, determination of compliance with the numeric targets for macrophyte coverage and percentage of nuisance aquatic vascular plant species (see 1.A., above).

In addition, at a minimum, the proposed plan shall also address the following:

- The plan shall be based on identified and acceptable goals for lake capacity, biological resources and recreational opportunities. Acceptable goals shall be identified in coordination with the Regional Board and other responsible agencies, including the California Department of Fish and Game and the U.S. Fish and Wildlife Service.
- The plan shall include a proposed plan and schedule for the development of biocriteria for Big Bear Lake. (This is intended to complement Regional Board efforts to develop biocriteria and to signal the parties' commitment to participate substantively.)
- The plan must identify a scientifically defensible methodology for measuring changes in the capacity of the lake.

- The proposed plan shall identify recommended short and long-term strategies for control and management of sediment and dissolved and particulate nutrient inputs to the lake.
- The plan shall also integrate the beneficial use survey information required to be developed pursuant to the Regional Board's March 3, 2005, Clean Water Act Section 401 Water Quality Standards Certification for Big Bear Lake Nutrient/Sediment Remediation Project, City of Big Bear Lake, County of San Bernardino, California. The purpose of the beneficial use survey is to correlate beneficial uses of the lake with lake bottom contours. The survey is required to be conducted throughout the lake. The survey will determine the location and the quality of beneficial uses of the lake and the contours of the lake bottom where these uses occur. The survey is expected to be used in regulating future lake dredge projects to maximize the restoration and protection of the lake's beneficial uses.

The Big Bear Lake – Lake Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting. Once approved, the plan shall be reviewed and revised as necessary at least once every three years. The review and revision shall take into account assessments of the efficacy of control/management strategies implemented and relevant requirements of new or revised TMDLs for Big Bear Lake and its watershed. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs and numeric targets shall be submitted by February 15 of each year.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group Big Bear Lake – Lake Management Plan and schedule for approval by the Regional Board. Any such individual or group plan must conform to the requirements specified above and is due no later than August 31, 2008. An individual or group plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs and numeric targets shall be submitted by February 15 of each year.

Task 7: Review and Revision of Big Bear Lake Water Quality Standards

By December 31, 2015, the Regional Board shall:

7.1 Review/revise as necessary the total inorganic nitrogen and total phosphorus numeric water quality objectives for Big Bear Lake. The Regional Board shall also consider the development of narrative or numeric objectives for other indicators of impairment (e.g., chlorophyll *a*, macrophyte coverage and species composition), in lieu of or in addition to review/revision of the numeric objectives for phosphorus and nitrogen.

7.2 Develop biocriteria for Big Bear Lake.

7.3 Develop a definition for natural background sources of nutrients (and other constituents) to Big Bear Lake and its tributaries.

Given budgetary constraints, completion of these tasks are likely to require substantive contributions from interested parties.

Task 8: Review of Big Bear Lake Tributary Data

No later than December 2008, the Regional Board shall review data collected on Rathbun Creek, Summit Creek and Grout Creek to determine whether beneficial uses of these tributaries are impaired by nutrients. If the Creeks are found to be impaired by nutrients, the Regional Board shall develop a TMDL development project plan and schedule. If these tributaries are found not to be impaired by nutrients, Regional Board shall schedule the delisting of the tributaries from the 303(d) list of impaired waters at the earliest opportunity.

Task 9: Development of TMDLs for Wet and/or Average Hydrological Conditions

No later than December 31, 2012, the Regional Board shall utilize additional water quality data and information collected pursuant to monitoring program requirements (Tasks 4 and 5) and model updates (Task 6A) to develop proposed nutrient TMDLs for Big Bear Lake for wet and/or average hydrological conditions. Completion of this task is contingent on the collection of requisite data for wet and/or average hydrological conditions.

Task 10: Review/Revision of the Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions (TMDL "Re-opener")

The basis for the TMDL for Dry Hydrological Condtions, the implementation plan and schedule will be re-evaluated at least once every three years[2] to determine the need for modifying the allocations, numeric targets and TMDL. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies and/or modeling analyses, changes to the TMDL may be warranted. Such changes will be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies.

---

[2] The three-year schedule is tied to the 3 year triennial review schedule.

Lake Elsinore/San Jacinto River Watershed (Amended by Resolution No. R8-2006-0023)

The Lake Elsinore/San Jacinto River Watershed is located in Riverside County and includes the following major waterbodies: Lake Hemet, San Jacinto River, Salt Creek, Canyon Lake and Lake Elsinore. The total drainage area of the San Jacinto River watershed is approximately 782 square miles. Over 90 percent of the watershed (735 square miles) drains into Canyon Lake. Lake Elsinore is the terminus of the San Jacinto River watershed. The local tributary area to Lake Elsinore, consisting of drainage from the Santa Ana Mountains and the City of Lake Elsinore, is 47 square miles.

Land use in the watershed includes open/forested, agricultural (including concentrated animal feeding operations such as dairies and chicken ranches, and irrigated cropland), and urban uses, including residential, industrial and commercial. Vacant/open space is being converted to residential uses as the population in the area expands. The municipalities in the watershed include the cities of San Jacinto, Hemet, Perris, Canyon Lake, Lake Elsinore and portions of Moreno Valley and Beaumont.

1. Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Load (TMDL)

Lake Elsinore and Canyon Lake are not attaining water quality standards due to excessive nutrients (nitrogen and phosphorus). Reports prepared by Regional Board staff describe the impact nutrient discharges have on the beneficial uses of Lake Elsinore and Canyon Lake [Ref. #26,27] Lake Elsinore was formed in a geologically active graben area and has been in existence for thousands of years. Due to the mediterranean climate and watershed hydrology, fluctuations in the level of Lake Elsinore have been extreme, with alternate periods of a dry lake bed and extreme flooding. These drought/flood cycles have a great impact on lake water quality. Fish kills and excessive algae blooms have been reported in Lake Elsinore since the early 20th century. As a result, in 1994, the Regional Board placed Lake Elsinore on the 303(d) list of impaired waters due to excessive levels of nutrients and organic enrichment/low dissolved oxygen.

Canyon Lake, located approximately 5 miles upstream of Lake Elsinore, was formed by the construction of Railroad Canyon Dam in 1928. Approximately 735 square miles of the 782 square mile San Jacinto River watershed drain to Canyon Lake. During most years, runoff from the watershed terminates at Canyon Lake without reaching Lake Elsinore, resulting in the buildup of nutrients in Canyon Lake. While Canyon Lake does not have as severe an eutrophication problem as Lake Elsinore, there have been periods of algal blooms and anecdotal reports of occasional fish kills. Accordingly, in

1998, the Regional Board added Canyon Lake to the 303(d) list of impaired waters due to excessive levels of nutrients.
A TMDL technical report prepared by Regional Board staff describes the nutrient related problems in Canyon Lake and Lake Elsinore in greater detail and discusses the technical basis for the TMDLs that follow [Ref. # 28].

A. Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets

Numeric targets for Lake Elsinore and Canyon Lake are based on reference conditions when beneficial uses in the lakes were not significantly impacted by nutrients. Table 5-9n shows both "causal" and "response" interim and final numeric targets for both lakes. Causal targets are those for phosphorus and nitrogen. Phosphorus and nitrogen are the primary limiting nutrients in Lake Elsinore and Canyon Lake, respectively. However, under certain conditions, nitrogen may be limiting in Lake Elsinore and phosphorus may be limiting in Canyon Lake. Targets for both nutrients are therefore necessary . Reduction in nitrogen inputs will be necessary over the long-term and only final targets are specified. Response targets include chlorophyll *a* and dissolved oxygen. These targets are specified to assess water quality improvements in the lakes. Finally, ammonia targets are specified to prevent un-ionized ammonia toxicity to aquatic life.

Table 5-9n

Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets*

Indicator	Lake Elsinore	Canyon Lake
Total P concentration (Final)	Annual average no greater than 0.1 mg/L; to be attained no later than 2020	Annual average no greater than 0.1 mg/L; to be attained no later than 2020
Total N concentration (Final)	Annual average no greater than 0.75 mg/L; to be attained no later than 2020	Annual average no greater than 0.75 mg/L; to be attained no later than 2020
Ammonia nitrogen concentration (Final) [Ref. #4]	Calculated concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$	Calculated concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$
Chlorophyll *a* concentration (Interim)	Summer average no greater than 40 ug/L; to be attained no later than 2015	Annual average no greater than 40 ug/L; to be attained no later than 2015
Chlorophyll *a* concentration (Final)	Summer average no greater than 25 ug/L; to be attained no later than 2020	Annual average no greater than 25 ug/L; to be attained no later than 2020
Dissolved oxygen concentration (Interim)	Depth average no less than 5 mg/L; to be attained no later than 2015	Minimum of 5 mg/L above thermocline; to be attained no later than 2015
Dissolved oxygen concentration (Final)	No less than 5 mg/L 1 meter above lake bottom; to be attained no later than 2020	Daily average in hypolimnion no less than 5 mg/L; to be attained no later than 2020.

* compliance with targets to be achieved as soon as possible, but no later than the date specified

B. Lake Elsinore and Canyon Lake Nutrient TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

As discussed in the technical TMDL report, nutrient loading to Canyon Lake and Lake Elsinore varies depending on the hydrologic conditions that occur in the San Jacinto watershed. As part of the TMDL analysis and development, three hydrologic scenarios and the relative frequency of each of these conditions (based upon an 87 year record of flow data at the USGS Gauging station downstream of Canyon Lake), were identified as shown in Table 5-9o. The resulting TMDLs, wasteload allocations and load allocations are based on 10-year running flow weighted average nutrient loads, taking into account the frequency of the three hydrologic conditions and the nutrient loads associated with each of them. Phosphorus and nitrogen TMDLs for Canyon Lake and Lake Elsinore are shown in Table 5-9p. The TMDLs, expressed as 10–year running averages, will implement the numeric targets and thereby attain water quality standards,. Phosphorus and nitrogen wasteload allocations for point source discharges and load allocations for nonpoint source discharges, also expressed as 10-year running averages, are shown in Tables 5-9q and 5-9r. No TMDLs, wasteload allocations or load allocations are specified for chlorophyll a, dissolved oxygen or ammonia. Chlorophyll a and dissolved oxygen targets are intended to serve as measures of the effectiveness of phosphorus and nitrogen reductions implemented to meet TMDL requirements. Until ammonia transformations, and nitrogen dynamics in general, are better understood, no ammonia TMDLs, wasteload allocations or load allocations are specified.

Table 5-9o
San Jacinto River Hydrologic Conditions with Relative Flow Frequency at the USGS Gauging Station Downstream of Canyon Lake (Station No. 1170500)

Hydrologic Condition	**Representative Water Year**	**Years of Hydrologic Condition**	**Relative Frequency (%)**	**Description**
Wet	1998	14	16	Both Canyon Lake and Mystic Lake overflow; flow at the USGS gauging station 11070500 17,000 AF or greater
Moderate	1994	36	41	No Mystic Lake overflow; Canyon Lake overflowed; flow at the USGS gauging station 11070500 less than 17,000 AF and greater than 2,485 AF
Dry	2000	37	43	No overflows from Mystic Lake or Canyon Lake; flow at the USGS gauging station 11070500 371 AF or less

Table 5-9p
Nutrient TMDLs and Compliance Dates for Lake Elsinore and Canyon Lake

TMDL	**Final Total Phosphorus TMDL (kg/yr)[a, b]**	**Final Total Nitrogen TMDL (kg/yr) [a, b]**
Canyon Lake	8,691	37,735
Lake Elsinore	28,584	239,025

[a] Final compliance to be achieved as soon as possible, but no later than December 31, 2020.
[b] TMDL specified as 10-year running average.

Table 5-9q

Canyon Lake
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Canyon Lake Nutrient TMDL	**Final Total Phosphorus Load Allocation (kg/yr)[b, c]**	**Final Total Nitrogen Load Allocation (kg/yr) [b, c]**
TMDL	**8,691**	**37,735**
WLA	486	6,248
Supplemental water	48	366
Urban	306	3,974
CAFO	132	1,908
LA	**8,205**	**31,487**
Internal Sediment	4,625	13,549
Atmospheric Deposition	221	1,918
Agriculture	1,183	7,583
Open/Forest	2,037	3,587
Septic systems	139	4,850

[a] The TMDL allocations for Canyon Lake apply to those land uses located upstream of Canyon Lake.
[b] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[c] TMDL and allocations specified as 10-year running average.

Table 5-9r

Lake Elsinore
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Lake Elsinore Nutrient TMDL	Final Total Phosphorus Load Allocation (kg/yr)[b, c]	Final Total Nitrogen Load Allocation (kg/yr)[c, d]
TMDL	**28,584**	**239,025**
WLA	3,845	7,791
Supplemental water [d]	3,721	7,442
Urban	124	349
CAFO	0	0
LA	**21,969**	**210,461**
Internal Sediment	21,554	197,370
Atmospheric Deposition	108	11,702
Agriculture	60	213
Open/Forest	178	567
Septic systems	69	608
CL Watershed [e]	2,770	20,774

[a] The Lake Elsinore TMDL allocations for urban, agriculture open/forest, septic systems and CAFOs only apply to those land uses located downstream of Canyon Lake.
[b] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[c] TMDL and allocations specified as 10-year running average.
[d] WLA for supplemental water should met as soon as possible as a 5 year running average.
[e] Allocation for Canyon Lake overflows

The TMDL distributes the portions of the waterbody's assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources, where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost-effective way to achieve pollution reduction benefits. (See Section E. TMDL Implementation, Task 11, below).

C. Margin of Safety

The Canyon Lake and Lake Elsinore Nutrient TMDLs include an implicit margin of safety (MOS) as follows:

- the derivation of numeric targets based on the 25th percentile of data for Lake Elsinore; Canyon Lake numeric targets to be consistent with the Lake Elsinore targets;
- the use of multiple numeric targets to measure attainment of beneficial uses and thereby assure TMDL efficacy;
- the use of conservative literature values in the absence of site-specific data for source loading rates in the watershed nutrient model;
- the use of conservative assumptions in modeling the response of Lake Elsinore and Canyon Lake to nutrient loads; and
- requiring load reductions to be accomplished during hydrological conditions when model results indicate, in some instances, that theoretical loads could be higher.

D. Seasonal Variations/Critical Conditions

The Canyon Lake and Lake Elsinore Nutrient TMDLs account for seasonal and annual variations in external and internal nutrient loading and associated impacts on beneficial uses by the use of a 10-year running average allocation approach. This 10-year running average approach addresses variation in hydrologic conditions (wet, moderate and dry) that can dramatically affect both nutrient loading and lake response.

Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.

E. TMDL Implementation

Typically, under dry and moderate conditions, the internal nutrient loading drives the nutrient dynamics in both Canyon Lake and Lake Elsinore. However, it is the extreme (albeit infrequent) loading that occurs during wet conditions that provides the nutrients to the lakes that remain in the lakes as internal nutrient sources in subsequent years. Given the complexity of the San Jacinto River watershed hydrology, control of nutrients input to the lakes is needed for all hydrologic conditions. Collection of additional monitoring data is critical to developing long-term solutions for nutrient control. With that in mind, the submittal of plans and schedules to implement the TMDLs should take into consideration the need to develop and implement effective short-term solutions, as well as allow for the development of long-term solutions once additional data have been generated.

Implementation of tasks and schedules as specified in Table 5-9s is expected to achieve compliance with water quality standards. Each of these tasks is described below.

This space has been intentionally left blank

Table 5-9s

Lake Elsinore and Canyon Lake Nutrient TMDL Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
TMDL Phase 1		
Task 1	Establish New Waste Discharge Requirements	March 31, 2006
Task 2	Revise Existing Waste Discharge Permits	March 31, 2006
Task 3	Identify Agricultural Operators	October 31, 2005
Task 4	Nutrient Water Quality Monitoring Program 4.1 Watershed-wide Nutrient Monitoring Plan(s) 4.2 Lake Elsinore Nutrient Monitoring Plan(s) 4.3 Canyon Lake Nutrient Monitoring Plan(s)	• Initial plan/schedule due December 31, 2005 • Annual reports due August 15 • Revised plan/schedule due December 31, 2006
Task 5	Agricultural Discharges – Nutrient Management Plan	Plan/schedule due September 30, 2007
Task 6	On-site Disposal Systems (Septic Systems) Management Plan	Dependent on State Board approval of relevant regulations (see text).
Task 7	Urban Discharges 7.1 Revision of Drainage Area Management Plan (DAMP) 7.2 Revision of the Water Quality Management Plan (WQMP) 7.3 Update of the Caltrans Stormwater Management Plan and Regional Plan 7.4 Update of US Air Force, March Air Reserve Base SWPPP	Plan/schedule due: 7.1 August 1, 2006 7.2 August 1, 2006 7.3 April 1, 2006 7.4 Dependent on Task 3 results. See text.
Task 8	Forest Area – Review/Revision of Forest Service Management Plans	Plan/schedule due September 30, 2007
Task 9	Lake Elsinore In-Lake Sediment Nutrient Reduction Plan	Plan/schedule due March 31, 2007
Task 10	Canyon Lake In-Lake Sediment Treatment Evaluation	Plan/schedule due March 31, 2007
Task 11	Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates	Plan/schedule due March 31, 2007
Task 12	Pollutant Trading Plan	Plan/schedule due September 30, 2007
Task 13	Review and Revise Nutrient Water Quality Objectives	December 31, 2009
Task 14	Review of TMDL/WLA/LA	Once every 3 years to coincide with the Regional Board's triennial review

Task 1: Establish New Waste Discharge Requirements

On or before March 31, 2006, the Regional Board shall issue new waste discharge requirements (NPDES permit) to Elsinore Valley Municipal Water District for supplemental water discharges to Canyon Lake that incorporate the appropriate interim and final wasteload allocations, compliance schedule and monitoring program requirements.

Other proposed nutrient discharges will be addressed and permitted as appropriate.

Task 2: Review and/or Revise Existing Waste Discharge Requirements

There are five Waste Discharge Requirements (WDRs) issued by the Regional Board regulating discharge of various types of wastes in the San Jacinto watershed. On or before March 31, 2006, each of these WDRs shall be reviewed and revised as necessary to implement the Lake Elsinore and Canyon Lake Nutrient TMDLs, including the appropriate nitrogen and phosphorus interim and final wasteload allocations, compliance schedules and/or monitoring program requirements.

2.1 Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618033 (Regional Board Order No. R8-2002-0011). The current Order has provisions to address TMDL issues (see Task 7.1, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

2.2 Watershed-Wide Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with New Developments in the San Jacinto Watershed, Order No. 01-34, NPDES No. CAG 618005. It is expected that this Order will be rescinded once the Regional Board/Executive Officer approves a Water Quality Management WQMP) under Order No. R8-2002-0011 (see 2.1, above and Task 7.2, below)

2.3 General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region, NPDES No. CAG018001 (Regional Board Order No. 99-11).

2.4 Waste Discharge and Producer/User Reclamation Requirements for the Elsinore Valley Municipal Water District, Regional Water Reclamation Facility Riverside County, Order No. 00-1, NPDES No. CA8000027. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

2.5 Waste Discharge Requirements for Eastern Municipal Water District, Regional Water Reclamation System, Riverside County, Order No. 99-5, NPDES No. CA8000188[1]. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

2.6 Waste Discharge Requirements for US Air Force, March Air Reserve Base, Storm Water Runoff, Riverside County, Order No. R8-2004-0033, NPDES CA 00111007

Task 3: Identify Agricultural Operators

On or before October 31, 2005, the Regional Board shall develop a list of all known agricultural operators in the San Jacinto watershed that will be responsible for implementing requirements of this TMDL. The Regional Board will send a notice to these operators informing them of their TMDL responsibility and alerting them to potential regulatory consequences of failure to comply.

Task 4: Monitoring

No later than December 31, 2005, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval monitoring program as required by Tasks 4.1, 4.2 and 4.3.

If modifications to the monitoring program are warranted, no later than December 31, 2006, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a revised proposed Watershed nutrient monitoring program (Task 4.1), Lake Elsinore monitoring program (Task 4.2) and Canyon Lake nutrient monitoring program (Task 4.3).

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval for the monitoring program specified in tasks 4.1, 4.2 and 4.3. Any such individual or

---

[1] Contingent on Eastern Municipal Water District discharge of recycled water to Lake Elsinore.

group monitoring plan is due no later than December 31, 2005. If needed, any individual or group revised monitoring plan is due no later than December 31, 2006.

4.1 Watershed-wide Nutrient Water Quality Monitoring Program

The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed watershed-wide nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore and Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: (1) determination of compliance with interim and/or final nitrogen and phosphorus allocations; and (2) determination of compliance with the nitrogen and phosphorus TMDL, including the WLAs and LAs.

At a minimum, the stations specified in Table 5-9t and shown in Figure 5-3, at the frequency specified in Table 5-9t, shall be considered for inclusion in the proposed monitoring plan. If one or more of these monitoring stations are not included, rationale shall be provided and proposed alternative monitoring locations shall be identified in the proposed monitoring plan. In addition to water quality samples, at a minimum, daily discharge (stream flow) determinations shall be made at all stations shown in Table 5-9t.

At a minimum, samples shall be analyzed for the following constituents:

- organic nitrogen
- nitrite nitrogen
- total phosphorus
- total hardness
- total suspended solids (TSS)
- biological oxygen demand (BOD)
- ammonia nitrogen
- nitrate nitrogen
- ortho-phosphate (SRP)
- total dissolved solids (TDS)
- turbidity
- chemical oxygen demand (COD)
- pH
- water temperature

The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the WLAs/LAs shall be submitted by August 15 of each year.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. This individual monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the WLAs/LAs.

It may be that implementation of these monitoring requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

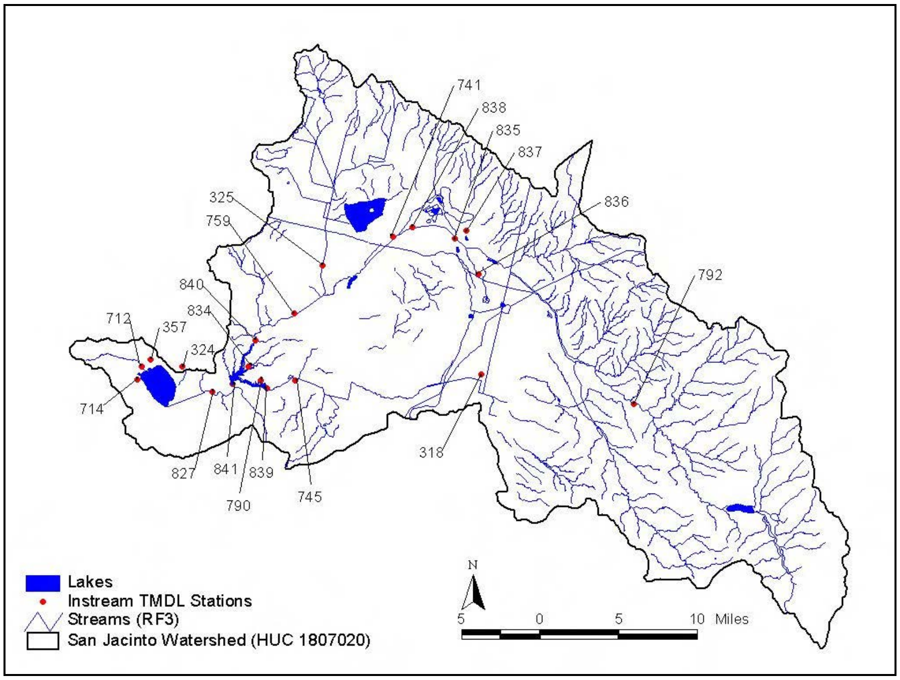


Figure 5-3 – San Jacinto River Watershed Nutrient TMDL Water Quality Stations Locations

Table 5-9t
Lake Elsinore and Canyon Lake Watershed
Minimum Required Sampling Station Locations

Station Number	Station Description
792	San Jacinto River @ Cranston Guard Station
318	Hemet Channel at Sanderson Ave.
745	Salt Creek @ Murrieta Road
759	San Jacinto River @ Goetz Rd
325	Perris Valley Storm Drain @ Nuevo Rd.
741	San Jacinto River @ Ramona Expressway
827	San Jacinto River upstream of Lake Elsinore
790	Fair Weather Dr. Storm Drain in Canyon Lake
357	4 Corners Storm Drain in Elsinore
714	Ortega Flood Channel in Elsinore
324	Lake Elsinore Outlet Channel
712	Leach Canyon Channel in Elsinore
834	Sierra Park Drain in Canyon Lake
835	Bridge Street and San Jacinto River
836	North Side of Ramona Expressway near Warren Road
837	Mystic Lake inflows
838	Mystic Lake outflows
841	Canyon Lake spillway

Frequency of sampling at all stations: dry season – none; wet season; minimum of 3 storms/year whenever possible and 8 samples across each storm hydrograph

4.2 Lake Elsinore: In-Lake Nutrient Monitoring Program

The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Lake Elsinore nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Lake Elsinore.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9u and shown in Figure 5-4, at the specified frequency indicated in Table 5-9u. With the exception of dissolved oxygen and water temperature, all samples to be analyzed shall be depth integrated.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

Table 5-9u

Lake Elsinore Minimum Required Sampling Station Locations

Station Number	**Station Description**
LE 14	Lake Elsinore – inlet
LE 15	Lake Elsinore – four corners
LE 16	Lake Elsinore – mid-lake

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

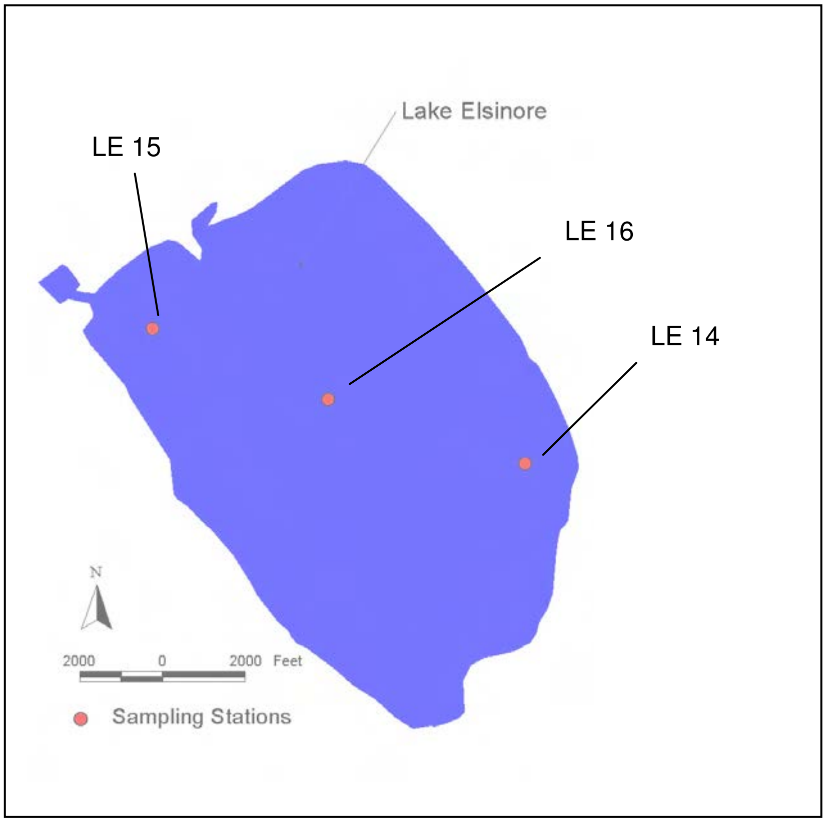


Figure 5-4 Lake Elsinore TMDL monitoring Stations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. This individual monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s), shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

4.3 Canyon Lake Nutrient Monitoring Program

The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Canyon Lake nutrient monitoring program that will provide data necessary to review and update the Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Canyon Lake.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9v and shown in Figure 5-5, at the specified frequency indicated in Table 5-9v. Discrete samples in Canyon Lake are to be collected in the epilimnion, hypolimnion and thermocline when and where appropriate.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

This space has been intentionally left blank

Table 5-9v

Canyon Lake Minimum Required Sampling Station Locations

Station Number	Station Description
CL 07	Canyon Lake – At the Dam
CL 08	Canyon Lake – North Channel
CL 09	Canyon Lake – Canyon Bay
CL 10	Canyon Lake – East Bay

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

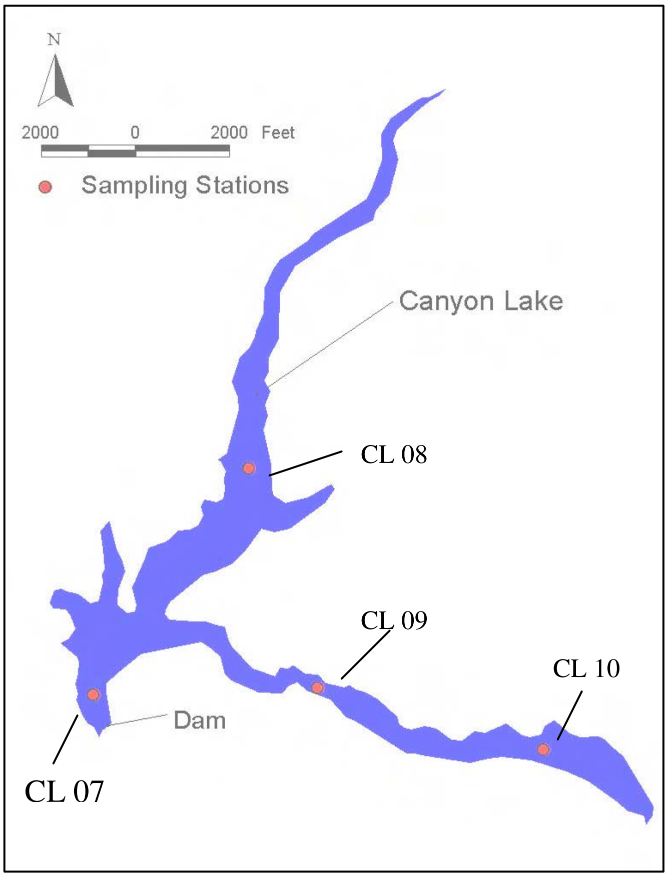


Figure 5-5 – Canyon Lake Nutrient TMDL Monitoring Station Locations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. This individual plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 5: Agricultural Activities

No later than September 30, 2007, the agricultural operators within the Lake Elsinore and Canyon Lake watershed (see Task 2), in cooperation with the Riverside County Farm Bureau, the UC Cooperative Extension, Western Riverside County Ag Coalition shall, as a group, submit a proposed Nutrient Management Plan (NMP). The Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of a coordinated plan, one or more of the parties identified above may submit a proposed individual or group Nutrient Management Plan to conduct the above studies for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval no later than September 30, 2007. This Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

At a minimum, the NMP shall include, plans and schedules for the following. In order to facilitate any needed update of the numeric targets and/or the TMDLs and/or agricultural LA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule.

- implementation of nutrient controls, BMPs and reduction strategies designed to meet load allocations;
- evaluation of effectiveness of BMPs;
- development and implementation of compliance monitoring; and
- development and implementation of focused studies that will provide the following data and information
  - ➢ inventory of crops grown in the watershed;
  - ➢ amount of manure and/or fertilizer applied to each crop with corresponding nitrogen and phosphorus amounts; and
  - ➢ amount of nutrients discharged from croplands.

The Regional Board expects that the NMP will be submitted and implemented pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will issue appropriate waste discharge requirements.

Compliance with the agricultural load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 6: On-site Disposal Systems (Septic System) Management Plan

No later than 6 months after the effective date of an agreement between the County of Riverside and the Regional Board to implement regulations adopted pursuant to Water Code Sections 13290-13291.7, or if no such agreement is required or completed, within 12 months of the effective date of these regulations, the County of Riverside and the Cities of Perris, Moreno Valley and Murrieta shall, as a group, submit a Septic System Management Plan to identify and address nutrient discharges from septic systems within the San Jacinto watershed. The Septic System Management Plan shall implement regulations adopted by the State Water Resources Control Board pursuant to California Water Code Section 13290 – 13291.7.

At a minimum, the Septic System Management Plan shall include plans and schedules for the development and implementation of the following. In order to facilitate any needed update of the numeric targets and/or the TMDLs and septic system LA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule.

- public education program;
- tracking system, including maintenance thereof;

- maintenance standards;
- enforcement provisions;
- monitoring program; and
- sanitary survey.

In lieu of a coordinated plan, one or more of the agencies with septic system oversight responsibilities may submit an individual or group Management Plan to develop the above Plan for areas within their jurisdiction. Any such individual or group plan shall also be submitted no later than March 31, 2006. This Septic System Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the septic systems load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 7: Urban Discharges

Urban discharges, including stormwater runoff, are those discharges from the cities and unincorporated communities in the San Jacinto River watershed. These discharges are regulated under the Riverside County MS4 NPDES permit, the San Jacinto Watershed Construction Activities Storm Water permit, the State Board's General Permit for Storm Water Runoff from Construction Activities, and the State Board's General Permit for Storm Water Runoff from Industrial Activities. Nuisance and stormwater runoff from state highways and right of ways is regulated under the State of California, Department of Transportation (Caltrans) statewide general NPDES permit. Finally, nuisance and stormwater runoff from the March Air Reserve Base is also regulated through an NPDES permit.

7.1 Revision to the Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. By August 1, 2006, the permittees shall review and revise the DAMP and or WQMP (see 7.2 below) as necessary to address the requirements of these nutrient TMDLs. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP revisions shall include schedules for meeting the interim and final nutrient wasteload allocations. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The revised DAMP/WQMP shall also include a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocation for urban runoff. The proposal must be implemented upon approval by the Regional Board after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period.

7.2 Revision of the Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to develop and submit a WQMP by June 2004 for approval. On September 17, 2004, the Board approved a WQMP developed by the permittees. The approved WQMP includes source control BMPs, design BMPs and treatment control BMPs. Further revisions to the WQMP and/or the DAMP may be necessary to meet the WLA for urban runoff. By August 1, 2006, the permittees shall submit a revised WQMP and/or revised DAMP (see 7.1 above) that addresses the nutrient input from new developments and significant redevelopments to assure compliance with the nutrient wasteload allocations for urban runoff. The WQMP shall also address requirements currently in Order No. 01-34 (see 2.2, above). Once the WQMP is approved, Order No. 01-34 may be rescinded. Further review and revision of the WQMP necessary to assure that TMDL requirements are addressed shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

7.3 Revision of the State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program are required to be submitted to the State Water Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. By April 1, 2006, Caltrans shall submit a Regional Workplan that includes plans and schedules for meeting the interim and final nutrient wasteload allocations, and provides a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocations for urban runoff , which includes runoff from Caltrans facilities. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The proposal shall be implemented upon the Executive Officer's approval. Annual updates to the Regional Workplan shall include, as necessary, revised plans and schedules for meeting the interim and final nutrient wasteload allocations and revised proposals for evaluating the efficacy of control actions and compliance with the nutrient wasteload allocations.

7.4 Revision to the United States Air Force, March Air Reserve Base, Stormwater Permit

Order No. R8-2004-0033 specifies monitoring and reporting requirements for stormwater runoff from the US Air Force, March Air Reserve facility. Provision C.17

indicates that the order could be reopened to incorporate TMDL requirements. Provisions C.18.a and C.18.b require that March Air Reserve Base submit a report and revise the Stormwater Pollution Prevention Plan (SWPPP) to address any pollutants that may be causing or contributing to exceedances of water quality standards. Results from the TMDL nutrient monitoring program conducted pursuant to Task 3, shall serve as the basis for revision of the SWPPP and/or reopening the order.

Development of the Municipal permittee's WQMP and revisions to their DAMP, development of the Caltrans SWMP and Regional Workplan, and Revision to the March Air Reserve Base SWPPP, shall address the urban component of the nutrient TMDL.

Compliance with the urban wasteload allocation may be achieved through a Regional Board approved pollutant trading program.

Task 8: Forest Area –Identification of Forest Lands Management Practices

No later than September 30, 2007, the US Forest Service shall submit for approval a plan with a schedule for identification, development and implementation of Management Practices to reduce nutrient discharges emanating from the Cleveland National Forest and the San Bernardino National Forest . The Plan shall identify watershed-specific appropriate Best Management Practices (BMPs) that will be implemented to achieve the interim and final load allocations for forest/. The proposal shall include specific recommendations and a schedule for 1) evaluating the effectiveness of control actions implemented to reduce nutrient discharges from forest and 2) evaluating compliance with the nutrient load allocation from forest/open space. The revised watershed-specific Management Practices shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the open space/forest load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 9: Lake Elsinore Sediment Nutrient Reduction Plan

No later than March 31, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, the State of California, Department of Transportation (Caltrans), the State of California, Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for in-lake sediment nutrient reduction for Lake Elsinore. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments to support development of a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Lake Elsinore In-lake Sediment Nutrient Reduction Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Reduction Plan for approval by the Regional Board. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the Lake Elsinore Sediment Nutrient Reduction Plan requirement may be achieved through a Regional Board approved pollutant trading program.

Task 10: Canyon Lake Sediment Nutrient Treatment Evaluation Plan

No later than March 31, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for evaluating in-lake sediment nutrient treatment strategies for Canyon Lake. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments in order to develop a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Canyon Lake In-lake Sediment Nutrient Treatment Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Treatment Evaluation Plan for approval by the Regional Board. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 11: Update of Watershed and In-Lake Nutrient Models

No later than March 31, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for updating the existing Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs/LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The plan for updating the Watershed and In-lake Models shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group plan for update of the Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs/LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 12: Pollutant Trading Plan

No later than September 30, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District[1], Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed Pollutant Trading Plan. At a minimum, this plan shall contain a plan, schedule and funding strategy for project implementation, an approach for tracking pollutant credits and a schedule for reporting status of implementation of the Pollutant Trading Plan to the Regional Board, The Pollutant Trading Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group Pollutant Trading Plan. Any such individual or group Plan is due no later than September 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 13: Review and Revision of Water Quality Objectives

By December 31, 2009, the Regional Board shall review and revise as necessary the total inorganic nitrogen numeric water quality objectives for Lake Elsinore and Canyon Lake. In addition, the Regional Board shall evaluate the appropriateness of establishing total phosphorus and un-ionized ammonia numeric water quality objectives for both Lake Elsinore and Canyon Lake.   Given budgetary constraints, completion of this task is likely to require substantive contributions from interested parties.

Task 14: Review/Revision of the Lake Elsinore/Canyon Lake Nutrient TMDL

The basis for the TMDLs and implementation schedule will be re-evaluated at least once every three years[2] to determine the need for modifying the load allocations, numeric targets and TMDLs. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies, modeling analysis, and/or special studies by one or more responsible parties, changes to the TMDL, including revisions to the numeric targets, may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies

(End of Resolution No. R8-2004-0037)

[2] The three-year schedule will coincide with the Regional Board's triennial review schedule.

Middle Santa Ana River Watershed (Amended by Resolution No. R8-2005-0001)

The Middle Santa Ana River Watershed covers approximately 488 square miles and lies largely in the southwestern corner of San Bernardino County, and the northwestern corner of Riverside County. A small part of Los Angeles County (Pomona/Claremont area) is also included. This watershed is comprised of three sub–watersheds. The first sub-watershed is the Chino Basin Watershed, which includes portions of San Bernardino County, Los Angeles County, and Riverside County. Surface drainage in this area is directed to Chino Creek and Cucamonga/Mill Creek and is generally southward, from the San Gabriel Mountains toward the Santa Ana River and the Prado Flood Control Basin. The second sub–watershed, the Riverside Watershed, is located in Riverside County. Surface drainage in this area is generally westward from the City of Riverside to the Santa Ana River, Reach 3. The third sub–watershed, the Temescal Canyon Watershed, is also located in Riverside County. Surface drainage in this area is generally northward to Temescal Creek.

Land uses in the Middle Santa Ana River watershed include urban, agriculture, and open space. Although originally developed as an agricultural area, the watershed is being steadily urbanized. Incorporated cities in the Middle Santa Ana River watershed include Pomona, Chino Hills, Upland, Montclair, Claremont, Ontario, Rancho Cucamonga, Rialto, Chino, Fontana, Norco, Corona, and Riverside. In addition, there are several pockets of urbanized unincorporated areas. The current population of the watershed, based upon 2000 census data, is approximately 1.4 million people. The principal remaining agricultural area in the watershed is the area formerly known as the Chino Dairy Preserve. This area is located in the south–central part of the Chino Basin watershed and contains approximately 300,000 cows, which generate the waste equivalent of more than two million people. Recently, the cities of Ontario and Chino annexed the San Bernardino County portions of this area. The remaining portion of the former preserve, which is in Riverside County, remains unincorporated. Open space areas include National Forest lands and State Parks lands.

Middle Santa Ana River Watershed Bacterial Indicator Total Maximum Daily Loads(TMDLs)

Middle Santa Ana River Watershed waterbodies listed on the Clean Water Act Section 303(d) list of impaired waters due to violations of REC1 fecal coliform bacteria objectives are shown in Table 5-9w.

Table 5-9w – Middle Santa Ana River Watershed Waterbodies on the 303(d) List Due to Bacterial Contamination

Waterbody, Reach
Santa Ana River, Reach 3
Chino Creek, Reach 1
Chino Creek, Reach 2
Mill Creek (Prado Area)
Cucamonga Creek, Reach 1
Prado Park Lake

During storm events, these waterbodies receive and transport runoff from urban, agricultural, and open space areas. During dry weather, these waterbodies receive and transport nuisance runoff, primarily from urban areas. Based on monitoring results, and observed waterbody conditions (fish kills and waste-laden stormflows), the Regional Board placed these waterbodies on the 303(d) list of impaired waters due to levels of bacterial indicators that exceeded established objectives for REC1 uses. The listings took place from 1988 to 1998.
A TMDL technical report prepared by Regional Board staff describes the bacterial indicator related problems in the Middle Santa Ana River Watershed waterbodies in greater detail and discusses the technical basis for the TMDLs that follow [Ref. # 30].

A. Middle Santa Ana River Watershed Bacterial Indicator TMDL Numeric Targets

Bacterial indicator numeric targets for the Middle Santa Ana River Watershed waterbodies shown in Table 5-9x are based, in part, on the fecal coliform water quality objective specified in Chapter 4 for the protection of body-contact recreation (REC1) in inland surface waters.

Recognizing that, in the future, *Escherichia coli* (*E. coli*) may be incorporated into the Basin Plan as new bacterial water quality objectives for REC1, alternative numeric targets for *E. coli* are also specified[1]. These targets are based on *E. coli* criteria recommended by the U.S. Environmental Protection Agency [Ref #31]. The *E. coli* levels were chosen to roughly correspond to the health risk level associated with the fecal coliform objectives.

---

[1] USEPA is requiring the states to evaluate and incorporate more appropriate bacterial indicators, including *E. coli*, as water quality standards based on its Ambient Water Quality Criteria for Bacteria – 1986. The Regional Board is participating in the efforts of the Storm Water Quality Standards Task Force (SWQSTF), which is evaluating USEPA's bacterial indicator recommendations and REC1 beneficial use designations for waterbodies within the Santa Ana Region, including the Middle Santa Ana River watershed waterbodies. This numeric target and resulting TMDLs, WLAs and LAs will be adjusted accordingly when and if recommendations from the SWQSTF are incorporated into the Basin Plan.

The numeric targets for both bacterial indicators incorporate an explicit 10% margin of safety to address uncertainties recognized in the development of the TMDLs.

These numeric targets are specified as follows:

> **Fecal coliform: log mean less than 200 organisms/100 mL based on five or more samples per 30 day period, and not more than 10% of the samples exceed 400 organisms/100 mL for any 30–day period**.
>
> ***E. coli*: log mean less than 126 organisms/100 mL based on five or more samples per 30–day period, and not more than 10% of the samples exceed 235 organisms/100mL for any 30 day period.**

The fecal coliform numeric targets (and other fecal coliform related provisions of these TMDLs) will become ineffective upon the replacement of the fecal coliform REC1 objectives in the Basin Plan with REC1 objectives based on *E. coli* Incorporation of new *E. coli* objectives will be considered through the Basin Planning process.

B. Middle Santa Ana River Watershed Bacterial Indicator TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

As discussed in the technical TMDL Report, the bacterial indicator TMDLs are expressed in terms of density since it is the number of organisms in a given volume of water (i.e., their density), and not their mass that is significant with respect to public health and the protection of beneficial uses. Similarly, the wasteload allocations for point source discharges (WLAs) and load allocations for nonpoint source discharges (LAs) are also based on density. The density–based WLAs and LAs do not add up to equal the TMDLs, since this is not scientifically valid. To achieve the density–based TMDLs, each WLA and LA must meet the density–based TMDL. As indicated in Table 5-9x, the TMDLs, WLAs and LAs also include a 10% margin of safety (see C., below) applied to the existing Basin Plan fecal coliform objective for REC1 for inland surface waters and to the alternative indicator *E. coli* criteria recommended by the U.S. Environmental Protection Agency. Again, the *E. coli* was chosen to correspond with the health risk level associated with the fecal coliform objectives.

WLAs are specified for urban discharges and discharges from Confined Animal Feeding Operations, including stormwater. LAs are specified for runoff from other types of agriculture and from natural sources (open space/undeveloped forest land). TMDLs, WLAs and LAs are specified for both dry weather discharges and wet weather discharges, with separate compliance schedules. An extended schedule for compliance with the wet weather TMDLs is specified in light of the expected increased difficulty in achieving compliance under these conditions.

Table 5-9x – Total Maximum Daily Loads, Waste Load Allocations, and Load Allocations for Bacterial Indicators in Middle Santa Ana River Waterbodies[a,b,c]

Indicator	Total Maximum Daily Loads for Bacterial Indicators	Waste Load Allocation for Bacterial Indicators in Urban Runoff including stormwater discharges	Waste Load Allocation for Bacterial Indicators in Confined Animal Feeding Operations discharges	Load Allocation for Bacterial Indicators in Agricultural runoff discharges	Load Allocation for Bacterial Indicators from Natural Sources
Dry Summer Conditions: April 1 through October 31, as soon as possible, but no later than December 31, 2015					
Fecal coliform	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.
E. coli	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.
Wet Winter Conditions: November 1 through March 31, as soon as possible, but no later than December 31, 2025					
Fecal coliform	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.
E. coli	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.

[a] To be achieved as soon as possible, but no later than dates specified.
[b] TMDLs, WLAs and LAs, include a 10% Margin of Safety
[c] The fecal coliform TMDLs, WLAs, and LAs become ineffective upon the replacement of the REC1 fecal coliform objectives in the Basin Plan by approved REC1 objectives based on E. coli.

C. Margin of Safety

A 10% margin of safety is explicitly incorporated into the Bacterial Indicator TMDLs for the Middle Santa Ana River Watershed to account for unknowns, such as bacterial regrowth, bacteria dilution and organism die–off. As additional data on bacterial dynamics in the Middle Santa Ana River watershed are developed, the margin of safety can be adjusted accordingly.

D. Seasonal Variations/Critical Conditions

The Basin Plan REC1 fecal coliform objectives apply year-round; no distinctions based on climate or other conditions that may affect actual REC1 use are specified[2.] As shown in Table 5-9x, different compliance dates are specified for dry season discharges and wet season discharges. This ensures that dry season recreational beneficial uses are addressed on a priority basis. Additional time is allowed to address complexities associated with the control of wet weather discharges.

E. TMDL Implementation

Implementation is expected to result in compliance with the water quality objectives/numeric targets for fecal coliform and with the numeric targets for *E. coli*. The intent is to ensure protection of the REC1 beneficial uses of Middle Santa Ana River Watershed waterbodies. Collection of additional monitoring data is critical to developing long-term solutions for bacterial indicator control, as well as to consider whether changes to the TMDL are appropriate. With that in mind, the requirements for submittal of plans and schedules to implement the TMDLs take into consideration the need to develop and implement effective short-term solutions, as well as allow for the development of long-term solutions once additional data have been generated.

Implementation of tasks and schedules as specified in Table 5-9y is expected to achieve compliance with the TMDLs and, thereby, water quality standards. Each of these tasks is described below.

---

[2] The SWQSTF may recommend changes to the REC1 objectives to reflect conditions, such as high flows, that affect REC1 use. Any such changes will be considered through the Basin Planning process

Table 5-9y – Middle Santa Ana River Watershed Bacterial Indicator TMDL Implementation Plan/Schedule Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
TMDL Phase 1		
Task 1	Revise Existing Waste Discharge Requirements	February 28, 2008
Task 2	Identify Agricultural Operators	June 30, 2007
Task 3	Develop Watershed-Wide Bacterial Indicator Water Quality Monitoring Program Implement Watershed-Wide Bacterial Indicator Water Quality Monitoring Program	November 30, 2007 Upon Regional Board approval Seasonal reports due May 31 and December 31 of each year Triennial reports due every 3 years beginning with first report due February 15, 2010.
Task 4	Urban Discharges 4.1 Develop and Implement Bacterial Indicator Urban Source Evaluation Plan 4.2 San Bernardino County MS4: Revise Municipal Storm Water Management Program (MSWMP) 4.3 Riverside County MS4: Revise Drainage Area Management Plan (DAMP) 4.4 San Bernardino County MS4: Revise Water Quality Management Plan (WQMP) 4.5 Riverside County MS4: Revise Water Quality Management Plan (WQMP)	Plan/schedule due 4.1 November 30, 2007 4.2 Dependent on Task 4.1 results (see text) 4.3 Dependent on Task 4.1 results (see text) 4.4 Dependent on Task 4.1 results (see text) 4.5 Dependent on Task 4.1 results (see text)
Task 5	Agricultural Discharges 5.1 Develop and Implement Bacterial Indicator Agricultural Source Evaluation Plan 5.2 Develop and Implement Bacterial Indicator Agricultural Source Management Plan	Plan/schedule due 5.1 November 30, 2007 5.2 Dependent on Task 5.1 results (see text)
Task 6	Review of TMDLs/WLAs/LAs	Once every 3 years to coincide with the Regional Board's triennial review, or more frequently as warranted

Task 1: Review and/or Revise Existing Waste Discharge Requirements

There are three Waste Discharge Requirements (WDRs) issued by the Regional Board regulating discharge of various types of wastes in the watershed. On or before **February 28, 2008**, each of these WDRs shall be reviewed and revised as necessary to implement the TMDLs, including the appropriate wasteload allocations, compliance schedules and/or monitoring program requirements.

1.1 Waste Discharge Requirements for the San Bernardino County Flood Control and Transportation District, the County of San Bernardino and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618036 (Regional Board Order No. R8-2002-0012). The current Order has provisions to address TMDL issues (see Task 4, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

1.2 Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618033 (Regional Board Order No. R8-2002-0011). The current Order has provisions to address TMDL issues (see Task 4, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

1.3 General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region, NPDES No. CAG018001 (Regional Board Order No. 99-11). Updated waste discharge requirements for Concentrated Animal Feeding Operations are expected to be considered by the Regional Board in 2005. These requirements will include appropriate TMDL requirements.

Other waste discharge requirements may be reviewed and/or revised to address bacterial indicator discharges as appropriate.

Task 2: Identify Agricultural Operators

On or before **June 30, 2007**, the Regional Board shall develop a list of all known agricultural owners/operators in the Middle Santa Ana River watershed that will be responsible for implementing requirements of these TMDLs. The Regional Board will send a notice to these operators informing them of their TMDL responsibility and alerting them to the potential regulatory consequences of failure to comply.

To implement the agricultural load allocations for non-Concentrated Animal Feeding Operations, monitoring program requirements specified in Task 3 and the agricultural source evaluation studies (Task 5), the Regional Board may issue waste discharge requirements or a waiver of such waste discharge requirements that is conditioned on satisfactory compliance with these TMDL elements.

Task 3: Watershed-Wide Bacterial Indicator Water Quality Monitoring Program

No later than **November 30, 2007**, the US Forest Service, the County of San Bernardino, the County of Riverside, the cities of Ontario, Chino, Chino Hills, Montclair, Rancho Cucamonga, Upland, Rialto, Fontana, Norco, Riverside, and Corona, Pomona and Claremont and agricultural operators in the watershed, shall as a group, submit to the Regional Board for approval a proposed watershed-wide monitoring program that will provide data necessary to review and update the TMDLs. Data to be collected and analyzed shall address, at a minimum, determination of compliance with the TMDLs, WLAs and LAs.

At a minimum, the stations specified in Tables 5-9z and 5-9aa and shown in Figure 5-6, at the frequency specified in Tables 5-9z and 5-9aa, shall be considered for inclusion in the proposed monitoring plan. If one or more of these monitoring stations are not included, the rationale shall be provided and proposed alternative monitoring locations shall be identified in the proposed monitoring plan. The proposed monitoring plan shall also include a plan to compile streamflow measurements at existing USGS stream gauging stations.

At a minimum, samples shall be analyzed for the following constituents:

- Fecal Coliform
- Escherichia Coli (E. coli)
- Total Suspended Solids
- pH
- Temperature
- Electrical Conductivity
- Dissolved Oxygen
- Turbidity

The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. Seasonal reports summarizing and including copies of the data collected during the dry season and wet season monitoring periods shall be submitted by May 31 and December 31 of each year. In order to facilitate review and update of the numeric targets and/or the TMDLs, WLAs, LAs, a triennial report summarizing the data collected for the preceding 3 year period and evaluating compliance with the WLAs/LAs shall be submitted every three years, beginning with the first report due February 15, 2010.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than **November 30, 2007** and shall be implemented upon Regional Board approval at a duly noticed public meeting. Seasonal reports summarizing and including copies of the data collected during the dry season and wet season monitoring periods shall be submitted by May 31 and December 31 of each year. In order to facilitate review and update of the numeric targets and/or the TMDLs, WLAs, LAs, a triennial report summarizing the data collected for the preceding 3 year period and evaluating compliance with the WLAs/LAs shall be submitted every three years, beginning with the first report due **February 15, 2010**.

It may be that implementation of these monitoring requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and shall be implemented upon the Regional Board's approval.

Table 5-9z – Watershed Minimum Required Weekly Sampling Station Locations

Station Number	**Station Description**
C1	Icehouse Canyon Creek
C2	Chino Creek at Schaeffer Avenue
C3	Prado Park Lake at lake outlet
C7	Chino Creek at Central Avenue
C8	Chino Creek at Prado Golf Course
M2	Cucamonga Creek at Regional Plant No. 1
M5	Mill Creek at Chino–Corona Road
S1	Santa Ana River at MWD Crossing
S3	Santa Ana River at Hamner Avenue
T1	Temescal Wash at Lincoln Avenue
TQ1	Tequesquite Arroyo at Palm Avenue

Frequency of sampling:
dry season: weekly
wet season: two 30-day sampling periods during which a minimum of 5 samples are to be collected (at least one sample weekly) and if possible, a minimum of 5 of those samples must be from storm events.

Table 5-9a-a --Additional Watershed Storm Event Sampling Locations

Station Number	**Station Description**
M3	Bon View Avenue @ Merrill Avenue
M4	Archibald Avenue @ Cloverdale Avenue
G1	Grove Channel @ Pine Avenue
E1	Euclid Avenue Channel @ Pine Avenue

Frequency of sampling: wet weather – one sample/storm event for 5 storm events/year; dry weather – none.

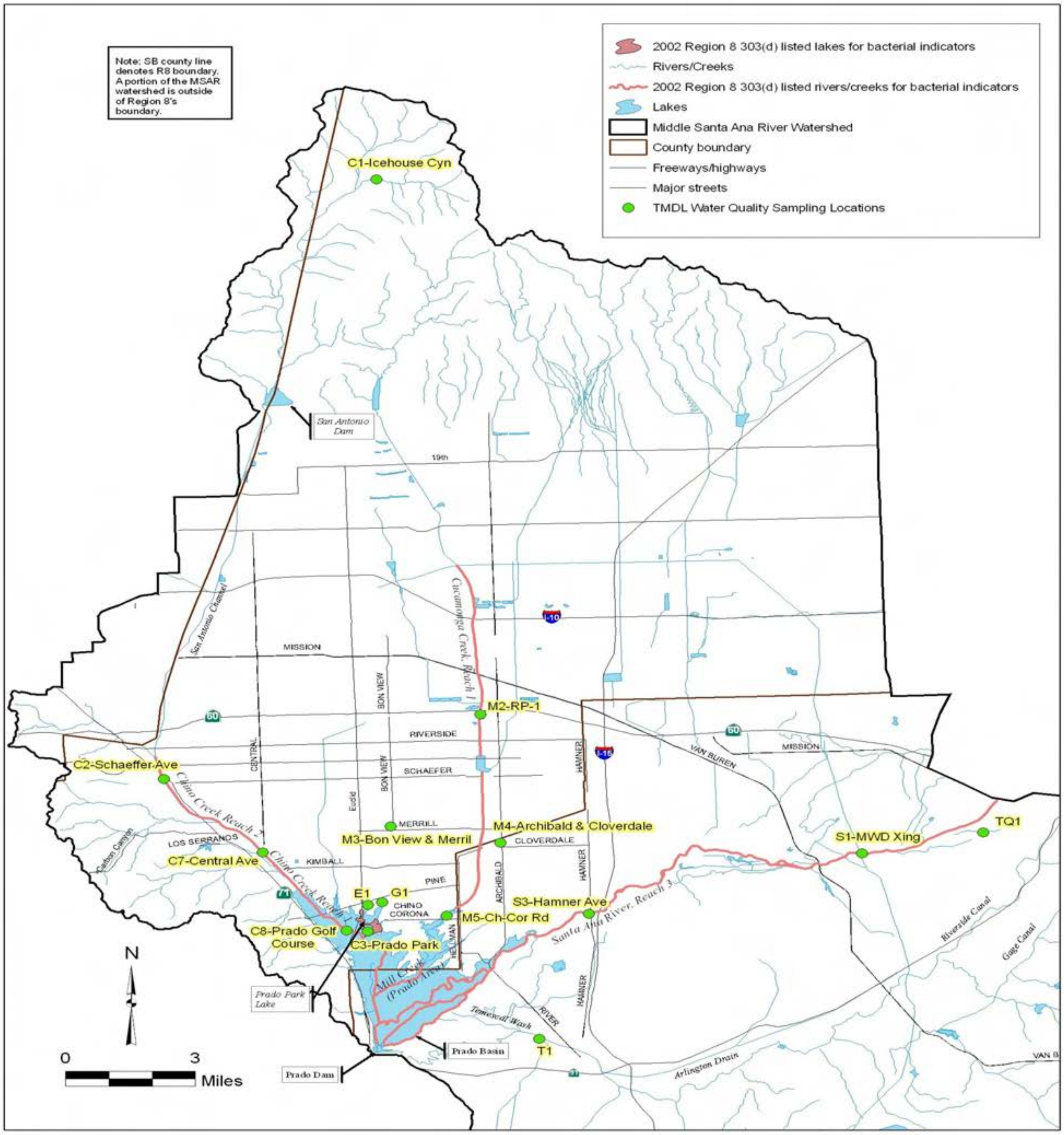
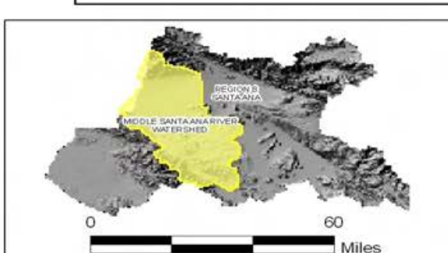


FIGURE 5-6: TMDL WATER QUALITY SAMPLING LOCATIONS



CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Map created January 2005
Map created by: HB

Data Sources:
Middle Santa Ana River Watershed: based on Calwater v. 2.2.1 boundaries - CA Spatial Information Library (2004), Santa Ana River reach designations, and GDT streets (SWRCB, 2002)
County: CA Spatial Information Library (2004)
Rivers/creeks, and lakes: CA Spatial Information Library (1998)
2002 303(d) listed water bodies: SWRCB (2003)

File name: wbr_tmdl_2.mxd

Task 4: Urban Discharges

Phase I urban discharges, including stormwater runoff, include those from the cities and unincorporated communities in the Middle Santa Ana River Watershed. These discharges are regulated under the MS4 NPDES permits identified in Tasks 1.1 and 1.2 (Review and Revise Existing Waste Discharge Requirements), above. The requirements of these NPDES permits differ somewhat and therefore the TMDL implementation requirements that pertain to the permittees under each permit also vary slightly, as shown below[3].

4.1 Develop and Implement Bacterial Indicator Urban Source Evaluation Plans

On or before **November 30, 2007**, the County of San Bernardino, the County of Riverside, the cities of Ontario, Chino, Chino Hills, Montclair, Rancho Cucamonga, Upland, Rialto, Fontana, Norco, Riverside, and Corona, Pomona and Claremont shall develop a Bacterial Indicator Urban Source Evaluation Plan(s) (USEP). This plan shall include steps needed to identify specific activities, operations, and processes in urban areas that contribute bacterial indicators to Middle Santa Ana River Watershed waterbodies. The plan shall also include a proposed schedule for completion of each of the steps identified. The proposed schedules can include contingency provisions that reflect uncertainty concerning the schedule for completion of the SWQSTF work and/or other investigations that may affect the steps that are proposed. The USEP shall be implemented upon Regional Board approval at a duly noticed public meeting.

4.2 Revise the San Bernardino County Municipal Storm Water Management Program (MSWMP)

Provision XVI.3. of Order No. R8-2002-0012 (see 1.1, above) requires the permittees to revise their Municipal Storm Water Management Program (MSWMP) to include TMDL requirements. Revisions to the MSWMP may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the MSWMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the MSWMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval, a plan and schedule to review and revise the MSWMP as necessary to incorporate measures to address the results of

[3] The San Bernardino MS4 permit requires the development and implementation of a Municipal Stormwater Management Program (MSWMP) to address stormwater discharges from existing urban activities. For the Riverside County MS4 permit, the Drainage Area Management Plan (DAMP) addresses stormwater discharges from existing urban activities.

the USEP and/or other studies. Further review and revision of the MSWMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0012 or amendments thereto that are adopted by the Regional Board at a public hearing. The MSWMP revisions shall include schedules for meeting the bacterial indicator wasteload allocations based on the schedule established in these TMDLs. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The permittees shall also provide a proposal and schedule for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the bacterial indicator waste load allocations for urban runoff. The plan and schedule to review the MSWMP must be implemented upon approval by the Regional Board after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period.

4.3 Revise the Riverside County Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 1.2, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. Revisions to the DAMP may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the DAMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the DAMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval, a plan and schedule to review and revise the DAMP as necessary to incorporate measures to address the results of the USEP and/or other studies. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP revisions shall include schedules for meeting the bacterial indicator wasteload allocations based on the schedule established in these TMDLs. In order to facilitate review and update of the numeric targets and/or the TMDLs and urban discharge WLAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The revised DAMP shall also include a proposal and schedule for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the bacterial indicator waste load allocations for urban runoff. The plan and schedule to review and revise the DAMP must be implemented upon approval by the Regional Board after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period.

4.4 Revise the San Bernardino County Water Quality Management Plan (WQMP)

Provision XII.B. 1. of Order No. R8-2002-0012 requires the permittees to develop and submit a WQMP for new developments and significant redevelopments by January 2004 for the Executive Officer's approval. Revisions to the WQMP may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the WQMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the WQMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval a plan and schedule to review and revise the WQMP that addresses the bacterial indicator input from new developments and significant redevelopments to assure compliance with the bacterial indicator wasteload allocations for urban runoff. Further review and revision of the WQMP necessary to address TMDL requirements, shall be completed in accordance with the requirements of Order No. R8-2002-0012 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

4.5 Revise the Riverside County Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 1.2, above) requires the permittees to develop and submit a WQMP for new developments and significant redevelopments by June 2004 for approval. On September 17, 2004, the Board approved a WQMP developed by the permittees. The approved WQMP includes source control BMPs, design BMPs and treatment control BMPs. Further revisions to the WQMP may be necessary to meet the WLA for urban runoff. Such revisions may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the WQMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the WQMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval a plan and schedule for review and revision of the WQMP that addresses the bacterial indicator input from new developments and significant redevelopments to assure compliance with the bacterial indicator wasteload allocations for urban runoff. Further review and revision of the WQMP necessary to address TMDL requirements, shall be completed in accordance with the requirements of

Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

If the results of studies conducted pursuant to Tasks 3 and 4.1 above demonstrate that either the Phase II non-traditional small MS4 discharges covered under the statewide Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Storm Systems (Order No. 2003-0005-DWQ) or industrial discharges from facilities covered by the statewide Industrial Stormwater General Permit (Order 97-03-DWQ) or any Regional Board individual industrial permit, are responsible, to a significant degree, for exceedances of the urban WLAs, the Regional Board will take the appropriate regulatory steps to address these discharges.

Task 5: Agricultural Discharges

Agricultural discharges include stormwater runoff, wastewater release and tailwater runoff from agricultural land uses. Tailwater runoff is irrigation water that runs off of agricultural land. Agricultural land uses include concentrated animal feeding operations and irrigated and dry-land farming in the Middle Santa Ana River Watershed. Concentrated animal feeding operations are regulated under WDRs (see Task 1.3,above); irrigated agriculture and dry-land farming are not currently regulated.

5.1 Develop and Implement Bacterial Indicator Agricultural Source Evaluation Plans

On or before **November 30, 2007**, concentrated animal feeding facility operators and agricultural operators in the Middle Santa Ana River Watershed shall develop and implement Bacterial Source Agricultural Source Evaluation Plans (AGSEP). These plans shall include steps needed to identify specific activities, operations, and processes in agricultural areas that contribute bacterial indicators to Middle Santa Ana River Watershed waterbodies. The plan shall also include a proposed schedule for completion of each of the steps identified. The proposed schedules can include contingency provisions that reflect uncertainty concerning the schedule for completion of the SWQSTF work and/or other investigations that may affect the steps that are proposed. The AGSEP shall be implemented upon Regional Board approval at a duly noticed public meeting.

The Regional Board expects that the AGSEP will be submitted and implemented pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will utilize appropriate waste discharge requirements including those for concentrated animal feeding operations (see 1.3, above), or other Water Code authorities.

In lieu of a coordinated source evaluation plan, one or more of the parties identified above may submit a proposed individual or group AGSEP to conduct the above studies for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval no later than. **November 30, 2007**. This AGSEP shall be implemented upon Regional Board approval at a duly noticed public meeting.

5.2 Develop and Implement a Bacterial Indicator Agricultural Source Management Plan

Based on the results of Task 5.1 or other studies conducted in the watershed, concentrated animal feeding operators and agricultural operators within the Middle Santa Ana River Watershed shall, as a group, submit a proposed Bacterial Indicator Agricultural Source Management Plan (BASMP). Because of uncertainties regarding the timing of completion of these studies and in recognition that readily identifiable steps may be taken to reduce bacterial discharges from agricultural lands, it is not feasible to identify an explicit date whereby the development and implementation of the BASMP is to be accomplished. Instead, the Executive Officer shall notify agricultural operators of the need to submit the proposed BASMP in whole or to submit plans and schedule to address a subset of tasks identified in the AGSEP. Within 90 days of notification by the Executive Officer, the proposed BASMP, or a subset thereof, shall be submitted. The BASMP, or subset thereof, shall be implemented upon Regional Board approval at a duly noticed public meeting. At a minimum, the BASMP shall include, plans and schedules for the following:

A. implementation of bacterial indicator controls, BMPs and reduction strategies designed to meet load allocations;
B. evaluation of effectiveness of BMPs; and
C. development and implementation of compliance monitoring program(s).

The Regional Board expects that the BASMP will be submitted and implemented pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will utilize appropriate waste discharge requirements or other Water Code authorities.

In lieu of a coordinated plan, one or more of the parties identified above may submit a proposed individual or group BASMP to develop and implement the above plan for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval. Because of uncertainties regarding the timing of completion of these studies and in recognition that readily identifiable steps may be taken to reduce bacterial discharges from agricultural lands, it is not feasible to identify an explicit date whereby the development and implementation of the BASMP is to be accomplished. Instead, the Executive Officer shall notify agricultural operators of the need to submit the proposed BASMP in whole or to submit plans and schedule to address a subset of tasks identified in the AGSEP. Within 90 days of notification by the Executive Officer, the proposed BASMP, or a subset therefore, shall be submitted. This BASMP, or a subset thereof, shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 6: Review/Revision of the Bacterial Indicator TMDL (TMDL "Re-opener")

The basis for the TMDLs and implementation schedule will be re-evaluated at least once every three years[4] to determine the need for modifying the load and wasteload allocations, numeric targets and TMDLs. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies, modeling analysis, efforts of the Storm Water Quality Standards Task Force[5] and/or special studies by one or more responsible parties, changes to the TMDLs, including revisions to the numeric targets, WLAs and LAs, may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by the results of monitoring and/or other relevant studies

---

[4] The three-year schedule will coincide with the Regional Board's triennial review schedule.

[5] Stakeholders formed the Storm Water Quality Standards Task Force (Task Force) in 2002 to support review and update of the bacterial quality objectives for REC1 waters and to review the REC1 designations themselves to assure their accuracy. Participants include representatives from the Santa Ana Watershed Project Authority, (SAWPA) flood control agencies from the 3 counties within the Santa Ana Region, POTW dischargers and stormwater staff from various municipalities in the watershed. Environmental groups, Regional Board staff and USEPA staff are also participants. SAWPA staff serve as facilitators for the Task Force.

BAY PROTECTION AND TOXIC CLEANUP PROGRAM

Legislation enacted in 1989 added Chapter 5.6, Bay Protection and Toxic Cleanup, to Division 7 of the California Water Code (Sections 13390-13396). These new sections require the State Board and Regional Boards to establish programs for the maximum protection of beneficial uses of bays and estuaries, focusing on water quality problems due to toxic substances. In part, the State Board was directed to formulate and adopt a water quality control plan for Enclosed Bays and Estuaries and a workplan for the development of sediment quality objectives. When setting waste discharge requirements, the Regional Boards must implement the water quality control plan and any sediment quality objectives which may be adopted by the State Board.

The Bay Protection and Toxic Cleanup Program (BPTCP) must also include plans to identify and remediate "toxic hot spots." These are areas in the enclosed bays, estuaries or adjacent waters where the contamination affects the interests of the state and "…where hazardous substances have accumulated in the water or sediment to levels which (1) may pose a substantial present or potential hazard to aquatic life, wildlife, fisheries or human health, or (2) may adversely affect the beneficial uses of bay, estuary or ocean waters as defined in water quality control plans, or (3) exceeds adopted water quality or sediment quality objectives." Criteria for the assessment and priority ranking of toxic hot spots are to be developed by the State Board in coordination with the California Department of Fish and Game and the California Office of Environmental Health Hazard Assessment (OEHHA). The ranking criteria will be used by the Regional Board to prioritize toxic hot spots based on the severity of the problem.

The BPTCP consists of both short- and long-term activities. The short-term activities include:

- Develop and maintain a program to identify toxic hot spots, plan for their cleanup or mitigation, and amend Water Quality Control Plans and policies to abate toxic hot spots;
- Develop and implement regional monitoring and assessment programs;
- Develop numeric sediment quality objectives;
- Develop and implement Toxic Hot Spot Cleanup Plans;
- Revise waste discharge requirements, if necessary, to conform to the Basin Plan; and
- Develop a comprehensive database containing information pertinent to describing and managing toxic hot spots.

Long-term activities of the BPTCP include:

- (Continue to) develop numeric sediment quality objectives;

- Develop and implement strategies to prevent the formation of new Toxic Hot Spots and to reduce the severity of effects from existing Toxic Hot Spots;

- Periodic review and update of a Water Quality Control Plan for enclosed bays and estuaries; and

- Maintain the comprehensive database.

The BPTCP is a comprehensive effort to regulate toxic pollutants in enclosed bays and estuaries and is not intended to be a monitoring program resembling the State Mussel Watch Program or the Toxic Substances Monitoring Program (see Chapter 6 for descriptions of these programs). The BPTCP program does, however, use the data from the State Mussel Watch Program and the Toxic Substances Monitoring Program to identify Toxic Hot Spots.

The Santa Ana Region, State Mussel Watch data and data provided by the Orange County Environmental Management Agency have been used to identify toxic hot spots in Newport Bay and Anaheim Bay/Huntington Harbour. Tables 5-10 and 5-11 lists the known toxic hot spots and potential toxic hot spots, respectively. The Regional Board, in coordination with the State Board and the California Department of Fish and Game are currently in the process of confirming these toxic hot spots and potential toxic hot spots using a battery of toxicity tests on both the water column and sediment. Once confirmed, the list of toxic hot spots and potential toxic hot spots will be ranked according to the ranking criteria. The priority ranking will be included in the regional Toxic Hot Spot Cleanup Plan(s) which will include identification of likely contaminant sources and appropriate remedial actions.

GROUNDWATER CONTAMINATION FROM VOLATILE ORGANIC COMPOUNDS

In 1984, the legislation passed Assembly Bill 1803 which instructed the California Department of Health Services, Office of Drinking Water, to develop and implement a program to require the sampling of public drinking water supply wells for volatile organic compounds. The Department was instructed to provide the results to the appropriate Regional Board. The initial data indicated extensive organic contamination of groundwater supplies throughout the state. As a result, in 1985, the State Board and the Regional Water Quality Control Boards initiated the Well Investigation Program. The intent of the Well Investigation Program was to identify the parties responsible for the organic contamination of municipal drinking water supply wells so that those parties could be made accountable for cleanup.

In order to identify the responsible parties, the Regional Board followed an intensive investigation program for each contaminated public drinking water supply well on a priority basis. This program included:

- Field reconnaissance for potential sources
- Record searches
- Hydrogeological assessments
- Questionnaires, meetings, and inspections
- Requests for preliminary soil investigations and follow-up soil and groundwater investigations of potential sources
- Requests for cleanup
- Enforcement actions, where appropriate

In the late1980's the Well Investigation Program was expanded to include private drinking water supply wells and agricultural and industrial supply wells that were located in areas where organic contamination posed a threat to public drinking water supply wells. In the late 1980's the Well Investigation Program represented the largest single funded program in the Region. However, due to severe budget cuts statewide, the Well Investigation Program was scaled down and eventually discontinued in 1992. Investigation and cleanup of sites identified by the Well Investigation Program are currently being overseen by the Regional Board's Spills, Leaks, Investigations, and Cleanup (SLIC) program.

Currently (1993), there are more than 300 water supply wells identified in the Region which contain organic compound contaminants. The loss of many drinking water supply wells and the threat of loss of additional existing drinking water supply wells due to organic compound contamination is a serious problem in several areas of the Region, most notably the Bunker Hill, Chino, and Santa Ana Forebay Groundwater Basins.

Perchloroethylene (PCE) and trichloroethylene (TCE) are the major contaminants in the Bunker Hill I Subbasin, which underlies northern San Bernardino. The City of San Bernardino lost 25% of its water supply in the early 1980s when 14 wells operated by the City were found to contain concentrations of perchloroethylene above the state and federal drinking water Maximum Contaminant Level (MCL). The Newmark Wellfield was placed on the federal Superfund list in 1988, and EPA assumed lead responsibility for investigating the extent of the contamination and identifying long-term cleanup measures. The Regional Board has identified no specific source of the contamination; potential sources include dry cleaners, airports, and a World War II munitions facility. Interim groundwater extraction and treatment at existing municipal supply wells using air stripping and granulated activated carbon (GAC) facilities funded by the California Department of Toxic Substances Control. These facilities have the capacity to treat 37.6 million gallons per day (MGD). The treated water is used as a potable water supply to replace the water lost as a result of the solvent contamination.

Table 5-10

Known Toxic Hot Spots
Santa Ana Region

Waterbody Name	Pollutants Involved
Lower Newport Bay	Cd, Pb, As, Se, Zn, Cu
Upper Newport Bay Ecological Reserve	Pb, Cu, Cd
Anaheim Bay	Cd, Cu, Pb, Cr
Huntington Harbour	Cd, Pb, Se, Cr, Cu
Bolsa Bay	Cr, Cu, Pb

Table 5-11

Potential Toxic Hot Spots
Santa Ana Region

Waterbody Name	Pollutants Involved
Lower Newport Bay	Chlorpyrifos, Dacthal, PCB, Chlorbenside, DDT, Lindane, Ronnel, Hexachlorbenzene, Chlordane, Endosulfan, Toxaphene, Aldrin, Heptachlorepoxide, Heptachlor
Upper Newport Bay Ecological Reserve	Dacthal,DDT,PCB,Endosulfan,Chlordane, Chlorpyrifos, Diazinon, Lindane, Heptachlorepoxide, Hexchlorbenzene
Anaheim Bay	Aldrin, Chlordane, Lindane, Chlorbenside, PCB, DDT, Chlorpyrifos, Endosulfan, Heptachlorepoxide, Hexachlorbenzene
Huntington Harbour	Aldrin, Chlorbenzide, DDT, Lindane, Endosulfan, Chlordane, Chlorpyrifos, Dieldrin, Endrin, Toxaphene, Heptachlorepoxide

The Bunker Hill II Subbasin underlying Redlands has been contaminated with TCE and dibromochloropropane (DBCP). It is estimated that the TCE plume covers an area of approximately twenty square miles. Twenty-six water supply wells are impacted by TCE or DBCP, including five municipal water supply wells where the concentration of TCE or DBCP exceeds the MCL. No responsible parties have been identified yet, however, potential sources for the TCE plume include an airport, commercial and industrial facilities, and a former rocket motor testing facility. DBCP, a soil fumigant, was used extensively by the citrus industry prior to the 1960's and the DBCP contamination in the Bunker Hill II Subbasin is believed to be the result of this past legal agricultural use. A 3.0 MGD GAC facility at the Rees Well, which began operation in 1989, treats the contaminated water and provides potable water for the City of Redlands. In addition, an 8.6 MGD wellhead treatment facility at the Texas Street Well Field began operation in 1993. The facility, which was funded by the State Board and the State Department of Toxics, removes TCE and DBCP and also provides potable water back to the City of Redlands.

Forty-four water supply wells in the Chino Basin, primarily the Chino II Subbasin, contain TCE and PCE. To date, only one facility, the former GE Flatiron Plant in Ontario, has been confirmed as a source of organic compound contamination that has impacted a water supply well. In 1993, prior to exploring final cleanup options, GE will be implementing plume containment and interim cleanup activities on the almost two mile long, one-half mile wide TCE plume. Other potential sources in the Chino Basin include the California Institute for Men, the Chino Airport, and the Ontario Airport. Potential responsible parties are in the process of conducting investigative studies.

Organic contamination from TCE, PCE, dichloroethylene (DCE), and dichloroethane (DCA) has been found in water supply wells in Orange County in the Santa Ana Forebay and Irvine Forebay Groundwater Basins. A wellhead treatment unit (air stripping) was installed at the City of Orange Well No. 13 and began operation in 1993. The Regional Board staff oversees investigations at numerous sites in the Forebay area where past discharges of industrial solvents have occurred. Twenty-one of these sites have been identified to date as sources of volatile organic compounds in groundwater. Site investigations are being conducted to identify the extent of contamination and to clean up the effects of the discharges.

The Regional Board has been successful in identifying many sites throughout the region where volatile organic compounds have impacted groundwater. However, with the exception of the former GE Flatiron facility in the Chino Basin, there has been no other direct cause-and-effect relationship drawn between a contaminated drinking water supply well and a specific source. In most cases, records of compounds used at facilities have not been maintained and information regarding past disposal practices is not available, making it difficult to pinpoint specific sources. In addition, considering that most sources of the volatile organic compounds found in water supply wells are probably industrial discharges that may have occurred as long as 30 years ago, and considering the complex factors affecting the fate of volatile organic compounds in soil and groundwater and the changes in groundwater flow patterns from pumping, etc., it is difficult to backtrack contamination from water supply wells to specific sites which may be sources of local groundwater contamination.

DEPARTMENT OF DEFENSE FACILITIES

There are six major Departments of Defense (DoD) facilities in the Santa Ana Region, two of which are currently scheduled for closure. Table 5-12 identifies these facilities and the water quality problems of each.

Significant groundwater contamination has been detected at a number of these facilities. Contamination is severe enough at three of these facilities to have them placed on EPA's National Priorities List (NPL) for remediation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly referred to as Superfund).

For these three National Priorities List facilities (Norton and March Air Force Bases and Marine Corps Air Station – El Toro), the EPA is the lead environmental regulatory agency for oversight of investigation and cleanup. CERCLA requires EPA to consider applicable or relevant and appropriate state laws and regulations when establishing cleanup. CERCLA requires EPA 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 US EPA, DoD, and the state agencies have signed Federal Facility Agreements (FFA) for each of the National Priorities List facilities. 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 it performed; and (6) compromise is reached.

The US EPA is not involved in the investigation and cleanup of DoD facilities that are not on the National Priorities List (Marine Corps Air Station-Tustin, Naval Weapons Station-Seal Beach, and Armed Forces Reserve Center-Los Alamitos). However, many of these facilities have significant contamination. In these cases, the two state agencies enter info Federal Facility Site Remediation Agreements

Table 5-12

Summary of Water Quality Problems from Department of Defense (DoD) Facilities

Santa Ana Region

DoD Facility	Receiving Water Affected	Water Quality Problem Identified to Date
Norton Air Force Base [1]	Bunker Hill I Subbasin	trichloroethylene (TCE) plume landfills; Superfund listing
March Air Force Base	Perris North Subbasin	trichloroethylene (TCE) plume; fuel plume; landfills; Superfund listing
Marine Corps Air Station - El Toro	Irvine Forebay Subbasin	trichloroethylene (TCE) plume; fuel plume; benzene plume; landfills; proposed Superfund Listing
Marine Corps Air Station - Tustin [1]	Irvine Pressure Subbasin	volatile organic compound (VOC) plume; fuel plume
Naval Weapons Station - Seal Beach	Santa Ana Pressure Subbasin	fuel plume; landfills
Armed Forces Reserve Center - Los Alamitos	Santa Ana Pressure Subbasin	fuel plume; landfills

[1] Facilities which are scheduled to be closed. These bases are given high cleanup priority.

(FFSRAs) with DoD. FFSRAs are very similar to the above-mentioned Federal Facility Agreements, with the exception that US EPA is not a party. The Regional Board and Department of Toxic Substances Control have already entered into an agreement with DoD for the Naval Weapons station – Seal Beach and are near the end of negotiations on Federal Facility Site Remediation Agreements for Marine Corps Air Station – Tustin.

The Department of Toxic Substances Control has been identified as the “lead” state agency and the Regional Board as “support” agency for all of the above facilities. A Memorandum of Understanding has been signed by the State Board and Department of Toxic Substances Control 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 Department of Defense for cleanup and oversight reimbursement. All work performed by the State agencies with regard tot he investigation and cleanup of environmental problems at these facilities is fully reimbursed by DoD.

LEAKING UNDERGROUND STORAGE TANKS

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 California Code of Regulations, Title 23, Division 3, Chapter 16. In 1988, the State Board and the Department of Health Services (now Department of Toxic Substances Control) issued the Leaking Underground Fuel Tank (LUFT) field manual which prescribes specific methods for evaluating the effects of underground storage tank leaks.

There are approximately 2,000 known cases of leaking underground storage tanks (USTs) in the Region. Approximately 35% of the cases involve instances where only soil contamination is present, 35% 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, with tanks from industrial facilities contributing a smaller, but significant, minority. To date, these groundwater impacts have not grown to the point where drinking water supply wells have been affected. The Regional Board maintains and regularly updates the

Leaking Underground Storage Tank Information Systems (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 storage tanks 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 the County of San Bernardino Department of Environmental Health Services handle approximately 80% of the active cases in the Region, with several cities managing their own programs. The local agencies' caseload consists of soil cases, while the Regional Board maintains responsibility for the highly complex cases where groundwater has been affected.

As specified in State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges," the investigation and cleanup of releases from underground storage tanks involves several steps including: (1) preliminary site assessment and workplan submittal; (2) pollution characterization; (3) remediation; and (4) post-remedial action monitoring. Soil contamination cleanup levels are determined on a case-by-case basis and are established to prevent continued leaching from the affected soils at levels which may cause the underlying groundwater to exceed applicable water quality objectives. Cleanup goals for groundwater contamination cases are generally established at drinking water standards (Maximum Contaminant Levels or Action Levels).

In most areas of the Santa Ana Region, the uppermost portions of the aquifers are considered to be in hydrologic contact with deeper portions which are currently utilized for drinking water supplies. In the pressure zone of Orange County, the uppermost sediments are fine-grained materials which are unable to sustain sufficient pumping rates. However, due to the large volume of water held within these sediments, the close vertical proximity of these areas to underlying pumping locations, and the existence of pathways for movement into the deeper aquifers, the shallow waters in this area are considered as contributing to the sources of drinking water in Orange County. Leaking underground storage tank cleanups must be conducted accordingly.

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 UST. The Fund can also pay for direct cleanup (by local agency or Regional Board) of UST 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 cents per gallon fee for gasoline. The Fund has been established to provide reimbursement to tank owners or operators for the costs of cleanup of the effects of unauthorized releases of petroleum. Up to one million dollars ($1,000,000) 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.

The Regional Boards provide technical support to both the applicants who file claims against the UST Cleanup Fund and the State Board staff who verify the corrective action work covered by the claim. For claims that involve future work, the Regional Boards will oversee site investigation and cleanup on cases for which they are the lead agency.

ABOVEGROUND STORAGE TANKS

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).

The purpose of the regulation is to protect the public and the environment from the serious threat of millions of gallons of petroleum-derived chemicals stored in thousands of aboveground storage tanks. The Regional Board inspects aboveground petroleum storage tanks, which were used to store crude oil and its fractions after January 1991, to assure compliance with a federally required site-specific Spill Prevention, Control, and Countermeasure Plan. In the event that a release occurs which threatens surface or groundwater, the Act allows the state to recover reasonable costs incurred in the oversight and regulation of cleanup.

Storage statements are required from facilities with aboveground storage tanks, describing the nature and size of their tanks. Filing fees are required which are intended to fund inspections, training, and research. Approximately 280 aboveground storage tanks are under regulation in the Santa Ana Region as of May 1, 1993. Their number is continually expanding as aboveground storage tanks are increasingly used to replace underground storage tanks. A list of aboveground storage tanks is available from the Regional Board.

DISPOSAL OF HAZARDOUS AND NONHAZARDOUS WASTE TO LAND

Hazardous and nonhazardous waste disposal can, if not properly managed and regulated, diminish the beneficial uses of the waters of the Region. These are typically losses to groundwater beneficial uses, but in some cases, surface waters can also be affected by disposal operations or contaminated soil in the vadose zone.

The Regional Board regulates landfills receiving municipal solid wastes and surface impoundments receiving hazardous or designated liquid wastes. Although these sites are closely regulated and monitored, some water quality problems have been detected and are being addressed. There are no hazardous solid waste disposal facilities currently operating in the Region.

The laws and regulations governing the disposal of both hazardous and nonhazardous solid wastes have been revised and strengthened in the last few years. The US EPA, DTSC, the State Board, and Regional Water Quality Control Boards are implementing the federal RCRA regulations. Described below is Regional Board implementation of RCRA and the following state programs: Title 23, Division 3, Chapter 15; Toxic Pits Cleanup Act; and Solid Waste Assessment Tests.

Resource Conservation and Recovery Act

The state implements the Resource Conservation and Recovery Act (RCRA) in California through the Department of Toxic Substances Control (DTSC) and the Regional Boards. Chapter 15 monitoring requirements have been implemented through the adoption of waste discharge requirements for both hazardous and nonhazardous waste disposal sites covered by RCRA. The discharge requirements for both hazardous waste sites are part of a state RCRA permit issued by the DTSC. The Regional Board and the Integrated Waste Management Board issues state permits for nonhazardous waste disposal sites.

The Resource Conservation and Recovery Act of 1976 provided for the development of federal and state programs for the regulation of land disposal of waste materials and the recovery of materials and energy resources from the waste stream. The Act regulates not only the generation, transportation, treatment, storage, and disposal of hazardous wastes, but also nonhazardous solid waste disposal facilities. In addition, the 1976 Act called for phasing out the use of open dumps for disposal of solid wastes in favor of sanitary landfills.

The most recent and significant amendments to RCRA (1984) impose a variety of new, more stringent requirements both on hazardous and nonhazardous waste generators, transporters, and the owners/operators of treatment, storage, and disposal facilities within the existing regulated community. Significant provisions include bans on land disposal of certain wastes, restrictions and placement of liquids in landfills, and establishment of minimum technological requirements for landfills and surface impoundments.

Subtitle C of RCRA contains requirements related to the identification and listing of hazardous wastes and standards applicable to generators, transporters, owners, and owner/operators of treatment, storage, and disposal facilities. Primary responsibility for the implementation of Subtitle C rests with the DTSC, with Regional Board participation as necessary.

Subtitle D of RCRA establishes a framework for federal, state, and local government cooperation in controlling the management of nonhazardous solid waste. The federal role in this arrangement is to establish the overall regulatory direction by providing minimum nationwide standards for protecting human health and the environment and to provide technical assistance to states for planning and developing their own environmentally sound waste management practices. The actual planning and direct implementation of solid waste programs under subtitle D. however, remain largely state and local functions, and the act authorizes states to devise programs to deal with state-specific conditions and needs. US EPA approved the state's proposed solid waste management program, and delegated authority to the state to implement the program in October 1993. In September 1993, the Santa Ana Region adopted a blanket Waste Discharge Requirement (WDR) amendment for all affected landfills in the Region which implements both Subtitle D and Chapter 15.

Subtitle D includes the Criteria for Classification of Solid Waste Disposal Facilities and Practices (40 CFR Part 257). The criteria establish minimum national performance standards necessary to ensure that "no reasonable probability of adverse effects on health or the environment" will result from solid waste disposal facilities or practices.

Part 258 of subtitle D establishes minimum national criteria for municipal solid waste landfills including those used for sludge disposal and disposal of nonhazardous waste combustion and ash. Part 258 also sets forth minimum federal criteria for municipal solid waste landfills, including location restrictions, facility design and operating criteria, groundwater monitoring requirements, financial assurance requirements, and closure and post-closure care requirements. The rule establishes differing requirements for existing and new units, (*e.g.,* existing units are not required to remove wastes in order to install liners).

Subtitle D provides that states with approved water management programs that wish to run the program will have flexibility in implementing these criteria. A municipal solid waste landfill unit that does not meet the Part 258 Criteria will be considered to be engaged in the practice of "open dumping" in violation of Section 4005 of RCRA. Municipal solid waste landfill units that receive sewage sludge and fail to satisfy those criteria will be deemed to be in violation of Sections 309 and 405(e) of the Clean Water Act.

Title 23, Division 3, Chapter 15

The most important regulation used by the Regional Board in regulating hazardous and nonhazardous waste disposal is California Code of Regulations (CCR) Title 23, Division 3, Chapter 15 (formerly Subchapter 15). These regulations include very specific siting, construction, monitoring, and closure requirements for all existing and new waste disposal facilities. Chapter 15 also contains a provision requiring landfill operators to provide assurances of financial responsibility for initiating and completing closure, and for corrective action to address all known or reasonably foreseeable releases from their waste management units. Detailed technical criteria are provided for establishing water quality protection standards, monitoring programs, and corrective action programs for releases from waste management units. Chapter 15 defines waste types to include hazardous wastes (Class I), designated wastes (Class II), and nonhazardous solid wastes (Class III). Hazardous wastes are defined by DTSC in Title 22 of the California Code of Regulations.

Designated wastes are defined as:

1. Those non hazardous wastes consisting of or containing contaminants which under ambient landfill conditions could be released at concentrations that could cause water quality degradation, or

2. Those wastes which are hazardous according to Title 22, but are not considered hazardous by the federal RCRA definition and have been granted a variance from hazardous waste management requirements by DTSC.

Nonhazardous solid wastes are those normally associated with domestic and commercial activities. The California Integrated Waste Management Board (CIWMB) is the lead agency responsible for non-water quality-related issues relating to nonhazardous waste management in California (Division 7 of Title 14 of the CCR). CIWMB has the overall responsibility for landfill operations and ensuring that nonhazardous wastes are collected and disposed of in a manner which protects public health and safety as well as the environment. Inert wastes can be regulated by the Regional Board if necessary to protect water quality.

The Regional Board has regulated nonhazardous municipal solid waste facilities (Class III) since the mid-1970s. Many of the smaller, older facilities have closed, and waste is now typically disposed of at larger regional nonhazardous solid waste facilities. The Regional Board is responsible for the review and revision of waste discharge requirements for both active and inactive permitted sites to assure consistency with the current regulations. These responsibilities include the upgrading of groundwater monitoring systems to identify violations of water quality protection standards, and the establishment of corrective action programs where standards are violated.

A significant task faced by the Regional Board in implementing Chapter 15 at nonhazardous solid waste facilities is defining what constitutes designated wastes. Many wastes which are not hazardous still contain constituents of water quality concern that can become mobile in a nonhazardous solid waste facility, and can produce leachates that could pose a threat to beneficial uses of the water of the state. The criteria for determining whether a nonhazardous waste is a designated waste are based on water quality objectives for waters located in the vicinity of the sites, the containment features of the solid waste facility, and the solubility/mobility of the waste constituents. To assist in the identification of designated waste criteria, the Regional Board will rely on a methodology acceptable to the Executive Officer and other relevant technical data.

Landfill Expansion

A steady increase in the rate of solid waste generation in the region is causing landfills to reach capacity sooner than expected. This situation has man it necessary not only to plan for the closure of some existing landfills, but also to anticipate the need for expansions of existing facilities and the construction of new ones. To minimize the problems associated with the rapid filling and subsequent closure of solid waste disposal facilities, the Regional Board supports efforts to reduce the volume of wastes disposed of at landfills. To reduce the potential for household hazardous wastes entering municipal landfills, the Regional Board also supports public education and household hazardous waste disposal and recycling programs.

The Regional Board conducts many other activities related to the disposal of wastes. Examples of these activities are review and approval of site design plans and construction oversight for new or expanding facilities, implementation of strict drainage and erosion control measures at landfills, soil and groundwater cleanup activities at contaminated disposal sites, and closure/post-closure plan review, approval, and closure construction oversight.

Toxics Pits Cleanup Act

The Toxics Pits Cleanup Act of 1984 (TPCA) required that all impoundments containing liquid hazardous wastes or free liquids containing hazardous waste must be either reconstructed with a liner/leachate collection system or be dried out by July 1, 1988. These facilities must also be closed by removing all contaminants or by capping to contain any residual soil contamination. In 1985, there were 11 sites in the Santa Ana Region with ponds subject to TPCA. As of 1993, 2 facilities are continuing to operate following upgrades to meet TPCA requirements, eight facilities have closed, and discharges at the remaining facility have ceased. Lead responsibility for closure of the remaining site has been assumed by the DTSC, with participation continued by the Regional Board.

Solid Waste Assessment Tests

Section 13273 was added to the Water Code in 1985, requiring all operations of both active and inactive nonhazardous landfills to complete a Solid Waste

Assessment Test (SWAT). The purpose of the SWAT is to determine whether hazardous or toxic substances above regulatory thresholds, or any other constituents which may threaten water quality, are migrating from the facility. Funding for the SWAT program is provided by the California Integrated Waste Management Board.

There were 159 sites identified in the region subject to this program. Pursuant to a list adopted by the State Board, 150 sites statewide were to be evaluated each year through the year 2001 (approximately 10 sites per year in the Santa Ana Region). These sites were according to their perceived threat to water quality. Active sites, those overlying high quality aquifers, and those already known to have adversely impacted groundwater were replaced in the highest ranks (Rank 1 through 4).

Program funding was eliminated in 1991, but was restored in 1992 for a period of three years to allow for review of reports for sites in Ranks 1 through 5 only. These reviews must be completed by 1995. Although landfill site evaluations, which seek to identify adverse impacts to both surface and groundwater quality, can be required pursuant to Chapter 15 whenever necessary, it appears that the SWAT program will be fully funded after 1995. A revised SWAT ranking list will be created prior to implementation of the program for Rank 6 and beyond.

REFERENCES:

1. Wildermuth Environmental, Inc., TIN/TDS – Phase 2A of the Santa Ana Watershed, Development of Groundwater Management Zones, Estimation of Historic and Current TDS and Nitrogen Concentrations in Groundwater, Final Technical Memorandum," July 2000.
2. Wildermuth Environmental, Inc., "Santa Ana Watershed Data Collection and Management Program, Final Technical Memorandum," October 2001.
3. Wildermuth Environmental, Inc., "TIN/TDS Study - Phase 2B of the Santa Ana Watershed, Wasteload Allocation Investigation Memorandum," October 2002.
4. Wildermuth Environmental, Inc., Memo to TIN/TDS Task Force, "Transmittal of Final Tables, Figures and CD in Support of Basin Plan Amendments – TIN/TDS Study," October 2002.
5. Wildermuth Environmental, Inc., "June 2003 Addendum TIN/TDS Study – Phase 2B of the Santa Ana Watershed Wasteload Allocation Investigation," July 2003
6. California Regional Water Quality Control Board – Santa Ana Region, "Guidelines for Sewage Disposal from Land Developments," January 1979.
7. State Water Resources Control Board, "Order No. 73-4, Rancho Caballero Decision," April 1972.

8. Department of Water Resources, “Mineral Increases from Municipal Use of Water in the Santa Ana River Basin,” Memorandum Report, June 1982.

9. City of Riverside, Memo from Rod Cruze to TIN/TDS Task Force,” Nitrogen Loss Assumptions for Reach 3 of the Santa Ana River,” April 2002.

10A. California Regional Water Quality Control Board – Santa Ana Region, Staff Report, “Santa Ana River at Prado Dam, Results of Annual Water Quality Sampling for 2002”, April 2003.

10B. Chino Basin Watermaster, Letter to Gerard Thibeault, “Chino Basin Watermaster Proposal for New Total Dissolved Solids (TDS) and Nitrogen Water Quality Objectives for the Chino and Cucamonga Basins Based on Maximum Beneficial Use,” December 2002.

10C. Chino Basin Watermaster, “Chino Basin Optimum Basin Management Plan,” 1999.

10D. Yucaipa Valley Water District, Letter to Gerard Thibeault, “Yucaipa Valley Water District Proposal for New Total Dissolved Solids (TDS) and Total Inorganic Nitrogen Water Quality Objectives for the San Timoteo and Yucaipa Management Zones Based on Maximum Beneficial Use,” January 2002.

10E. San Timoteo Watershed Management Agency, Letter to Gerard Thibeault, “Revised San Timoteo Watershed Management Agency Proposal for New Total Dissolved Solids (TDS) and Total Inorganic Nitrogen Water Quality Objectives for the Beaumont, San Timoteo and Yucaipa Management Zones Based on Maximum Beneficial Use,” December 2002 (Revised November 11, 2003).

11. USDA Soil Conservation Service, U.S. Forest Service, and the West End Conservation District, “Chino Agriculture Land Use Study,” September 1988.

12. California Regional Water Quality Control Board – Santa Ana Region, “A Review of Nitrate Problems in the Ground Waters of the Santa Ana Region and Their Relationship to High Density Developments on Septic Tank-Subsurface Disposal Systems,” September 1989.

13. California Regional Water Quality Control Board – Santa Ana Region, “Guidelines for Sewage Disposal from Land Developments,” January 1979.

14. Department of Water Resources, “Mineral Increases from Municipal Use of Water in the Santa Ana River Basin,” Memorandum Report, June 1982.

15. California Regional Water Quality Control Board – Santa Ana Region, “Dairies and Their Relationship to Water Quality Problems in the Chino Basin,” July 1990.

16. California Regional Water Quality Control Board – Santa Ana Region, “A Report to the California Legislature, Newport Bay: Water Quality Issues and Recommendations,” November 1985.

17. California Regional Water Quality Control Board – Santa Ana Region, “Newport Bay Clan Water Strategy--A Report and Recommendations for Future Actions,” September 1989.

18. California Regional Water Quality Control Board – Santa Ana Region, “Evaluation of Boatyard Waste Treatment Technologies within the Santa Ana Region,” October 1990.

19. University of California, Irvine, “Newport Bay Basin Plan Update/Nonpoint Source Study,” July 1993.

20. University of California, Davis, “Newport Bay Watershed Toxicity Study,” June 1993.

21. University of California, Irvine, “Anaheim Bay Basin Plan Update Study,” August 1993.

22. University of California, Davis, “Anaheim Bay Watershed Toxicity Study,” June 1993.

23. California Regional Water Quality Control Board – Santa Ana Region, “An Assessment of the Water Quality Conditions in Big Bear Lake,” pending.

24. California Regional Water Quality Control Board, Santa Ana Region, Staff Report on the Nutrient Total Maximum Daily Loads for Big Bear Lake, June, 2005.

25. California Regional Water Quality Control Board, Santa Ana Region. Staff Report on the Nutrient Total Maximum Daily Loads for Big Bear Lake, June 2005.

26. California Regional Water Quality Control Board, Lake Elsinore Nutrient TMDL Problem Statement, October, 2000.

27. California Regional Water Quality Control Board, Canyon Lake Nutrient TMDL Problem Statement, October 2001.

28. California Regional Water Quality Control Board, Total Maximum Daily Load for Nutrients in Lake Elsinore and Canyon Lake, May 2004.

29. Environmental Protection Agency, Update of Ambient Water Quality Criteria for Ammonia. EPA-822-R-99-014.

30. California Regional Water Quality Control Board, Total Maximum Daily Load for Bacterial Indicators in the Middle Santa Ana River Watershed, February 3, 2005.

31. US Environmental Protection Agency (USEPA), Ambient Water Quality Criteria for Bacteria, 1986.

CHAPTER 6

MONITORING AND ASSESSMENT

INTRODUCTION

The effectiveness of a water quality control program cannot be judged without information supplied by a comprehensive monitoring and assessment program. The State Board, the Regional Boards, and other federal, state, and local agencies monitor water quality throughout the state. Coordination among the agencies is essential to identify data gaps and supplement monitoring efforts as necessary. The results of these programs show where water quality problems exist now and where problems can be expected based on quality trends over time. Monitoring activities in the Santa Ana Region were described as part of Chapter 5 (Plan Assessment) in the 1983 Basin Plan. In this Plan, the discussion has been expanded and updated. New programs have been added and obsolete programs have been deleted. Additionally, this chapter provides a brief description of the databases being used to store and analyze the data collected. This chapter also describes the periodic water quality assessments which are conducted on a statewide basis, using the monitoring data collected.

STATE MONITORING PROGRAMS

The State Board is the lead agency for statewide monitoring activities. The State Board coordinates extensively with the California Departments of Fish and Game, Water Resources, Health Services, and various federal agencies in its monitoring activities. The objectives of the State's surveillance and monitoring program are as follows:

- To measure the achievement of water quality goals and objectives specified in the Basin Plan;
- To measure the specific effects of water quality changes on established beneficial uses;
- To measure background conditions of water quality;
- To determine long-term trends in water quality;
- To locate and identify sources of water pollution that pose an acute, accumulative, and/or chronic threat to the environment;
- To provide information needed to compare receiving water quality to mass emissions of pollutants from waste discharge;

- To provide data for determining compliance with permit conditions and to support enforcement actions, if necessary;
- To measure wasteloads discharged to receiving waters and to identify their effects, and in water quality limited segments, to prepare wasteload allocations necessary to achieve water quality control;
- To provide data needed to carry on the continuing planning process;
- To measure the effects of water rights decisions on water quality and to guide the State Board in its responsibility to regulate unappropriated water for the control of quality;
- To provide a clearinghouse for the collection and dissemination of water quality data gathered by other agencies and private parties cooperating in the program; and
- To prepare reports on water quality conditions as required by federal and state regulations and other users requesting water quality data.

The monitoring program provides for collection and analysis of samples and the reporting of water quality data. It includes laboratory support and quality assurance, storage of data for rapid and systematic retrieval and preparation of reports and data summaries. Most important is the interpretation and evaluation of data leading to recommendations for action.

The State monitoring program focuses on fresh and marine surface waters. The goal of the State monitoring program is to provide an overall, continuing assessment of water quality in the state. Historically, conventional parameter such as minerals, nutrients, and dissolved oxygen were considered to be the most important parameters. More recently, toxic substances have received increasing attention in federal and state water pollution control activities. The State and Regional Boards are intensifying their efforts to investigate the presence of toxic substances in surface waters and the effects of these substances on aquatic biota.

The State program consists of a toxicity monitoring program, the Inland Surface Waters Toxicity Testing Program, and two toxic substances monitoring programs – the Toxic Substances Monitoring Program and State Mussel Watch.

Inland Surface Waters Toxicity Testing Program

The goal of this program, which was initiated in 1990, is to evaluate the extent, magnitude, nature and sources of toxicity in the waters of the State. Emphasis is on those waters where toxicity is associated with unregulated discharges such as runoff from agriculture, mining or urban areas. As part of this program, a toxicity testing facility at the University of California, Davis was established to conduct State and Regional Board studies. The Regional Board performs the sampling of the waterbodies in the region and supplies the testing facility with the samples.

The toxicity test measures the combined effects of toxics in the water and is not used to separate and identify a specific toxic substance. Toxicity is determined by using water column examples from a waterbody under lab conditions. Appropriate test organisms are observed for their response by using growth, reproduction or mortality as indicators. Two types of toxicity tests are used, acute and chronic, which involve measuring responses in different life stages of the test organisms.

In the Santa Ana Region, Big Bear Lake and its tributaries, the Anaheim and Newport Bay Watersheds, Lake Elsinore, and some creeks have been sampled for toxicity as part of this program.

Toxic Substances Monitoring Program

The Toxic Substances Monitoring Program (TSMP) was initiated in 1976 by the State Board. The TSMP was organized to provide a uniform statewide approach to the detection and evaluation of the occurrence of toxic substances in fresh and estuarine waters of the state. The TSMP primarily targets waterbodies with known or suspected impaired water quality and is not intended to give an overall water quality assessment. Data obtained from the TSMP is used to focus the Regional Board's attention on those waterbodies impacted by toxic pollutants. Special TSMP or other studies are then conducted to investigate the source(s) of the pollutants. The State Board has contracted with the Department of Fish and Game to perform the monitoring and chemical analyses associated with this program.

The presence of toxic substances often cannot be determined by water column sampling due to the low concentrations of toxicants in the water. Also, a number of toxic substances are not water soluble, but can be found associated with sediment or organic matter. The process of bioaccumulation acts to concentrate toxicants through the aquatic food web, sometimes many hundreds of times the levels actually in water. Therefore, in the TSMP the flesh of fish and other aquatic organisms (mainly crayfish) is analyzed to indicate whether any toxic substance is present. Fish livers are analyzed for metals, including arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc; fish muscle tissue (filet) is analyzed for mercury and selenium. In addition, fish filet and crayfish tail are analyzed for 45 synthetic organic compounds, which include pesticides and PCBs (Table 6-1). When very small-sized fish are available, only whole-body analyses are conducted.

The objectives of the Toxic Substances Monitoring Program are as follows:

- To develop statewide baseline data and to demonstrate trends in the occurrence of toxic elements and organic substances in the aquatic biota;
- To assess impacts of accumulated toxicants upon the usability of State waters by man;
- To assess impacts of accumulated toxicants upon the aquatic biota; and
- Where problem concentrations of toxicants are detected, to attempt to identify sources of toxicants and to relate concentrations found in the biota to concentrations found in the water.

Based upon the priorities identified by the Regional Board and the TSMP, the number and location of the sampling stations and the constituents investigated vary each year. When the program began, streams and lakes were ranked according to various criteria established to indicate their importance to the state in terms of water quality. The priority I, or highest priority, waterbodies were included in the first phase of monitoring. The Santa Ana River was included in this list and the station at Prado Dam has been sampled annually since the program began. The monitoring was expanded to include four other stations on the Santa Ana River and two of its tributaries, Chino and Cucamonga Creeks. A number of sites in the Newport Bay Watershed have also been sampled, largely in response to findings by the State Mussel Watch Program (see below) of high levels of organics and metals in the Bay itself. The results of this TSMP sampling led to an intensive study of toxics in San Diego Creek in 1985. Several stations were added to the program to monitor Anaheim Bay and its tributaries because of similar concerns. A number of the lakes in the region, including several park lakes, have also been sampled in this program. Table 6-2 lists the TSMP sampling sites in the Santa Ana Region (1978-1991).

Reports which describe the statewide TSMP sampling program sites, the constituents investigated, and the results have been published annually since 1977. A ten-year data summary was published in 1987.

State Mussel Watch Program

The State Mussel Watch (SMW) program is the state's long term marine water quality monitoring program, initiated in 1977. The SMW program provides the state with data showing trends in coastal and estuarine water quality. The Regional Board uses the data from SMW to establish the presence or absence of toxic substances and to monitor the variation in the concentrations detected at the various locations. Using this information, the Regional Board then attempts to locate the sources of the contamination. As with the Toxic Substances Monitoring Program, the State Board contracts with the Department of Fish and Game to perform the sampling and analysis.

- The primary goal of the SMW program are as follows:
- To provide long-term monitoring of certain toxic substances levels in coastal marine waters;

- To provide an important element in comprehensive water quality monitoring strategy; and
- To identify on a year-to-year basis specific areas where concentrations of toxic materials are higher than normal.

Mussels were chosen for the State Mussel Watch program because: (1) they are common along the California coast; (2) they are immobile in nature, permitting a localized measurement of water quality; (3) they have the ability to concentrate pollutants above ambient seawater levels; and (4) they provide a time-averaged sample. Where freshwater tributaries are suspected sources of toxics, freshwater clams are used. The trace metals analyzed in mussel and clam tissues are similar to those investigated by the Toxic Substances Monitoring Program and include aluminum, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc. Synthetic organic compounds analyzed are listed in Table 6-1.

As with the Toxic Substances Monitoring Program, the number and location of SMW sites investigated varies each year, according to program needs and resource constraints. Several key areas in the Santa Ana Region are frequently sampled in this program (See Table 6-3). Anaheim Bay/Huntington Harbour area sampling locations include the Anaheim Navy Harbor, Anaheim Navy Marsh, Anaheim Bay at Edinger Street, and Anaheim Bay at Warner Avenue. In the Newport area, the most frequently sampled stations include Newport Bay Island, Newport Bay at Hwy 1 Bridge, Newport Bay at Crows Nest, Rhine Channel, and Newport Bay/Upper Rhine Channel. As with the TSMP, statewide SMW reports are published annually and a ten-year data summary for 1977-1987 is available.

REGIONAL MONITORING PROGRAMS

The regional monitoring programs are grouped with local agencies' programs because they are, for the most part, cooperative efforts. The sampling frequency, sampling stations, constituents, and other details vary from year to year, depending on needs and budgets of the Regional Board and local agencies.

The regional monitoring effort consists of the following:

1. Surface Water Monitoring
2. Groundwater Monitoring
3. Compliance Monitoring
4. Complaint Investigation
5. Intensive Surveys
6. Aerial Surveillance
7. Stormwater Monitoring

Surface Water Monitoring

With the exception of the annual sampling of the Santa Ana River at Prado Dam, the Regional Board's surface water monitoring program is not strictly formalized. The sampling frequency, locations, constituents, and other details vary from year to year depending on identified problems and needs, and on staff and funding availability. A number of other agencies conduct surface water monitoring programs in the region, including water purveyors, wastewater dischargers, and flood control agencies. The Regional Board makes every effort to coordinate its monitoring activities with these other agencies to maximize the collection and exchange of data, as well as the use of resources.

This Basin Plan specifies water quality objectives applicable to Reach 3 of the Santa Ana River for TDS, nitrogen, and other constituents which are set on the baseflow of the River (see Chapter 4). To determine compliance with these objectives, the Basin Plan requires that sampling of the River be conducted annually at Prado Dam. As directed by the Basin Plan, Board staff conducts the sampling during August, when the quantity and quality of baseflow is most consistent. Staff then reports the results to the Board. The results of this program are used to assess the effectiveness of the Board's regulatory programs and to determine whether changes, such as revisions to the TDS and nitrogen wasteload allocations, are necessary.

Groundwater Monitoring

The regional groundwater monitoring program depends upon the cooperation of local agencies to ensure that data are collected. The Region's municipal water supply districts sample their potable water wells to assure that the public health regulations are met. The sample results are also submitted to the Regional Board.

This Region relies greatly on groundwater computer models for basin planning studies. The groundwater quality data is collected by numerous agencies. The Regional Board contributes to the collection effort. All data will be collected in a computer database compiled by the Santa Ana Watershed Project Authority.

Compliance Monitoring

Under this program, data is collected and used to determine compliance with discharge requirements and receiving water standards, and to support enforcement actions and waste discharge prohibitions. The data are collected from self-monitoring reports generated by waste dischargers and from compliance monitoring reports prepared by Regional Board staff.

Self-monitoring reports submitted to the Regional Board are reviewed, and if violations are noted, appropriate action is taken, ranging from administrative enforcement to judicial abatement, depending on the circumstances. Self-monitoring report data have also been used to develop pollutant loads and to measure general water quality conditions in the receiving water.

Table 6-1

Synthetic Organic Compounds Analyzed
in the State Mussel Watch
and Toxic Substances Monitoring Programs

Aldrin	p,p'-DDMU	delta-Lindane
Chlorbenside	o,p'-DDT	Total Lindane [2]
alpha-Chlordane	p,p'-DDT	Methoxychlor
gamma-Chlordane	Total DDT	Methyl Parathion
cis-Chlordane	Diazinon	Oxadiazon [2]
trans-Clordane	Dieldrin	PCB 1248
Oxychlordane	Endrin	PCB 1254
Total Chlordane	Endosulfan [1]	PCB 1260
cis-Nonachlor	Endosulfan [2]	Total PCB
trans-Nonachlor	Endosulfan Sulfate	Pentachlorophenol [1]
Chlorpyrifos	Total Endosulfan	Phenol [1]
Dacthal	Ethyl Parathion	Ronnel [1]
Dicofol [2]	Heptachlor	Tetrachlorophenol [1]
p,p'-DDE	Heptachlor Epoxide	Tetradifon [1]
o,p'-DDE	Hexachlorobenzene	Toxaphene
o,p'-DDD	alpha-Lindane	Tributylin [1]
p,p'-DDD	beta-Lindane	
p,p'-DDMS	gamma-Lindane	

1 These constituents are analyzed only in the State Mussel Watch Program

2 These constituents are analyzed only in the Toxic Substances Monitoring Program

Table 6-2

Toxic Substances Monitoring Program Stations
(Santa Ana Region)

			Year Sampled													
Stations	Station Nos.	Map No. [1]	78	79	80	81	82	83	84	85	86	87	88	89	90	91
Anaheim Bay Watershed																
Bolsa Chica Channel/Westminster Ave.	801.11.08	1									X	X	X			
E.G.G. Wintersburg Chnl/Beach Blvd.	801.11.90	2										X				
E.G.G. Wintersburg Chnl/Gothard St.	801.11.02	3									X		X			
Huntington Harbour/Anaheim Bay	801.11.00	4													X	
Ocean View Chnl/Beach Blvd.	801.11.03	5									X	X				
Ocean View Chnl/Brookhurst St.	801.11.91	6										X				
Ocean View Chnl/Newhope St.	801.11.92	7										X				
Westminster Chnl/Graham St.	801.11.01	8									X	X				
Newport Bay Watershed																
Newport Bay	801.11.97	9													X	
Peters Canyon Channel	801.11.96	10												X	X	X
San Diego Ck/Barranca Pkwy	801.11.09	11										X			X	X
San Diego Ck/Laguna Rd.	801.11.13	12										X				
San Diego Ck/Michelson Dr.	801.11.07	13						X	X	X	X	X	X	X	X	X
San Diego Ck/Upper Newport Bay	801.11.04	14							X	X	X					
Other																
Anza Channel	801.26.03	15												X	X	

1 See Figure 6-1 for station locations.

Table 6-2

Toxic Substances Monitoring Program
Stations
(Santa Ana Region)
(Continued)

			Year Sampled													
Stations	Station Nos.	Map No. [1]	78	79	80	81	82	83	84	85	86	87	88	89	90	91
Big Bear Lake	801.71.10	16											X	X		
Big Bear Lake/Boulder Bay	801.71.08	17							X							
Canyon Lake	802.12.01	18												X		
Carbon Canyon Park Lake	801.13.90	19										X				
Chino Creek/d/s Euclid Ave.	801.21.02	20							X	X	X		X			
Chino Creek/u/s Pine Ave.	801.21.03	21									X					
Craig Park Lake	845.61.91	22										X				
Cucamonga-Mill Ck/McCarty Rd.	801.21.04	23												X		
Delhi Channel	801.11.05	24								X						
Irvine Park Lake	801.12.01	25										X				
Lake Elsinore	802.31.00	26						X	X							
Lake Evans	801.26.01	27									X					
Lake Mathews	801.33.00	28									X					
Los Coyotes Park Lake	845.61.90	29										X				
Mason Park Lane	801.11.93	30										X				
Mile Square Park Lake #1	801.11.94	31										X				
Mile Square Park Lake #2	801.11.95	32										X				
Prado Lake	801.21.90	33												X		

1 See Figure 6-1 for station locations.

Table 6-2

Toxic Substances Monitoring Program Stations
(Santa Ana Region) (Continued)

			Year Sampled													
Stations	Station Nos.	Map No. [1]	78	79	80	81	82	83	84	85	86	87	88	89	90	91
Santa Ana River/Featherly Park	801.13.03	34								X						
Santa Ana River/Hammer Ave.	801.21.05	35											X			
Santa Ana River/Imperial Hwy	801.13.00	36								X						
Santa Ana River/Prado Dam	801.25.00	37	X	X	X	X	X	X	X	X	X		X	X	X	X
Santa Ana River/USGS Gage	801.21.09	38								X			X			
Yorba Park Lake	801.13.91	39										X				

1 See Figure 6-1 for station locations.

Table 6-3

State Mussel Watch Stations
(Santa Ana Region)

Stations	Station Nos.[1]	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
			Year Sampled														
Anaheim Bay Watershed																	
Anaheim Navy Harbor	707							X		X	X	X		X	X	X	
Anaheim Navy Marsh	708							X			X	X		X	X	X	
Anaheim Navy Marsh 2	708.5														X	X	
Anaheim Bay Entrance	709						X										
Anaheim Fuel Docks N	710				X	X											
Anaheim Fuel Docks S	710.2									X	X			X			
Launch Ramp Docks	711						X										
Peters Landing	712						X										
Anaheim Edinger St.	713							X		X	X				X	X	
Anaheim Bay - Warner Ave.	715							X		X	X			X	X	X	
Anaheim Harbor Ln.	717										X				X	X	
G.G. Wintersburg Channel	727															X	
Newport Bay Watershed																	
Newport Pier	720										X						
Newport Entrance Channel	721						X	X		X	X			X			
Newport Bay Police Docks	722				X		X				X						
Newport Bay El Pasco Dr.	722.4										X						

1 See Figure 6-2, 6-3, and 6-4 for station locations.

Table 6-3

State Mussel Watch Stations
(Santa Ana Region) (Continued)

		Year Sampled															
Stations	Station Nos. [1]	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Newport Bay Island	723						X		X	X	X			X	X	X	
Newport Bay Turning Basin	723.4										X			X	X	X	
Newport Hwy 1 Bridge	724						X	X		X	X			X		X	
Newport Bay Dunes Duck	724.4										X						
Newport Crows Nest	725						X	X		X	X	X	X	X	X	X	
Newport Upper Rhine	726						X	X		X	X	X	X	X			
Newport Bay Rhine Channel	726.2										X				X		
Newport Bay Rhine Channel End	726.4										X					X	
Newport Pier	731				X												
Newport W. Jetty	732			X	X												
Newport W. Jetty End	733				X												
Newport E. Jetty	734				X												
San Diego Ck./MacArthur	728.4									X	X				X	X	
San Diego Ck./Michelson	728.7															X	
Peters Cyn/Barranca	728.9															X	
Other																	
Corona Del Mar	735	X	X	X		X										X	
Santa Ana River/Prado Dam	719.1																X
Temescal Ck/Nickels Road	719.8																X

1 See Figure 6-2, 6-3, and 6-4 for station locations.

Figure 6-1
Toxic Substances Monitoring Program
Santa Ana Region Stations

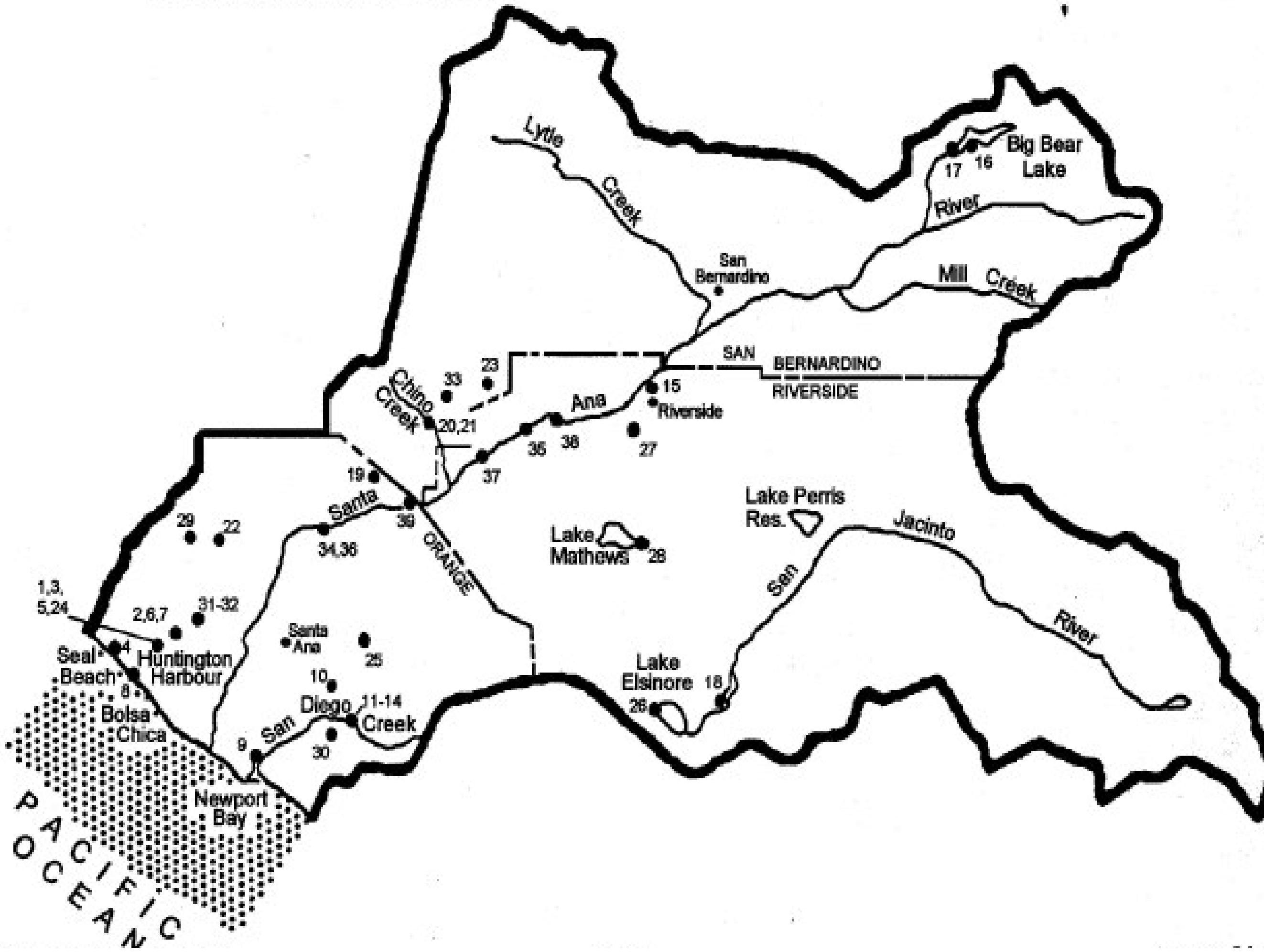


Figure 6-2
State Mussel Watch Stations
Anaheim Bay/Huntington Harbour Watershed

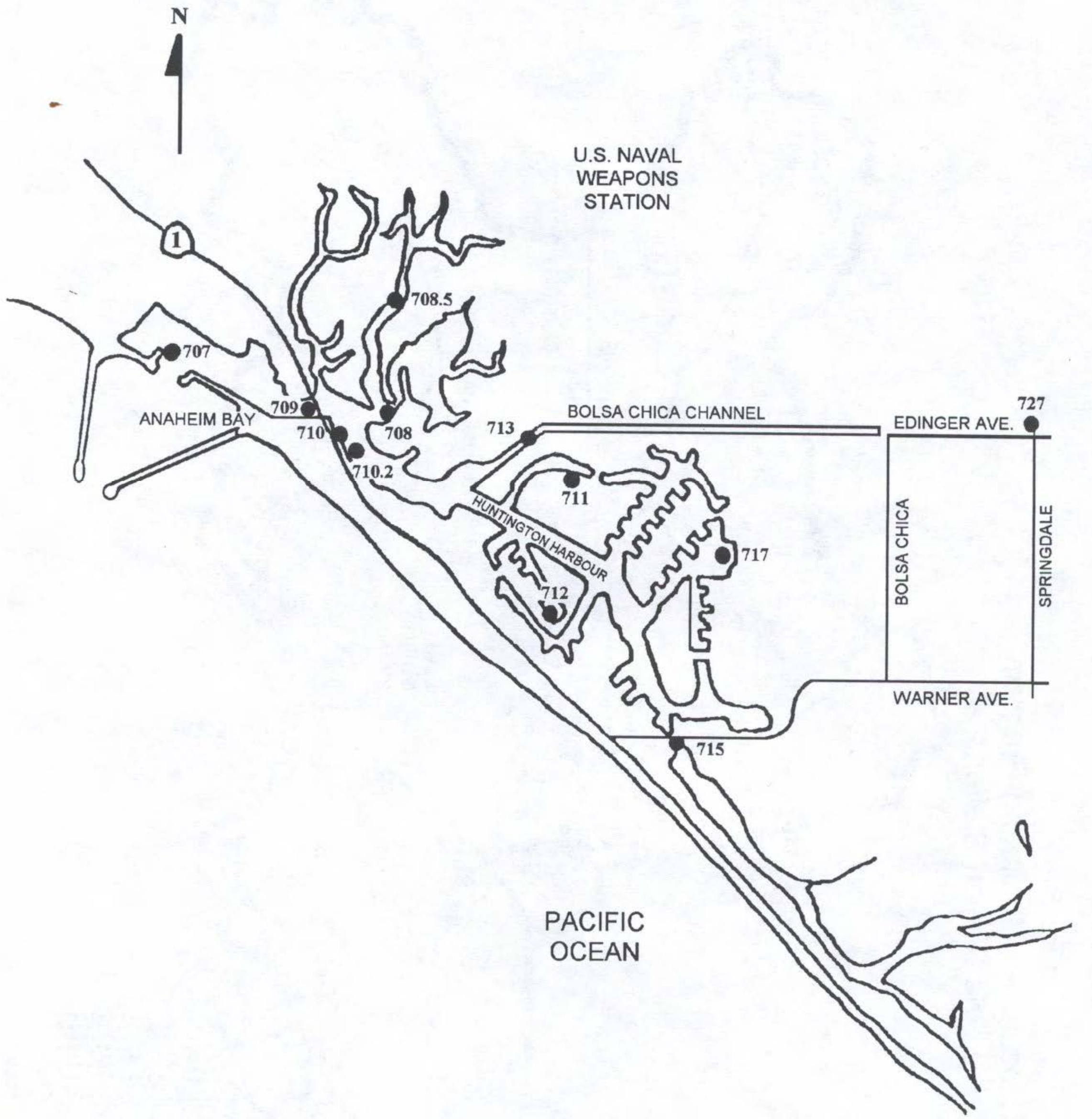


Figure 6-3
State Mussel Watch Stations
Newport Bay Watershed

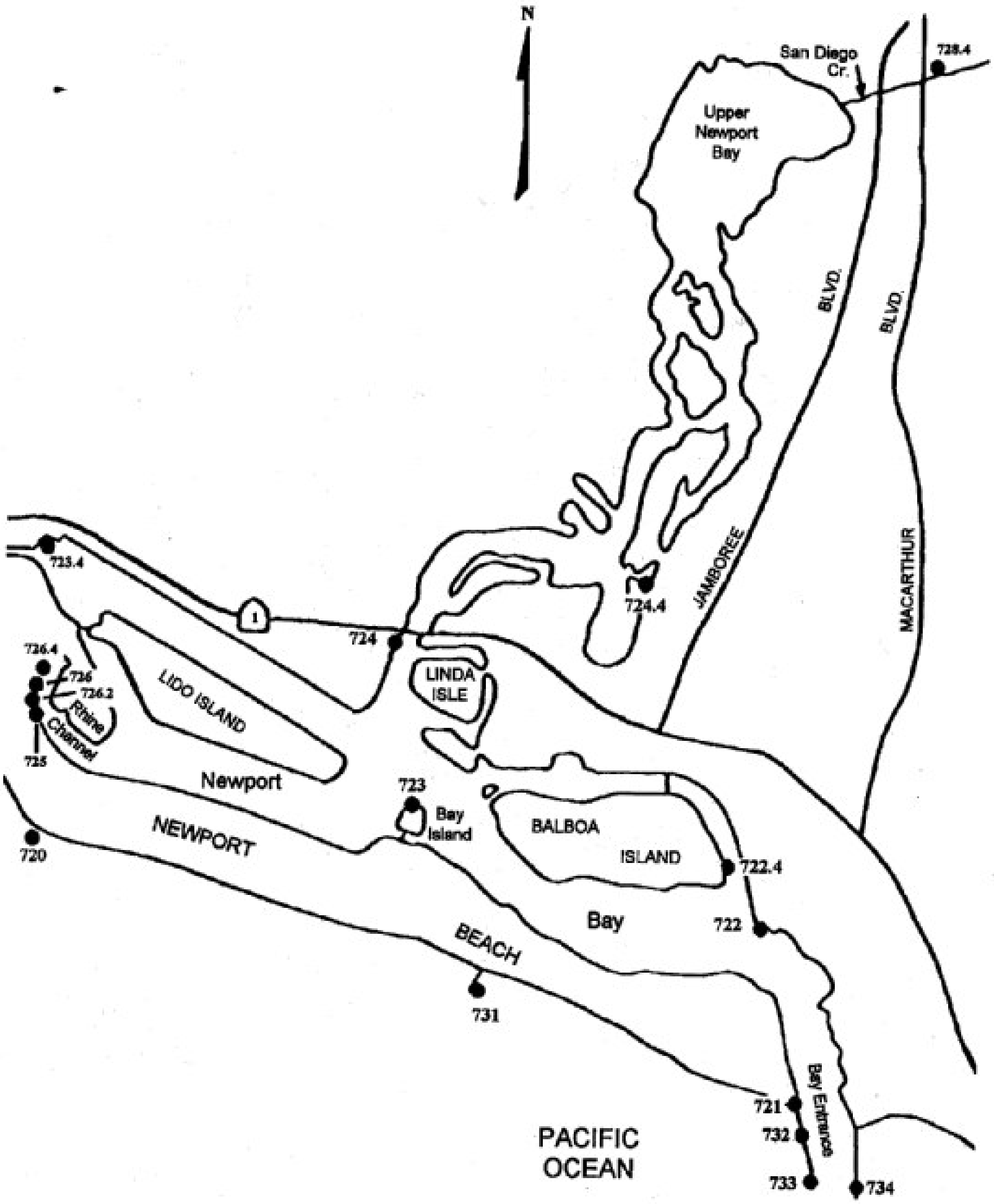
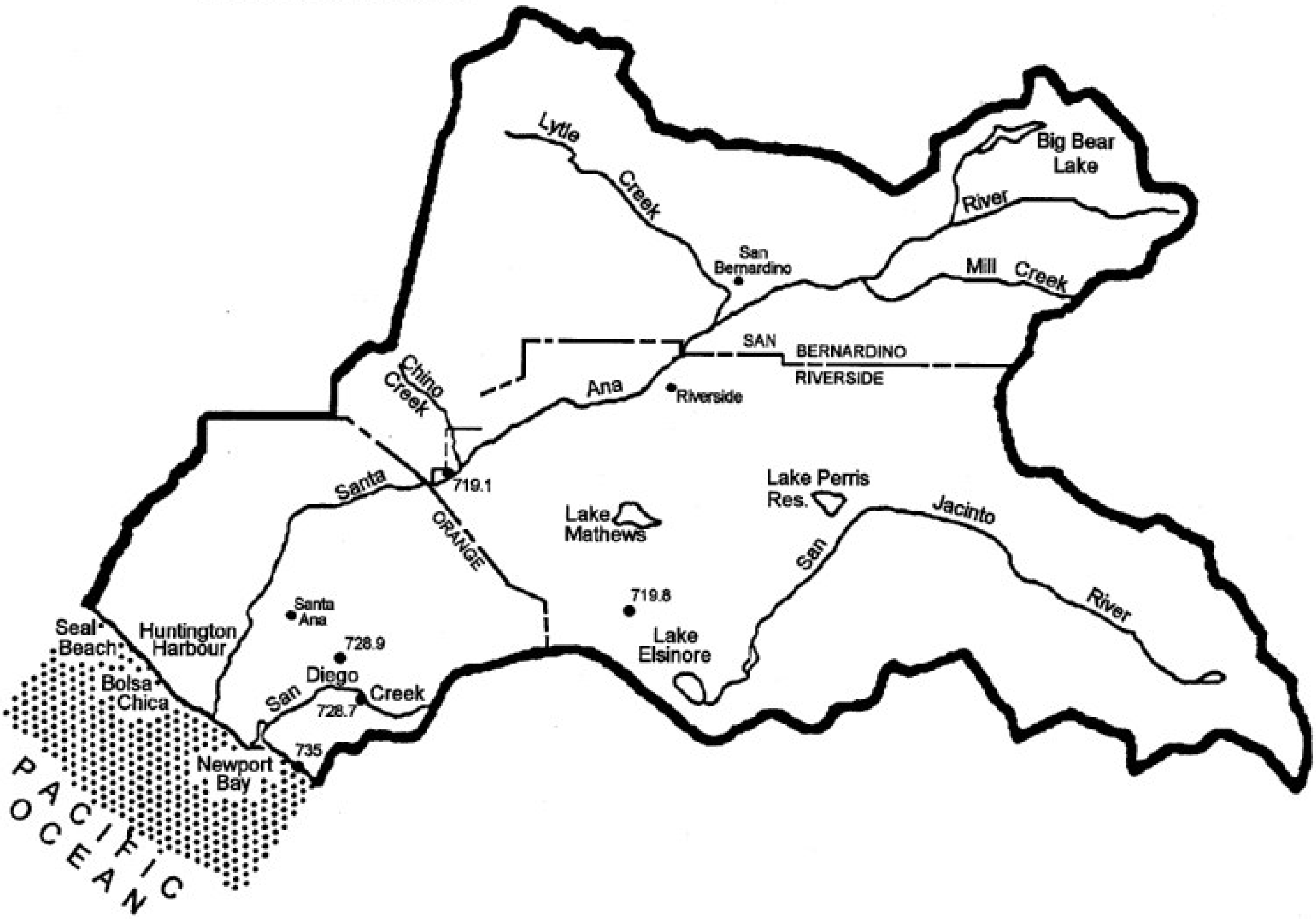


Figure 6-4
State Mussel Watch
Additional Stations



Compliance Monitoring (Continued form page 6-6)

The lowest concentration by which permit compliance is reliably measured is called the Practical Quantification Level (PQL). The PQL is used and taken into account when establishing waste discharge limits. PQLs will be developed using all available information, and will be established based upon information obtained from regional laboratories.

The Regional Board requires the initiation of a Toxicity Reduction Evaluation (TRE) if a discharge consistently exceeds its chronic toxicity effluent limit. The Regional Board, to date, has interpreted the "consistency exceeds" trigger as the failures of three successive monthly toxicity tests, each conducted on separate samples. Initiation of the TRE has also been conditioned on a determination that a sufficient level of toxicity exists to permit effective application of the analytical techniques required by a TRE. The Regional Board also encourages the development of scientifically sound toxicity test quality control and standardized interpretation criteria to improve the accuracy and reliability of chronic toxicity demonstrations.

Compliance monitoring also involves staff inspections of regulated and unregulated sites and includes observations made by staff members and/or results of analyses performed on samples collected by staff members.

Complaint Investigation

This program involves the investigation of complaints from citizens and public governmental agencies regarding the discharge of wastes or creation of nuisance conditions. It is a Regional Board responsibility which includes field studies, preparation of reports and letters, and other necessary follow-up actions to document observed conditions and to initiate appropriate corrective actions.

Intensive Surveys

Intensive monitoring surveys provide detailed water quality data to locate and evaluate violations of receiving water standards and to make wasteload allocations. They usually involved localized, intermittent sampling at higher than normal frequency. These surveys are performed in water quality-limited segments or hydrologic units which require additional sampling data to supplement the routine monitoring program results. The surveys are specially designed to evaluate water quality problems.

Beneficial use surveys are executed to aid in the review of the Basin Plan's water quality standards. This periodic review, entitled a "triennial review," is required in the

Clean Water Act. Intensive surveys have been performed on the middle Santa Ana River, Lake Elsinore, Lytle Creek, Mill Creek, San Diego Creek, Newport Bay, Huntington Harbour, and Strawberry Creek.

The Clean Lakes Program is specified in Section 314 of the Clean Water Act, and requires that all publicly owned freshwater lakes be identified and classified according to their trophic conditions. If a lake's condition is not known, a Clean Lakes Program survey may be performed to assess its water quality condition. If the trophic quality of the lake is determined not to protect its beneficial uses, the pollution sources and potential restorative measures are to be identified. The above actions may be conducted under a Clean Lake grant received from the federal government. Clean lake grant-funded studies of Lake Elsinore and Big Bear Lake are currently in progress.

Aerial Surveillance

Aerial surveillance is used primarily to gather photographic records of discharges and water quality conditions in the Region. Aerial surveillance is particularly effective because of the overall view of a facility that is obtained and because many facilities can be observed in a short period of time.

Municipal Stormwater Monitoring

The stormwater permitting program has been established to protect the water quality of the waterbodies which receive stormwater runoff. See Chapter 5 for a complete description of this program. Sampling of first-flush phenomena has indicated that stormwater discharges contain significant amounts of pollutants. Therefore, the Region's municipal stormwater permits require the permittees to develop comprehensive management and monitoring programs. Because each permit generally covers a large number of waterbodies, the required monitoring program is in two phases.

Phase I requires the discharger to sample those receiving waters where the beneficial uses are threatened or impaired due to runoff of stormwater and urban nuisance water. Under Phase II the dischargers will be required to develop stormwater management and monitoring programs for the remaining waterbodies included under the permit.

Stormwater discharges from urbanized areas consist mainly of surface runoff emanating from residential, commercial, and industrial areas. In addition, there are stormwater discharges from agricultural and other land uses. The constituents of concern in these discharges include: total and fecal coliform, enterococcus, total suspended solids, biochemical oxygen demand, chemical oxygen demand, total organic carbon, oil and grease, heavy metals, nutrients, base/neutral and acid extractibles, pesticides, herbicides, petroleum hydrocarbon products, and/or those causing extremely high or low pH.

The objectives of the stormwater monitoring programs are to: 1) define the type, magnitude, and sources of pollutants in the stormwater discharges within the permittee's jurisdiction so that appropriate pollution prevention and correction measures can be identified; 2) evaluate the effectiveness of pollution prevention and correction measures; and 3) evaluate compliance with water quality objectives established for the stormwater system or its components.

QUALITY ASSURANCE / QUALITY CONTROL

The purpose of the Quality Assurance Program is to ensure that data generated from environmental measurement studies are technically sound and legally defensible. A State Quality Assurance (QA) Program Plan was prepared under authority of the State Board in April 1990 describing how the State and Regional Boards will implement and manage the QA program. This Plan was approved by the State Board and the US EPA, Region IX, to meet requirements for federal funding.

The federal regulation requiring the State to develop and implement a QA Program is written in EPA Order 5360.1, April 3, 1993. The mandate is identified in 40 CFR 30.503 (July 1, 1987) requiring State agencies involved in environmentally-related measurement projects to develop and implement a Quality Assurance Program for programs partially or fully supported by Federal funds.

This mandate further requires that a QA Program Plan be developed that describes how a State agency will implement and manage a QA Program. It also requires that a QA Project Plan be prepared and approved prior to the start of any field or laboratory activities. A State's QA Program Plan must be approved by the federal award official before federal funds can be released. QA Project Plans are approved by a state's designated QA Officer and are available for federal review.

The State Board has appointed a QA Program Manager to direct and coordinate the overall program. Each State Board division and Regional Board has appointed a QA Officer to administer their respective QA responsibilities. The State and Regional Boards jointly administer the program but the State Board has lead responsibility for managing the overall program and reporting to EPA.

The Regional Board's QA Officer interacts with project managers on the required preparation of QA Project Plans for studies involving field and laboratory activities. The Project Plans should outline project objectives, data quality objectives in which management decisions will be based, and field and laboratory procedures that will be used to achieve the objectives. Once completed, the Plan must be reviewed and approved by an agency QA Officer or, when problems arise, by the State Board QA Program Manager before any field work can begin. Guidelines on Plan preparation have been distributed to the State and Regional Board QA Officers.

ASSESSMENT PROGRAMS

There are several statewide water quality assessments which are performed periodically. The assessments are used to evaluate the effectiveness of the Regional Boards' water quality programs to determine if making any changes are needed.

Water Quality Assessment

The Water Quality Assessment (WQA) is a catalog of the State's waterbodies and their water quality condition. The WQA identifies the water quality condition as good, intermediate, impaired or unknown. The data used to categorize waterbodies in the WQA are obtained from the various monitoring programs identified previously. All Regional Boards adopted their regional WQA at public meetings and submitted them to the State Board for inclusion in the State WQA. In addition, for impaired and high priority waters, factsheets were prepared to provide additional detail. The State Board intends the WQA to be updated on a regular basis, generally every two years.

The WQA serves many different purposes. The WQA, a public document, reports the condition of the State's waterbodies in a summary format. The lists of impaired waterbodies, included in the WQA, satisfy several Clean Water Act listing requirements. These federal lists are identified by the applicable Clean Water Act (CWA) section or Code of Federal Regulation (CFR) number. These include:

- CWA 303(d) – Water Quality Limited Segments where water quality objectives will not be met even with the Best Available Treatment/Best Control Technology (BAT/BCT)

- CFR 131.11 – Segments which may be affected by or warrant concern due to toxics

- CWA 314 – Lake Priorities

- CWA 319 – Nonpoint Source Impacted Waters

- CWA 304(l) ("Long List") – Waters designated as impaired because narrative or numeric objectives are violated or beneficial uses are impaired similar to CWA Section 303(d).

- CWA 304(s) ("Short List") – Waters not meeting water quality objectives because of toxics from point source discharges

- CWA 304(m) ("Mini List") – Waters not meeting water quality objectives because of toxics from either point or nonpoint sources.

WQA Water Quality Condition Classification

For each region, the individual waterbodies are listed. They are identified by water resource type, ***i.e***., bays and harbors, wetlands, coastal waters, estuaries, lakes and reservoirs, groundwater, rivers and streams, and saline lakes. An entire waterbody may be classified with one water quality condition or divided by segments into more than one.

Good: waters that support and enhance the designated beneficial uses. Waterbodies classified as good may be designated a high priority if a threat to water quality is present.

Intermediate: waters that support designated beneficial uses while there is occasional degradation of water quality. Waterbodies suspected of impairment but for which there is inadequate data to conclude impairment are also given this classification.

Impaired: waters not reasonably expected to attain or maintain applicable water quality standards. Standards include both numeric and narrative water quality objectives and the beneficial uses the objectives are intended to protect.

Unknown: waters with unknown water quality where limited or no direct observations are available.

The WQA also provides the foundation for the State Board's Clean Water Strategy process. The current regional WQA and the associated factsheets are included as Appendix VII.

Clean Water Strategy

The Clean Water Strategy (CWS) is a process that the State Board implemented to assure that staff and fiscal resources are directed at the highest priority water quality issues throughout California. The primary objective of the CWS is to more effectively define and respond to priorities as revealed by the best available water quality information. A CWS goal is to link State and Regional Board programs together in directing actions on individual waterbodies.

The CWS relies on the Water Quality Assessment condition ratings to provide the technical information necessary to identify waterbodies needing protection or prevention actions, additional assessment or cleanup activities. In addition to the Water Quality Assessment, the regions determined the relative resource value of their waterbodies to recognize the relative importance of individual waters when compared to each other. The regions developed priority waterbody lists which are based upon the severity of their water quality problems or needs and relative resource values, from which the State Board assembled a statewide priority list based upon the same criteria.

There are six phases involved in implementing the Clean Water Strategy. As of this date, phases 1 and 2 have been completed. The State Board has begun a pilot study to determine the feasibility of phases 3 through 6.

Phase 1: Obtain the best information
2: Compare and prioritize waterbody concerns
3: Prioritize actions to address concerns
4: Allocate new resources
5: Implement strategy goals
6: Review results

305(b) Report

The 305(b) Report, also known as the National Water Quality Inventory Report, is a summary of all states' water quality reports compiled by the Environmental protection Agency. The report is prepared biennially from information that states are required to submit pursuant to Section 305(b)(1) of the Clean Water Act.

The State Board prepares the State report using information taken from the WQA. The State 305(b) Report includes: (a) a description of the water quality of major navigable waters in the State during the preceding years; (b) and analysis of the extent to which significant navigable waters provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water; (c) an analysis of the extent to which elimination of the discharge of pollutants is being employed or will be needed; and (d) estimates of the environmental impact, the economic and social costs necessary to achieve the "no discharge" objective of the Clean Water Act, the economic and social benefits of such achievement, and the dates of such achievement. The report also recommends programs which must be implemented to achieve the CWA goals.

DATA MANAGEMENT

Regional Modeling Efforts

SAGIS/ADSS: The Santa Ana Watershed Project Authority Planning Department has devised a modeling program and system called the Advanced Decision Support System (ADSS) to aid in the development of long-range plans to meet water quality and quantity objectives (ARC/INFO is the trademark of the Environmental Systems Research Institute's copyrighted program. Although this product is mentioned in the Basin Plan, the Santa Ana Regional Board is not endorsing any commercial products). The ADSS creates a central data storage facility standardizing data collection, storage, and retrieval. The core of the ADSS is the Santa Ana

Geographic Information Systems (SAGIS). SAGIS is an ARC/INFO[1]-based water resource analysis and graphic tool written in ARC Marco Language. SAGIS includes a library of various geographic overlays to create custom base maps for water resource data. The system also allows the user to view data stored in tabular form and plot the results versus time. SAGIS will produce a variety of water quality and quantity analysis maps and plots. SAGIS includes a comprehensive landuse database of the Santa Ana River Basin to project future water needs.

Regional Databases

STORET: STORET, which stands for STOrage and RETrieval, is a national database system that contains environmental monitoring data relating to the water quality within this Regional Board's boundaries and throughout the United States. These data are the result of field and laboratory analyses performed on samples gathered from streams, lakes, estuaries, groundwater, and other waterbodies. The STORET system resides on an IBM 3090 mainframe computer maintained by the US EPA at the National Computer Center in North Carolina.

The original database has evolved into a more comprehensive system capable of performing a broad range of analyses, as well as serving as the depository for data. In California, stations are sampled, in part, by the following agencies: California Department of Water Resources, U.S. Geographical Survey, California Department of Health Services, and the Regional Boards. The Regional Boards, as well as the State Board, EPA, and other regulatory agencies utilize the STORET database to examine the causes and effects of water pollution, to measure compliance with water quality objectives and maintenance of beneficial uses, and to determine water quality trends.

SABRINA: Another part of the ADSS is the Santa Ana Relational Database Management System, or SABRINA. Developed by SAWPA, SABRINA is a menu-driven application written in a database language and stores the data used by SAGIS.

[1] ARC/INFO is the trademark of the Environmental Systems Research Institute's copyrighted program. Although this product is mentioned in the Basin Plan, the Santa Ana Regional Board is not endorsing any commercial products.

REFERENCES

California Regional Water Quality Control Board – Santa Ana Region, "Newport Bay Clean Water Strategy – A Report and Recommendations for Future Actions," September, 1989.

California State Water Resources Control Board, "California State Mussel Watch, Ten Year Data Summary 1977-1987, WQMR No. 87-3," May, 1988.

California Regional Water Quality Control Board, Santa Ana Region, Staff Report, "State Mussel Watch Results, 1987-1988 and 1988-1989, Item 21," February 9, 1990.

California Sate Water Resources Control Board, "Toxic Substances Monitoring Program, 1988-89, 91-1WQ," June, 1991.

California State Water Resources Control Board, "Toxic Substances Monitoring Program, Ten year Summary Report 1978-1987, 90-1WQ," August, 1990.

California Regional Water Quality Control Board, Santa Ana Region, "Newport Bay Clean Water Strategy, A Report and Recommendations for Future Action," September, 1989.

United Sates Environmental Protection Agency, "STORET Documentation for Menu-Driven User Interface," February, 1992.

CHAPTER 7

WATER RESOURCES AND WATER QUALITY MANAGEMENT

INTRODUCTION

Numerous water resource management studies and projects, focused on water quality and/or water supply, are in progress in the Region under the auspices of a variety of parties. Some of these activities bear directly on the implementation of this Plan and were briefly described earlier (Chapter 5). Others may lead to future Basin Plan amendments to incorporate appropriate changes, such as revised regulatory strategies for POTWs or other dischargers. Excellent examples of these programs are the extensive, multi-agency effort in the Chino Basin to evaluate water resource management alternatives and the implementation of groundwater desalters by the Santa Ana Watershed Project Authority (SAWPA) to address the severe TDS and nitrate quality problems in that Basin. Such investigations, and the implementation of appropriate physical solutions, are an essential and integral part of the effort to restore and maintain water quality in the Region.

Funding for these investigations and projects comes from a variety of sources. Local and regional agencies contribute substantial funds and staff resources. State and federal funds, in the form of loans or grants administered principally by the State Water Resources Control Board or the US EPA, are an important source of support. Volunteer efforts by citizens' groups and private landowners also contribute significantly.

The purpose of this chapter, which is new to the Basin Plan, is strictly informational – the intent is to provide an overview of some of these studies, the agencies conducting them and funding mechanisms. This discussion is necessarily brief and incomplete but should convey a sense of the scope and significance of the participation of others in water resources management in the Region.

SANTA ANA WATERSHED PROJECT AUTHORITY

The activities of the Santa Ana Watershed Project Authority (SAWPA) have been and remain exceptionally important to the management and protection of water resources in the Region. For this reason, SAWPA warrants special discussion.

As noted in Chapter 1, SAWPA is a joint powers agency which conducts water-related investigations and planning studies, and builds physical facilities where needed for water supply, wastewater treatment or water quality remediation. SAWPA is comprised of the five major water supply and/or wastewater management agencies in the Region: Chino Basin Municipal Water District (CBMWD); Eastern Municipal Water District (EMWD); Orange County Water

District (OCWD); San Bernardino Valley Municipal Water District (SBVMWD); and Western Municipal Water District (WMWD).

Since the early 1970's, SAWPA has played a key role in the development and update of the Basin Plan for the Santa Ana Region. SAWPA continues to sponsor, participate in, and/or oversee numerous water quality planning studies. Ongoing studies include the Chino Basin Water Resources Management Study, the Colton-Riverside Conjunctive Use Project, an investigation of water quality in Lake Elsinore, and studies of nitrogen and organic carbon in the Prado Basin. These studies are briefly described later in this chapter.

SAWPA also plays a crucial role in the implementation of the Basin Plan through the construction of physical facilities. SAWPA built and now operates the Arlington Desalter and is in the process of implementing two such facilities in the Chino Basin. As described in Chapter 5, these desalters are key parts of this Plan's strategy to address salt problems in the upper Santa Ana Basin. Additional desalters for the Riverside/Colton and Temescal areas are being considered.

SAWPA is responsible for the construction of the West Riverside County Regional Wastewater Treatment Facility and, with the cities of San Bernardino and Colton, for the Rapid Infiltration and Extraction treatment facility, which will provide wastewater treatment equivalent to tertiary for those cities. SAWPA built and is now planning expansion of the Santa Ana Regional Interceptor, or SARI line, which transports highly saline wastes out of the Basin (see also Chapter 5). SAWPA constructed and operates treatment facilities for contaminated groundwater at the Stringfellow site. SAWPA has also played a key role in the implementation of the Lake Elsinore Stabilization Project.

As noted in Chapter 6, SAWPA has undertaken to act as a clearinghouse for region-wide data on water quality, landuse, population, etc., by implementing database and geographical information systems including SABRINA, SAGIS (Santa Ana Geographic Information System) and the Advanced Decision Support System.

NATIONAL WATER RESEARCH INSTITUTE

The National Water Research Institute (NWRI) was founded through funding provided by the Joan Irvine Smith and Athalie R. Clarke Foundation, the County Sanitation Districts of Orange County, the Irvine Ranch Water District, the Municipal Water District of Orange County, Orange County Water District, and the San Juan Basin Authority. The Institute was created to identify and support independent research projects throughout the United States which will lead to improved water quality and water supplies.

The Institute's research priorities include water quality improvement and recycling, watershed management, health risk assessment, membrane research, and the development of public policy. The Institute uses a number of strategies to fulfill these objectives, including:

- working with local, state, and national water resource organizations to identify research needs;
- encountering broad-based participation in joint venture partnership which support water research;
- providing opportunities for members of the national water research community to meet and exchange ideas;
- developing technical and institutional strategies which ensure that research results are implemented in a timely, cost-effective manner;
- educating the general public about the need for water conservation and research; and
- serving as a catalyst to encourage development of centers of excellence in water research.

The Institute is independently governed by a Board of Directors consisting of one member from each of the contributing agencies. The NWRI and its partners establish joint ventures to sponsor research projects. NWRI has funded numerous projects which benefit the region including research on water quality and wildlife enhancement in the Prado Wetlands, television documentaries focusing on water resources issues on the lower Santa Ana River, investigation of several wastewater treatment technologies, and the treatment of contaminants in groundwater.

INLAND SURFACE WATERS

Big Bear Watershed

Big Bear Lake is located in the San Bernardino Mountains in central San Bernardino County. The close proximity of the Lake and mountains to the urban communities within Los Angeles, San Diego, Riverside, and San Bernardino Counties has made it a heavily utilized recreational attraction. During winter, the mountains surrounding Big Bear Lake are visited by hundreds of thousands of skiers and sightseers, while the summer months bring thousands of tourists to enjoy the pleasures of the Lake and the beautiful forested landscape. The Lake is also an important wildlife resource, providing habitat for a wide variety of plants and animals, including rare and endangered species.

A cooperative effort to ensure proper management and protection of this resource is in progress. A number of agencies, private organizations, and individuals have joined in the development of the Big Bear Valley Coordinated Resource Management Plan (CRMP). A geographic information system will be developed to integrate information on plant and animal habitats, tributaries, and other relevant data. The intent is to use this system as a guide in making land use decisions.

The participants include:

- East Valley Resource Conservation District
- City of Big Bear Lake
- Big Bear Municipal Water District
- County of San Bernardino Planning Department
- Santa Ana Regional Water Quality Control Board
- California Department of Forestry
- California Department of Fish and Game
- California Department of Health Services
- Natural Heritage Foundation
- Big Bear Area Regional Wastewater Agency
- Big Bear City Community Services District
- Bear Mountain Ski Area
- Snow Summit Ski Area
- U.S. Fish and Wildlife Services
- U.S. Army Corps of Engineers
- U.S. Soil Conservation Service
- USDA Forest Service

Lake Elsinore

Lake Elsinore is a heavily used recreational waterbody located in the San Jacinto Watershed in southwest Riverside County. As noted in Chapter 1, the lake periodically goes dry, resulting in fish kills and adverse impacts on recreational opportunities. Projects to stabilize the level of the Lake are now being completed or considered. Among these is consideration of the use of reclaimed water to maintain water levels.

SAWPA is overseeing a study of the Lake, funded by a Clean Water Act Section 314 Clean Lakes Program grant. The objectives of the study, which is to be completed by December 1993, are to:

- determine Lake Elsinore's current water quality and its effect on its beneficial uses;

- analyze the potential effects of reclaimed water upon the Lake; and

- prepare a water quality management plan.

The study is a one-year program consisting of water quality sampling and analysis. The Lake's water quality will be compared to the water quality of reclaimed water distributed by Eastern Municipal Water District. A water quality management plan will be prepared and should specify: (1) ways to maximize the Lake's water quality; (2) the feasibility of the proposed improvements; (3) a technical plan; and (4) a schedule with implementation milestones.

Santa Ana River Mainstream Project

Because of rapid growth and development in Orange, Riverside, and San Bernardino Counties, the current flood control system is inadequate to manage the runoff in these areas. The three counties are working collaboratively with the U.S. Army Corps of Engineers (Corps) to design and construct the Santa Ana River Mainstream project (Mainstream Project). The Mainstream Project will provide increased flood protection to communities within those counties, and will include specific environmental restoration projects.

The Mainstream Project will cover 75 miles from the Santa Ana River headwaters to its mouth. The project will provide the upper and lower Santa Ana River Basin various levels of flood protection ranging from a 100-year to 190-year flood flows.

The Corps will construct structural improvements including Seven Oaks Dam, Mill Creek Levee, San Timoteo Creek, Prado Dam, Oak Street Drain in Corona, 23 miles of the lower Santa Ana River, and Santiago Creek. Prado Dam and the spillway will be raised an additional thirty feet in height. Ninety-two acres of currently degraded marshland located within the Santa Ana River Salt Marsh will be restored increasing the marsh's value as a wetland habitat. In addition, a large portion of Santa Ana Canyon will be purchased and a resource, habitat, and floodplain management plan will be developed to ensure that that part of the Canyon will not undergo any landuse changes.

Santa Ana River Total Inorganic Nitrogen/Total Organic Carbon

Modeling work done for the update of the total dissolved solids and nitrogen management plans for the upper Santa Ana Basin (see Chapter 5) demonstrated the presence of a "nitrogen sink" in the Prado Basin. This sink effectively removes a major portion of the nitrate present in the Santa Ana River. In order to optimize this phenomenon, Orange County Water District and SAWPA have undertaken a study to evaluate the natural biochemical processes impacting total inorganic nitrogen (TIN) and total organic carbon (TOC) concentrations in the water as it flows through constructed wetlands. Based on the study's findings and conclusions, ways to enhance the natural processes to maximize total inorganic nitrogen removal will be recommended.

Multipurpose Corridor

Eastern Municipal Water District is leading the conceptual development of a natural multipurpose corridor to be located within the San Jacinto River and Salt Creek riparian corridors. The multipurpose corridor would connect adjacent communities, as well as agricultural regions, wildlife habitats, and rural areas. A planning task force has endorsed the idea of establishing such a passageway. The task force is hoping the corridor will lead to other benefits such as the development of:

- A water resource management plan, including groundwater basin recharge and emergency storage, general water quality improvement, storm flow storage, and erosion and flood control;

- coordinated landuse planning, including parks, water conservation measures, recreational areas, buffer zones, shared utility easements, and cost-effective resource management; and

- enhancement of the local environment for both wildlife and people.

Water Harvesting Demonstration Project

The development of demonstration water harvesting facilities within the San Jacinto watershed has been proposed by Eastern Municipal Water District (EMWD). The objective would be to capture surface water flows, consisting of rainfall runoff and stormwater discharges, which would normally flow unimpeded in the river. EMWD is considering this project because rapid urban development has decreased the amount of surface area available for percolation of rainfall and other runoff into the aquifers.

The District is interested in implementing the water capture plan to supplement their reclaimed water supplies. EMWD could use the harvested runoff directly for irrigation or site percolation ponds in locations where the groundwater basin would be recharged for domestic beneficial uses. Initiation of the program will entail a review of the physical and chemical properties of the runoff, hydrology, operational and maintenance controls of the reuse facilities, economics, compliance with the Basin Plan's water quality objectives, and permitting issues.

Several project locations were identified during a feasibility study and include existing storm drains, conveyance pipelines, and recharge facilities. Facilities currently under consideration are the Buena Vista and San Jacinto Retention Basins and the San Jacinto Reservoir. Conceptual projects include the Salt Creek and San Jacinto Northwest Improvement Plan, and the Lake Hemet Municipal Water District Cooperative Program.

Multipurpose Wetlands

EMWD and the U.S. Bureau of Reclamation are cooperating in a Multipurpose Wetlands Research and Demonstration Study. The objective is to evaluate the effectiveness and feasibility of integrating constructed wetlands with conventional wastewater treatment facilities.

The agencies have constructed a wetlands research facility located on four acres of Hemet/San Jacinto Regional Water Reclamation Facility. It is being used to determine future design and operating criteria for demonstration wetlands at the Reclamation Facility and to refine the design and operating criteria for future EMWD wetlands projects.

EMWD is interested in the use of desalters to reclaim brackish groundwater for water supply or groundwater recharge purposes. A pilot study at the Wetlands Research Facility is being conducted to evaluate the feasibility of using the reject stream from the desalters in vegetated saline marshes. If they prove feasible, these marshes would provide wildlife habitat as well as additional use of brackish water.

A 20-to-30-acre demonstration project at the Reclamation Facility is expected to begin in the fall of 1993. It will include an integrated system of 5 separate wetlands treatment units, a combined open water and marsh habitat area, and a combined final polishing wetland. One of the objectives of this project is to evaluate the ability of a constructed wetland system to provide treatment of secondary wastewater which is equivalent to that of conventional tertiary treatment facilities, and to remove nitrogen and low levels of metals and organic compounds.

A 20-acre demonstration project at the San Jacinto Wildlife Area is also planned. The intent is to provide additional treatment of wastewater, while maximizing brooding habitat for a variety of birds.

GROUNDWATERS

Chino Basin Water Resources Management Study

The purpose of this study is to develop a comprehensive plan for water resources management in the Chino Basin. The objectives are to coordinate the management of imported and local water supplies, including wastewater, and to develop plans and projects which will maximize the use of these resources, assure reliable, good quality supplies, and protect or improve local water quality.

This study is being conducted by a consortium of agencies, including the Chino Basin Municipal Water District, SAWPA, the Metropolitan Water District of Southern California (MWD), the Chino Basin Watermaster (which represents municipal and agricultural water users in the Basin), and the Regional Board.

A significant feature of this study is the development of a new integrated ground and surface water model for the Chino Basin. The model is calibrated for both TDS and nitrogen. This model is much more detailed and refined than the Basin Planning Procedure (BPP) (see Chapter 5) and will supplant the use of the BPP in this area. The new model will be used to evaluate the water quality (and quantity) effects of alternative water resource management plans. These analyses will then be used to select a recommended plan.

The Chino Basin water resources management plan is expected to include the following: management of rising groundwater contributions to the Santa Ana River; use and protection of groundwater supplies; the expansion of wastewater reclamation; optimization of capture of local runoff for recharge purposes; and reduction of water demand through water conservation.

MWD has proposed a groundwater storage program in the Chino Basin, whereby State Water Project water would be recharged in the Basin for use during emergency, drought, and other conditions when the Project water is not available. As proposed, the recharge would occur directly, via spreading or injection of State Project Water, and indirectly, through exchange of Chino Basin groundwater for surface water delivered to local water supply agencies. The Chino Basin study will evaluate opportunities to increase seasonal storage and optimize local and imported water use.

In part because of the involvement and varied interests of so many parties, the development and implementation of the water resources management plan is likely to be very complex. The Regional Board’s requirements must also be satisfied. Further, Chino Basin is adjudicated and the requirements of the adjudication must be met or modified, if all the parties agree to the management plan.

The results and recommendations of this study may lead to changes in the Basin Plan. Such changes would be accomplished through appropriate Basin Plan amendments.

Colton-Riverside Basins Water Resources Management Plan

Under the auspices of SAWPA, a project task force has been formed to develop a water resources conjunctive use plan for the Colton and Riverside groundwater subbasins. The task force members are:

- Western Municipal Water District
- San Bernardino Valley Municipal Water District
- Orange County Water District
- Eastern Municipal Water District
- Elsinore Valley Municipal Water District

- San Bernardino Valley Water Conservation District
- Yucaipa Valley Water District
- Jurupa Community Services District
- City of Riverside
- City of San Bernardino
- City of Colton
- City of Rialto
- SAWPA

Many other parties have interest in the development and implementation of the management plan, including the Regional Board, which is participating in the study in an advisory role.

The purpose of the plan is to integrate the management of imported water, wastewater, and stormwater in the two subbasins. The overall objective is to maximize the use of local water resources with equitable sharing of the costs among all parties, including water purveyors, regional water management agencies, and wastewater dischargers. The term “conjunctive use” refers to this coordinated management of water supply sources that the yield from these sources is greater than the sum of the yields resulting from independent management of the sources.

Some of the goals identified are to: restore the quality of the Colton and Riverside subbasins; ensure a reliable potable water supply; reduce dependence on imported water; maximize both the use of local groundwater and reuse of wastewater; minimize the cost of wastewater treatment; and redistribute base flow in the Santa Ana River to allow more capture of the flows by Orange County Water District.

Four projects, designated A, B, C, and D, have been identifies to accomplish these goals. Project A involves the improvement of wastewater quality discharged to the Santa Ana River through improvements at the Colton, Rialto, and San Bernardino wastewater treatment plants, and the construction of a pipeline to relocate the wastewater discharge points downstream of the Colton subbasin. Project B involves the production of high-TDS groundwater from the Riverside subbasin with the goal of creating capacity for recharge with higher quality water (such as stormwater, State Project water, and Bunker Hill subbasin groundwater) and seasonal storage of wastewater. Project C would improve groundwater quality in the Colton subbasin by pumping and export of groundwater and recharge with higher quality local runoff, State Project water, Bunker Hill groundwater, and San Bernardino wastewater. Recharge would be accomplished via run-of-river “T” levees. Project D is a Riverside subbasin restoration and water supply project. Groundwater would be extracted and high quality stormwaters, imported water, Bunker Hill groundwater, and reclaimed wastewater would be percolated in a system of “T” levees in the Santa Ana River. The mix of waters recharged would be controlled to produce a water supply quality that is consistent with both drinking water standards and wastewater discharge limitations.

These projects will be considered and implemented in phases. Wastewater treatment plant improvements (Project A) are already in progress. As in the Chino Basin (see preceding discussion), the involvement and interests of the many parties is likely to make implementation complex. Water resources in this area are also adjudicated and, again, the requirements of the adjudication must be satisfied. The Regional Board's concerns and requirements must also be addressed.

The result of the Conjunctive Use study may lead to changes in this Basin Plan. For example, a revised regulatory strategy for wastewater discharges by San Bernardino, Colton, and Rialto may be found appropriate. Implementation of the identified projects may supplant the need for the Riverside-Colton desalter, which is included in the Recommended Plan (Alternative 5C). If appropriate, amendments to the Basin Plan can be made to incorporate such changes.

Bunker Hill Basin Replenishment

The Bunker Hill Basin is artificially recharged by several agencies. Surface stream diversions are made for groundwater replenishment by the Lytle Creek Water Association on Lytle Creek and by the San Bernardino Valley Water Conservation District on Santa Ana River and Mill Creek. The San Bernardino County Flood Control District has facilities on Devil Creek, Twin Creek, Waterman Creek, and Sand Creek which may be used for groundwater recharge. The surface diversion of the waters of Lytle Creek have occurred as early as 1872. Lytle Creek water rights, which include diversions for groundwater recharge, are now administered by the Lytle Creek Water Association for six parties, according to a 1924 judgement. The San Bernardino Valley Water Conservation District began recharging the Bunker Hill Basin with Santa Ana River water (through its predecessor) in 1911 while groundwater recharge on Mill Creek began in the 1890s and was taken over by the Conservation District in 1934. In excess of 1,000,000 acre feet of Santa Ana River and Mill Creek waters have been recharged to replenish the Bunker Hill Basin. In addition, the San Bernardino Valley Municipal Water District has imported State Project water for replenishment into the Bunker Hill Basin. Since 1972, in excess of 150,000 acre feet of imported State Project Water has been recharged in the Bunker Hill Basin. The replenishment activities of the above four agencies play an extremely important role in managing the Bunker Hill Basin to supply the current and future needs of the Basin.

Hemet and San Jacinto Groundwater Basin Management Program

The Hemet/San Jacinto Groundwater Association and Eastern Municipal Water District are in the process of developing a Groundwater Management Plan for the Hemet and San Jacinto basins. The Objective of the Management Plan is to optimize use and management of the groundwater resources in the Hemet and San Jacinto groundwater subbasins through the cooperative efforts of an association of the major basin pumpers. Eastern Municipal Water District is cooperating with the Metropolitan water District of Southern California (MWD), the U.S. Geological Survey, UC Riverside and UC Los Angeles to collect water quality and quantity data, landuse information, and data on basin hydrogeology, and to develop appropriate planning tools. A Management Plan will be developed and will include plans or programs designed to maximize the groundwater resources and ensure future water supplies.

To protect the other subbasins in the San Jacinto watershed, including Perris, Menifee, Lakeview, Winchester, and San Jacinto Lower Pressure, Eastern Municipal Water District has initiated an Assembly Bill (AB) 3030 Groundwater Management Plan. AB 3030 was adopted by the California Legislature in 1992. AB 3030 amends Section 10750 ***et seq.*** of the Water Code to allow a local agency whose service area includes a groundwater basin that is not already subject to groundwater management pursuant to law or court order to adopt and implement a groundwater management plan. The program could include plans to mitigate overdraft conditions, control brackish water, and monitor and replenish groundwater.

Hemet Groundwater Investigations

Eastern Municipal Water District and the U.S. Geological Survey (USGS) are currently involved in a four-year investigation of the dynamics of nitrate and TDS movement in the unsaturated zone of the Hemet groundwater subbasin. The Study objectives are to define the thickness and extent of water-bearing materials and to determine the direction of groundwater flow, the chemical quality of groundwater, the flux of nitrate in the unsaturated zone, and the degree of mixing and vertical distribution of nitrate in the saturated zone. The USGS has completed a draft study and is scheduled to provide a final report by the end of 1993.

Eastern Municipal Water District and MWD are also contracting with UC Los Angeles to develop and Optimal Data Collection Design Strategy as a basin management planning tool for the Hemet Basin. Eastern Municipal Water District and MWD contracted with UC Riverside to perform geophysical investigations in order to delineate the bedrock of the Hemet Basin and to obtain information on the available water supply of the Basin.

San Jacinto River Groundwater Recharge Program

A groundwater recharge/storage program within the San Jacinto Basin has been developed by EMWD. A demonstration project was begun in October 1990 with cooperation from MWD and the Universities of California, Riverside, and Los Angeles. The objectives of the demonstration project were to evaluate the infiltration rate, establish the impacts on basin hydrology and groundwater quality, and approximate the distribution of the recharged water.

The demonstration project used ponds located within the San Jacinto riverbed to recharge the aquifer with State Project Water for a three-year period. Interaction between the local groundwater and State Project Water was assessed by monitoring water quality conditions and levels from October 1990 through January 1991. It was concluded that the average percolation rate in these basins is 6.30 feet/day. The study has determined that imported water can be successfully stored seasonally.

Green Acres Project

Orange County Water District has obtained funding for the Green Acres project from the State Board. The Green Acres project uses reclaimed wastewater to extend local water supplies. Secondary effluent supplied by the County Sanitation Districts of Orange County is treated at the Green Acres facility site in Fountain Valley. The product water is provided to parks, greenbelts, nurseries, schoolyards, golf courses, and industrial sites within a five-mile radius of the plant. Phase I of the project provides 7.5 million gallons of water each day for those uses. The facility design allows for a second-phase expansion to 15 million gallons per day.

The Green Acres distribution system calls for over 25 miles of pipe ranging in diameter from 6 to 36 inches. The first reach of the pipeline will extend into the City of Fountain Valley. The distribution system will supply areas in Santa Ana, Costa Mesa, and eventually Huntington Beach and Newport Beach.

Southern California Comprehensive Reclamation and Reuse Study

In October 1991, SAWPA and several other local agencies became participants in the Southern California Comprehensive Reclamation and Reuse ("SOCAL") Study. The project is a 6-year, $6 million effort which will be cost-shared 50 percent by the U.S. Bureau of Reclamation and 50 percent by local agencies. The region's participants include SAWPA, Chino Basin Municipal Water District, Eastern Municipal Water District, Orange County Water District, San Bernardino Valley Municipal Water District, and Western Municipal Water District. The San Diego County Water Authority is a participant as well. The purpose of the study is to develop a long-range strategy for more effective integration of fresh and reclaimed water management programs, and to determine the feasibility of various water reclamation projects within Southern California.

The overall study, initiated on March 10, 1992, consists of two main phases with the first phase consisting of two parts. The first part, Phase 1a, will be the compilation and generation of baseline information. The intended objective of Phase 1a is to more clearly identify the potential for increasing the use of reclaimed water throughout Southern California. When all data on reclaimed water supply and potential use is collected, possible reclamation project alternatives will be identified, including the possibility of transferring reclaimed water across jurisdictional lines.

Phase 1a will also include the development of screening criteria and tools of analysis necessary to identify and evaluate potential reclaimed water projects. Significant public involvement efforts will begin in Phase 1a and continue through the remainder of the study.

Phase 1a will conclude with the production of a report. The report will include: 1) a description and evaluation of those project alternatives that are considered likely to be feasible given the current and expected economic, environmental, and institutional conditions during the 20-year and 50-year planning horizons; 2) and economic distribution model to be used to further analyze the feasibility of those projects; and 3) a detailed scope of work for Phase 1b.

COASTAL WATERS

Southern California Coastal Water Research Project

As discussed in Chapter Six (Monitoring and Assessment), the Regional Board requires that waste dischargers conduct monitoring programs to evaluate the effects of their discharges on the receiving waters. In the Santa Ana Region, the most extensive self-monitoring program (approximately 2 million dollars per year) is carried out by the County Sanitation Districts of Orange County (CSDOC), which discharges about 240 MGD of wastewater to the Pacific Ocean via a 5-mile outfall.

Other ocean dischargers, such as the Southern California Edison's Huntington Beach Generating Station, conduct receiving water monitoring programs, though these are considerably less extensive than that prescribed for CSDOC.

It has been recognized for some time, however, that these individual discharger efforts, despite their intensity and sophistication, are not in themselves sufficient to obtain an accurate and complete picture of the impacts of ocean discharges. A broader, regional perspective is necessary to evaluate the cumulative effects and interactions of all inputs to the coastal waters from both point and nonpoint sources.

Towards that end, the Southern California Coastal Water Research Project (SCCWRP) was established in 1969 by a consortium of waste dischargers. SCCWRP conducts a wide variety of chemical, physical, and biological investigations of the open coastal waters from San Diego to Ventura, and area commonly called the Southern California Bight. SCCWRP's mission is to understand the effects of urban wastes on the marine environment. Annual reports describe the specific research projects conducted to characterize the sources, fates, and effects of anthropogenic pollution on marine water quality, biota, and sediments.

The organization of the SCCWRP administration was recently revised. The SCCWRP Commission, which provides direction on regional monitoring needs and priorities, now includes staff representatives from the Los Angeles, Santa Ana, and San Diego Regional Boards, the State Board and US EPA, as well as the Sanitation Districts of Orange and Los Angeles Counties and the cities of Los Angeles and San Diego.

Huntington Beach

The City of Huntington Beach coordinates the Huntington Beach Waterways and Beaches Committee, a public outreach task force engaged in tracking agency activities in the Huntington Beach area. The public at large is invited to the meetings in which staff from the City Council, Orange County (Environmental Management Agency, Health Care Agency, and Flood Control District), the U.S. Naval Weapons Station at Seal Beach, and Regional Board staff participate. Reports are given to update the activities and studies in which the above agencies are involved. One of the Committee's major concerns is water quality. The Committee is actively involved in public education and efforts to ensure compliance with holding tank requirements.

Newport Bay Watershed

Water quality problems in Newport Bay and its watershed and the activities in progress to address them are described briefly in Chapter 5 and, in more detail, in reports prepared in response to Senate Concurrent Resolutions (SCR) 38 and 88. Both SCR reports identify a plan for future action by the agencies and parties with responsibilities and interests related to water quality in the watershed. A major them of these reports is the need for continued interagency coordination to implement these action plans.

Towards this end, the Newport Bay Coordinating Council was formed. It includes representatives from the Regional Board, the Environmental Management and Health Care Agencies of Orange County, Senator Marian Bergeson's office, City of Newport Beach, Newport Harbor Quality Committee, California Department of Fish and Game, U.S. Army Corps of Engineers (Corps), Irvine Company, and various Newport Bay community action groups. The Council provides a forum for the exchange of information on and coordination of activities related to the Bay, from grass roots debris cleanups to the possible Corps dredging in the Upper Bay. The Council also sponsors public education and outreach programs.

Many of the representatives on the Coordinating Council are also members of the City of Newport Beach Harbor Quality Committee. The City of Newport Beach Parks and Recreation and Marine Departments are participants as well. This committee has been involved in many projects to educate the public on ways Newport Harbor water quality can be better protected. It has sponsored excellent outreach projects, such as the Baywatchers Program, and has distributed informational brochures identifying simple pollution prevention practices. The Committee assisted in the development of a pamphlet showing the locations of vessel pumpout stations in the Bay and was instrumental in the adoption of a city ordinance regarding vessel waste management for charter and tour boats. The Committee's action also led to a ban on the use of endosulfan in the Newport Bay watershed.

FUNDING PROGRAMS

Grant Programs

<u>Clean Water Act §205(j) Water Quality Planning Grant Program</u>

Section 205(j) of the federal Clean Water Act (CWA) allows each state to reserve up to one percent of its annual Clean Water Construction Grant allotment for water quality management and planning. In addition, Congress has provided funding under Section 604(b), State Revolving Fund Set Aside. Any interstate, regional or local public agency may apply directly to the State Water Resources Control Board for funding. As funds are available, State agencies and publicly-funded educational institutions may also apply.

Generally, the State Board requests a workplan on the project be submitted one year prior to the project's actual start date, due to the period of delay between submittal of the proposal and receipt of federal funding. The State Board notifies interested parties through a Request for Workplans notice. Currently, the workplans are evaluated and ranked according to specific criteria. The criteria include:

- Resource value of the waterbody
- Condition rating of the waterbody
- Whether/how water quality is addressed
- Feasibility of the workplan proposal
- Benefits expected from the work
- Cost of the work

- Applicant's Institutional/financial commitment to implement work products

- Applicant's capability to carry out workplan

The resource value and condition ratings have been calculated and usually are identified in the Water Quality Assessment factsheets. In all cases, there is a minimum 25 percent local funds match requirement for all 205(j)(2) funded projects. The match is calculated on the basis of the total project cost.

Clean Water Act §319 Nonpoint Source (NPS) Grant Program

The Clean Water Act (CWA) Section 319(h) provides grant funds for projects directed at the management of nonpoint source pollution. In California, the State Board determines which project receives Section 319 funds, with input from the Regional Boards. The amount of funds available is dependent upon Congressional Appropriations and therefore varies each year.

The State Board has placed highest priority on projects which implement specified nonpoint source management practices under Section 319 requirements. The State Board must also commit to address nonpoint source waters listed pursuant to CWA section 303(d) (water quality limited segments), and to the protection of high quality waters.

For fiscal Year (FY) 1994, the nonpoint source funds are to be used for the implementation of watershed management plans or strategies that will lead to coordinated water management, or for the demonstration of specific practices considered part of a watershed management effort.

Activities which reduce, eliminate, and/or prevent NPS pollution are eligible projects. The agencies eligible to receive Section 319 funds are those with the demonstrated authority to require implementation of the project (***e.g.***, Resource Conservation Districts). Examples of specific activities eligible for Section 319 funds include the demonstration of best management practices (BMPs) for agricultural drainage, acid mine drainage, acid mine drainage, channel erosion, hydrologic modification, groundwater protection, pollution prevention, and septic systems.

Generally, the State Board requests that a workplan on the project be submitted one year prior to the projects actual start date, due to the period of delay between submittal of the proposal and receipt of federal funding. The State Board notifies interested parties of the availability of finds through a Request for Workplans notice. The workplans are then evaluated and ranked according to specific criteria. The applicant is required to match the grant funds with a 40 percent nonfederal match. The State Board's NPS Program staff should be contacted to get other specific guidance on this grant.

Clean Water Act §314 Clean Lakes Grant Program

The Clean Lakes Program grant is similar to the CWA 205(j) program, but is specified under CWA section 314. Under the Clean Lakes Program, the US EPA, through the State Board, provides assistance in two phases. Phase I awards up to $100,000 per project for diagnostic feasibility studies and requires a 30 percent non-federal match. These studies must be completed in three years. The Phase II awards have no funding cap, but they require a 50 percent non-federal match. These funds are available to support implementation of pollution control and/or in-lake restoration methods and procedures, including final engineering design. These projects must be completed in four years.

Funding is also available for Lake Water Quality Assessment projects, which are projects intended to achieve any needed lake monitoring and assessment which would not otherwise be done. These grants require a fifty percent non-federal match.

All State and local agencies can participate in the 314 Program. Only projects dealing with publicly-owned lakes are eligible for funding. The lake must also be prioritized for remediation by the State, which is demonstrated by placement on the 314 list of impacted water bodies in the Water Quality Assessment.

Currently, procedures require State Board staff to evaluate the proposed projects and draft a project priority list to be brought before the State Board. The State Board adopts and submits the list to the US EPA, which determines the final priority projects for funding.

Small Communities Grant Program

The 1987 amendments to the CWA terminated the federal Clean Water Grant Program but provided for the use of federal funds to capitalize State Revolving Fund (SRF) loan programs (see SRF discussion below). California voters recognized that many small communities would not be able to afford the higher costs of the SRF Program and passed the Clean Water and Water Reclamation Bond Law of 1988. The Clean Water Bond Law contains 25 million dollars in State grant assistance for small communities. The program defines a small community as less than 3,500 people. No grant under this program can exceed 2 million dollars. The Law also states that the State Board may make grants on a sliding scale based on a community's ability to pay.

The Small Communities Grant (SCG) Program provides only the funds to make a wastewater treatment project affordable. It is assumed that a community can afford to spend a certain percentage of its Median Household Income (MHI) calculated, the higher the percentage the community can afford to spend for wastewater facilities. If a community's treatment costs exceeds what the program assumes is affordable, the SCG Program will provide up to 2 million dollars to reduce the costs to make the project more affordable.

A community can receive a SCG for up to 97.5 percent of the allowable project costs and is also eligible to apply to any other State or federal agency to fund the local share of the project costs. A low interest loan from the SRF Program may be obtained, for example, if the project is on the SRF Loan Priority List. If funding is not available for the local share from any source at a reasonable cost, the community may apply for a low interest loan from the Water Quality Control Fund. The combined assistance can not exceed 100 percent of the total project costs.

There are many requirements to receive a SCG. Briefly, the project must be submitted to the Regional Board for placement on a Regional Board SCG Priority List. The project is classified according to the need for a sewage treatment facility. The Regional Board SCG lists are compiled for State Board adoption and further prioritized according to several criteria. There are other restrictions and specific provisions a grantee must satisfy, as specified in guidelines provided by the State Board.

The State Board may use a portion of the SCG to fund pollution study grants. The SCG Program will fund up to 97.5 percent of the eligible costs for an approved pollution study. The objective of the study must be to document the existence of an actual or potential public health or water quality problem.

Loan Programs

State Revolving Fund (SRF) Loan Program

The SRF Loan Program provides funding for construction of publicly-owned treatment works (POTWs), for nonpoint source correction programs and projects, and for the development and implementation of estuary conservation and management programs. Water reclamation projects are also eligible for SRF funding. The loan interest rate is set at one-half the rate of the most recent sale of a State general obligation bond.

Proposed projects must be submitted to the Regional Board for placement on a Regional Board SRF Priority List. Projects are classified and ranked according to several criteria, including documented health problems, conformance with applicable Water Quality Control Plans, and/or compliance with waste discharge requirements. The Executive Officer can directly submit the list to the State Board. The State Board adopts the Statewide Priority List, after which the funds are available on a first-come, first-served basis.

There are other restrictions and specific provisions which the SRF prioritized projects must satisfy; the State Board's Clean Water Program staff should be contacted for a copy of the guidelines.

Agricultural Drainage Water Management Loan Program (ADLP)
The State Agricultural Drainage Water Management Loan Program is funded with a $75 million bond fund. The program funds are available for feasibility studies and the design and construction of agricultural drainage water management projects. The interest rate is set at one-halt the rate of the most recent sale of a general obligation bond. The loan term is not to exceed 20 years. The loan limitations are $20 million for any one project and $100,000 dollars for each feasibility study.

Only local agencies can apply for this loan. The project must remove, reduce, or mitigate pollution from agricultural drainage. The specific types of projects funded include agricultural drainage projects such as evaporation ponds and deep injection wells, selenium removal project, cleanup of groundwater contaminated form agricultural practices, and agroforestry projects. In this region, projects which have acquired ADLP funds include SAWPA's Arlington Desalter and the Chino Basin West Desalter.

The loan application is obtained from the State Board's Division of Water Quality. The completed loan application is submitted with the project planning documents. Upon completion of the loan contract, the applicant submits the final plans and specifications for the project.

Water Reclamation Loan Program
This program makes available low-interest loans for the design and construction of water reclamation projects. The objective of this program is to meet a portion of the future water needs for California through the use of reclaimed water. Projects funded must be cost-effective compared to the development of new sources of water or alternative new freshwater supplies.

As of July 1, 1989, $33 million were available for use only by local public agencies. The funds are augmented annually by loan repayments. The loan interest rate is set at one-half the rate of the most recent sale of the State general obligation bond. The loan term may not exceed 20 years, with up to $5 million available for any one project. Eligible projects include the wastewater treatment facilities necessary to produce water for beneficial reuse, as well as reclaimed water storage and distribution systems. Only that capacity of wastewater which can be used within five years of the completion of construction is eligible.

A loan application package may be obtained from the State Board's Office of Water Recycling. The completed application is submitted with the project planning documents. Projects with complete application packages are funded on a first-come, first-served basis.

Water Quality Control Fund (WQCF) Loan Program
The WQCF Loan Program is a special set-aside intended only for the construction of wastewater treatment facilities or for wastewater reclamation loan feasibility studies. Approximately 6 million dollars are available with the interest

rate set at one-half the average rate paid by the State on general obligation bonds sold in the preceding year.

This program's eligibility requirements state that the applicant must hold a local election with a simple majority approving the application for the loan. In addition, the applicant must demonstrate that: 1) revenue or general obligation bonds cannot be sold; 2) financial hardship exists; and 3) local funding is not available.

The State Board's Division of Clean Water Programs is the contact for a loan application. The application is submitted with the documents which demonstrate financial hardship, lack of the local share, and the election results.

REFERENCES

James M. Montgomery Consulting Engineers, Inc., "Chino Groundwater Basin Management Task Force, Draft Work Plan to Develop a Water Resources Management Plan," June, 1990.

Montgomery Watson, Inc., "Chino Basin Municipal Water District, Final Report on Reclaimed Water Master Plan," April, 1990.

Boyle Engineering Corporation, "Newport Bay Watershed, San Diego Creek Comprehensive Stormwater Sedimentation Control Plan," August, 1983.

Wildermuth, Mark J., Water Resources Engineer, "Plan of Study, Implementation of a Conjunctive Use Plan for the Colton and Riverside Basins, Draft Number 1," June 1993.

"Southern California Coastal Water Research Project, Annual Report 1990-91 and 1991-92," November, 1985 (SCR 38 Report).

California Regional Water Quality Control Board, Santa Ana Region, "Newport Bay Clean Water Strategy, A Report and Recommendations for Future Action," September, 1989 (SCR 88 Report).

California Regional Water Quality Control Board
Santa Ana Region

RESOLUTION NO. 94-1

Resolution Adopting the Updated Water Quality Control Plan for the Santa Ana River Basin (8)

WHEREAS, the California Regional Water Quality Control Board, Santa Ana Region (hereinafter Regional Board), finds that:

1. The Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) was adopted by the Regional Board on April 11, 1975 and approved by the State Water Resources Control Board (State Board) on April 17, 1975.

2. An amended Basin Plan was adopted by the Regional Board on May 13, 1983 and approved by the State Board on October 20, 1983. Since that time, specific amendments to the Basin Plan have been adopted by the Regional Board and approved by the State Board. These amendments include the following: revisions of compliance dates for certain waste discharge prohibitions; revisions of the beneficial use designations, in part to conform the Basin Plan to the State Board's Sources of Drinking Water Policy; revision of the total inorganic nitrogen wasteload allocation for discharges to the Santa Ana River system; and the incorporation of minimum lot size requirements and exemption criteria for the use of septic tank-subsurface disposal systems in the Region.

3. Section 303(c) of the Federal Clean Water Act requires that water quality standards be reviewed and revised, if appropriate, on a triennial basis, and Section 13240 of the California Water Code provides that basin plans must be periodically reviewed and may be revised.

4. In 1989, the State Board initiated a statewide program for comprehensive review and update of the basin plans by all regional boards.

5. With extensive public participation and input, the Regional Board has prepared an updated Basin Plan. This Basin Plan update process satisfies federal triennial review requirements under Section 303(c) of the Clean Water Act and the periodic review requirements of the California Water Code under Section 13240.

6. The Regional Board discussed the basin plan update process at its meeting on April 23, 1993. A first draft of the revised Basin Plan was released in June, 1993 and a public workshop to review that draft was conducted on July 16, 1993. The Regional Board released a second draft of the Basin Plan and the relevant staff report in September, 1993 and conducted a public workshop on October 22, 1993. The public workshops were conducted after notice was given to all interested persons in accordance with Section 13244 of the California Water Code. The testimony introduced at those workshops was considered in the preparation of the final revised Basin Plan.

7. Significant additions to the revised Basin Plan include the addition of a new beneficial use designation of "Limited Warm Freshwater Aquatic Habitat" (LWRM) specifically for concrete-lined channels, the creation of wetlands as a waterbody type, designation of RARE beneficial use for a number of waterbodies, revised un-ionized ammonia objectives and corresponding total ammonia effluent limits, water quality objectives for the Big Bear groundwater basin, revised total dissolved solids wasteload allocation and a discussion of water quality and water resource managment projects in the region.

8. In accordance with applicable guidance and regulations, the Regional Board has developed site-specific water quality objectives (SSOs) for cadmium, copper and lead in the Middle Santa Ana River system. The Regional Board reviewed and discussed the issues related to the development and adoption of these SSOs in public meetings and workshops on August 7, 1992, March 5, 1993 and June 4, 1993. The testimony introduced at these workshops was considered in the preparation of final recommendations for SSOs.

9. In accordance with the provisions of California Water Code, Section 13280 *et seq.*, the Regional Board developed a proposed Basin Plan amendment to incorporate the SSOs.

10. At a duly noticed Public Hearing on October 22, 1993, the Regional Board adopted Resolution No. 93-64, adopting the proposed Basin Plan amendment to incorporate the SSOs for cadmium, copper and lead for the middle Santa Ana River system. A staff report regarding this matter was prepared and distributed to all interested parties 30 days prior to the hearing. However, between the time of the transmittal of the staff report and the October 22, 1993 hearing, new information was presented that led to the modification of the SSOs which had been recommended in the staff report. To avoid procedural questions, it is appropriate to rescind Resolution No. 93-64 and to reconsider adoption of the SSOs as part of the final revised Basin Plan. A report concerning the SSOs considered and adopted by the Regional Board on October 22, 1993 is included in the staff report pertaining to the adoption of the revised Basin Plan.

11. Regional Board Resolution No. 92-10, adopted February 14, 1992, found that some of the national water quality criteria, including those for cadmium, copper and lead, are inappropriate for the Middle Santa Ana River because the flows are dominated by reclaimed water, which provides and supports beneficial uses which would not otherwise exist.

12. A Use-Attainability Analysis (UAA) has been conducted for the Santa Ana River. The UAA provided data and analyses which allow the Regional Board to make the following findings regarding the Santa Ana River:
    a. The Site-Specific Water Quality Objectives (SSOs) for cadmium, copper and lead proposed by Regional Board staff will protect the beneficial uses of the Santa Ana River.
    b. The proposed SSOs have been shown to be conservative.

c. The proposed SSOs, which represent higher water quality than presently exists, will not result in degradation of water quality.
d. Existing levels of cadmium, copper and lead in the SAR do not contribute to toxicity in the Santa Ana River.
e. Dischargers to the Santa Ana River are either in compliance with their NPDES permits or are meeting approved compliance schedules.

13. Adoption and implementation of the cadmium, copper and lead SSOs is consistent with the maximum benefit to the people of California, particularly because it encourages water reclamation and will support important social and economic development in the Santa Ana Region.

14. The findings of this Resolution with respect to metals SSOs are specific to the Santa Ana River and to cadmium, copper and lead These findings are not meant to establish precedent or be applicable to other metals or other water bodies.

15. The Regional Board has prepared and distributed a written report (Staff Report) on adoption of the revised Basin Plan, including site-specific objectives for metals, in compliance with applicable state and federal environmental regulations (California Code of Regulations, Section 3775, Title 23 and 40 CFR Parts 25 and 131).

16. The process of basin planning is exempt from the requirements of the California Environmental Quality Act (Public Resources Code Section 21000 *et seq*) to prepare an Environmental Impact Report or Negative Declaration. The updated Basin Plan includes a completed Environmental Checklist, an assessment of the environmental impacts of the adoption of the updated Basin Plan and a discussion of alternatives. The updated Basin Plan, Environmental Checklist, staff report and supporting documentation are functionally equivalent to an Environmental Impact Report or Negative Declaration.

17. Review of potential environmental impacts of adoption and implementation of the reviewed Basin Plan indicated that a substantial increase in energy consumption might be required and that there may be no feasible alternatives or mitigation measures for this impact. However, the only alternatives identified which would not require increase in energy consumption would not ensure protection of the beneficial uses of the waters of the Santa Ana Region and would therefore not comply with state and federal laws. Pursuant to CEQA regulations Section 15093a, Findings of Overriding Considerations, as attached to the Checklist, are therefore appropriate. The benefits of the Basin Plan amendments outweigh the unavoidable adverse environmental effects.

18. The Regional Board has considered federal and state antidegradation policies, the state Sources of Drinking Water Policy and other relevant water quality control policies and finds the updated Basin Plan consistent with those policies.

19. On January 28, 1994, the Regional Board held a Public Hearing to consider the revised Basin Plan, including site-specific objectives for metals. Notice of the Public Hearing was given to all interested persons and published in accordance with Water Code Section 13244.

20. This Basin Plan must be submitted for review and approval by the State Board, the Office of Administrative Law (OAL) and the US Environmental Protection Agency. Once approved by the State Board, the Basin Plan is to be submitted to the Office of Administrative Law. A Notice of Decision will be filed after the State Board and the Office of Administrative Law have acted on this matter. The Basin Plan must then be submitted for review by the U.S. Environmental Protection Agency.

21. The revised Basin Plan will become effective upon approval by the State Water Resources Control Board and the Office of Administrative Law

NOW THEREFORE BE IT RESOLVED THAT:

1. The California Regional Water Quality Control Board, Santa Ana Region, adopts the updated Water Quality Control Plan for the Santa Ana River Basin (8) as set forth in the attached document.

2. The Regional Board hereby adopts the Findings of Overriding Considerations attached to the Environmental Checklist prepared for the updated Water Quality Control Plan.

3. Resolution No. 93-64 adopting site-specific objectives for metals for the middle Santa Ana River system is hereby rescinded.

4. The Regional Board will implement the Inland Surface Waters Plan and Enclosed Bays and Estuaries Plan (Plans), where applicable, as long as they remain in effect. If the Plans are invalidated, the Regional Board will continue to issue National Pollutant Discharge Elimination System permits in compliance with the Porter-Cologne Act and applicable State and federal regulations, including but not limited to, 40 CFR 122.44(d).

5. Within three years after consultation with the Department of Fish and Game on specific waterbodies that support threatened or endangered species, and where scientific evidence indicates that certain existing water quality objectives for these water bodies do not adequately protect such species, the Regional Board will determine whether these objectives are adequately protective. In cases where such existing objectives do not provide adequate protection for threatened and endangered species, the Regional Board will develop and adopt adequately protective site-specific objectives for those constituents.

6. The Executive Officer is directed to forward copies of the updated Water Quality Control Plan for the Santa Ana River Basin (8) to the State Water Resources Control Board in accordance with the requirements of Section 13245 of the California Water Code.

7. The Regional Board requests that the State Water Resources Control Board approve the Water Quality Control Plan in accordance with the requirements of Sections 13245 and 13246 of the California Water Code and forward it to the Office of Administrative Law and the US Environmental Protection Agency-Region IX for approval.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Santa Ana Region, on March 11, 1994.

Gerard J. Thibeault
Executive Officer

7. The Regional Board requests that the State Water Resources Control Board approve the Water Quality Control Plan in accordance with the requirements of Sections 13245 and 13246 of the California Water Code and forward it to the Office of Administrative Law and the US Environmental Protection Agency-Region IX for approval.

I, Gerard J. Thibeault, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Santa Ana Region, on January 28, 1994.

for Gerard J.Thibeault
Executive Officer