Chapter 3

Hydrology and Water Quality

Chapter 3. Hydrology and Water Quality

INTRODUCTION

This chapter describes existing hydrologic and water quality conditions in the JOS service area and identifies impacts of the 2010 Plan on these resources. Impacts on public health related to increased availability of reclaimed water are described in Chapter 10, "Public Health". Data and information were compiled using several sources, including the Districts, the Water Replenishment District, the Los Angeles District of the Corps, and the RWQCB.

As described in Chapter 1, "Introduction", this EIR provides project-specific CEQA compliance for full secondary treatment and solids processing at the JWPCP. Other elements of the 2010 Plan are analyzed on a program level when site-specific information is unavailable or locations of sites are not identified.

SETTING

Regulatory Setting

Federal Regulations

Clean Water Act. The CWA sets effluent discharge limitations; requires states to establish and enforce water quality standards; initiates the NPDES permit program for municipal and industrial point-source dischargers; and requires NPDES permits for municipal and industrial discharges, and for stormwater discharges caused by general construction activity.

Pretreatment Program Regulations. The general pretreatment regulations, adopted as part of the CWA (40 CFR 403), require that municipal treatment plants regulate nonresidential waste discharges into public sewers. The regulations give operators of treatment plants the authority to prohibit or limit discharges of any pollutant that could pass through the treatment processes into receiving waters, interfere with treatment plant operations, or limit biosolids disposal options. The general pretreatment regulations also established categorical pretreatment standards that regulate sewer discharges from specific types of industries.

The Districts' pretreatment program began in 1972 with the adoption of the wastewater ordinance. In 1975, local effluent limits were established for industrial wastewater discharges (Los Angeles County Flood Control District 1975). These limits were initially imposed to assist in meeting State Ocean Plan standards included in the regional water quality control plan. Adoption and enforcement of local discharge limits and federal categorical standards is now a required part of the pretreatment program (County Sanitation Districts of Los Angeles County 1993a). The Districts' program was approved by the EPA and the RWQCB in March 1985. Existing and proposed local limits are presented in Appendix B.

These numerical limits for nonresidential discharges to the sewer system and the authority provided by the wastewater ordinance form the basis for control of toxic compounds and other constituents of concern that are difficult to remove using conventional wastewater treatment processes. Implementation of the pretreatment program has enabled the Districts to consistently meet NPDES permit limits at JOS treatment facilities. Monitoring and sampling is conducted for various organic compounds such as phenols, chlorinated hydrocarbons, and cyanide. The program has been very successful in reducing the discharge of constituents of concern to treatment plants, especially the JWPCP, and levels of many constituents (e.g., metals and phenols) have been reduced by 90% or more from 1975 levels (County Sanitation Districts of Los Angeles County 1993a).

Safe Drinking Water Act. The Safe Drinking Water Act established a national program for protecting drinking water supplied to municipal and industrial water suppliers. Reclaimed water that is used to recharge groundwater or is discharged to a surface water body designated as a drinking water supply are required by permit to meet drinking water standards for trace constituents. Amendments to the act instituted in 1986 require EPA to promulgate new standards for certain contaminants known or suspected to be present in drinking water, such as arsenic. New standards for many of these constituents could become more stringent than existing standards.

State Regulations

Porter-Cologne Water Quality Control Act. The Porter-Cologne Act requires the SWRCB to adopt water quality control plans for protection of water quality. The Porter-Cologne Act also provides for the issuance of waste discharge requirements (WDRs) to dischargers. When the state issues WDRs for a point-source discharge, that action also typically includes the issuance of an NPDES permit as required by the CWA. The RWQCB is responsible for administering and enforcing NPDES permits, water quality control plans, and pretreatment programs in the Los Angeles Basin.

Water Quality Control Plans. The CWA requires that water resources be protected from degradation that may occur as a result of waste discharges and requires that identified beneficial uses be maintained. The water quality control plan most applicable to District's JOS facilities is the RWQCB Water Quality Control Plan for the Los Angeles Region (Basin

Plan) (California Regional Water Quality Control Board 1994). The Enclosed Bays and Estuaries Plan and the Inland Surface Waters Plan formerly applied but were invalidated by a 1993 lawsuit.

The RWQCB Basin Plan identifies the designated beneficial uses of groundwater and surface water bodies in the region and contains water quality objectives and standards established to protect these uses. The beneficial uses for surface waters in the project area are, in general: groundwater recharge, contact and noncontact recreation, warm water aquatic habitat, and wildlife habitat. The upper and lower canyon reaches of the San Gabriel River also have designated beneficial uses of municipal and industrial water supply.

This plan contains both narrative and numeric standards and constitutes the major portion of the regulatory framework for wastewater discharges and related programs in the region. The Basin Plan provides narrative objectives for color, tastes, odors, floating material, suspended and settleable material, oil and grease, toxicity, and turbidity. Relevant numeric surface water and groundwater quality objectives from the Basin Plan, and other objectives for surface waters and groundwater designated as municipal water supply, are presented in Appendix B.

Reclaimed Water Production and Use. The production and use of reclaimed water (treated municipal wastewater) is regulated under 22 CCR Chapter 3. The regulations specify the treatment methods and other requirements for various types of reclamation. Four reuse scenarios are addressed in this discussion: landscape irrigation, discharge to surface waters used for recreation or drinking water, groundwater recharge, and industrial use. The requirements below apply to unrestricted use under these scenarios; these requirements also include the maximum treatment level specified by the regulations (tertiary).

Reclaimed water used for landscape irrigation in public areas and parks, discharge to surface waters used for recreation or drinking water, and industrial use is to be at all times adequately oxidized, coagulated, clarified, filtered, and disinfected (equivalent to tertiary treatment). Reclaimed water is to have a 7-day median number of coliform organisms not exceeding 2.2 per 100 milliliters (ml) and a maximum single value of 23 per 100 ml in any 30-day period. These and other requirements for direct nonpotable reuse are contained in reuse permits issued to each of the Districts' WRPs.

Reclaimed water requirements for groundwater recharge are set by the RWQCB, under recommendations from the DOHS. The water reclamation requirements are similar to an NPDES permit and are issued jointly to the Los Angeles County Department of Public Works (DPW), the Districts, and the Water Replenishment District. Details of the water reclamation requirements and water quality limits are presented later in this chapter.

Regional Setting

Regional Hydrology

The major hydrologic features in the JOS service area are the San Gabriel Valley and the Los Angeles Coastal Plain, as identified in the RWQCB Basin Plan for the Los Angeles region. Precipitation in the Los Angeles area is characterized by intermittent but regular rainfall during winter months, with 85% of the annual precipitation occurring between November and March (City of Los Angeles Bureau of Engineering, Department of Public Works and U.S. Environmental Protection Agency 1990). Rainfall during summer is usually negligible. Precipitation as snow is common in higher elevations of upper watersheds of the San Gabriel Mountains. Monthly precipitation totals are quite variable but usually average 10-20 inches annually (City of Los Angeles Bureau of Engineering, Department of Public Works and U.S. Environmental Protection Agency 1990). Annual precipitation is usually highest in the northeast portion of the JOS in the foothills of the San Gabriel Mountains.

Surface Water. Major rivers in the JOS service area include the San Gabriel and Los Angeles Rivers and the Rio Hondo. The major creeks include San Jose and Coyote Creeks. Other water bodies near or tributary to these streams are Big Dalton Wash, Puddingstone Wash and Reservoir, Legg Lake, Walnut Creek, and the Morris and San Gabriel Reservoirs. These major water bodies are shown in Figure 3-1.

Rio Hondo and Los Angeles River. The Rio Hondo flows southwest from its origin at the Sawpit Dam to its confluence with the Los Angeles River. The Los Angeles River flows south to the Pacific Ocean. No flow data are available for the Rio Hondo and Los Angeles River. Most of the flow in the Rio Hondo upstream of the spreading grounds is either WRP effluent or water supplied by Metropolitan Water District of Southern California (MWD) for groundwater recharge.

San Gabriel River. The San Gabriel River drains the eastern half of the Los Angeles basin and a portion of Orange County. The river flows southwesterly from its headwaters in the San Gabriel Mountains for 34 miles, forming a tidal prism before entering the Pacific Ocean at Seal Beach, at the eastern end of San Pedro Bay. In the upper portions of the watershed, river flow is underground during the dry season with surface flows in the headwaters percolating rapidly into alluvial aquifers in the San Gabriel Valley. River flow is regulated by a series of dams that reduce seasonal flow variations for flood protection and maximize conservation of water supplies. During most of the year, river flow south of the Whittier Narrows Dam consists mostly of treatment plant effluent (at least 90%), urban and nonpoint-source runoff, and industrial flows (Los Angeles County Flood Control District 1975). Mean daily flow rates for the San Gabriel River and Coyote Creek at Spring Street (Figure 3-2) are presented in Table 3-1.

The main channel of the San Gabriel River is 80-120 feet wide and contains a trapezoidal low-flow channel in the center about 2 feet deep and 10 feet wide to route

Table 3-1. Average Daily Flow Rate of the San Gabriel River and Coyote Creek at Spring Street, 1963-1994

Year	San Gabriel River Station F42B-R (cfs)	Coyote Creek Station F354-R (cfs)
1963-1964	4	11
1964-1965	12	17
1965-1966	10	33
1966-1967	37	38
1967-1968	9	27
1968-1969	286	89
1969-1970	24	23
1970-1971	27	33
1971-1972	82	--
1972-1973	71	60
1973-1974	64	38
1974-1975	48	37
1975-1976	51	25
1976-1977	55	38
1977-1978	--	128
1978-1979	--	--
1979-1980	247	126
1980-1981	61	34
1981-1982	75	56
1982-1983	221	123
1983-1984	109	44
1984-1985	116	164
1985-1986	152	76
1986-1987	113	34
1987-1988	108	47
1988-1989	91	45
1989-1990	81	19
1990-1991	78	50
1991-1992	108	62
1992-1993	381	150

Notes: Variation in average daily flow rate is largely a result of variation in annual rainfall.

cfs = cubic feet per second.
-- = no data

Source: Flow monitoring data obtained from Los Angeles County Department of Public Works.

nonstorm low flows quickly downstream. Discharges to the San Gabriel River from the San Jose Creek and Los Coyotes WRPs combined with any dry weather urban runoff and other discharges occasionally exceed the capacity of the low-flow channel in the concrete-lined portion of the river, which is approximately 93 mgd, but is as low as 67 mgd in two limited stretches where hydraulic jumps occur (bottom elevation increases relative to the upstream portion) (County Sanitation Districts of Los Angeles County 1992b). It is preferable that freshwater flows be confined to the low-flow channel during summer months because sheet flow across the entire channel width could result in increased algal growth, insect growth, and reduced water quality and odors under certain conditions (County Sanitation Districts of Los Angeles County 1992b).

San Gabriel River Tidal Prism. The San Gabriel River tidal prism is a 4.5-mile reach beginning below the river's confluence with Coyote Creek and terminating at San Pedro Bay (Figure 3-2). The tidal prism is divided into two reaches by large saline discharges from the Alamitos and Haynes power plants. The dominant hydrologic feature of the tidal prism is the discharge of cooling water to the San Gabriel River between Seventh Street and Westminster Avenue after it is drawn from Alamitos Bay by the two power plants (Figure 3-2). In a previously prepared report, the Districts designated a 1.5-mile reach above the power plants as the "critical reach" because it is directly influenced by upstream freshwater discharges, especially WRP effluents. Treatment plant effluent provides freshwater flow for biota in this area and dilutes incoming tidal flows. (Los Angeles County Flood Control District 1975.)

The salinity gradient in the critical reach is based on mixing of upstream freshwater flows from natural sources and WRP effluents with saline tidal variations and power plant discharges. The plants contributing effluent flows to this area are the Los Coyotes, San Jose Creek, and Long Beach WRPs. Tides occur diurnally, with two unequal highs and two unequal lows every 25 hours. Lower density freshwater flows float on saltwater flows and form a mixing zone. The depth of the mixing zone varies with tidal ebb and flow; however, below Seventh Street the water is completely saline. The dilution with seawater below Seventh Street is so great that effluent discharges have very little hydrologic influence on this lower reach of the tidal prism (Los Angeles County Flood Control District 1975).

Groundwater. The major groundwater basins in the JOS service area are the Los Angeles Coastal Basins (the Central Basin and West Coast Basin), the San Gabriel Valley Basins (the Main San Gabriel Basin, the Raymond Basin, the Claremont Heights Basin, the Live Oak Basin, the Spadra Basin, and the Pomona Basin), and a small portion of the upper Santa Ana Valley Basin (California Regional Water Quality Control Board, Los Angeles Region 1994). Groundwater is a significant water source for much of the area and replenishment of coastal plain aquifers is an important part of maintaining groundwater supplies. Figure 3-3 shows the groundwater elevations for the JOS service area. The use of reclaimed water for groundwater recharge began in 1962 in the Montebello Forebay area following the construction of the Whittier Narrows WRP. The Montebello Forebay area extends south from the Whittier Narrows and is the most important area for groundwater recharge in the Central Basin. Ten freshwater aquifers underlie the area (California

Regional Water Quality Control Board 1991). Imported and reclaimed water is used to reduce the problems of groundwater overdraft and seawater intrusion. In 1977, reclaimed water constituted about 10% of the total annual recharge in the Central Basin, most of which was in the percolation basins in the Montebello Forebay area (Los Angeles County Flood Control District 1975). Currently, this figure is approximately 30%.

Just south of the Whittier Narrows Dam, discharged effluent, stormwater, and river water is diverted to percolation basins alongside the San Gabriel River and the Rio Hondo, and in the unlined portion of the San Gabriel River. Below this area, aquifers are confined and cannot receive surface percolation and the San Gabriel River is lined with concrete for flood control. The Rio Hondo spreading facility is the larger recharge location, with a total of 423 wetted acres available (County Sanitation Districts of Los Angeles County 1992b). The San Gabriel River spreading grounds have approximately 90 wetted acres, and an additional 133 acres of unlined river bottom are also available for recharge.

Reclaimed Water Production and Use. The recharge program involves the Districts, the DPW, and the Water Replenishment District. The DPW owns and operates the recharge facilities, commonly referred to as the spreading grounds. The DPW operates both spreading grounds on a 21-day cycle, with an individual basin flooded for 7 days, allowed to drain the next 7 days, and then allowed to dry for 7 days to prevent mosquitos and other vectors from thriving and to restore percolation rates in basins. The Replenishment District purchases reclaimed water from the Districts and imports water supplies from the MWD, which are then mixed and spread by the DPW in the Rio Hondo and San Gabriel River percolation basins.

The five JOS WRPs that produce tertiary treated reclaimed water are the San Jose Creek, Los Coyotes, Whittier Narrows, Pomona, and Long Beach WRPs. These five WRPs produced a total of 166,030 acre-feet (af) (approximately 148 mgd) of reclaimed water in 1993-94. Of this amount, 50%, or 82,580 af, was reused. Of that amount, 69,670 af of reclaimed water was used for groundwater recharge and 12,910 af for general reuse. Reclaimed water produced at the Pomona and Whittier Narrows WRPs is almost entirely reused. Reclaimed water produced at the San Jose Creek, Long Beach, and Los Coyotes WRPs is reused at rates of 67.5%, 15.1%, and 9.8%, respectively. Studies of four of the five WRPs (all except Long Beach) have recently been conducted to evaluate the present and future operating conditions for reclaimed water production and demand based on presently planned reuse project demands.

Regional Water Quality

Regional water quality in the JOS service area is affected by a variety of discharges from point and nonpoint sources. Wastewater treatment plant effluent is the most common point-source discharge (Southern California Association of Governments 1994a). Common nonpoint sources include urban runoff, erosion, agriculture, and natural causes. Pollutants from both point and nonpoint sources include salinity, suspended solids, nutrients, heavy metals, pesticides, oil and grease, and bacteria.

Surface Water

Impaired Water Bodies. The water quality of several of the major water bodies in the area is known or suspected to be impaired and some beneficial uses may not be attained. Both the Rio Hondo and the San Gabriel River are listed as impaired in some reaches by the SWRCB and the California Environmental Protection Agency. A 20-mile reach of the Rio Hondo above the Whittier Narrows Dam is suspected to be impaired because of the presence of heavy metals and conventional pollutants from nonpoint sources (California State Water Resources Control Board 1990a). A 17-mile reach of the lower San Gabriel River is impaired as a result of pesticides and heavy metals from suspected nonpoint sources (California Environmental Protection Agency and California State Water Resources Control Board 1992). Data on fish (tilapia) samples collected from the San Gabriel River showed elevated levels of copper and silver relative to data collected in other areas of the state (California Environmental Protection Agency and California State Water Resources Control Board 1992).

San Gabriel River and Tidal Prism. The main water quality concern for this system is associated with the critical reach of the San Gabriel River tidal prism. Historically, this section of the river has had low levels of dissolved oxygen and high coliform bacteria counts. A 1976 study by the Districts concluded that WRP discharges were not a cause of these conditions. Instead, dairy runoff, urban runoff, and industrial discharges flowing down Coyote Creek were identified as the major causes (Los Angeles County Flood Control District 1975).

In 1972 and 1975 the Districts conducted water quality studies to evaluate the combined effects of discharges into this reach. These studies showed that WRP discharges tend to stabilize and improve dissolved oxygen levels, reduce pH fluctuations, and reduce coliform bacteria counts (Los Angeles County Flood Control District 1975). Average dissolved oxygen levels have been 6-7 milligrams per liter (mg/l); levels increase with WRP discharges of 40 mgd or more and are above the NPDES permit minimum of 5 mg/l virtually all the time.

WRP effluents typically contain 15-25 mg/l total nitrogen and 3-12 mg/l total phosphate, which can stimulate algal growth and contribute to eutrophication of waterways. WRP discharges substantially increase nutrient levels above background levels; however, nutrient levels in Coyote Creek upstream of WRP discharge are also high and exceed levels that cause algal growth.

The RWQCB has set a chlorine residual limit of 0.1 mg/l at the beginning of the transition from lined to unlined channel, which is routinely met by discharges from the Los Coyotes, San Jose Creek, and Long Beach WRPs. Chlorine, which is used as a disinfectant during treatment, is fully dissipated by the time the flow reaches the tidal prism (County Sanitation Districts of Los Angeles County 1992b).

Sessile and floating algae are important to both the biota and water quality of the river and tidal prism. Oxygen deficiencies or supersaturation can result from the presence of high numbers of algae. The upper reaches of the river are characterized by large populations of a few species of small freshwater algae. The more saline region, from below Seventh Street to San Pedro Bay, is dominated by smaller but more diverse populations of marine species. These two communities mix in the critical reach between the lined channel and Seventh Street (Figure 3-2), where freshwater flows mix with saline tidal waters (County Sanitation Districts of Los Angeles County 1988). Problems with algal blooms have not been identified in the tidal prism, most likely because of the low residence time in this reach (Los Angeles County Flood Control District 1975).

The discharge of compounds such as ammonia, heavy metals, and pesticides into the tidal prism have the potential to cause problems for the biota. With the exception of ammonia, historical data have shown that urban and nonpoint-source runoff has generally contributed higher amounts of these chemical compounds than have WRP effluents. In general, levels of pesticides and metals in Coyote Creek were higher than levels of these compounds in the natural flow of the San Gabriel River and in WRP effluents.

With the exception of selenium, mercury, and cyanide, historical WRP contributions of metals to the tidal prism have constituted much less than 50% of the total load. Pesticides in WRP effluents constituted only 30% of the total discharge to the tidal prism. Neither pesticides nor metals were reported to be a problem currently.

Un-ionized ammonia concentrations have ranged from 0.01 mg/l to 0.66 mg/l (as nitrogen). No adverse effects from ammonia discharges have been noted: dense populations of tilapia and a variety of bird species thrive in the tidal prism. The RWQCB has adopted ammonia standards that are potentially applicable to all inland surface waters. The standards are dependent on pH and temperature for waters designated as either cold or warm. Application of the standards would depend on the beneficial uses of the river (California Regional Water Quality Control Board 1994).

Long-term accumulation of heavy metals and pesticides in sediments of the tidal prism would be a potential concern. However, these substances do not accumulate over a long period because wet season flows in the San Gabriel River scour the river bottom and flush accumulated sediment to the ocean (County Sanitation Districts of Los Angeles County 1992b).

Groundwater. Groundwater pollutant types and sources are similar to those of surface waters. Contamination from common industrial solvents and nitrates has been found in many areas of Los Angeles County. Groundwater in portions of the coastal basins is highly saline because of seawater intrusion resulting from groundwater pumping. Groundwater in some portions of the Los Angeles Coastal Basin has shown high salinity values and concentrations of minerals such as chloride, nitrate, and sulfate (Southern California Association of Governments 1994a). Phosphate concentrations are also high in this groundwater basin.

San Gabriel Valley groundwater has had elevated levels of nitrates and metals, especially copper and zinc (Southern California Association of Governments 1993a). The San Gabriel Valley Basin is also classified as a "Superfund" site by EPA. Many water supply wells in the San Gabriel Valley Basin contain chlorinated solvents. In an investigation into the presence of the most common contaminants in area wells, 195 wells throughout the San Gabriel Valley Basin were sampled (CH2M Hill 1987). The results of the investigation are summarized in Table 3-2.

Table 3-2. Organic Contaminants in San Gabriel Basin Wells

Compound	Number of Wells Contaminated	Highest Reported Concentration (μg/l)
Trichloroethylene	89	1,100
Perchloroethylene	67	500
1,1-Dichloroethylene	25	96
1,1,1-Trichloroethane	21	170
Chloroform	18	25
Benzene	none	--

Note: μg/l = micrograms per liter.

Source: CH2M Hill 1987.

The summary of sampling results shows that trichloroethylene (TCE) was found in 89 wells and perchloroethylene (PCE) in 67 wells. Benzene, a very volatile contaminant by contrast, was not found in any wells.

Groundwater quality issues related to the use of reclaimed water for recharge are discussed later in this chapter.

Groundwater Recharge with Reclaimed Water (Central Basin). To protect basin water quality and beneficial uses designated in the Basin Plan, the RWQCB establishes the maximum amount of reclaimed water allowed to be used for groundwater recharge. Until 1987, the maximum was 32,700 af/yr (29.2 mgd). In 1987, RWQCB issued new water reclamation requirements that allowed a 15% increase in the amount of recharge in water year 1986-87, to 37,700 af/yr (33.7 mgd). The new RWQCB requirements also allowed increases to 42,700 af/yr (38.1 mgd) in 1987-88 and 50,000 af/yr (44.6 mgd) in 1988-89 and each water year thereafter, if acceptable to RWQCB (County Sanitation Districts of Los Angeles County 1992b). In 1991, the RWQCB reissued new water reclamation requirements that allowed an average quantity of groundwater recharge with reclaimed water at the Montebello Forebay of up to 50,000 af/yr (or 35% of total inflow to the Montebello Forebay) over a 3-year period, and a maximum of 60,000 af/yr (or 50% of the total inflow to the Montebello Forebay) in any one year (California Regional Water Quality Control Board

1991). The Water Replenishment District of Southern California would like to expand the amount of reclaimed water recharged to 75,000 af/yr (Helsley pers. comm.).

Approval of the increase from 32,700 af/yr to 50,000 af/yr was based on the results of a 1984 study of the health effects of groundwater recharge, which demonstrated that the historical level of recharge had no measurable impact on either groundwater quality or the health of individuals drinking the water (County Sanitation Districts of Los Angeles County 1984). Currently, reclaimed water used for groundwater recharge must comply with water reclamation requirement limits and the rigorous monitoring program established in the new RWQCB requirements. The limits and monitoring program are discussed in detail later in this chapter.

Biological Resources in the San Gabriel River and Tidal Prism

Although no areas of special biological significance have been designated along the San Gabriel tidal prism, the waterway is considered an ecologically important watershed because of the habitat it provides for species. Reclaimed water and saline thermal effluent discharged into receiving waters support diverse flora and fauna. The freshwater zone (to the end of the concrete lining) consists mostly of the Districts' reclaimed water, and hosts freshwater algae and invertebrates. Brackish water communities occur in the unlined region of estuarine tidal action, where organisms must tolerate cycles in salinity, temperature, oxygen, and organic matter. Marine communities of the lower San Gabriel River, where most of the water consists of saline power plant discharges, are more diverse.

Rainstorms and heavy runoff, which occur irregularly, usually in winter, greatly affect the San Gabriel tidal prism biota. The portion of the river lined with concrete is scoured clean of attached algae, which are an important food source that usually sloughs off slowly from upstream areas and floats to the tidal wedge. During storms, sediment quality also changes dramatically: sediments and organic matter are often washed away, along with most of the biota.

Benthic Communities. Benthic animals along the San Gabriel River generally include tube-dwelling worms and crustaceans. The diversity and number of species found vary greatly depending on local salinity conditions and predation. The lined portion of the San Gabriel River does not accumulate sediment; thus, benthic samples are not taken. Large freshwater populations (oligochaete worms and chironomid insect larvae) are collected only in Coyote Creek, above the Long Beach WRP. Smaller population densities occur at the junction of the San Gabriel River and Coyote Creek. Few sediment dwellers are found along the river near the San Diego freeway, likely because of salinity fluctuations and large populations of tilapia that eat invertebrates and completely disturb surface sediments.

Rainstorms and associated riverbed scouring and salinity changes periodically destroy benthic communities, at least down to the area north of Seventh Street. Recolonization following such disturbances is rapid (Stone and Reish 1965). The richest benthic communities develop following dry winters and springs.

Fish. The Mozambique tilapia (*Oreochromis mossambica*) is the dominant fish in the tidal prism. It is an important food resource for birds, which congregate in the tidal prism area, and it is commonly taken by anglers. The tilapia, which is a non-native species, was introduced to Coyote Creek, and its aggressive territorial nature and great productivity allowed it to quickly displace the native fish populations from the area; by 1976, tilapia had established dominance. California Department of Fish and Game surveys have found that more than 99% of all fish in the tidal prism are tilapia.

Tilapia normally live in 52°F to 100°F (11-38°C) water, with optimum growth around 86°F (30°C) (St. Amant 1966). Many die if the temperature falls below 54°F (12°C) for long periods (Hoover 1971). In the San Gabriel River, tilapia spend the winter months further down river, closer to the power plants where the water is warmer. Tilapia are largely herbivorous and feed primarily on algae, but they also feed on other aquatic plants, invertebrates, or other small fish.

Birds. The San Gabriel River is an important regional habitat for birds. Flyways exist between the river, Whittier Narrows, and other sites with surface water. The upper tidal prism is used by many shorebirds, particularly from the San Gabriel River/Coyote Creek confluence to the San Diego freeway area. Waterfowl are attracted by rich food supplies, including tilapia, algae, and insects, found in the relatively shallow water. The habitat is ideal for birds that feed on the wing by plunge diving, or by shallow diving, or from a wading position. Waterfowl are not known to congregate in such large numbers elsewhere on the river.

Year-round resident birds generally sighted daily include great blue heron, common egret, snowy egret, green heron, black-crowned night heron, black-necked stilt, American coot, mallard duck, Caspian tern, ring-billed gull, least sandpiper, and brown pelican.

Sightings throughout the year include osprey, common raven, double-crested cormorant, Forster's tern, common tern, California gull, Western gull, red-winged blackbird, western grebe, pied-billed grebe, and black skimmer. Winter migrants, occasionally sighted at specific times of the year, include pintail duck, American widgeon, cinnamon teal, and green-winged teal. Peregrine falcon, white-tailed kite, cattle egret, and white pelican are sighted once or twice a year.

Joint Water Pollution Control Plant

Hydrology

The major hydrologic feature associated with the JWPCP is the Wilmington Drain, a storm drain that was constructed after 1975 along the west side of the plant. Before construction of the drain, lowlands in the JWPCP area were prone to natural winter flooding; the area is no longer subject to flooding or drainage problems and is not in a 100-year floodplain. The Wilmington Drain is located in a natural wetland area known as Bixby Slough, and portions of this area were maintained as a condition of drain construction. The drain collects runoff from a 19.7-square-mile area upstream and routes it around the JWPCP marsh north of the plant site to the Lomita Marsh west of the plant, then across I-110 and into Harbor Lake (Los Angeles County Flood Control District 1975). Runoff from incident precipitation in developed areas along Figueroa Boulevard and I-110, including the JWPCP, flows into the Lomita Marsh-Greenbelt area.

Area soils have a high clay content and infiltration capacity is minimal (see Chapter 11, "Botanical and Wildlife Resources", for a description of soils and vegetative resources at the JWPCP marsh). Perched groundwater is also common in this area (Los Angeles County Flood Control District 1975).

Water Quality

Runoff. The ponding and subsequent evaporation of runoff flow from the JWPCP vicinity results in the deposition and concentration of solids and other materials in the JWPCP marsh. The initial winter storms convey materials to Harbor Lake, which has water quality that is highly influenced by the runoff inflow collected by the Wilmington Drain from the 19.7-square-mile drainage area and subsequent evaporation. Concentrations of total dissolved solids (TDS) in the lake can range from 450 mg/l in winter to more than 900 mg/l in late summer. The inflow from the drain has not been observed to have any adverse effects on the water quality of Harbor Lake (Los Angeles County Flood Control District 1975).

Effluent. Most water quality issues associated with the JWPCP relate to historical wastewater discharges via the ocean outfall and ambient marine water quality conditions. These issues are addressed in Chapter 5, "Marine Environment". Factors affecting JWPCP effluent quality include the influent strength and character, which are determined by upstream plant discharges, pretreatment of industrial discharges, plant operating conditions, and NPDES permit limits. JWPCP influent is considered "high strength" because of the combined wastes received from upstream plants and the influence of industrial discharges. The JWPCP service area has a high concentration of industrial discharges, and the JOS has developed such that industrial discharges in the inland areas of the JOS service area are generally routed around WRPs for treatment at the JWPCP.

Influent and effluent water quality data for the JWPCP in 1993 are presented in Table 3-3. Concentrations of total suspended solids (TSS) in influent flows averaged 449 mg/l; effluent concentrations averaged 63 mg/l.

National Pollutant Discharge Elimination System Permit Requirements for Inland WRPs

This summary of NPDES permit requirements is applicable to the Los Coyotes, San Jose Creek, and Whittier Narrows WRPs. Existing local hydrology and water quality condi-

Table 3-3. Parameters Monitored for Influent and Effluent Water Quality at the JOS Treatment Plants (1993)

Constituents	Units	JWPCP		San Jose Creek WRP East (62.5 mgd)		San Jose Creek WRP West (37.5 mgd)		Los Coyotes WRP		Whittier Narrows WRP	
		Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
Average flow		--	321	--	52.0	--	22.9	--	33.27	--	11.25
Peak flow		--	433	--	82.9	--	34.5	--	46.2	--	16.3
pH		7.42	7.51	--	6.86	--	7.09	--	7.34	--	7.13
TSS[a]	mg/l	449	63.1	296	2	280	<2	449	2	250	2
TDS[b]	mg/l	1446	1452	--	631	--	601	--	843	--	526
Conductance	μmhos/cm	2580	2648	--	1,108	--	18	--	--	--	938
COD[c]	mg/l	794	225	562	29	484	27	762	40	458	31
BOD[d]	mg/l	360	88	271	12	235	6	325	6	216	7
Total alkalinity	mg/l $CaCO_3$	327.2	331.8	--	199	--	204	--	267.3	--	222
Chloride	mg/l	415.0	425.4	--	128.3	--	112.8	--	204.8	--	93.8
Sulfate	mg/l	338.2	341.2	--	136.7	--	129.2	--	187.0	--	116.1
Nitrate	mg/l N	0.04	0.29	--	2.7	--	3.24	--	0.50	--	1.10
Nitrite	mg/l N	<0.01	0.2	--	1.6	--	0.6	--	0.7	--	1.0
Ammonia	mg/l N	29.6	34.9	20.4	8.0	21.3	8.9	24.3	17.6	21.5	14.6
Organic nitrogen	mg/l N	20.9	6.6	--	1.2	--	1.6	--	2.1	--	1.7
Phosphate	mg/l	10.0	4.2	--	2.8	--	11.6	--	5.1	--	8.6
Fluoride	mg/l	2.3	2.1	--	0.6	--	0.7	0.8	0.7	--	0.8
Cyanide	mg/l	0.0125	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total hardness	mg/l $CaCO_3$	321.2	331.4	--	237	--	226.5	--	281.7	--	199.8
Arsenic	mg/l	0.0049	0.0027	0.0025	0.0021	0.002	0.0039	0.0045	0.0023	0.0025	0.00275
Cadmium	mg/l	0.0032	0.0011	<0.0065	<0.005	<0.01	<0.0056	<0.01	<0.01	0.015	<0.0065
Chromium	mg/l	0.0444	0.0112	<0.02	<0.02	0.02	<0.02	0.025	<0.02	0.02	<0.02
Copper	mg/l	0.154	0.024	0.075	<0.02	0.075	<0.02	0.13	<0.02	0.055	<0.02
Iron	mg/l	10.26	2.41	--	0.0675	--	0.0463	--	0.165	--	0.03
Lead	mg/l	0.0302	0.0084	<0.04	<0.003	0.055	<0.003	0.045	<0.04	0.04	<0.002
Mercury	mg/l	0.0008	<0.0005	0.0002	<0.0001	0.0002	<0.0001	0.0009	0.00024	0.0005	<0.0001
Nickel	mg/l	0.0638	0.0387	0.03	<0.03	<0.03	<0.03	0.12	<0.03	<0.03	<.03
Selenium	mg/l	0.0232	0.0134	0.0177	0.009	0.0177	<0.0026	0.0187	0.0017	0.0233	0.0097
Silver	mg/l	0.0159	0.0064	0.008	<0.005	0.014	<0.005	0.012	<0.005	0.0065	<0.005
Zinc	mg/l	0.374	0.0861	0.325	0.0625	0.175	0.0425	0.385	0.049	0.215	0.1125
Total phenols	mg/l	0.846	0.410	--	0.004	--	0.006	--	0.007	--	0.007
TICH[e]	mg/l	--	--	--	0.04	--	0.03	--	0.04	--	0.04
Coliform	MPN[f]/100 ml	--	<1	--	<1	--	<1	--	<1	--	<1

Note: -- = data unavailable.

[a] TSS = total suspended solids.
[b] TDS = total dissolved solids.
[c] COD = chemical oxygen demand.
[d] BOD = biochemical oxygen demand.
[e] TICH = total identifiable chlorinated hydrocarbons.
[f] MPN = most probable number.

Source: County Sanitation Districts of Los Angeles County 1992b.

tions for each of these WRPs are described later in this chapter. An NPDES permit contains a regulatory authorization, a list of general provisions, effluent limitations, and monitoring and reporting requirements for WRP effluent and receiving waters. The San Jose Creek WRP historically has had the most stringent conditions and limitations; those for the Whittier Narrows and Los Coyotes WRPs have recently been upgraded to be equally stringent. The RWQCB determines effluent limits after assessing the level of treatment (i.e., tertiary), dilution factors, other area discharges, and beneficial uses of the receiving water. The RWQCB may allow a mixing zone, or zone of dilution with a specific part of the receiving water, on a case-by-case basis. The typical list of effluent constituents and limitations is presented in Table 3-4.

To meet monitoring requirements, each individual discharge point is sampled in a representative location. Parameters monitored continuously include flow, turbidity, and chlorine residual. Coliform bacteria, TSS, and TDS are monitored daily. Other parameters, such as metals, organics, and pesticides, are monitored monthly or quarterly using 24-hour composite samples. All WRPs also conduct chronic toxicity tests each quarter using the most sensitive of three test species.

Monitoring requirements for receiving waters specify the exact locations and frequency of sampling at locations above and below discharge points. In general, constituents of concern in effluent are also monitored in the receiving waters. Monitoring is conducted quarterly or semiannually with the frequency depending on the constituent. There are nine monitoring stations in the San Gabriel River, two in San Jose Creek, and two in Coyote Creek. Extensive marine monitoring of this discharge zone is also required; there are three near-shore stations between the San Gabriel River and Alamitos Bay, and three stations in the ocean.

Pretreatment program requirements are also included as a condition of the permits for these three plants. The existing NPDES permits are all up for reevaluation and renewal by the RWQCB by the end of 1994.

Los Coyotes Water Reclamation Plant

Hydrology

The major hydrologic feature associated with the Los Coyotes WRP is the concrete-lined portion of the San Gabriel River below Whittier Narrows Dam and immediately west of the plant. Flow in this reach of the San Gabriel River is regulated by the Whittier Narrows Dam and a series of other upstream dams discussed below. Tertiary treated effluent is discharged primarily to the river and only 5%-10% of plant effluent is generally reused.

The main hydrologic fact associated with the Los Coyotes WRP is its contribution to the potential for exceeding the capacity of the low-flow channel of the river, as described

Table 3-4. Discharge Limitations for Effluent Constituents at WRPs, in mg/l

Constituents	30-Day Average	7-Day Average	Daily Maximum
BOD at 20°C	20	30	45
Suspended solids	15	40	45
Settlable solids	0.1	--	0.3
Oil and grease	10	--	15
Total dissolved solids	--	--	750
Sulfate	--	--	300
Chloride	--		150
Nitrate-N plus nitrate-N	--	--	10
Fluoride	--	--	1.6
Arsenic	--	--	0.05
Barium	--	--	1.0
Cadmium	--	--	0.01
Total chromium	--	--	0.05
Copper	--	--	1.0
Iron	--	--	0.3
Lead	--	--	0.05
Mercury	--	--	0.002
Selenium	--	--	0.01
Silver	--	--	0.05
Zinc	--	--	5.0
Residual chlorine	--	--	0.1
Chlorinated hydrocarbons			
Endrin	--	--	0.0002
Lindane	--	--	0.004
Methoxychlor	--	--	0.1
Toxaphene	--	--	0.005
Chlorophenoxys			
2, 4-D	--	--	0.1
2, 4, 5-TB (silvex)	--	--	0.01

Notes: Numerical limits may vary slightly at some WRPs.

-- = data unavailable.
BOD = biochemical oxygen demand.
N = nitrogen.

Other Conditions:

- The acute toxicity of the effluent shall be such that the average survival in the undiluted effluent for any three consecutive 96-hour static or continuous flow bioassay tests shall be at least 90%, with no single test resulting in less than 70% survival.

- The arithmetic mean of BOD 20°C and suspended solids values *by weight* for effluent samples collected in a period of 30 consecutive calendar days shall not exceed 15% of the arithmetic mean of values *by weight* for influent samples collected at approximately the same time during the same period.

- Wastes discharged to watercourses shall be adequately disinfected at all times. For the purpose of these requirements, the wastes shall be considered adequately disinfected if the median number of coliform organisms at some point in the treatment process does not exceed 2.2 per 100 millimeters, and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within any 30-day period. The median value shall be determined from the bacteriological results of the last 7 days for which analyses have been completed. Samples shall be collected at a time when wastewater flow and characteristics are most demanding on treatment facilities and disinfection processes.

- Wastes discharged to watercourses shall have received treatment equivalent to that of filtered wastewater.

above under "Regional Hydrology". In 1993, the Los Coyotes WRP discharge generally ranged from 20 mgd to 40 mgd from April to November. The combined effluent flow exceeded the rated maximum capacity of the low-flow channel of 93 mgd in April, May, and parts of June. San Jose Creek WRP effluent contributed to this flow.

Water Quality

Water quality of the concrete-lined section of the San Gabriel River is affected by the same point and nonpoint sources described above under "Regional Water Quality". The two main types of discharges in this reach of the San Gabriel River are WRP effluent and urban runoff. The San Gabriel River is one of the major contributors of pollutant loading to the Southern California Bight, via the tidal prism and Alamitos Bay. Urban runoff is considered to be a major contributor to degradation of water quality of most surface waters flowing to the Southern California Bight, including the San Gabriel River (Southern California Coastal Water Research Project 1992b).

Constituent Loadings in the San Gabriel River. Suspended solids, copper, lead, and zinc have the highest constituent loadings in this reach of the San Gabriel River, with the levels of TSS being substantially higher than all other reaches of river. In 2 years of sampling (1986-88), the San Gabriel River contributed 25-45% of the total amount of TSS, 20-36% of the total amount of copper, and 16-34% of the total amount of lead discharged to the Southern California Bight from all channels and streams (Southern California Coastal Water Research Project 1992b). These data include flow from Coyote Creek.

Data considered representative of this reach of the San Gabriel River were obtained from a sampling location above the confluence with Coyote Creek and are presented in Table 3-5. The data show coliform bacteria, salinity, ammonia, and phosphates. Arsenic and zinc were detected in all sampling periods. Other metals were not detected. Oil and grease, a common constituent of concern in urban runoff, was detected. Phenols and hexachlorocyclohexane (HCH) were also found during at least one sampling period.

Flow from Coyote Creek. This reach of the river (below the confluence with Coyote Creek) is also affected by flow from Coyote Creek. Coyote Creek water quality data are presented in Table 3-6. Constituents detected in Coyote Creek samples were similar to those in the San Gabriel River samples. Data for Coyote Creek were higher than those for the San Gabriel River for almost all constituents, indicating the presence of nonwastewater discharge from urban runoff, dairies, and other nonpoint sources. Constituents at high levels include nutrients (nitrates), ammonia, and coliform bacteria. Conductance values were fairly high, considering that Coyote Creek is a freshwater stream, averaging 1,373 micromhos (μmhos) for the period. Phenols and HCH were detected in all sampling periods.

The water quality of the Los Coyotes WRP discharge is presented in Table 3-3. Biochemical oxygen demand (BOD) and chemical oxygen demand (COD) levels were lower, in general, than in receiving waters. Nitrate and phosphate levels were much lower than in

Table 3-5. Water Quality Data - San Gabriel River 1992 (Station R-9-W)

Constituents	February	May	August	November	Mean[a]
Residual chlorine (mg/l)	<0.05	<0.05	<0.05	<0.1	<0.06
Temperature (°C)	20.5	22.3	25.2	24.3	23.1
Dissolved oxygen (mg/l)	13	6.8	8.3	15	10.8
pH	7.94	8.27	7.73	7.75	7.92
Conductance (μmhos)	1,280	1,330	1,110	1,260	1,245
Coliform (MPN[b]/100 ml)	3,300	160,000	13,000	4,900	45,300
Nitrate N[c], mg/l N	0.95	2.1	1.93	2.44	1.86
Nitrite N, mg/l N	2.39	1.37	0.719	2.56	1.76
Ammonia N, mg/l N	9.87	11.5	6.5	6.7	8.64
Organic N, mg/l n	1.96	2.52	1.5	1.4	1.85
Total N, mg/l N	15.2	17.5	10.6	13.1	14.1
Phosphate, mg/l PO_4	15.5	18.9	15.3	12.9	15.65
Oil and grease, mg/l	<1.0	<1.0	<1.0	1.0	<1.0
BOD[d], mg/l	23	9	7	10	12
COD[e], mg/l	47	50	34	35	42
Arsenic, mg/l	0.003	--	0.005	--	0.004
Cadmium, mg/l	<0.003	--	<0.01	--	<0.007
Total chromium, mg/l	<0.02	--	<0.02	--	<0.02
Copper, mg/l	<0.02	--	<0.02	--	<0.02
Lead, mg/l	<0.04	--	<0.04	--	<0.04
Mercury, mg/l	<0.0001	--	<0.0001	--	<0.0001
Nickel, mg/l	<0.03	--	<0.03	--	<0.03
Cyanide, mg/l	<0.01	--	<0.01	--	<0.01
Phenols, mg/l	0.006	--	0.002	--	<0.004
Aldrin, μg/l	<0.01	--	<0.01	--	<0.01
Dieldrin, μg/l	<0.01	--	<0.01	--	<0.01
Endrin, μg/l	<0.01	--	<0.01	--	<0.01
HCH[f], μg/l	0.05	--	0.04	--	0.05
Chlordane, μg/l	ND[g]	--	ND	--	ND
Toxaphene, μg/l	<5	--	<5	--	<5
Total PCBs[h], μg/l	ND	--	ND	--	ND
Total DDTs, μg/l	ND	--	ND	--	ND
Total PAHs[i], μg/l	ND	--	ND	--	ND

Note: -- = no data.

[a] Value for coliform is for annual median.
[b] MPN = most probable number.
[c] N = nitrogen.
[d] BOD = biochemical oxygen demand.
[e] COD = chemical oxygen demand.
[f] HCH = hexachlorocyclohexane.
[g] ND = Not detected.
[h] PCBs = polychlorinated biphenyls.
[i] PAH = polynuclear aromatic hydrocarbons.

Source: County Sanitation Districts of Los Angeles County 1993a.

Table 3-6. Water Quality Data - Coyote Creek at Confluence with the San Gabriel River 1992 (Station R-A)

Constituents	February	May	August	November	Mean[a]
Residual chlorine (mg/l)		<0.05	<0.05		<0.05
Temperature (°C)	21.0	22.7	25.5	24.8	23.5
Dissolved oxygen (mg/l)	9.4	8.3	9.5	11.4	9.7
pH	7.65	8.04	7.71	7.60	7.75
Conductance (μmhos)	1,380	1,210	1,600	1,300	1,372.5
Coliform (MPN[b]/100 ml)	7,000	3,500	7,900	3,100	5,375
Nitrate N[c], mg/l N	4.62	1.31	0.61	4.2	2.69
Nitrite N, mg/l N	1.26	1.77	0.872	0.86	1.19
Ammonia N, mg/l N	14.4	6.3	9.9	6.9	9.38
Organic N, mg/l n	1.86	1.75	1.9	1.4	1.73
Total N, mg/l N	22.1	11.1	13.3	13.4	15.0
Phosphate, mg/l PO_4	20.4	8.2	49.8	3.67	20.5
Oil and grease, mg/l	1.1	<1.0	2.2	1.3	<1.4
BOD[d], mg/l	20	6	14	6	12
COD[e], mg/l	18	34	39	32	31
Arsenic, mg/l	0.007	--	0.008	--	0.008
Cadmium, mg/l	<0.003	--	<0.01	--	<0.007
Total chromium, mg/l	<0.02	--	<0.02	--	<0.02
Copper, mg/l	<0.02	--	<0.02	--	<0.02
Lead, mg/l	<0.04	--	<0.04	--	<0.04
Mercury, mg/l	<0.0001	--	<0.0001	--	<0.0001
Nickel, mg/l	<0.03	--	<0.03	--	<0.03
Zinc, mg/l	0.04	--	0.05	--	0.05
Cyanide, mg/l	<0.01	--	<0.01	--	<0.01
Phenols, mg/l	0.001	--	0.004	--	0.003
Aldrin, μg/l	<0.01	--	<0.01	--	<0.01
Dieldrin, μg/l	<0.01	--	<0.01	--	<0.01
Endrin, μg/l	<0.01	--	0.01	--	<0.01
HCH[f], μg/l	0.03	--	0.02	--	0.03
Chlordane, μg/l	ND[g]	--	ND	--	ND
Toxaphene, μg/l	<5	--	<5	--	<5
Total PCBs[h], μg/l	ND	--	ND	--	ND
Total DDTs, μg/l	ND	--	ND	--	ND
Total PAHs[i], μg/l	ND	--	ND	--	ND

Note: -- = no data.

[a] Value for coliform is for annual median.
[b] MPN = most probable number.
[c] N = nitrogen.
[d] BOD = biochemical oxygen demand.
[e] COD = chemical oxygen demand.
[f] HCH = hexachlorocyclohexane.
[g] ND = not detected.
[h] PCBs = polychlorinated biphenyls.
[i] PAH = polynuclear aromatic hydrocarbons.

Source: County Sanitation Districts of Los Angeles County 1993a.

both the San Gabriel River and Coyote Creek, although organic nitrogen values were similar. Levels of metals were similar to those of the San Gabriel River and Coyote Creek, but arsenic values were lower than those detected in Coyote Creek. Ammonia levels were high, almost twice those of receiving water in most samples; this is the only obvious constituent that the WRP contributes in significant quantities that has an obvious impact on the water quality of the San Gabriel River. The phenols value of 0.007 mg/l was slightly higher than both receiving water values. Values for total identifiable chlorinated hydrocarbons (TICH) averaged 0.04 mg/l; however, this constituent is actually the total amount of several chlorinated compounds (see Appendix B for a discussion of TICH). The higher values of some constituents, relative to those of the other WRPs, is indicative of the higher industrial waste flow the plant receives.

San Jose Creek Water Reclamation Plant

Hydrology

The San Jose Creek WRP, which is divided into the San Jose Creek WRP East, located east of the San Gabriel River Freeway, and the San Jose Creek WRP West, located west of the San Gabriel River Freeway, is adjacent to San Jose Creek just southeast of its confluence with the San Gabriel River above Whittier Narrows Dam. This reach of the San Gabriel River drains the entire upper San Gabriel River drainage area; flow is regulated by the Santa Fe, Morris, and San Gabriel Dams in the upstream watershed.

San Jose Creek drains the San Jose Hills and Puente Hills areas. Puente, Lincoln, and Diamond Bar Creeks are all tributary to San Jose Creek above the San Jose Creek WRP. The Pomona WRP also discharges to the south fork of San Jose Creek in the upper watershed.

The San Jose Creek WRP has four effluent discharge points:

- an outfall that discharges at the beginning of the concrete-lined San Gabriel River below the Whittier Narrows Dam;
- a diversion from the outfall line to the unlined portion of the San Gabriel River for groundwater recharge;
- a direct discharge to San Jose Creek from the San Jose Creek WRP East, which flows into the unlined San Gabriel River above Whittier Narrows Dam; and
- a direct discharge to the unlined San Gabriel River from the San Jose Creek WRP West.

The DPW Flood Control Division has a diversion in the outfall line that allows effluent to be released into the unlined portion of the San Gabriel River. This water, in addition to any effluent discharged to San Jose Creek, can be used for groundwater recharge in the recharge basins. The Zone 1 ditch is an unlined channel that is used to route flow from the unlined San Gabriel River to the Rio Hondo, where the other recharge basin is located. The Rio Hondo is discussed further below under "Whittier Narrows Water Reclamation Plant". The Replenishment District decides how much water is needed for recharge and indicates the locations to which the Division should route effluent flows.

The main hydrologic issue associated with the San Jose Creek WRP is the potential exceedance of the low-flow channel capacity of the San Gabriel River, as described above for the Los Coyotes WRP. The San Jose Creek WRP discharge ranged generally from 0 mgd to 80 mgd between April 1993 and November 1993, with the amount discharged depending on the demand for reclaimed water (County Sanitation Districts of Los Angeles County 1992b). The maximum discharge to the river occurred during April and May, when demand for reclaimed water was lowest.

Water Quality

Effluent discharged to the San Gabriel River receiving water locations is a combination of effluent from the two plants (East and West); discharge to San Jose Creek is from the San Jose Creek WRP East only. The water quality of the San Jose Creek WRP discharges is presented in Table 3-3. Ammonia levels in both discharges were the lowest of all WRPs, at 8 mg/l (San Jose Creek WRP East) and 8.9 mg/l (San Jose Creek WRP West). The ranges of levels of most metals were similar to those of the other inland WRPs. Phenols and TICH were detected in the effluent from the San Jose Creek WRP West, as in the effluent from the Los Coyotes and Whittier Narrows WRPs, but all samples met all federal and state drinking water standards.

San Gabriel River. The two main types of discharges in the upper reach of the San Gabriel River are WRP effluent and urban runoff. Water quality of the concrete-lined section of the San Gabriel River is assumed to be similar to that described above for the Los Coyotes WRP because both facilities discharge to similar points in the river (Figure 3-2). Both WRPs also have a common discharge monitoring station in this reach of the river, Station R9W (Table 3-5).

San Jose Creek. Table 3-7 presents data on the ambient water quality of San Jose Creek in 1992. The data indicate high coliform bacteria counts, but the levels of other constituents are lower overall than in the San Gabriel River or Coyote Creek data. Nutrients were lower in general, and levels of phosphate were substantially lower. Some amounts of arsenic, HCH, and phenols were detected; however, detection limits for metals were high, as in the previous data sets. The sampling station is above San Jose Creek WRP approximately 15 miles below Pomona WRP.

Table 3-7. Water Quality Data for San Jose Creek above the San Jose Creek WRP (Station C-1)

Constituents	February	May	August	November	Mean
Residual chlorine (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05
Temperature (°C)	13.0	17.3	21.0	13.0	16.1
Dissolved oxygen (mg/l)	8.8	5.6	3.3	11.6	7.3
pH	8.29	8.41		8.51	8.40
Conductance (μmhos)	1,570	1,540	1,370	1,120	1,140
Coliform (MPN/100 ml)	16,000	240,000	13,000	70,500	5,375[a]
Nitrate N, mg/l N	4.28	0.5	0.16	1.41	2.69
Nitrite N, mg/l N	0.10	0.16	0.328	0.06	0.162
Ammonia N, mg/l N	0.56	<0.01	2.1	<0.1	<0.69
Organic N, mg/l n	1.05	2.1	1.6	0.3	1.26
Total N, mg/l N	5.99	2.76	4.19	1.05	3.50
Phosphate, mg/l PO_4	0.38	1.07	1.56	0.48	0.87
Oil and grease, mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
BOD, mg/l	3	8	6	3	5
COD, mg/l	14	44	39	10	27
Arsenic, mg/l	0.002	--	0.002	--	0.002
Cadmium, mg/l	<0.003	--	<0.003	--	<0.003
Total chromium, mg/l	<0.02	--	<0.02	--	<0.02
Copper, mg/l	<0.02	--	<0.02	--	<0.02
Lead, mg/l	<0.04	--	<0.04	--	<0.04
Mercury, mg/l	<0.0001	--	<0.0001	--	<0.0001
Nickel, mg/l	<0.03	--	<0.03	--	<0.03
Zinc, mg/l	<0.02	--	<0.02	--	<0.02
Cyanide, mg/l	<0.01	--	<0.01	--	<0.01
Phenols, mg/l	<0.001	--	0.002	--	0.002
Aldrin, μg/l	<0.01	--	<0.01	--	<0.01
Dieldrin, μg/l	<0.01	--	<0.01	--	<0.01
Endrin, μg/l	<0.01	--	<0.01	--	<0.01
HCH, μg/l	0.01	--	0.01	--	0.0
Chlordane, μg/l	ND[8]	--	ND	--	ND
Toxaphene, μg/l	< 5	--	< 5	--	< 5
Total PCBs, μg/l	ND	--	ND	--	ND
Total DDTs, μg/l	ND	--	ND	--	ND
Total PAHs, μg/l	ND	--	ND	--	ND

Notes: -- = no data.

BOD = biochemical oxygen demand.
COD = chemical oxygen demand.
HCH = hexachlorocyclohexane.
MPN = most probable number.
N = nitrogen.
ND = not detected.
PAH = polynuclear aromatic hydrocarbons.
PCBs = polychlorinated biphenyls.

[a] Value for coliform is for annual median rather than mean.

Source: County Sanitation Districts of Los Angeles County 1992b.

Los Angeles River. Proposed San Jose Creek WRP discharges to the Rio Hondo via the Zone 1 Ditch are generally used for groundwater recharge. However, occasionally some of the discharge continues down the Rio Hondo to the Los Angeles River.

Groundwater Quality. Discharges from this WRP to the unlined portion of the San Gabriel River or to San Jose Creek and the Rio Hondo via the Zone 1 ditch are used for groundwater recharge. Therefore, groundwater quality data are the most appropriate for discussion of water quality in this reach. Groundwater monitoring is conducted under a separate permit for groundwater recharge in Program Number 5728. This monitoring program is conducted as part of the water reclamation requirements issued by RWQCB, which are discussed in detail below under that section. Six spreading ground monitoring wells are sampled bimonthly and 19 domestic production wells are sampled semiannually (County Sanitation Districts of Los Angeles County 1993b). Additionally, monitoring of recharge water is conducted quarterly at the headworks of both spreading grounds.

Water quality data for individual wells are extensive, so data and information from the October 1992 to September 1993 groundwater monitoring program were summarized for presentation in this analysis. Data from the 1992-93 monitoring program indicate that water quality was good and that no adverse effects resulted from recharge operations using reclaimed water (County Sanitation Districts of Los Angeles County 1993b). Review of data on TDS and nitrate, which are two key constituents of concern in recharge water, shows no significant increase of either constituent compared with historical levels. Iron and manganese concentrations for some wells were occasionally above secondary drinking water standards. Iron and manganese do not pose health hazards but can cause aesthetic problems such as changes in flavor and odor. The concentrations of these constituents in groundwater are largely a function of natural underground chemical processes rather than recharge water concentration. Additionally, concentrations of iron and manganese in reclaimed water were below the secondary drinking water standard throughout the monitoring year.

A wide variety of trace constituents and organic compounds were monitored in basin groundwater. A review of the data indicated that only TCE and PCE were present in some production wells at levels of concern. The affected wells have had TCE detected at concentrations generally of 1-2 $\mu g/l$, with concentrations at some wells of 4-6 $\mu g/l$. Neither reclaimed water nor recharge water (sampled at the Montebello Forebay) contained detectable amounts of TCE, and further evaluation of the data clearly showed that recharge operations were not the source of the TCE (County Sanitation Districts of Los Angeles County 1993b). Seven wells had detectable PCE concentrations similar to the concentrations of TCE, but PCE concentrations were generally lower and appeared to be declining from historical levels. As with TCE, all detected PCE concentrations were considered to be the result of local contamination and, therefore, are unrelated to recharge operations.

All other water quality parameters either were not detected or were detected below acceptable water reclamation requirement limits (see below) and drinking water standards.

Water Reclamation Requirements. Water reclamation requirements issued under Order 91-100 to the Districts, the DPW, and the Water Replenishment District by the

RWQCB and the DOHS apply to groundwater recharge with reclaimed water produced at the San Jose Creek, Whittier Narrows, and Pomona WRPs.

General provisions state that the reclaimed water shall not result in odors or color or cause toxicity to humans, plants, or aquatic life. Also, reclaimed water supplies must not cause a nuisance, mosquito problems, or damage to structures or facilities. The numeric limits in the water reclamation requirements are presented in Table 3-8. The major narrative limits include the following:

- reclaimed water must have received treatment equal to filtration to reduce turbidity,
- reclaimed water must not contain trace constituents in concentrations exceeding California drinking water standards or action levels established by DOHS, and
- reclaimed water must not cause a measurable increase in organic chemical contaminants in groundwater.

These narrative limits, along with numeric limits, quantity limits, and other general provisions, make up the water reclamation requirements and ensure the protection of public health.

Whittier Narrows Water Reclamation Plant

Hydrology

The Whittier Narrows WRP is located in the Whittier Narrows Flood Control Basin near the Rio Hondo, north of its confluence with the Zone 1 ditch. The Whittier Narrows WRP is in the 100-year floodplain in this area, above the Whittier Narrows Dam (Figure 3-4). Information from the Los Angeles District Corps on water surface elevations for specific storm frequencies is presented in Table 3-9. Table 3-9 shows that the existing WRP facilities are above the elevation of a 25-year storm, but the chlorine contact tanks, filters, and other facilities would be inundated by a 50-year flood. All the Whittier Narrows WRP facilities would be inundated by a 100-year flood.

Effluent from the Whittier Narrows WRP is discharged to the Zone 1 Ditch or to the Rio Hondo above the Whittier Narrows Dam. Most of the effluent is routed to the Rio Hondo groundwater recharge basin. Effluent can also be routed back to the unlined San Gabriel River for recharge in that basin.

Table 3-8. Limits for Groundwater Recharge Using Reclaimed Water

Constituent or Condition	Discharge Limitations		
	30-Day Average	7-Day Average	Daily Maximum
Fluoride (mg/l)	--	--	1.6
Chloride (mg/l)	--	--	250
Boron (mg/l)	--	--	1
NO_3+NO_2 as N (mg/l)	10	--	--
Sulfate (mg/l)	--	--	250
Settlable solids (mg/l)	0.1	--	0.3
Suspended solids (mg/l)	15	40	--
Total dissolved solids (mg/l)	--	--	700
Oil and grease (mg/l)	10	--	15
Coliform bacteria (number of organisms)	2.2/100 ml	--	23/100 ml
Turbidity	--	--	2[a]
pH	--	--	6.0-9.0
Temperature (°F)	--	--	100

[a] Daily average, not to exceed 5 more than 5% of the time.

Source: California Regional Water Quality Control Board 1991.

Table 3-9. Flood and Facility Elevations
for the Whittier Narrows WRP

Storm Frequency	Water Surface Elevation	Facility	Elevation
100 year	226 feet		
		control building	221 feet
		primary sedimentation tanks	220.5 feet
		aeration tanks	220 feet
		final sedimentation tanks	220 feet
50 year	219 feet		
		filters	218 feet
		chlorine contact tanks	217 feet
25 year	211 feet		
		ground surface	205-210 feet

Water Quality

Discharges from the Whittier Narrows WRP to the unlined portion of the Rio Hondo or the Zone 1 ditch are used for groundwater recharge. Thus, the groundwater quality data discussed above for the San Jose Creek WRP are also applicable to this affected reach.

The water quality data for Whittier Narrows WRP reclaimed water is presented in Table 3-3. Data for this WRP generally fall within the range of values for other WRPs. The Whittier Narrows WRP had the lowest salinity levels of all plants, as indicated by conductance, chloride, and sulfate values. Metal levels, except for zinc, were also lower than those of the other WRPs. Zinc levels were the highest reported of all plants. TICH and phenol were detected at the same levels reported for the Los Coyotes WRP.

IMPACTS AND MITIGATION MEASURES OF THE 2010 PLAN ALTERNATIVES

Methodology and Assumptions for Impact Analysis

The impacts in this section were evaluated based on standard practices; published reports from the Districts, RWQCB, and other agencies; and other internal documents and memos. Regulations applicable to wastewater treatment and water quality, and agency viewpoint/assessment regarding some issues were also used in analyzing the impacts.

The following methods apply to this impact analysis:

- The maximum design capacity flows proposed for each expansion were used to evaluate plant discharge to a given location.
- Water quality data used for analysis were evaluated using a simple, qualitative comparison of recent effluent and receiving water data.
- Projected reuse of WRP effluent is based on demand for reclaimed water identified in the Regional Wastewater Reclamation and Reuse Operations Coordination Study, which was prepared under the direction of the Central Basin Municipal Water District (Engineering-Science 1993).

Criteria for Determining Significance

Based on Appendices G and I of the State CEQA Guidelines and on professional practice, a project alternative would be considered to result in a significant hydrologic or water quality impact if it would:

- substantially alter drainage patterns or the rate and amount of surface water runoff;
- cause or result in substantial flooding;
- interfere substantially with groundwater recharge;
- result in substantial depletion of groundwater resources;
- result in substantial degradation of surface water or groundwater quality or contaminate a public water supply; or
- cause exceedance of applicable water quality standards or objectives or cause impairment of beneficial uses.

Comparison of Alternatives

Table 3-10 at the end of this chapter shows that the impacts associated with Alternatives 2, 3, and 4 are similar to those under Alternative 1, with some variation. This variation is described below for each alternative.

Alternative 1: Upgrade JWPCP/Expand Los Coyotes/San Jose Creek WRP

Construction Impacts

Impact: Short-Term Water Quality Degradation Resulting from Construction Activities at the JWPCP. Construction activities related to expansion of the JWPCP would expose disturbed and loosened soils to weathering effects of precipitation and wind. Increased erosion and sedimentation could occur if soil is exposed during wet periods. Suspended sediments could increase turbidity in receiving streams (Wilmington Drain/Bixby Slough); cause dissolved oxygen levels to decrease; and increase concentrations of nutrients, metals, and other pollutants associated with sediment particles.

Pollutants may also be introduced in the form of chemicals and other materials commonly used at construction sites. Gasoline, oil, solvents, lubricants, concrete, cleaners and soaps, and sanitary waste are examples of pollutants that may reach receiving waters as a result of accidental spillage or exposure to runoff and that can be toxic to aquatic life. The potential effects on water quality are usually short term and diminish once construction is completed. This impact is considered significant.

Mitigation. Implementation of the following mitigation measure would be required to reduce this impact to a less-than-significant level:

- **Mitigation Measure 3-1. Prepare and implement a stormwater pollution prevention plan.**

  The Districts are required under the CWA to prepare and submit a general construction activity stormwater permit (a type of NPDES permit for stormwater) before beginning construction at the JWPCP. The permit requires preparation of a stormwater pollution prevention plan (SWPPP). The SWPPP is based on the use of best management practices (BMPs). BMPs applicable to construction sites include measures to prevent erosion, prevent pollutants from the construction materials from mixing with stormwater, and trap pollutants before they can be discharged.

  The key of the SWPPP would be establishment of sediment and erosion control practices recommended by a qualified specialist. BMPs in the SWPPP would include measures such as limiting construction activities to the minimum area necessary, using silt fences or straw bales to filter sediment in runoff, revegetating bare soil areas before onset of the wet season, and locating covered material storage areas away from drainage channels. Construction activities may also be restricted by the SWPPP during wet periods. The SWPPP may also require water quality monitoring to ensure that background levels of turbidity and other constituents are not being exceeded.

  The SWPPP would also contain requirements for the construction contractor(s) to prepare and implement a hazardous materials management plan to reduce the possibility of chemical spills or releases to drainage channels. Proper material handling, storage, and disposal protocols would be established and enforced.

  The contents of the SWPPP and details of the required BMPs would be prepared by the Districts before they obtain the general construction activity stormwater permit from the SWRCB. The Districts engineering staff propose to ensure that the permit has been obtained before construction starts and would monitor the site periodically to ensure that provisions of the SWPPP are being adhered to by the construction contractor(s).

Impact: Short-Term Water Quality Degradation Resulting from Construction Activities at the Los Coyotes and San Jose Creek WRPs. Implementation of Alternative 1 would involve expansions at the Los Coyotes WRP to a 50-mgd capacity and at the San Jose Creek WRP to a 125-mgd capacity, which would disturb more than 5 acres of soil at each of the plant sites. This impact is considered significant for the same reasons described above for the JWPCP.

Mitigation. Implementation of the following mitigation measure would be required to reduce this impact to a less-than-significant level:

- **Mitigation Measure 3-1. Prepare and implement a stormwater pollution prevention plan.**

  This mitigation measure is described above for the JWPCP.

Impacts of Treatment Plant Operations

Treated effluent at the JWPCP is disposed of through the Districts' ocean outfalls 1.5-2 miles offshore. Therefore, impacts on water quality resulting from the disposal of treated effluent at the JWPCP are discussed in Chapter 5, "Marine Environment". Treated effluent disposal and reuse impacts of the inland WRPs affected by the 2010 Plan are discussed below.

Impact: Potential for Increased Availability of Reclaimed Water for Reuse at the Los Coyotes and San Jose Creek WRPs. Under Alternative 1, the additional 25 mgd of reclaimed water produced at the San Jose Creek WRP and the additional 12.5 mgd of reclaimed water produced at the Los Coyotes WRP has been identified for future potential use for irrigation, industrial purposes, or groundwater recharge under a high-reuse scenario. This impact is considered beneficial because the limited availability of existing potable water supplies and extended drought conditions in the JOS service area have increased the overall importance of reclaimed water use.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation from Algal Blooms Resulting from Increased Effluent Discharge at the Los Coyotes and San Jose Creek WRPs. Under Alternative 1, additional effluent from the expansion of the Los Coyotes and San Jose Creek WRPs would be conveyed to the lined portion of the San Gabriel River for disposal. The potential increases in effluent flow, in conjunction with other freshwater and effluent discharges, could occasionally lead to the exceedance of the capacity of the low-flow San Gabriel River channel during portions of the day. Effluent discharge to the Rio Hondo is so minor that algal blooms are not an issue. Algal blooms are a site-specific issue for the tidal prism. The overall capacity of the low-flow channel is 93 mgd, but in two areas the capacity is reduced to 67 mgd. Flows in excess of this amount would overflow the channel, resulting in sheet flow over the channel bottom. Under certain special circumstances, this condition can promote algal blooms. The critical period for this potential impact to occur is during summer, when water temperatures are higher, daylight hours are longer, and algal blooms are more prone to occur. Algae can be sloughed off and decay downstream, which could potentially deplete oxygen, affecting the biota and causing odors. Other potential water quality problems include foaming and insect growth. Under a treated effluent high-reuse scenario, exceedance of the low-flow channel is not likely. Under a low-reuse scenario, however, the flow could exceed low-flow capacity.

However, the buildup of algae to levels of concern has only occurred once, in 1986. At that time there was a critical combination of flow, temperature, and daylight conditions. There is no history of this impact reoccurring. Based on the low potential for this problem and the expected increase in the amount of effluent reused, this is considered a less-than-significant impact.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation in the San Gabriel River Resulting from Increased Discharge of Reclaimed Water from the Los Coyotes WRP. The proposed increased discharge of up to 12.5 mgd from the Los Coyotes WRP to the San Gabriel River could increase loading of some constituents of concern, such as ammonia and some metals. This is a relatively small increase in effluent discharge, however, over both the existing 37.5-mgd capacity and the total of 100 mgd of WRP effluent currently discharged to the San Gabriel River.

Ammonia is the main constituent of concern because of the sensitivity of aquatic biota to ammonia and proximity of the Los Coyotes WRP discharge to the tidal prism. However, adverse effects from ammonia in WRP effluent have not been noted or reported. Recent data indicate that the WRP effluent levels of most constituents, except nutrients, are similar to or lower than background concentrations in the river. However, nutrient concentrations added to the San Gabriel River from Coyote Creek were also higher than San Gabriel River background concentrations. Additionally, WRP effluent improves water quality of the critical reach and the tidal prism by flushing urban runoff and other freshwater discharges that affect the San Gabriel River during the dry season.

Water quality limits set in the NPDES permit provide the basis for application and enforcement of surface water quality standards and objectives. These limits have been adopted by the RWQCB based on water quality control plans, monitoring data, and other water quality regulatory programs. Water quality objectives and standards from these sources are translated into numerical limits in NPDES permits.

The Los Angeles RWQCB recently adopted a revised basin plan, and the SWRCB is working on a revised Water Quality Plan for Inland Surface Waters in the State. Both of these plans will be used in developing new NPDES permits for the Los Coyotes and San Jose Creek WRPs. Additionally, the CWA may be revised in future years to allow for a broader watershed approach to water quality management (i.e., begin to control nonpoint sources). If this occurs, NPDES permit limits for these plants may be affected.

WRP effluent tends to have a positive flushing effect on the critical reach of the San Gabriel River tidal prism, and stringent requirements of the NPDES permitting process and associated regulatory requirements described above maintain water quality and protect beneficial uses. This is considered a less-than-significant impact.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation in the San Gabriel River and Rio Hondo Resulting from Increased Discharge of Reclaimed Water from the San Jose Creek WRP. The proposed 25-mgd increase in effluent discharge from the San Jose Creek WRP to the unlined portion of the San Gabriel River could increase loading of some constituents of concern, such as ammonia and metals. It is unlikely that all the proposed increases in flows would be released to the San Gabriel River because increased water reuse will consume some of the flow and some may be diverted to the Rio Hondo via the Zone 1 Ditch. The resulting increase in effluent would be so minimal that water quality conditions would not be changed.

The constituents of concern and relative contribution of additional flows are the same as for the Los Coyotes WRP, and the discharge points to the San Gabriel River are similar. Dry season flows in the Rio Hondo consist mostly of WRP effluent and recharge water from upstream. Water quality impacts on the Zone 1 ditch or the Rio Hondo and Los Angeles River resulting from the increased discharge of effluent would be minimal.

The pending regulatory requirements and evaluation of NPDES permit limits applicable to this WRP are the same as those described above for the Los Coyotes WRP. The increase in flow volume proposed for expansion of this WRP would not change water quality conditions. New permit limits would be established that take into account the new plant capacity and applicable standards and objectives. Concerns specific to the San Jose Creek WRP will be addressed during the permit renewal process in 1994, as with the Los Coyotes WRP. This impact is considered less than significant.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation Resulting from Increased Reuse of Reclaimed Water from the Los Coyotes and San Jose Creek WRPs. The proposed 25-mgd increase in effluent discharge from the San Jose Creek WRP and 12.5-mgd increase from the Los Coyotes WRP could affect regional water quality if the effluent is reused for irrigation or recharge. However, the use of reclaimed water for reuse is regulated by water reclamation requirements. Use of reclaimed water is limited to approved amounts and locations and subject to strict RWQCB requirements for monitoring and reporting. The Districts and the other joint parties must request approval from the RWQCB to reuse additional reclaimed water.

Mitigation. No mitigation is required.

Impacts of Biosolids Disposal and Reuse

Impact: Minimal Potential for Degradation of Water Quality Resulting from Biosolids Disposal and Reuse. Implementation of the 2010 Plan would increase the quantity of biosolids that must be managed by the Districts. This would increase composting, land application, and landfilling activities. These activities could degrade water quality as a result of accidental releases during transport or disposal, or from wind and water erosion and subsequent deposition into nearby waterways. However, the Districts will use only sites that are properly permitted and for which all site-specific impacts, including the potential for water quality degradation, have been mitigated thoroughly through either preparation of site-specific environmental documents or compliance with other federal, state, and local regulations.

Mitigation. No mitigation is required.

Alternative 2: Upgrade JWPCP/Expand Los Coyotes WRP

Under Alternative 2, impacts at the JWPCP and the Los Coyotes WRP would be the same as under Alternative 1. No impacts would occur at the San Jose Creek WRP. An additional impact that would occur from construction of sewer lines is described below.

Impact: Short-Term Water Quality Degradation Resulting from Construction Activities for Sewer Projects. Implementation of Alternative 2 would require construction of a relief sewer approximately 10 miles long and roughly parallel to the existing JO "B" and JO "H" trunk sewers downstream of the San Jose Creek and Whittier Narrows WRPs and upstream of the Los Coyotes WRP interceptor. There will be a temporary disruption and displacement of soil beneath streets during project construction. However, excavation is generally limited to a narrow trench along paved public roads, and the Districts' standard methods for constructing sewer relief lines would ensure that this impact is less than significant.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation in the San Gabriel River Resulting from Increased Effluent Discharge at the Los Coyotes WRP. The proposed 37.5-mgd discharge increase from the Los Coyotes WRP to the San Gabriel River could increase loading of some constituents of concern, such as ammonia and some metals. As under Alternative 1, however, this is a relatively small increase in effluent discharge from the existing 100-mgd total of WRP effluent historically discharged to the San Gabriel River.

This impact is considered less than significant for reasons described above under Alternative 1.

Mitigation. No mitigation is required.

Alternative 3: Upgrade JWPCP/Expand Whittier Narrows WRP

Under Alternative 3, impacts at the JWPCP would be the same as under Alternatives 1 and 2. No impact would occur at the Los Coyotes or San Jose Creek WRPs or on sewers because no modifications to these JOS facilities would occur. Impacts at the Whittier Narrows WRP are described below.

Construction Impacts

Impact: Short-Term Water Quality Degradation from Construction Activities at the Whittier Narrows WRP. The expansion of the Whittier Narrows WRP to a capacity of 52.5 mgd would disturb more than 5 acres of land. This impact is described above for the Los Coyotes and San Jose Creek WRPs under Alternative 1. This impact is considered significant.

Mitigation. Implementation of the following mitigation measure would be required to reduce this impact to a less-than-significant level:

- **Mitigation Measure 3-1. Prepare and implement a stormwater pollution prevention plan.**

  This mitigation measure is described above under Alternative 1.

Impact: Potential Flooding of Facilities at the Whittier Narrows WRP Resulting from Construction in the 100-Year Floodplain. Expansion of the WRP under this alternative would occur on land in the 100-year floodplain. New facilities below a water surface elevation of 226 feet would be inundated by a 100-year storm and could incur significant damage, resulting in potential degradation of water quality.

The Districts, however, are currently consulting with the Los Angeles District of the Corps to identify regulatory requirements and develop design needs to construct the proposed facilities. The design of the proposed Whittier Narrows facilities would prevent inundation by a 100-year flood by constructing the proposed facilities on fill to raise their elevation. Because the Districts are designing facilities to minimize flood damage, this impact is considered less than significant.

Mitigation. No mitigation is required.

Impact: Minimal Loss of Flood Storage Capacity behind the Whittier Narrows Dam from Construction of Proposed Facilities at the Whittier Narrows WRP. Construction of proposed facilities at the Whittier Narrows WRP would result in the loss of flood storage capacity in the 100-year floodplain behind the Whittier Narrows Dam (Figure 3-4). Although the new facilities would reduce the available flood storage area behind the Whittier Narrows Dam by a very small, proportionate amount, the Corps considers any loss of flood storage capacity a significant impact.

Mitigation. Implementation of the following mitigation measure would be required to reduce this impact to a less-than-significant level:

- **Mitigation Measure 3-2. Replace flood storage capacity.**

  The Districts propose to create flood storage in the Whittier Narrows Flood Control Basin equal to the volume lost behind the Whittier Narrows Dam. Soil, vegetation, and other materials would be removed in the selected flood storage area. The Districts would consult with the Corps before construction begins to determine where in the floodplain to locate the replacement flood storage area and what revegetation and maintenance requirements would be imposed.

Impacts of Treatment Plant Operations

Impact: Potential for Increased Availability of Reclaimed Water for Reuse at the Whittier Narrows WRP. Under Alternative 3, the entire 37.5 mgd of additional reclaimed water could be reused for irrigation or groundwater recharge under a high-reuse scenario. This impact is considered beneficial.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation in the San Gabriel River and the Rio Hondo Resulting from Increased Discharge of Reclaimed Water from the Whittier Narrows WRP. Under Alternative 3, the capacity of the Whittier Narrows WRP would be expanded by 37.5 mgd to 52.5 mgd. The potential for degradation of water quality under this alternative would be similar to the potential under Alternative 1 for the San Jose Creek WRP because the facilities discharge to the same locations, except that treated effluent from the Whittier Narrows WRP would not be discharged into the lined channel of the San Gabriel River. Because most of the effluent from the Whittier Narrows WRP would be discharged to unlined channels of the Zone 1 ditch, the San Gabriel River, and the Rio Hondo, the potential for degradation would be greatest for groundwater. Additional effluent would probably be routed to several locations, reducing the impact on each area. Therefore, the potential impact would be less than significant.

Mitigation. No mitigation is required.

Impact: Minimal Potential for Water Quality Degradation from Increased Reuse of Reclaimed Water at the Whittier Narrows WRP. This impact is considered less than significant for reason described above under Alternative 1 for the Los Coyotes and San Jose Creek WRPs.

Mitigation. No mitigation is required.

Alternative 4: Upgrade JWPCP/Expand Los Coyotes WRP/ San Jose Creek WRP/Whittier Narrows WRP

Under Alternative 4, impacts at the JWPCP and Los Coyotes and San Jose Creek WRPs would be the same as under Alternative 1. Although the proposed sewer relief project for Alternative 4 would be for a much shorter length (approximately 2 miles instead of the 10 miles required for Alternative 2) and of smaller diameter, impacts on sewers would be similar to those under Alternative 2. Impacts at the Whittier Narrows WRP would be the same as under Alternative 3. No additional impacts would occur under this alternative.

No-Project Alternative

Under the No-Project Alternative, impacts of the 2010 Plan alternative would be avoided. However, failure to expand JOS capacity could eventually result in decreased quality of effluent, leading to NPDES permit violations.

Table 3-10. Comparison of Hydrology and Water Quality Impacts by Alternative

Impacts and Mitigation Measures	Alternative 1			Alternative 2			Alternative 3		Alternative 4				
	JWPCP	LC	SJC	JWPCP	LC	Sewers	JWPCP	WN	JWPCP	LC	SJC	WN	Sewers
Construction Impacts Impact: Short-term water quality degradation resulting from construction activities at the JWPCP (S) Mitigation Measure 3-1. Prepare and implement a stormwater pollution prevention plan	✓			✓			✓		✓				
Impact: Short-term water quality degradation resulting from construction activities at the Los Coyotes and San Jose Creek WRPs (S) Mitigation Measure 3-1. Prepare and implement a stormwater pollution prevention plan		✓	✓		✓					✓	✓		
Impact: Short-term water quality degradation from construction activities at the Whittier Narrows WRP (S) Mitigation Measure 3-1. Prepare and implement a stormwater pollution prevention plan								✓				✓	
Impacts of Treatment Plant Operations Impact: Potential for increased availability of reclaimed water for reuse (B) No mitigation is required		✓	✓		✓			✓		✓	✓	✓	
Impact: Minimal potential for water quality degradation from algal blooms resulting from increased effluent discharge at the Los Coyotes and San Jose Creek WRPs (LT) No mitigation is required		✓	✓		✓					✓	✓		

B = beneficial. LT = less than significant. S = significant.

Table 3-10. Continued

Impacts and Mitigation Measures	Alternative 1			Alternative 2			Alternative 3		Alternative 4				
	JWPCP	LC	SJC	JWPCP	LC	Sewers	JWPCP	WN	JWPCP	LC	SJC	WN	Sewers
Impact: Minimal potential for water quality degradation in the San Gabriel River resulting from increased discharge of reclaimed water from the Los Coyotes WRP (LT) No mitigation is required		✓			✓					✓			
Impact: Minimal potential for water quality degradation in the San Gabriel River and Rio Hondo resulting from increased discharge of reclaimed water from the San Jose Creek WRP (LT) No mitigation is required			✓								✓		
Impact: Minimal potential for water quality degradation in the San Gabriel River resulting from increased discharge of reclaimed water from the Los Coyotes WRP (LT) No mitigation is required					✓					✓			
Impact: Potential flooding of facilities at the Whittier Narrows WRP resulting from construction in the 100-year floodplain (LT) No mitigation is required								✓				✓	
Impact: Minimal loss of flood storage area behind the Whittier Narrows Dam from construction of proposed facilities at the Whittier Narrows WRP (S) Mitigation Measure 3-2. Replace flood storage capacity								✓				✓	
Impact: Minimal potential for water quality degradation in the San Gabriel River and Rio Hondo resulting from increased discharge of reclaimed water from the Whittier Narrows WRP (LT) No mitigation is required								✓				✓	

B = beneficial. LT = less than significant. S = significant.

Table 3-10. Continued

Impacts and Mitigation Measures	Alternative 1			Alternative 2			Alternative 3		Alternative 4				
	JWPCP	LC	SJC	JWPCP	LC	Sewers	JWPCP	WN	JWPCP	LC	SJC	WN	Sewers
Impact: Minimal potential for water quality degradation from increased reuse of reclaimed water from the Whittier Narrows WRP (LT) No mitigation is required								✓				✓	
Impacts of Biosolids Disposal and Reuse Impact: Minimal potential for degradation of water quality resulting from biosolids disposal and reuse (LT) No mitigation is required	✓			✓			✓		✓				

B = beneficial. LT = less than significant. S = significant.