SUBCHAPTER 3.4

HYDROLOGY/WATER QUALITY

3.4 HYDROLOGY/WATER QUALITY

3.4.1 REGULATORY BACKGROUND

3.4.1.1 Water Quality

The U.S. EPA is the federal agency responsible for water quality management and administration of the federal Clean Water Act (CWA). The U.S. EPA has delegated most of the administration of the CWA in California to the California State Water Resources Control Board (SWRCB). The SWRCB was established through the California Porter-Cologne Water Quality Act of 1969 and is the primary State agency responsible for water quality management issues in California. Much of the responsibility for implementation of the SWRCB's policies is delegated to the nine RWQCBs. Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) to regulate discharges into "navigable waters" of the United States. The U.S. EPA authorized the SWRCB to issue NPDES permits in the State of California in 1974. The NPDES permit establishes discharge pollutant thresholds and operational conditions for industrial facilities and wastewater treatment plants. For point source discharges (e.g., wastewater treatment facilities), the RWQCBs prepare specific effluent limitations for constituents of concern such as toxic substances, total suspended solids (TSS), bio-chemical oxygen demand (BOD), and organic compounds. The limitations are based on the Basin Plan objectives and are tailored to the specific receiving waters, allowing some discharges, for instance deep water outfalls in the Pacific Ocean, more flexibility with certain constituents due to the ability of the receiving waters to accommodate the effluent without significant impact.

Non-point source NPDES permits are also required for municipalities and unincorporated communities of populations greater than 100,000 to control urban stormwater runoff. These municipal permits include Storm Water Management Plans (SWMPs). A key part of the SWMP is the development of Best Management Practices (BMPs) to reduce pollutant loads. Certain businesses and projects within the jurisdictions of these municipalities are required to prepare Storm Water Pollution Prevention Plans (SWPPPs) which establish the appropriate BMPs to gain coverage under the municipal permit. On October 29, 1999, the U.S. EPA finalized the Storm Water Phase II rule which requires smaller urban communities with a population less than 100,000 to acquire individual storm water discharge permits. The Phase II rule also requires construction activities on one to five acres to be permitted for storm water discharges. Individual storm water NPDES permits are required for specific industrial activities and for construction sites greater than five acres. State-wide general storm water NPDES permits have been developed to expedite discharge applications. They include the State-wide industrial permit and the State-wide construction permit. A prospective applicant may apply for coverage under one of these permits and receive Waste Discharge Requirements (WDRs) from the appropriate RWQCB. WDRs establish the permit conditions for individual dischargers. Phase II of the stormwater permit program, when promulgated, will require permits for construction sites of one to five acres.

Section 303(d) of the CWA requires the SWRCB to list impaired water bodies in the State and determine total maximum daily loads (TMDLs) for pollutants or other stressors impacting water quality. The California 303(d) list was completed in March of 1999. TMDLs have yet to be determined for most of the identified impaired water bodies, although a priority schedule has been developed to complete the process in the region within 13 years. The RWQCBs will be responsible for ensuring that total discharges do not exceed TMDLs for individual water bodies as well as for entire watersheds.

The RWQCBs also coordinate the State Water Quality Certification program, or Section 401 of the CWA. Under Section 401, states have the authority to review any federal permit or license that will result in a discharge or disruption to wetlands and other waters under state jurisdiction, to ensure that the actions will be consistent with the state's water quality requirements. This program is most often associated with Section 404 of the CWA which obligates the U.S. Army Corps of Engineers to issue permits for the movement of dredge and fill material into and from "waters of the United States."

3.4.1.2 Regional Water Quality Management

Water quality of regional surface water and groundwater resources is affected by point source and non-point source discharges occurring throughout individual watersheds. Regulated point sources, such as wastewater treatment effluent discharges, usually involve a single discharge into receiving waters. Non-point sources involve diffuse and non-specific runoff that enters receiving waters through storm drains or from unimproved natural landscaping. Common non-point sources include urban runoff, agriculture runoff, resource extraction (on-going and historical), and natural drainage. Within the regional Basin Plans, the RWQCBs establish water quality objectives for surface water and groundwater resources and designate beneficial uses for each identified waterbody.

California Water Code, Division 7, Chapter 5.6 established a comprehensive program within the SWRCB to protect the existing and future beneficial uses of California's enclosed bays and estuaries. The Bay Protection and Toxic Cleanup Plan (BPTCP) has provided a new focus on the SWRCB and the RWQCBs efforts to control pollution of the State's bays and estuaries by establishing a program to identify toxic hot spots and plan for their cleanup. In June 1999, the SWRCB published a list of known toxic hot spots in estuaries, bays, and coastal waters.

Other state-wide programs run by the SWRCB to monitor water quality include the California State Mussel Watch Program and the Toxic Substances Monitoring Program. The Department of Fish and Game collects water and sediment samples for the SWRCB for both these programs and provides extensive state-wide water quality data reports annually. In addition, the RWQCBs conduct water sampling for Water Quality Assessments required by the CWA and for specific priority areas under restoration programs such as the Santa Monica Bay Restoration Program.

3.4.1.3 Watershed Management

In February of 1998, President Clinton announced the Clean Water Action Plan (CWAP) which requests that states and tribes, with assistance from federal agencies and input from stakeholders and private citizens, convene a collaborative process to develop Unified Watershed Assessments (UWA). The CWAP stated that watersheds were to be placed in one of the following categories:

Category I – Watersheds that are candidates for increased restoration because of poor water quality or the poor status of natural resources.

Category II – Watersheds that have good water quality but can still improve.

Category III – Watersheds with sensitive areas on federal, state, or tribal lands that need protection.

Category IV – Watersheds for which there is insufficient information to categorize them.

Targeted watersheds and watershed priorities or activities were identified for each of California's nine RWQCBs. Federal Clean Water Act funding administered by SWRCB may be used to work on priority programs. Examples of targeted watersheds include the Santa Monica Bay Restoration Commission and the Malibu Creek Watershed Non-Point Source Pilot Project.

3.4.1.4 Wastewater Treatment

The federal government enacted the CWA to regulate point source pollutants, particularly municipal sewage and industrial discharges, to waters of the United States through the NPDES permitting program. In addition to establishing a framework for regulating water quality, the CWA authorized a multibillion dollar Clean Water Grant Program, which together with the California Clean Water Bond funding, assisted communities in constructing municipal wastewater treatment facilities. These financing measures made higher levels of wastewater treatment possible for both large and small communities throughout California, significantly improving the quality of receiving waters State-wide. Wastewater treatment and water pollution control laws in California are codified in the California Water Code and CCR Titles 22 and 23. In addition, to federal and state restrictions on wastewater discharges, most incorporated cities in California have adopted local ordinances for wastewater treatment facilities. Local ordinances generally require treatment system designs to be reviewed and approved by the City prior to construction. Larger urban areas with elaborate infrastructure in place would generally prefer new developments to hook into the existing system rather than construct new discharges. Other communities promote individual septic systems to avoid construction of potentially growth accommodating treatment facilities. The RWQCBs generally delegate management responsibilities of septic systems to local jurisdictions. Regulation of wastewater treatment includes disposal and reuse of biosolids.

3.4.1.5 Water Supply

The federal Safe Drinking Water Act, enacted in 1974 and implemented by the U.S. EPA, imposes water quality and infrastructure standards for potable water delivery systems nation-wide. The primary standards are health-based thresholds established for numerous toxic substances. Secondary standards are recommended thresholds for taste and mineral content. The California Safe Drinking Water Act enacted in 1976 is codified in Title 22 of the CCR. Potable water supply is managed through local agencies and water districts, the State DWR, the DHS, the SWRCB, the U.S. EPA, and the U.S. Bureau of Reclamation. Water right applications are processed through the SWRCB for properties claiming riparian rights or requesting irrigation water from State or Federal distribution facilities. The DWR manages the SWP and compiles planning information on supply and demand within the state. The U.S. EPA has established primary drinking water standards in the Clean Water Act Section 304. States are required to ensure that potable water retailed to the public meets these standards. Standards for a total of 81 individual constituents have been established under the Safe Drinking Water Act as amended in 1986. The U.S. EPA may add additional constituents in the future. State primary and secondary drinking water standards are promulgated in CCR Title 22 §§64431-64501. Secondary drinking water standards incorporate non-health risk factors including taste, odor, and appearance. The 1991 Water Recycling Act established water recycling as a priority in California. The Water Recycling Act encourages municipal wastewater treatment districts to implement recycling programs to reduce local water demands.

3.4.2 EXISTING WATER SOURCES AND USES

The DWR divides the state into ten hydrologic regions. The hydrologic regions define a river basin drainage area (they contain a watershed of one or more rivers). Some regions contain a great deal of water; some regions are very dry and must have their water imported by aqueducts (DWR, 1998).

The South Coast Air Basin lies within the South Coast Hydrologic Region. The cities of Ventura, Los Angeles, Long Beach, Santa Ana, San Bernardino, and Big Bear Lake are among the many urban areas in this section of the state which contain moderate-sized mountains, inland valleys, and coastal plains. The Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers are among the area's hydrologic features. Most lakes in this area are actually reservoirs, made to hold water coming from the State Water Project, the Los Angeles Aqueduct, and the Colorado River Aqueduct. These reservoirs include Lake Casitas, Castaic Lake, Big Bear Lake, Lake Mathews, Lake Perris, Silverwood Lake, Diamond Valley Lake, and Morena Lake. While most land use in the region is urban, other land uses include national forest and a small percentage of irrigated crop acreage (DWR, 1998).

3.4.2.1 Surface Water Resources

Surface water resources include creeks and rivers, lakes and reservoirs, and the inland Salton Sea. Reservoirs serving flood control and water storage functions exist throughout the region. Since the climate of southern California is predominantly arid, many of the natural rivers and creeks are intermittent or ephemeral, drying up in the summer or flowing only in reaction to precipitation. For example, annual rainfall amounts vary depending on elevation and proximity to the coast. The City of Los Angeles averages less than 16 inches per year, while parts of San Bernardino County average less than five. However, due to agricultural irrigation and urban landscape watering, some waterways such as La Ballona Creek and the Los Angeles River maintain a perennial flow. The Colorado River watershed includes seven states on the western slope of the Rocky Mountains, traversing the arid southwest to the Gulf of California in Mexico. The river supplies water to 25 million people in both the U.S. and Mexico. The Salton Sea, the largest inland body of water in California, was formed around 1906 when the Colorado River was diverted from its natural course. At present, the Salton Sea serves as a drainage reservoir for agricultural runoff in the Imperial Valley and Mexico. The Salton Sea is fed by the New River and Alamo River and would dry up entirely without agricultural runoff. Other major natural surface waters in the southern California area include the Santa Clara, Los Angeles, San Gabriel, Santa Ana, San Jacinto Rivers, and upstream portions of the Santa Margarita River. The Los Angeles River is a highly disturbed system due to the flood control features along much of its length. Due to the high urbanization in the area around the Los Angeles River, runoff from industrial and commercial sources as well as illegal dumping contribute to reduce the channel's water quality. The San Gabriel River is similarly altered with concrete flood control embankments and impacted by urban runoff. The Santa Ana River drains the San Bernardino Mountains, cuts through the Santa Ana mountains, and flows onto the Orange County coastal plain. Recent flood control projects along the river have established reinforced embankments along much of the river's path through urbanized Orange County. The Santa Margarita River begins in Riverside County draining portions of the San Jacinto Mountains and flowing to the ocean through northern San Diego County. Complete lists of surface water resources along with the beneficial uses associated with them are contained in each of the five Basin Plans prepared by the RWQCBs (SCAG, 2001).

Most of the outlying regions of the district are heavily dependent on local surface and groundwater resources as major sources of supply for both domestic and agricultural uses. Supplemental supplies are also available in some areas through the State Water Project (SWP), the Colorado River Aqueduct (CRA), and the Los Angeles Aqueduct (LAA).

Past population growth and agricultural development in the outlying regions have resulted in groundwater pumping beyond safe yield levels. The Antelope Valley Basin (north Los Angeles County), Mojave Basin (San Bernardino County), and the Coachella Valley Basin (Riverside County) are all in overdraft condition.

Local water districts are the primary water purveyors. These water districts receive some of their water supply from surface and ground water resources within their respective jurisdictions, with any shortfall made up from supplemental water purveyors. In some cases, 100 percent of a local water district's water supply may come from supplemental sources. The main sources of surface water used by local water districts within southern California are the Colorado, Santa Ana, and Santa Clara Rivers. The primary groundwater sources used by local water districts are as follows:

- Los Angeles County: Raymond, San Fernando, and San Gabriel Water Basins.
- San Bernardino and Riverside counties: Upper Santa Ana Valley Water Basin.
- Riverside County: Coachella Valley Water Basin.
- Orange County: Coastal Plain Water Basin.

3.4.3 WATER DEMAND AND FORECASTS

Estimating total water use in the district is difficult because the boundaries of supplemental water purveyors' service areas bear little relation to the boundaries of the District and there are dozens of individual water retailers within the District. Water demand in California can generally be divided between urban, agricultural, and environmental uses. In the SCAG area, 74 percent of potable water is provided from imported sources. Annual water demand fluctuates in relation to available supplies. During prolonged periods of drought, water demand can be reduced significantly through conservation measures.

Increases in California's water demand are due primarily to the increases in population. According the DWR Bulletin 160-98, urban water demand will increase by about 3.2 million acre-feet in average years. However, agricultural water demand is forecast to be reduced by 2.3 million acre-feet (one acre-foot equals approximately 325,850 gallons) by 2020 due to anticipated increases in water use efficiency and reductions in irrigated agricultural acreage. Environmental water demand will increase only slightly by 2020. Measures to ensure an adequate water supply include conservation programs, recycling, and increased storage facilities (SCAG, 2001).

The Metropolitan Water District of Southern California (MWD) monitors demographics in its service area using official SCAG and San Diego Association of Governments (SANDAG) growth projections. In the service area of (MWD), the population increased approximately seven percent from 1995 through 2000. This is an increase of about 211,000 people per year over the five-year period. Based on official SCAG and SANDAG growth projections, the population in MWD service area is expected to be 21.3 million people by 2020, reflecting an annual increase of 223,000 per year (MWD, 2002).

In 1998, 3.5 million acre-feet of water was used in the MWD service area. Of this total, 3.2 million acre-feet (91 percent) were used for municipal and industrial purposes (M&I), and 0.3 million acre-feet (nine percent) were used for agricultural purposes. Due to urbanization and market factors, including the price of water, agricultural water use has declined as the relative share of M&I water use has increased over time. Agricultural water use has declined from 14 percent in 1980 to 8.3 percent in 1997 (MWD, 2002).

Based on official SCAG and SANDAG growth projections, total water use is expected to grow from a projected 3.8 million acre-feet in 2000 to 4.8 million acre-feet in 2020. All water demand projections reflect demands under normal weather conditions. The water demand forecasts account for projected implementation of California's conservation best management practices (BMPs), water savings resulting from plumbing codes, and savings due to price effects. Per capita water demand in MWD's service area has decreased significantly since the 1980s, but is expected to remain relatively constant as rising affluence and growth in hot and dry areas dampen the effects of intense conservation efforts (MWD, 2002). See Table 3.4-1.

3.4.3.1 Residential Water Use

While single-family homes account for about 55 percent of the total occupied housing stock, they account for approximately 70 percent of total residential water demand. This variation occurs because single-family households tend to use more water than households in a multi-family structure (such as apartment buildings) on a per housing-unit basis (MWD, 2002).

3.4.3.2 Nonresidential Water Use

Nonresidential water use represents about 25 percent of the total M&I demand in the MWD's service area. The nonresidential sector represents water that is used by businesses, services, government, institutions (such as hospitals and schools), and industrial (or manufacturing) establishments. Within the commercial/institutional category, the top water users include schools, hospitals, hotels, amusement parks, colleges, laundries, and restaurants. In southern California, the major industrial users include electronics, aircraft, petroleum refining, beverages, food processing, and other industries that use water as a major component of the manufacturing process (MWD, 2002).

3.4.3.3 Agricultural Water Use

Agricultural water use currently constitutes about nine percent of total regional water demand in MWD's service area. Historically, MWD has supplied 30 to 50 percent of agriculture's total water demand, while local water supplies satisfy agriculture's remaining demand (MWD, 2002).

3.4.4 IMPORTED WATER SUPPLIES

Imported sources of water (including the Colorado River Aqueduct, the State Water Project's California Aqueduct, and the Los Angeles Aqueduct) currently supply more than six million-acre-feet of water to the southern California region annually. This water supplies the MWD's service area, as well as the Imperial Irrigation District, Palo Verde Irrigation District, Desert Valley Water Agency, San Bernardino Valley Municipal Water

District, Coachella Valley Water District, et al. Imported sources account for approximately 74 percent of the total water used in the region. Imported water supplies have historically been developed to accommodate Southern California's original agricultural economy and more recently, its fast growing urban population. This population growth, driven by a fast growing economy and immigration has outstripped locally available water supplies, as in many cities around the country and California. Beginning with the completion of the Los Angeles Aqueduct (LAA) in 1913, the region has imported water from other parts of the state to compensate for inadequate local supplies. The LAA delivers water from the Owens Valley and Mono Basin areas of the eastern Sierra Nevada (MWD, 2003a). The All American Canal and Coachella Canal were completed in 1940, supplying irrigation districts in the Imperial and Coachella Valleys with water for agricultural operations. The Colorado River Aqueduct completed in 1941 by the MWD supplies Colorado River water to the urban coastal areas. The 444 mile-long California Aqueduct completed in the 1970s, delivers water collected from the Sacramento – San Joaquin Delta to MWD for distribution to retail agencies throughout southern California (DWR, 2003).

3.4.4.1 State Water Project

One source of water for MWD is the SWP, which is owned and operated by the DWR. SWP facilities comprise 32 storage facilities (reservoirs and lakes), 662 miles of aqueduct, and 25 power and pumping plants. MWD receives deliveries of SWP supplies via the California Aqueduct at Castaic Lake in Los Angeles County, Devil Canyon Afterbay in San Benardino County, and Box Springs Turnout and Lake Perris in Riverside County (MWD, 2000).

The State Water Project has historically provided from 25 to 50 percent of MWD's supplies. DWR is contracted to ultimately deliver 4.23 million acre-feet per year. In accordance with its contract with the DWR, MWD is entitled to 2,011,500 acre-feet per year from the SWP. Actual deliveries have never reached this amount and depend on availability of supplies as determined by DWR, as well as demand within MWD's service area. MWD reached a high of 1,396,000 acre-feet in 1990, and experienced shortages in SWP supplies in 1991 and 1992, with reduced deliveries of 391,000 acre-feet and 710,000 AF, respectively. The five year average between 1995 and 1999 was approximately 600,000 AF (MWD, 2002). In 2001, MWD took delivery of 1.098 million acre-feet from SWP (MWD, 2002)

TABLE 3.4-1

2000 – 2020 Water Demand and Forecast

Water District	2000 Demand (MAF)[1]	2005 Demand (MAF)	2010 Demand (MAF)	2015 Demand (MAF)	2020 Demand (MAF)
Metropolitan Water District Service Area:					
MWD [2] [3][12]	2.8	1.99	1.94	2.13	2.34
LADWP[4]	0.68	0.68	0.72	0.76	0.80
Local Supplies:					
Antelope Valley/East Kern Water Agency [5]	0.085	0.085	0.141	0.141	0.141
Castaic Lake Water Agency	0.075	0.082	0.089	0.091	0.101
Coachella Valley Water District	0.68	0.72	0.75	0.78	0.815
Crestline/Lake Arrowhead Water Agency[6]	0.0008	0.0008	0.001	0.001	0.001
Desert Water Agency [7]	0.042	0.048	0.054	0.057	0.060
Little Rock Creek Irrigation District	NA[8]	NA[8]	NA[8]	NA[8]	NA[8]
Palmdale Water Agency[9]	0.03	NA[8]	0.04	NA[8]	0.05
San Bernardino Valley Municipal[10]	0.052	0.055	0.060	0.065	0.070
San Gorgonio Pass Water Agency	0.028	0.035	0.045	0.058	0.074
Metropolitan Water District of Orange County[11]	0.703	0.650	0.683	0.712	0.757

(1) MAF = million acre-feet
(2) Metropolitan Water District Report on Metropolitan's Water Supplies (Feb 11, 2002).
(3) Metropolitan Water District Report on Metropolitan's Water Supplies (Mar.25,2003)
(4) LADWP uses water from the Los Angeles Aqueduct (LAA), local groundwater, and the Metropolitan Water District (MWD). In fiscal year 2000-2001, 36% came from LAA, 51% from MWD and 13% from local groundwater. These percentages vary slightly from year to year based on the impact of hydrology on imported supplies.
(5) Personal Communication, Curtis Paxton, Antelope Valley/Kern County Water Agency, 2002
(6) Crestline Village Water District 2001 Urban Water Management Plan
(7) Desert Water Agency 2000 Urban Water Management Plan
(8) NA (Not Available)
(9) Palmdale Water District 2000 Urban Water Management Plan
(10) City of San Bernardino Municipal Water Department Urban Water Management Plan Update for the planning period of 2000-2020
(11) Metropolitan Water District of Orange County (MWDOC) obtains about 50% of its water use from local sources, and about 50% from MWD.
(12) Year 2000 demand includes the filling of Diamond Valley Lake, which occurred during a dry year.

3.4.4.2 Los Angeles Aqueducts

The Los Angeles Aqueducts have supplied about half of the Los Angeles Department of Water and Power (LADWP)'s water needs over the past ten years. For 2001, the Los Angeles Aqueducts delivered 238,997 acre-feet to LADWP, which was 35 percent of total supply, and the lowest total delivered since 1994. This is 79 percent of the normal Los Angeles Aqueducts delivery over the past ten years. The Los Angeles Aqueducts have averaged approximately 368,000 acre-feet per year for the five-year period ending in 2001. Water deliveries by the City's aqueducts will be subject to further reductions in upcoming years with continuing environmental obligations in the Mono Basin and Owens Valley (LADWP, 2001b).

September 1994 court decisions require that minimum stream flows be established in four of the streams feeding Mono Lake so that fish and water fowl habitats can be restored and protected (Frink, 1996). In addition, California courts have ruled that the average lake surface elevation of Mono Lake be restored to 6,392 feet above mean sea level. To comply with these rulings, the City of Los Angeles anticipates it will have to reduce diversion of Mono Lake water by as much as 60,000 acre-feet per year.

3.4.4.3 Colorado River Aqueduct

Under the "Law of the River", MWD has priorities to Colorado River water which yield an annual supply that is delivered to MWD's service area via its CRA. The "Law of the River" is a collective body of laws, court decrees, compacts, agreements, regulations, and an international treaty that governs the distribution and management of Colorado River water. This supply is currently available and consists of a firm annual supply of 550,000 acre-feet per year, MWD's fourth priority to California's basic apportionment, and available surplus water is determined annually by the Secretary of Interior in accordance with MWD's fifth priority and surplus water contract (for more information on the apportionment priority system, refer to subsection 3.4.4.4). MWD conveys Colorado River water 242 miles from its Lake Havasu intake through the CRA and distribution system to MWD's terminal reservoirs. MWD's terminal reservoirs include Lake Mathews, located near the City of Riverside, and Diamond Valley Lake, located near the City of Hemet (MWD, 2002).

MWD's dependable water supply from its fourth priority apportionment of California's Colorado River water is expected to be 550,000 acre-feet in every of the next 20 years. In other words, it is expected that the supply would be available during all year types, including wet, average, single dry-year, and multiple dry-year weather. Although the Secretary of the Interior has allowed MWD to divert surplus water and water that is unused by Arizona and Nevada under MWD's fifth priority to California's apportionment in the past, these additional water supplies over the next 20 years will be provided in accordance with Interim Surplus Guidelines established in 2001 (MWD, 2002).

3.4.4.4 Supply Inventory

MWD's available supplies are diverse and include SWP deliveries, Colorado River deliveries (according to Federal apportionments and guidelines), water transfers and exchanges, storage and groundwater banking programs, and State and Federal initiatives (such as the California Water Use Plan for the Colorado River and Delta Improvements) (MWD, 2002).

<u>Supply Sufficiency:</u> The demand forecasts and supply capabilities have been compared over the next 20 years and under varying hydrologic conditions. These comparisons determine the supplies that can be reasonably relied upon to meet projected supplemental demands and to provide resource reserves that can provide a margin of safety to mitigate

against uncertainties in demand projections and risks in implementing supply programs (MWD, 2002).

In summary, this analysis finds that current practices allow MWD to bring water supplies on-line at least ten years in advance of demand with a very high degree of reliability. If all imported water supply programs and local projects proceed as planned, with no change in demand projections, reliability could be assured beyond twenty years. (MWD, 2002).

Water supply under MWD's apportionment of Colorado River water has been delivered to MWD since 1930 and by existing contract would continue to be available in perpetuity. In 2005, 2010, 2015, and 2020, the estimated water supplies available to MWD is 550,000 acre-feet per year. Over the last 20 years, an average of 1.212 million acre-feet per year has been available for MWD's use, enabling MWD to maintain a full CRA delivery capability each year. The historical record indicates that MWD's fourth priority supply has been available in every year and can reasonably be expected to be available over the next 20 years, although in 2003, California for the first time received no surplus water, and MWD was cut back to 592,000 acre-feet (MWD, 2002).

MWD's entitlement to Colorado River water is based on the "Law of the River". The documents that specifically determine MWD's dependable supplies are as follows:

- 1931 Seven Party Agreement - The 1931 Agreement recommended California's Colorado River use priorities and has no termination date. California's basic annual apportionment is 4.4 million acre-feet. Palo Verde Irrigation District (PVID), Yuma Project (Reservation Division), Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), and MWD are the entities that hold the priorities. These priorities are included in the contracts that the Department of the Interior executed with the California agencies in the 1930's for water from Hoover Dam. These priorities are shown in Table 3.4-2. MWD has the fourth priority to California's Basic Apportionment of Colorado River water and utilizes this water, 550,000 acre-feet per year, every year. In addition, MWD has access to additional Colorado River water, up to 662,000 acre-feet per year, through its fifth priority in the California apportionment. The Secretary of the Interior determines the availability of certain fifth priority water on an annual basis. The fifth priority water consists of: (1) water apportioned to, but unused, by Arizona and Nevada, (2) surplus Colorado River water, (3) water unused by holders of priorities 1 through 3 in California, and (4) an amount of water equal to the amount conserved under the 1988 and 1989 agreements with Imperial Irrigation District (MWD, 2002).

- MWD's Basic Contracts. The MWD's 1930, 1931, and 1946 basic contracts with the Secretary of the Interior permit the delivery of 1.212 million acre-feet per year when sufficient water is available. The MWD's 1987 surplus flow contract with reclamation permits the delivery of water to fill the remainder of the Colorado River Aqueduct when water is available. Certain programs discussed subsequently are being implemented and planned to increase assurances that this water will be available (MWD, 2002).

- 1964 Court Decree. The 1964 U.S. Supreme Court Decree confirmed the Arizona, California, and Nevada basic apportionment of 2.8 million acre-feet per year, 4.4 million acre-feet per year and 300,000 acre-feet per year, respectively. The Decree also permits the Secretary of the Interior to make water unused by one of the states available for use in the other two states (MWD, 2002).

3.4.4.5 Tentative Agreement Reached on Colorado River Water Accords

October, 2002: Four California water agencies reached a tentative agreement advancing landmark agriculture-to-urban water transfers and providing a basis for settling nearly seven decades of disputes among California's Colorado River water agencies. The agreement would have provided a framework to execute the Quantification Settlement Agreement (QSA) by December 31, 2002, if it was ratified by each agency's board of directors and translated into signed contracts. Execution of the QSA was a requirement for preservation of the federal Colorado River Interim Surplus Guidelines, which would have provided a "soft landing" for California while it reduced its take on the Colorado River. Under a seven-state agreement, California would have had 15 years to reduce its draw on the Colorado river, from about 5.2 million acre-feet per year, to its basic annual

TABLE 3.4-2

Priority in Seven-Party Agreement and Water Delivery Contracts

<table>
<tr><th>Priority</th><th>Description</th><th>Acre-feet annually</th></tr>
<tr><td>1</td><td>Palo Verde Irrigation District gross area of 104,500 acres of land in the Palo Verde valley</td><td rowspan="4">3,850,000</td></tr>
<tr><td>2</td><td>Yuma Project (Reservation Division) not exceeding a gross area of 25,000 acres in California</td></tr>
<tr><td>3(a)</td><td>Imperial Irrigation District and land in Imperial and Coachella Valleys[1] to be served by the All American Canal</td></tr>
<tr><td>3(b)</td><td>Palo Verde Irrigation District – 16,000 acres of land on the Lower Palo Verde Mesa</td></tr>
<tr><td>4</td><td>Metropolitan Water District of Southern California for use on the coastal plain</td><td>550,000</td></tr>
<tr><td></td><td>Subtotal</td><td>4,400,000</td></tr>
<tr><td>5(a)</td><td>Metropolitan Water District of Southern California for use on the coastal plain</td><td>550,000</td></tr>
<tr><td>5(b)</td><td>Metropolitan Water District of Southern California for use on the coastal plain[(1)]</td><td>112,000</td></tr>
</table>

TABLE 3.4-2 (CONCLUDED)

Priority in Seven-Party Agreement and Water Delivery Contracts

Priority	**Description**	**Acre-feet annually**
6(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys(2) to be served by the All American Canal	
6(b)	Palo Verde Irrigation District – 160,000 acres of land on the Lower Palo Verde Mesa	300,000
7	Agricultural Use in the Colorado River Basin in California	
	Total	5,362,000

MWD, 2002

(1) The Coachella Valley Water District now serves Coachella Valley

(2) In 1946, the City of San Diego County Water Authority, MWD, and the Secretary of Interior entered into a contract that merged and added the City of San Diego's rights to storage and delivery of Colorado River water to the rights of MWD. The conditions of that agreement have since been satisfied.

apportionment of 4.4 million acre-feet per year, in the absence of surplus water. During the 15-year ramp-down period, California would continue to receive surplus water from the river. The agreement was negotiated by officials from the IID, the San Diego County Water Authority (SDCWA), the CVWD and MWD. Under the agreement, water transfers from Imperial Valley to San Diego County could have begun in 2003. IID agreed to a combined temporary fallowing and a system improvement program during the first 15 years of the transfer. In order to meet benchmark requirements for California's reduction in Colorado River water use, IID would have delivered one million acre-feet of water over the first 15 years. The 75-year agreement was comprised of two terms: an initial 45-year term, and a 30-year renewal; either party could compel the 30-year renewal term. As part of the pacts, the SDCWA would receive additional water over the first 15 years from the MWD's land management, crop rotation, and water supply program with the Palo Verde Irrigation District. In all, the SDCWA would receive nearly 1.4 million acre-feet of transfer water in the first 15 years.

As of December 31, 2002, IID had elected not to ratify the terms of this agreement. They expressed concerns about the duration of the agreement, the fallowing of land, and any costs ultimately associated with the environmental impacts created to the Salton Sea, due to the lack of runoff water supply. Due to the lack of a settlement, the execution of the QSA has not been achieved. Execution of the QSA is a requirement for preservation of the federal Colorado River Interim Surplus Guidelines, which would have provided a "soft landing" for California while it reduced its take on the Colorado River. The Secretary of the Interior immediately reduced California's access to the Colorado River Interim Surplus. If the Interim Surplus Guidelines are not reinstated, over the next 20 years, MWD will receive available surplus water as determined by the Department of the Interior.

Currently, California's Governor is meeting with the appropriate water agencies to aid in realizing an agreement. A new proposed QSA agreement package was presented to the Department of the Interior on March 12, 2003. Also on March 12, 2003, the negotiators for CVWD, IID, MWD, and SDCWA, having worked closely with the State of California Administration, are prepared to move forward and recommend the QSA and related agreements to their agencies' Boards when the following conditions are satisfied: (1) the special surplus water provisions in the Interim Surplus Guidelines are reinstated; (2) the overrun payback issue is resolved; (3) the legal action of IID vs. U.S. is appropriately settled and/or dismissed; and (4) the related agreements are satisfactory to the Department of the Interior and the other Basin States (MWD, 2003).

After a hearing on March 18, 2003, a federal judge blocked a decision by the Department of the Interior, granting a preliminary injunction which will restore Imperial County's full allotment of Colorado River Water (Associated Press, 2003)

Recently, MWD published its 2003 Report on Metropolitan's Water Supplies (Water Supplies Report) which indicated the water supply inventory for the Southern California region is adequate and reliable for the foreseeable future. Southern California's water supply reliability is based on a mix of local supplies, water storage and imported supplies. A portion of the region's imported water supply portfolio includes water from the Colorado River. As part of an effort to increase the reliability of Southern California's Colorado River water supply, the Colorado River Board for the State of California released the working draft California Colorado River Water Use Plan (California Plan) in 2001. A part of the California Plan is contingent upon completion of a water transfer between IID and San Diego County Water Authority (SDCWA) and completion of a Quantification Settlement Agreement (QSA) among MWD, IID and Coachella Valley Water District. Both the IID/SDWA Transfer and the QSA have been delayed due to a number of factors and it remains unclear when or if those transactions will be completed. In addition to uncertainty over the IID/SDCWA Transfer and the QSA, a record setting drought in the Colorado River Basin has further complicated ensuring reliability of Colorado River water supply for the near future. Negotiations are continuing on both the QSA and the IID/SDCWA Transfer and it remains possible that agreement may be reached on these programs before October 2003. Regardless of the status of the QSA, the IID/SDCWA Transfer, or hydrologic conditions on the Colorado River, MWD's water supply portfolio has adequate supplies to meet regional demands from other sources as documented in its Water Supplies Report.

3.4.5 LOCAL WATER SUPPLIES

Local sources of water account for approximately 26 percent of the total volume consumed annually in the SCAG area. Local sources include surface water runoff and groundwater.

The largest surface water sources in the region are the Colorado, the Santa Ana, and the Santa Clara River systems. Major groundwater basins in the region include the Central, Raymond, San Fernando, and San Gabriel basins (Los Angeles County); the Upper Santa

Ana Valley Basin system (San Bernardino and Riverside counties); the Coastal Plain Basin (Orange County); and the Coachella Valley Basin (Riverside County).

Local water resources are fully developed and are expected to remain relatively stable in the future on a region-wide basis. However, local water supplies may decline in certain localized areas and increase in others. Several groundwater basins in the region are threatened by overdraft conditions, increasing levels of salinity, and contamination by agricultural land to urban development, thereby reducing the land surface available for groundwater recharge. Increasing demand for groundwater may also be limited by water quality, since levels of salinity in sources currently used for irrigation could be unacceptably high for domestic use without treatment.

3.4.5.1 Groundwater

Groundwater accounts for most of the region's local (i.e., non-imported) supply of fresh water. Many cities within the area augment imported water supplies with groundwater from underlying groundwater basins. Groundwater basins are recharged through local precipitation and through imported water applied through injection wells or percolation ponds. Groundwater basins in California are generally not managed by overseeing authorities which allows overlying property owners to extract water to the extent that other users are not impaired. However, through court decisions, several basins in the South Coast area have become adjudicated. Adjudicated groundwater basins are managed through a watermaster assigned by the court. The watermaster manages the distribution of extracted water and is responsible for maintaining water quality.

Recent efforts to store recycled water and surplus water in groundwater basins for use during drought periods have proven successful. These conjunctive use projects, in place of surface reservoirs, promise to play a major role in future water management planning.

3.4.5.2 Surface Runoff

Surface runoff augments groundwater and surface water supplies. However, the regional demand far surpasses the potential natural recharge capacity. The arid climate, summer drought, and increased urbanization contribute to the inadequate natural recharge. Urban and agricultural runoff can contain pollutants, which decrease the quality of local water supplies. Runoff captured in storage reservoirs varies widely from year to year depending on local precipitation, averaging 130,000 acre-feet per year within the MWD service area. Within the desert regions, the amount is considerably less, given the low annual rainfall and the relatively few surface reservoirs.

3.4.6 WATER RESOURCE ALTERNATIVES

The MWD and other water providers are currently exploring various strategies for increasing water supplies and maximizing the use of existing supplies. Imported supply options include storage of water from existing sources, use or storage of water unused by other state or agricultural agencies, and advance delivery of water to irrigation districts.

Groundwater basins within MWD's service area are the foundation of the water supply system in Southern California, and conjunctive use is an important part of maintaining and enhancing the reliability of the basins. Conjunctive use refers to the use and storage of imported surface water supplies in groundwater basins and reservoirs during periods of supply abundance for use during times of need. Water years in California tend to be either wet or dry, with very few "average" years. Conjunctive use takes advantage of this by recharging basins during wet years and pumping during dry years. Basins are recharged with imported surface water supplies using spreading basins and injection wells, or by substituting imported water for pumping (in-lieu storage). More than 70 recharge facilities in Southern California are currently being used to replenish the groundwater basins (MWD, 2000).

MWD has developed a number of local programs to work with its member agencies to increase storage and assist in the efficient use of groundwater basins.

Seasonal Storage Service

The Seasonal Storage Service (SSS) program has three major goals:

1. Achieve greater water supply reliability though increased conjunctive use of imported and local water supplies

2. Encourage the construction of additional local production facilities

3. Reduce member agencies' dependence on deliveries from MWD during summer months and times of shortage

Cyclic Storage Agreements

These agreements allow MWD to deliver replenishment water when it is available in wet periods and the ability to stop the delivery of replenishment water when supplies are restricted. The goal of the program is to avoid losing available water by increasing groundwater basin levels above what they would otherwise be.

Salt Water Barriers

The barriers are built by injecting water into the basins at strategic locations, and they help protect aquifers in the West Coast, Central and Orange County basins. These deliveries must be continued except under the most severe shortage conditions.

Surface Storage

Diamond Valley Lake

In early 2000, MWD began filling Diamond Valley Lake (formerly known as the Eastside Reservoir Project). Diamond Valley Lake is an 800,000 acre-feet reservoir that nearly doubles Southern California's total surface storage capacity. Half of the capacity of Diamond Valley Lake is reserved for use in emergencies. The other half of the capacity is intended for carryover and regulatory storage operations. A fully operational Diamond Valley Lake will provide a vast improvement in the region's ability to regulate imported supplies and maximize the effectiveness of the groundwater basins.

<u>SWP Terminal Reservoirs</u>

MWD has operational control of 218,940 acre-feet in the reservoirs at the southern terminals of the California Aqueduct. This gives MWD greater flexibility in handling supply shortages (MWD, 2000).

In the area serviced by LADWP, two projects will decrease the availability of water from the Los Angeles Aqueducts, requiring the development of water resource alternatives. These projects are the Owens Lake Dust Mitigation Project and the Lower Owens River Project.

3.4.6.1 Owens Lake Dust Mitigation Project

Diversion of water from the Owens River, first by farmer's in the Owens Valley and then by the City of Los Angeles, resulted in Owens Lake drying up completely by the late 1920s. The exposed lakebed became a major source of windblown dust resulting in the U.S. EPA classifying the southern Owens Valley as a serious non-attainment area for particulates (dust) in 1991. The U.S. EPA required California to prepare a SIP to bring the region into compliance with federal air quality standards by 2006 (LADWP, 2001).

LADWP is financing the development of a multi-year program to implement the requirements of the SIP. Phase 1, completed in November 2001, consists of 13.5 square miles of flood irrigation in the northern and north-central part of the lakebed for dust control measures. The remaining phases of the project will utilize both shallow flooding and native vegetation planting to control dust blowing from the alkaline lakebed. The Great Basin Unified Air Pollution Control District plans to amend the SIP in 2003 to delineate the actual areas of the lakebed that need to be mitigated. LADWP is required to bring the lakebed into compliance with federal air quality standards by 2006 (LADWP, 2001).

3.4.6.2 Lower Owens River Project

The Lower Owens River Project will release water from the Los Angeles Aqueducts to rewater and create a warm water fishery along a 60-mile section of the Owens River that has been dry since the City diverted the river's flow. Although a pump station will be built downstream to recover a portion of the water released upstream, it is estimated that there will be a 16,000 acre-feet per year loss in Los Angeles Aqueducts supplies due the transit loss (LADWP, 2001).

3.4.7 WATER RECYCLING

One of the most dependable, abundant, and underutilized supplies of water in the region is recycled water – wastewater originating from municipal, industrial, or agricultural activities – which has been treated to a quality suitable for beneficial reuse. Among the potential reuses are irrigation, industrial processes, groundwater recharge, groundwater injection to prevent seawater intrusion, and environmental enhancement (DWR, 2002).

The use of recycled water for irrigation and industrial processes reduces the demand for supplied water. Some of these uses, including groundwater recharge, can augment potable water supply, actually creating new supplies of drinking water as accounted for in local water budgets. Water recycling has been practiced in California for decades as a means of reducing demand, and can to be a major source of water in the future.

The DWR California Water Plan Update of 1998 reports that the south coast region (including San Diego County) recycled approximately 263,000 acre-feet in 1995. The DWR California Water Plan Update of 1998 includes a long list of planned water recycling projects in the South Coast (RWQCB regions 4, 8, and 9), Colorado River region (RWQCB region 7), and South Lahontan region (RWQCB region 6). Currently, recycled water projects in operation in the southern California region account for more than approximately 200,000 acre-feet of new water supplies annually. Planned projects could account for up to 458,000 acre-feet of new water supplies in southern California (SCAG, 2002).

Below are discussions reflecting water recycling programs for specific agencies within the district. These discussions are not comprehensive in nature but provide examples of some of the programs that are in place.

3.4.7.1 Reclaimed Water by MWD

Water recycling (reclamation of wastewater to produce water that is safe and acceptable for various non-potable uses) has provided a valuable source of water supply for Southern California. Southern California has been a leader in developing recycled water projects. As a result, recycled water is currently used for numerous applications including groundwater recharge, seawater intrusion barriers, landscape and agricultural irrigation, and in industrial processes. Water recycling can improve reliability not only during a drought, but also during normal wet years. Currently, MWD has entered into agreements covering 53 projects through its Local Resource Program that have the capability to produce about 235,000 acre-feet per year. Presently 37 of these water recycling projects are partially operational and will have the ultimate capability to produce an additional 200,000 acre-feet per year when fully operational.

West Basin Water Recycling Project

Reclamation projects have been implemented in various areas within the district. The MWD provides financial support to local water districts for wastewater reuse and groundwater treatment projects. The West Basin MWD (WBMWD) operates a recycling system to reclaim wastewater from the City of Los Angeles' Hyperion Treatment Plant. The plant will ultimately deliver tertiary-treated reclaimed water with a capacity of up to 100,000 acre-feet per year. Via the "West Basin Water Recycling Project", almost 22,000 acre-feet of recycled water is annually distributed to more than 150 sites in the South Bay. These sites use recycled water for a wide range of non-potable applications (WBMWD, 2002).

3.4.7.2 Reclaimed Water by LADWP

During the fiscal year 2000-2001, LADWP continued water recycling project development and construction, and is on target to reach its goal of recycling 10 percent of total water demand by year 2010. This effort supports the overall goal set by the State Legislature of recycling one million acre-feet per year statewide by 2010 (LADWP, 2001). The recycling projects are listed below.

East Valley Water Recycling Project

The City of Los Angeles produces recycled water from four facilities; the Los Angeles/Glendale Water Reclamation Plant, the Donald C. Tillman Water Reclamation Plant, the Hyperion Treatment Plant, and the Terminal Island Treatment Plant. Each of the City's wastewater treatment plants is capable of delivering reusable water either directly or indirectly to customers (LADWP, 2001).

The East Valley Water Recycling Project is the backbone of a distribution system to deliver recycled water throughout the San Fernando Valley for irrigation, commercial and industrial use. The new facilities will provide recycled water to the Sepulveda Basin, West Valley and Hansen Water Recycling Projects, making recycled water available to areas stretching from the Warner Center in Woodland Hills to North Hollywood and up to the Hansen Dam Recreation area. Ground water recharge was originally within the scope of this project. However, the LADWP, upon instruction from the City's Mayor, suspended the ground water recharge element of the East Valley Water Recycling Project (LADWP, comment letter dated May 22, 2003.

Westside Water Recycling Project

LADWP plans to purchase as much as 1,850 acre-feet per year of recycled water from the West Basin Municipal Water District for irrigation and industrial uses in the West Los Angeles area. Distribution lines currently serve the Westchester and Los Angeles International Airport areas. Expansion to the Playa Vista Development Project is in progress with trunk line construction to be completed in 2004 (LADWP, 2001).

Los Angeles Harbor Water Recycling Project

A joint effort with the Bureau of Engineering and Sanitation, the newly constructed Advanced Treatment Facilities located at the City of Los Angeles's Terminal Island

Treatment Plant will provide up to 5,500 acre-feet per year of recycled water for use as a seawater intrusion barrier and for industrial applications. (LADWP, 2001).

Central City/Elysian Park Water Recycling Project

By 2010, up to 2,100 acre-feet per year of recycled water produced at the Los Angeles – Glendale Water reclamation Plant may be used for landscape irrigation and industrial uses in Elysian Park and the Central City area (LADWP, 2001).

3.4.7.3 Reclaimed Water by Orange County

Directly reused recycled water totaled 30,178 acre-feet in fiscal year 1999/2000, while about 5,000 acre-feet of recycled water was used to recharge aquifers. In 2020, directly reused water is projected to reach nearly 58,000 acre-feet, with another 110,000 acre-feet of recycled water projected for aquifer recharge. Municipal Water District of Orange County (MWDOC) is planning large increases in indirect water recycling through percolation and the proposed Groundwater Replenishment System project. This single recharge project could ultimately supply 120,000 acre-feet/year, which is currently lost to the ocean as a result of wastewater discharges (MWDOC, 2000).

Direct reuse figures for 1999/2000 show nearly a 62 percent increase in recycled water use over the past five years, and an 85 percent increase of recycled water used for aquifer recharge during the same time period. A steady increase in direct reuse of wastewater by the year 2020 is expected equaling nearly a 100 percent increase in recycled water use over the next 20 years (MWDOC, 2000).

The Groundwater Replenishment System (GWRS) is a project jointly sponsored by MWDOC and the OCSD to purify for reuse highly treated wastewater that is now discharged to the ocean. Using Advanced Water Treatment facilities, secondary-treated wastewater from the OCSD sewage treatment plant will be purified to levels that far exceed drinking water standards (MWDOC, 2002).

Future work on the GWRS includes demolishing the existing water purification facility in Fountain Valley, constructing a new water purification facility, constructing new injection wells and a pump station, and a 13-mile pipeline from Fountain Valley to Orange County Water District (OCWD) groundwater basin recharge facilities. The project is scheduled to produce purified water by 2006 (MWDOC, 2002).

The secondary treated wastewater will be treated through the advanced purification facilities in three stages: microfiltration, reverse osmosis, and ultraviolet disinfection. The water will then be stored in the Orange County groundwater basin either by injection along the coast or by percolation in ponds near the Santa Ana River. The underground basin provides 75 percent of the water used by north and central Orange County cities (MWDOC, 2002).

3.4.8 WATER CONSERVATION

In order to ensure reliable water supplies within the Basin, water conservation is an important factor in the overall water management strategy. Urban conservation measures include reducing landscape water use and replacing high volume toilets and shower heads with water saving models. In September 1991, during a state-wide drought, the MWD and other California water agencies signed a Memorandum of Understanding (MOU) regarding Urban Water Conservation that includes a commitment to implement cost-effective BMPs. BMPs address a variety of conservation measures and activities for all customer sections, including replacing toilets and showerheads with ultra-low-flow models, and landscape and facility water audits, and pubic information and education programs. BMPs also include water distribution system leak detection audits.

Water conservation, along with recycling, will be used to meet a substantial portion of increases in Los Angeles' water demands created by ongoing growth in population and commerce . This strategy will minimize the need for new imported water sources and will provide a drought-proof resource that is not subject to environmental restrictions or weather conditions. Measures such as tiered water pricing, financial incentives for installation of ultra-low-flush toilets and water efficient washing machines, technical assistance and incentive programs for business and industry, and large landscape irrigation efficiency programs are examples of LADWP's ongoing conservation efforts (LADWP, 2001).

MWD's Ultra-Low-Flush Toilet (ULFT) Program conserves water by replacing older, high-flush-volume toilets (3.5 gallons per flush and larger) with 1.6 gallons per flush ULFTs. This activity is the largest of MWD's Conservation Credits programs. As of January 2000, the region had achieved as estimated 32 percent overall saturation of ULFTs. More than 200,000 ULTFs are installed each year through programs sponsored by MWD and its member agencies. As of FY 1999/2000, the annual savings are 60,000 acre-feet per year. By FY 2003/2004, the estimated savings will be 90,000 acre-feet per year, translating into a lifetime savings of almost 2 million acre-feet (MWD, 2002).

3.4.9 WATER QUALITY

3.4.9.1 Groundwater

The general quality of groundwater in the district has degraded substantially from historic levels. Much of the degradation reflects land uses. Fertilizers and pesticides typically used on agricultural lands can infiltrate and degrade groundwater. Septic systems and leaking underground storage tanks can also impact groundwater quality. Urban runoff has been proven to be a significant source of pollutants. Pollutants in urban runoff include urban debris, suspended solids, bacteria, viruses, heavy metals, pesticides, petroleum hydrocarbons, and other organic compounds. In addition, when increased withdrawals from groundwater basins exceed safe yields, salt water intrusion from the ocean further degrades groundwater quality. Conversely, as impervious surfaces in urban areas increase, the rate of natural surface recharge declines.

3.4.9.2 Coastal Waters

Coastal waters in the region include bays, harbors, estuaries, beaches, and open ocean. Deep draft commercial harbors include the Los Angeles/Long Beach Harbor complex. Shallower small craft harbors are prevalent along the coast line including Dana Point Harbor, Newport Beach Harbor, Huntington Harbor, and Marina Del Rey Harbor. Several small estuaries and salt water marshes exist along the coast and are generally considered sensitive ecological areas. These include Newport Bay, Bolsa Chica Wetlands, La Ballona Wetlands, and Malibu Lagoon. These coastal waters are impacted by previously described wastewater discharges, non-point source runoff, dredging, bilge water discharges, illicit discharges, and spills.

3.4.9.3 Drinking Water

Every well that is pumped to supply water to the City of Los Angeles is actively monitored by LADWP as required by the DHS. LADWP's groundwater monitoring program is comprised of four distinct components:

- Quarterly Organic Monitoring—the sampling of all wells where organic compounds have been detected;
- Organic Monitoring—the sampling of the full range of organic compounds of all wells every three years;
- Inorganic Monitoring—the sampling of the full range of inorganic compounds of all wells every three years; and,
- Radiological Monitoring—radiological testing of all wells every three years.

Monitoring for organic and inorganic compounds is performed at different points in the distribution system in close proximity to where the water is being pumped from the wells. If water quality problems are detected, the distribution system is immediately isolated. The source water is then identified and further treated. The City of Los Angeles pumps only from wells in non-contaminated areas or where adequate treatment is available as a safety measure. These steps ensure that all extracted water complies with or exceeds the water quality standards set by the regulatory agencies.

MWD imports water from the Colorado River and northern California. Each water source has unique water quality challenges. The sources of drinking water (both tap and bottled water) include rivers, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground it can pick up substances left behind from animals or people, and it dissolves minerals and sometimes radioactive material (MWD, 2002).

The DHS requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to assess potential sources of drinking water contamination. The survey includes suggestions for how to protect water quality at the source. Updated sanitary surveys for MWD's sources, the Colorado River and State Water Project, were completed in 2001. A similar requirement from U.S. EPA calls for utilities to complete a Source Water Assessment Report. Information collected in the sanitary surveys is used to evaluate the vulnerability of water sources to contamination and help determine if more proactive protection measures are needed (MWD, 2002).

In coordination with its 26 member public agencies, MWD instituted new security measures in 2001. These changes included increasing water quality tests above the 300,000 that already were being done each year. The changes brought increased system patrols, restricted facility access, and a top-to-bottom assessment of region-wide vulnerabilities, with new contingency plans (MWD, 2002).

Oversight of MWD's water quality has many layers that include monitoring and reporting, hundreds of thousands of tests, effective treatment technology and continual upgrades. MWD is actively involved in monitoring for constituents including those that are not yet regulated. This practice has taken place for many years and has covered different constituents such as perchlorate, radon and hexavalent chromium (Chromium VI). In time, MWD's findings, along with other utilities' data, will be used by the regulatory agencies to set new standards based on actual occurrence and treatment capabilities (MWD, 2002a).

In 2001, MWD continued the development and support of policies and programs that uphold high water-quality standards. Key achievements include:

- Near completion of a project to protect the Colorado River Aqueduct's terminal reservoir, Lake Mathews, from contaminated urban runoff;

- Continued financial support of watershed protection programs throughout the state including a donation to the Sacramento River Watershed Program;

- Continued participation in a federal-state effort to reduce salinity in the Colorado River;

- Support of the DWR new policy to govern the quality of water in the California Aqueduct; and,

- Adoption of a new boating policy for two major drinking water reservoirs that allows the use of boats powered by people, sails, electric and some gasoline engines, while prohibiting the use of carbonated two-stroke engines and fuels containing MTBE (MWD, 2002).

3.4.10 WASTEWATER TREATMENT

The CWA requires wastewater treatment facilities discharging to waters of the U.S. to provide a minimum level of treatment commonly referred to as tertiary treatment. Modern wastewater treatment facilities consist of staged processes with the specific treatment systems authorized through NPDES permits. Primary treatment generally consists of initial screening and clarifying. Primary clarifiers are large pools where solids in wastewater are allowed to settle out over a period of hours. The clarified water is pumped into secondary clarifiers and the screenings and solids are collected, processed through large digesters to break down organic contents, dried and pressed, and either disposed of in landfills or used for beneficial agricultural applications. Secondary clarifiers repeat the process of the primary clarifiers further, refining the effluent. Other means of secondary treatment include flocculation (adding chemicals to precipitate solids removal) and aeration (adding oxygen to accelerate breakdown of dissolved constituents). Tertiary treatment may consist of filtration, disinfection, and reverse osmosis technologies. Chemicals are added to the wastewater during the primary and secondary treatment processes to accelerate the removal of solids and to reduce odors. Hydrogen peroxide can be added to reduce odors and ferric chloride can be used to remove solids. Polymers are added to secondary effluent as flocculate. Chlorine is often added to eliminate pathogens during final treatment and sulfur dioxide is often added to remove the residual chlorine. Methane produced by the treatment processes can be used as fuel for the plant's engines and electricity needs. Recycled water must receive a minimum of tertiary treatment in compliance with DHS regulations. Water used to recharge potable groundwater supplies generally receives reverse osmosis and microfiltration prior to reuse. Microfiltration technologies have improved substantially in recent years and have become more affordable. As levels of treatment increase, greater volumes of solids and condensed brines are produced. These by-products of water treatment are disposed of in landfills or discharged to local receiving waters.

3.4.10.1 Existing Facilities

The SCAG region encompasses some of the most densely populated cities in the country and some of the least populated deserts. Capacities of wastewater treatment systems are commensurate with local population. Much of the urbanized areas of Los Angeles and Orange Counties are serviced by three large POTWs operating on the coast: the City of Los Angeles Bureau of Sanitation Hyperion Facility, the Joint Outfall System of the Los Angeles County Sanitation Districts (LACSD), and the OCSD treatment plant. Each of these facilities discharges an average of over 250 million gallons per day (mgd) of treated wastewater to ocean outfalls extending up to five miles from the shoreline. These three facilities handle more than 70 percent of the wastewater generated in the entire region, serving a population of approximately 12 million people. In addition to these large facilities, smaller communities in southern Orange County, and in the inland regions, are serviced by medium sized POTWs (greater than 10 mgd) and small treatment plants (less than 10 mgd). Many of these treatment systems recycle 100 percent of their effluent through local landscape irrigation and groundwater recharge projects. Other systems are allowed to discharge to local creeks on a seasonal basis to more effectively match the natural conditions of ephemeral and intermittent stream habitats. Table 3.4-3 provides information regarding the capacity, treatment levels and receiving waters for large and medium-sized wastewater treatment facilities in the region. Many rural communities utilize individually-owned and operated septic tanks rather than centralized treatment plants. Wastewater from individual homes is conveyed to an underground tank on the property where solids settle out and liquids are released into underground leach fields. Periodic maintenance is required to clean the tanks depending on frequency of use. In residential areas with shallow ground water, the cumulative effect of numerous septic tanks can degrade groundwater quality with nitrates and bacteria. However, for less dense communities, septic systems provide adequate treatment and pose little threat to the environment. The RWQCB generally delegates oversight of septic systems to local authorities. However, WDRs are generally required for multiple-dwelling units and in areas where groundwater is used for drinking water (SCAG, 2002).

TABLE 3.4-3

Major Sewage Treatment Facilities With Design Flow Greater Than 10 mgd

Facility Name	Average Flow MGD	Design Flow MGD	Receiving Waterbody	Treatment Level
RWQCB Los Angeles Region 4				
Joint Water Pollution Control Plant (Los Angeles County)	340.0	385.0	Pacific Ocean	Advanced Primary/ Secondary
Hyperion Treatment Plant (City of Los Angeles)	350.0	450.0	Santa Monica Bay	Primary/ Secondary
Donald C. Tillman Water Reclamation Plant	75.0	80.0	Los Angeles River	Tertiary
San Jose Creek Water Reclamation Plant (County of Los Angeles	71.7	100.0	San Gabriel River and San Jose Creek	Tertiary
Los Coyotes Water Reclamation Plant (County of Los Angeles)	37.8	37.5	San Gabriel River	Tertiary
Oxnard Wastewater Treatment Plant (City of Oxnard)	18.0	37.1	Pacific Ocean	Secondary
Terminal Island Treatment Plant (City of Los Angeles)	18.0	30.0	Los Angeles Harbor	Secondary
Long Beach Water Reclamation Plant (County of Los Angeles)	17.3	25.0	Coyote Creek	Tertiary
Los Angeles-Glendale Water Reclamation Plant (City of Los Angeles)	20.0	20.0	Los Angeles River	Tertiary
Tapia Water Reclamation Facility	13.0	16.0	Malibu Creek	Tertiary

TABLE 3.4-3 (Concluded)

Major Sewage Treatment Facilities With Design Flow Greater Than 10 mgd

Facility Name	Average Flow MGD	Design Flow MGD	Receiving Waterbody	Treatment Level
Pomona Water Reclamation Plant (County of Los Angeles)	13.2	15.0	San Jose Creek	Tertiary
Whittier Narrows Water Reclamation (County of Los Angeles)	12.5	15.0	San Gabriel River and Rio Hondo	Tertiary
Ventura Water Reclamation Plant (Ventura County)	15.0	14.0	Santa Clara River	Tertiary
Simi Valley Water Quality Control Plant (Simi Valley)	9.0	12.5	Arroyo Simi	Tertiary
RWQCB Colorado River Basin Region 7				
Palm Desert WRP # 10 (Riverside County)	14.0	18.0	N/A	Tertiary
Palm Springs WWTF (Riverside County)	11.0	16.5	N/A	Tertiary
RWQCB Santa Ana Region 8				
Orange County Sanitation District (Orange County)	222.0	232.0	Pacific Ocean	Advanced Primary/Secondary
Inland Empire Utility Agency (San Bernardino County)	38.0	44.0	N/A	Tertiary
City of Riverside (Riverside County)	30.6	40.0	Santa Ana River	Tertiary
Colton/San Bernardino RTT & WRA (San Bernardino County)	24.5	33.0	Santa Ana River	Secondary/Tertiary
Eastern MWD B Moreno Valley (Riverside County)	10.0	16.0	N/A	Tertiary/Secondary
Irvine Ranch Water District (Orange County)	10.5	15.0	Rattlesnake Canyon Reservoir	Tertiary
City of Rialto (San Bernardino County)	8.0	12.7	Santa Ana River	Tertiary
City of Redlands (San Bernardino County)	6.85	12.0	N/A	Secondary
Eastern MWD B Hemet (Riverside County)	7.5	11.0	N/A	Secondary

Source: SCAG, 2001