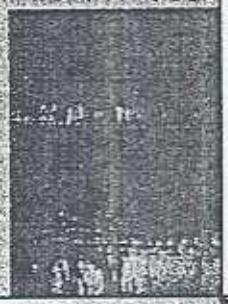
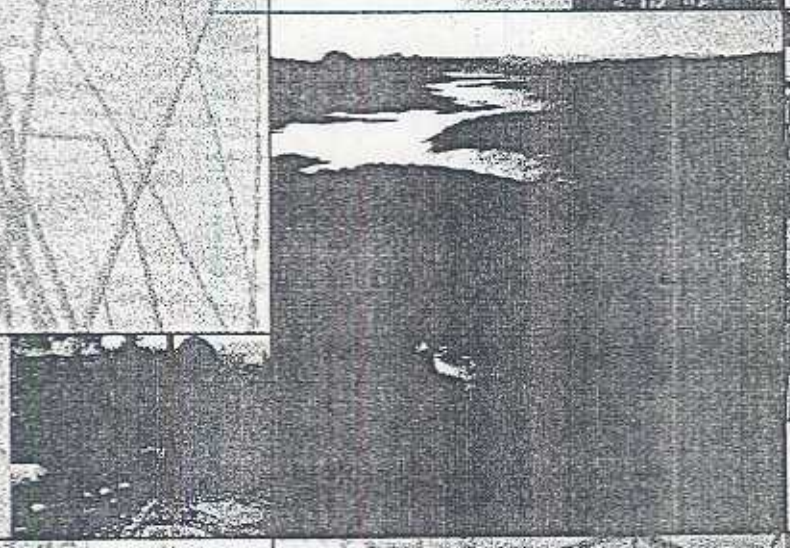
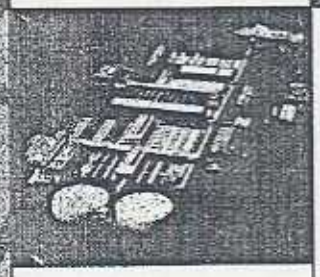
2000 Urban Water Management Plan







San Diego County Water Authority

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San Diego County Water Authority
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2000 URBAN WATER MANAGEMENT PLAN
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ABBREVIATIONS

2000 Plan	2000 Urban Water Management Plan
Act	Urban Water Management Planning Act
AF	acre-feet
AF/YR	acre-feet per year
Authority	San Diego County Water Authority
Bay-Delta	San Francisco Bay/Sacramento-San Joaquin Delta
BMPs	Best Management Practices (Water Conservation)
BTC	Binational Technical Committee
cfs	cubic feet per second
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information Systems
CIP	Capital Improvement Program
CRA	Colorado River Aqueduct
CUWA	California Urban Water Agencies
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project (Federal)
CWA-MAIN	County Water Authority - Municipal and Industrial Needs
DBP's	Disinfection By-Products
Delta	Sacramento - San Joaquin River Delta
DHS	Department of Health Services (State of California)
DWR	Department of Water Resources (State of California)
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EOC	Emergency Operations Center
ERP	Emergency Response Plan
ESA	Endangered Species Act (Federal)
ESP	Emergency Storage Project
EWA	Environmental Water Account
EWMPs	Efficient Water Management Practices
FAP	Financial Assistance Program
FFY	Federal Fiscal Year
FY	Fiscal Year
Framework	California's Water Future: A Framework For Action
HEWs	high-efficiency clothes washers
IAWP	Interim Agricultural Water Program
IBWC	International Boundary and Water Commission
IID	Imperial Irrigation District
IWR-MAIN	Institute for Water Resources - Municipal and Industrial Needs
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
LRP	Local Resource Program
M&I	municipal & industrial
MAF	million acre-feet
MAF/YR	million acre-feet per year
MF	multi-family residential

mg/l	milligrams per liter
mgd	million gallons per day
Metropolitan	Metropolitan Water District of Southern California
OAEP	Operational Area Emergency Plan
OBMP	Optimum Basin Management Program
plan	Urban Water Management Plan
ppb	parts per billion
ppm	parts per million
Regional Board	California Regional Water Quality Control Board
Regional Recycling	Regional Recycled Water System Alternatives Analysis Study
Regional Study	Regional Colorado River Conveyance Feasibility Study
RO	reverse osmosis
RWDF	Reclaimed Water Development Fund
SANDAG	San Diego Association of Governments
SAWR	Special Agricultural Water Rate
SCCWRRS	Southern California Comprehensive Water Reclamation and Reuse Study
SDG&E	San Diego Gas and Electric
SDWA	Safe Drinking Water Act
SEMS	Standardized Emergency Management System
SF	single-family residential
SRF	State Revolving Fund
SWP	State Water Project
SWRCB	State Water Resources Control Board
TOC	total organic carbon
TDS	total dissolved solids
ULFTs	ultra-low flush toilets
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
Water Use Plan	California's Colorado Water Use Plan
WRLP	Water Reclamation Loan Program
WSDM	Water Surplus and Drought Management
WSMP	Water Shortage Management Plan

SECTION 1 - INTRODUCTION

The mission of the San Diego County Water Authority (Authority) is to provide a safe and reliable supply of water to its member agencies serving the San Diego region. This 2000 Urban Water Management Plan (2000 Plan) includes the Authority's projected water resources mix necessary to provide water supply reliability for the region through the year 2020.

In 1997, the Authority adopted a Water Resources Plan, which projected future supplies through 2015. The 2000 Plan will serve a dual purpose in updating both the Authority's last Urban Water Management Plan prepared in 1995, and the 1997 Water Resources Plan to reflect current conditions.

This section describes the Urban Water Management Planning Act and the coordination that occurred in preparation of the Authority's 2000 Plan. It also provides a general description of the Authority, its physical water delivery system and service area characteristics, including climate, and future population.

1.1 CALIFORNIA URBAN WATER MANAGEMENT PLANNING ACT

The California Water Code requires all urban water suppliers within the state to prepare urban water management plans (plans) and update them every five years. These plans satisfy the requirements of the Urban Water Management Planning Act (Act) of 1983 including amendments that have been made to the Act. Sections 10610 through 10656 of the Water Code detail the information that must be included in these plans, as well as who must file them. **Appendix A** contains the text of the Act.

Recent amendments to the Act now require that total projected water use be compared to water supply sources over the next 20 years in five-year increments. The Act also requests the information be shown for a single dry water year and multiple dry water years. Additional amendments to the Act now require that all plans include a detailed water recycling analysis that includes a description of the wastewater collection and treatment system within the agency's service area along with current and potential recycled water uses.

According to the Act: "The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level." The Act requires that each urban water supplier, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually, shall prepare, update and adopt its urban water management plan at least once every five years or before December 31, in years ending in five and zero. In accordance with the Act, the Authority is required to update and adopt its plan for submittal to the California Department of Water Resources (DWR) by December 31, 2000.

1.2 AUTHORITY'S 2000 URBAN WATER MANAGEMENT PLAN

This report constitutes the 2000 update to the Authority's 1995 Urban Water Management Plan. It also serves as an update to the Authority's 1997 Water Resources Plan to reflect current conditions. Because the Authority is a water wholesaler, the Authority's 2000 Plan addresses regional issues concerning San Diego County water demands and supplies. Plans submitted by Authority member agencies, which are retail water agencies, are expected to provide information about these issues at the consumer level.

While preparing the 2000 Plan, the Authority coordinated its efforts with a number of agencies to ensure that data and issues are presented accurately. In coordination with DWR, the Authority conducted two workshops for its member agencies to discuss requirements of the Act and provide opportunities for coordination. In preparing the water recycling element of the Plan, the Authority worked directly with the wastewater agencies within its service area in order to accurately describe the wastewater treatment requirements and water recycling potential. The Authority also coordinated with the Metropolitan Water District of Southern California (Metropolitan) regarding projected imported water deliveries.

In accordance with the Act, the Authority Board of Directors held a public hearing on October 26, 2000 and adopted the Authority's 2000 Plan on November 26, 2000. A copy of the resolution is included in **Appendix B**. Prior to adoption, the 2000 Plan was mailed to a list of stakeholders that included the Authority's member agencies, members of the Water Authority Reclamation Advisory Committee and other entities, such as the Greater San Diego Chamber of Commerce, Sierra Club, County of San Diego and cities within Authority's service area. The 2000 Plan was also available for public review in the Authority's library and on the Authority's homepage.

DWR has prepared a checklist that lists items based on the Act, to be addressed in agencies' plans. The checklist allows agencies to identify where in their plan they have addressed each item. The Authority has completed the checklist, referencing the sections and page numbers included in the 2000 Plan. The completed checklist is included in **Appendix C**.

1.3 HISTORY AND DESCRIPTION OF AUTHORITY

1.3.1 History

The Authority was established by the California State Legislature in 1944 to provide a supplemental supply of water as the San Diego region's civilian and military population expanded to meet wartime activities. Due to the strong military presence, the federal government arranged for supplemental supplies from the Colorado River in the 1940s. In 1947, water began to be imported from the

Colorado River via a single pipeline that connected to Metropolitan's Colorado River Aqueduct (CRA) located in Riverside County. In order to meet the water demand for a growing population and economy, the Authority constructed four additional pipelines between the 1950s and early 1980s that are connected to Metropolitan's distribution system and deliver water into San Diego County. The Authority is now the predominant source of water, supplying from 75 to 95 percent of the region's needs, depending upon annual surface water runoff into local reservoirs.

1.3.2 Service Area

The Authority's boundaries extend from the border with Mexico in the south, to Orange and Riverside counties in the north, and from the Pacific Ocean to the foothills that terminate the coastal plain in the east. With a total of 908,959 acres (1,420.3 square miles), the Authority's service area encompasses the western third of San Diego County. **Figure 1-1** shows the Authority's service area, its member agencies, and aqueducts.

1.3.3 Member Agencies

The Authority is comprised of 23 member agencies that purchase water for use at the retail level. The county of San Diego is an ex-officio member. The Authority is governed by a 34-member Board of Directors. The member agencies - six cities, four water districts, eight municipal water districts, three irrigation districts, a public utility district, and a federal military base - have diverse and varying water needs.

A list of Authority member agencies is shown in **Table 1-1**. The locations of the member agency service areas are shown in **Figure 1-1**. In terms of land area, the largest member agency is the city of San Diego, with 210,626 acres. The smallest agency is the city of Del Mar, with 1,159 acres. Some member agencies, such as the cities of National City and Del Mar, use water almost entirely for municipal and industrial purposes. Other agencies, including Valley Center, Rainbow, and Yuima municipal water districts, deliver water that is used mostly for agricultural production.

TABLE 1-1
AUTHORITY MEMBER AGENCIES

Carlsbad MWD	Otay WD	San Dieguito WD
Del Mar (City)	Padre Dam MWD	Santa Fe ID
Escondido (City)	Pendleton Marine Corps Base	South Bay ID
Fallbrook PUD	Poway (City)	Vallecitos WD
Helix WD	Rainbow MWD	Valley Center MWD
National City (City)	Ramona MWD	Vista ID
Oceanside (City)	Rincon Del Diablo MWD	Yuima MWD
Olivenhain MWD	San Diego (City)	

1.4 AUTHORITY'S PHYSICAL WATER DELIVERY SYSTEM

The Authority purchases water from Metropolitan and delivers it to its member agencies through two aqueducts containing five large-diameter pipelines. The aqueducts follow general north-to-south alignments, and the water is delivered largely by gravity. Delivery points from Metropolitan are located about six miles south of the Riverside/San Diego county line. The most water the Authority ever delivered in a year was 613,000 AF in 1990.

The First Aqueduct includes Pipelines 1 and 2, which are located in a common right-of-way, share five common tunnels, and are operated as a unit. These pipelines have a combined capacity of 180 cubic feet per second (cfs). Pipelines 3, 4, and 5 form the Second Aqueduct. These pipelines are operated independently and are located in separate rights-of-way from the First Aqueduct. Pipeline 3 has a capacity of 280 cfs, Pipeline 4 is 425 cfs, and Pipeline 5 is 480 cfs. **Figure 1-1** shows the locations of the Authority's aqueducts within San Diego County.

1.4.1 Capital Improvement Program

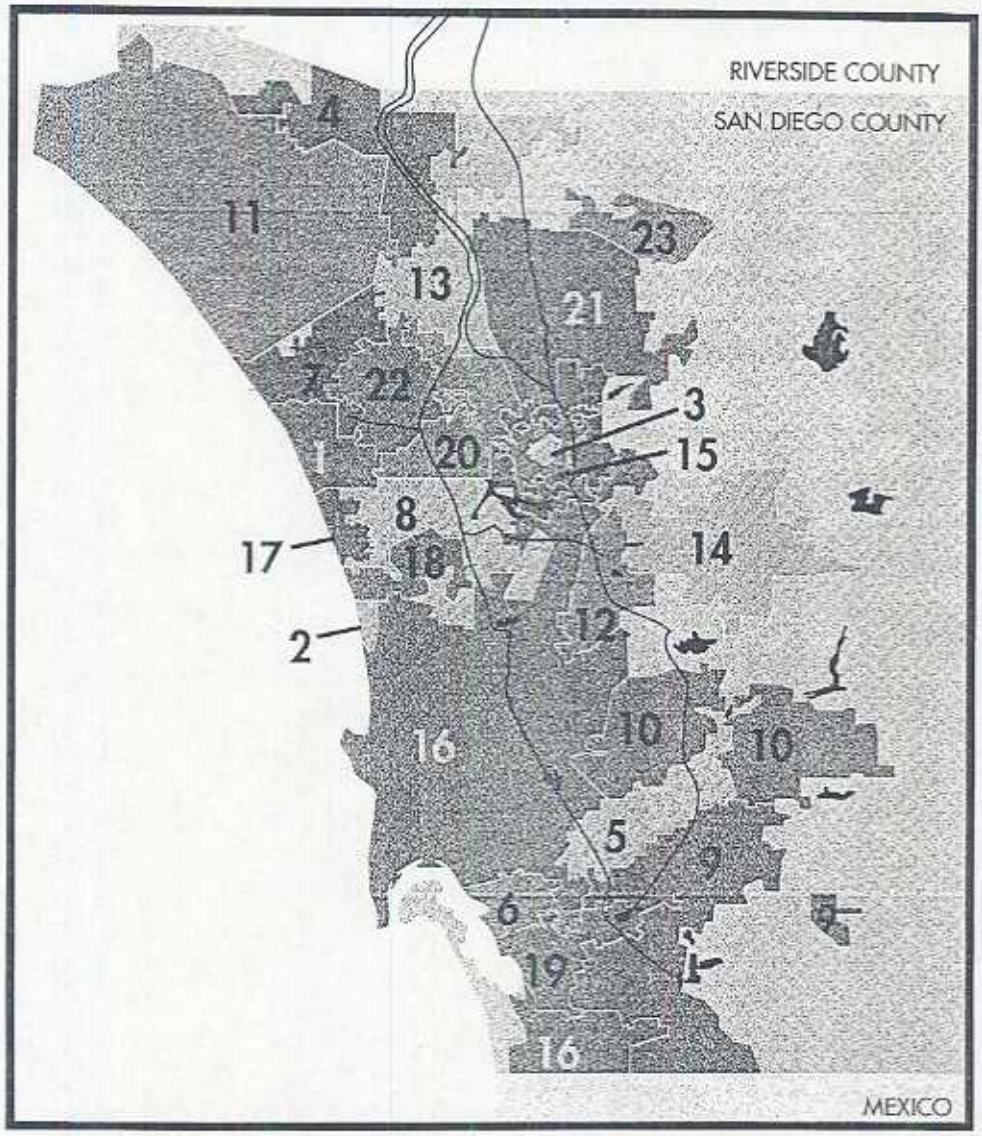
In 1989, the Authority initiated its Capital Improvement Program (CIP) to plan and implement projects necessary to meet the region's water needs to 2010. The goals of the program are to: (1) increase pipeline capacity to meet present and future demands, particularly during times of peak usage; (2) eliminate "bottlenecks" in the existing pipeline system; (3) increase reliability where water delivery is dependent on a single pipeline as a source; and (4) increase operational flexibility to make pipeline maintenance easier.

Table 1-2 lists the fiscal year (FY) 2001 CIP project categories and FY2001 project costs. In addition, a sixth pipeline may be necessary in the future that would extend from Lake Skinner to the Authority Diversion Structure north of the City of San Marcos. This pipeline was originally scheduled for completion in 1998, but has been delayed as Metropolitan and the Authority reassess capital facilities needs based upon resolution of pending issues and the nature and extent of their future relationship.

Emergency Storage Project

Included in the CIP is the Emergency Storage Project (ESP), which is a system of reservoirs, pipelines and other facilities that will work together to store and move water around the county during emergencies. Currently, imported water from Metropolitan is used to meet 75 to 95 percent of the region's water demand. The pipelines that transport this water cross several major fault lines. An earthquake or other disaster could interrupt San Diego County's imported water supply for up to six months. The ESP will connect existing reservoirs, assuring that water flows throughout the system in the event of a disaster. The project will also provide an

FIGURE 1-1
AUTHORITY SERVICE AREA
WITH DISTRICT BOUNDARIES



1 CARLSBAD M.W.D.
2 CITY OF DEL MAR
3 CITY OF ESCONDIDO
4 FALLBROOK P.U.D.
5 HELIX WATER DISTRICT
6 CITY OF NATIONAL CITY*
7 CITY OF OCEANSIDE
8 OLIVENHAIN M.W.D
9 OTAY WATER DISTRICT
10 PADRE DAM M.W.D
11 CAMP PENDLETON MARINE CORPS BASE
12 CITY OF POWAY
13 RAINBOW M.W.D
14 RAMONA M.W.D
15 RINCON DEL DIABLO M.W.D
16 CITY OF SAN DIEGO
17 SAN DIEGUITO WATER DISTRICT
18 SANTA FE IRRIGATION DISTRICT
19 SOUTH BAY IRRIGATION DISTRICT*
20 VALLECITOS WATER DISTRICT
21 VALLEY CENTER M.W.D
22 VISTA IRRIGATION DISTRICT
23 YUIMA M.W.D.

*The Sweetwater Authority is a service organization for the City of National City and the South Bay Irrigation District.

additional 90,100 AF of stored water. Combined with member agencies' local water supplies estimated to be available for emergency use, additional storage capacity is projected to meet the county' emergency needs through at least 2030.

TABLE 1-2
CIP COST SUMMARY BY CATEGORY
(IN $ MILLIONS)

PROJECT CATEGORY	FY 00/01 PROJECT COST
Pipeline Projects	$259.5
System-wide Improvements	$51.3
Emergency Storage Projects	$774.5
Water Supply Projects	$25.8
Flow Control & Pumping Facilities	$11.0
Reimbursable Projects-Total Cost	$17.3
Total Costs of Active & Future Projects	$1,139.4
Less All Reimbursable Costs[1]	$41.0
Net SDCWA Costs	$1,180.4

[1]There are project costs within the CIP that are considered reimbursable.

The facilities that make up the ESP will be located throughout San Diego County. They will be constructed in phases and include a new 308-foot-high dam (Olivenhain Dam) and 24,000 AF reservoir near Lake Hodges, new pipelines to connect the new reservoir to the Authority's Second Aqueduct and to Lake Hodges, raising San Vicente Dam by 54 feet to provide room to store another 52,100 AF of water, a new pipeline to connect San Vicente Reservoir to the Authority's Second Aqueduct, and additional pump stations and other facilities to move water within the system to meet emergency water needs.

The Authority is currently working on the design for construction of Olivenhain Dam and its associated pipelines. Construction has begun on the main access road for the dam, as did clearing and grading in other areas of the dam site. The estimated cost of the ESP is $774.5 million. All phases are expected to be complete by 2010.

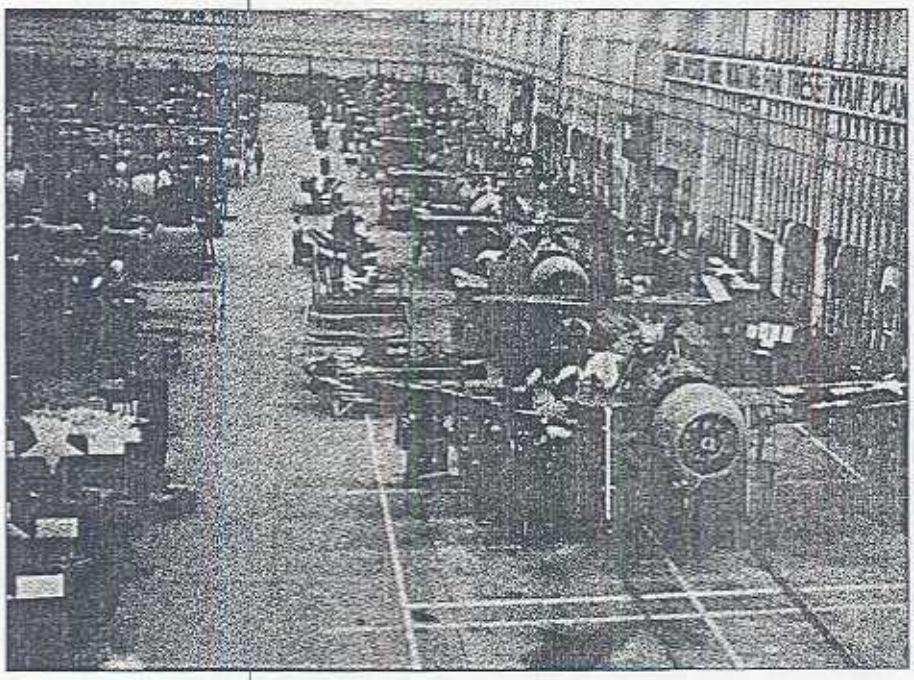
1.5 SERVICE AREA CHARACTERISTICS

While the Authority's service area contains many land uses, its most prominent aspect is an urban and suburban character. Large amounts of rural lands were converted for urban uses in the past few decades, as the region's population grew by up to 80,000 people a year. San Diego County also has a rich history of agriculture, beginning with the large cattle ranches established in the 18th century and continuing through the diverse range of crops and products grown today, such as flowers, vegetables, nursery plants, turf grass, avocados, and citrus. The latest survey conducted by DWR indicates that the Authority's service area includes 73,769 acres of agricultural production. San Diego County agriculture is a $1.2 billion per year industry, eighth in farm production value in the state and fourth in value in the county after manufacturing, tourism and military defense. Changing market forces,

including the increasing cost of water, may cause some economically marginal lands to be taken out of production in the future.

1.5.1 Regional Economy and Demographics

From the formation of the Authority in 1944 until 1990, the local economy was driven by defense-related manufacturing, especially in the aerospace sector. Economic growth in the 1980s was fueled by federal spending, as local defense-related expenditures more than doubled from $4.6 billion in 1983 to $9.6 billion in 1987. When this level of federal spending was sharply cut back in the early 1990s, it resulted in layoffs and a recession that lasted until 1995.



San Diego County is now experiencing a strong economic expansion, which increases the region's demand for water. The economy has diversified to include growth in areas such as telecommunications, electronics, computers, software, and biotechnology. San Diego's gross regional product is forecast to reach $100.4 billion in 2000. This will be an increase of 6.4 percent over 1999s estimated $94.4 billion. The number of people actively working, averaged 1,297,000 during 1999 which is expected to rise by 1.7 percent in 2000 to 1,318,900. Compared to the pace of expansion recorded in the 1980s, the current growth is much more moderate, and perhaps more healthy and sustainable.

1.5.2 Climate

Climatic conditions within the service area are characteristically Mediterranean along the coast, with mild temperatures year round. Inland areas are both hotter in summer and colder in winter, with summer temperatures often exceeding 90 degrees and winter temperatures occasionally dipping to below freezing. More than 80 percent of the region's rainfall occurs in the period between December through March (**Figure 1-2**). Average annual rainfall is approximately 9.9 inches per year on the coast (**Figure 1-3**) and in excess of 40 inches per year in the inland mountains.

FIGURE 1-2
SAN DIEGO CLIMATE 30-YEAR AVERAGE

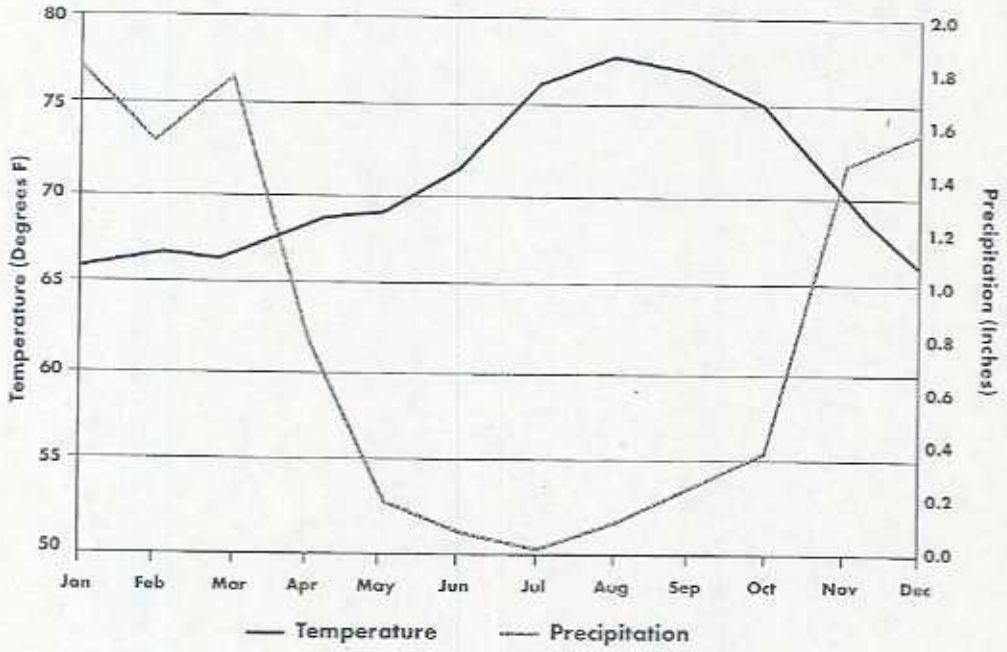
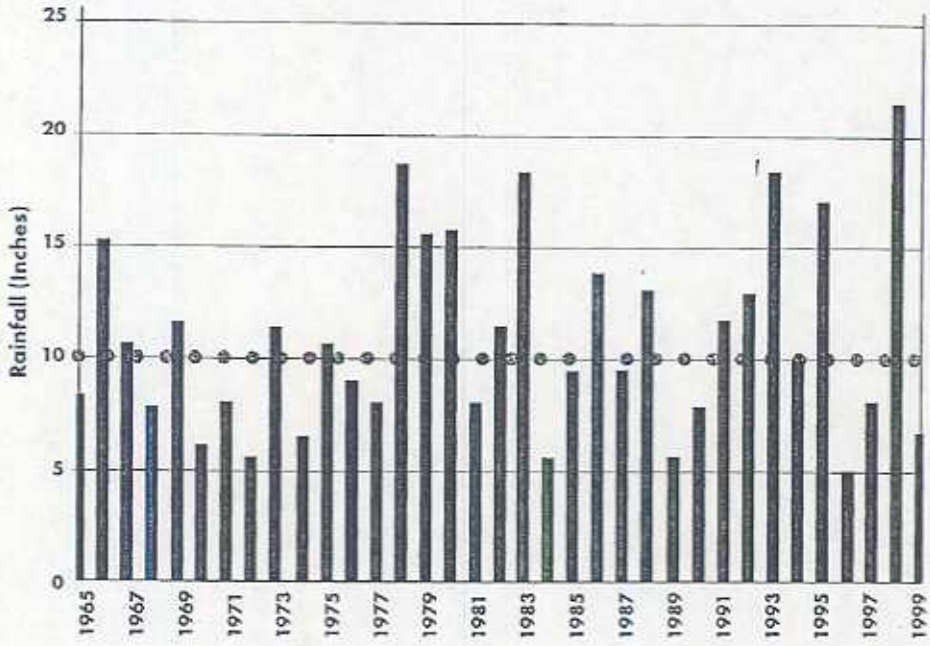


FIGURE 1-3
ANNUAL RAINFALL
(LINDBERG FIELD STATION)



Variations in weather affect short-term water requirements, causing demand spikes during hot, dry periods and reductions in use during wet weather. It is generally accepted in water demand forecasting that hot, dry weather may generate urban water demands that are about 7 percent greater than normal and agricul-

SECTION 2 - WATER DEMANDS

Demand for water in the Authority's service area is divided into two basic categories: municipal and industrial (M&I), and agricultural. M&I use constitutes about 80 to 85 percent of regional water consumption. Agricultural water, used mostly for irrigating groves and crops, accounts for the remaining 15 to 20 percent of demand. This section describes these use categories along with the total historic, current and projected water demands. By 2020 water demands are projected to reach 813,000 AF, which is approximately a 30 percent increase above the 1999 demand of 619,400 AF.

2.1 MUNICIPAL AND INDUSTRIAL WATER DEMAND

M&I demand can be subdivided into residential demand (water used for human consumption in the home, domestic purposes, and residential landscaping) and water used for commercial and industrial purposes.

2.1.1 Residential Demand

Residential water consumption is composed of both indoor and outdoor uses. Indoor water use includes sanitation, bathing, laundry, cooking, and drinking. Most outdoor water use is to meet landscaping irrigation requirements. Other minor outdoor uses include car washing, surface cleaning, and similar activities. For single-family homes and rural areas, outdoor demands may be as high as 60 percent of total residential use.

Based on SANDAG data, the San Diego regional housing stock composition in 1999 was approximately 59 percent single-family homes, 36 percent multi-family homes, and 5 percent mobile homes. Single-family residences generally contain larger landscaped areas, predominantly planted in turf, and require more water for outdoor application in comparison to other types of housing. The general characteristics of multi-family and mobile homes limit outdoor landscaping and water use, although some condominium and apartment developments do contain green belt areas.

2.1.2 Commercial and Industrial Demand

Commercial water demand consists of generally incidental uses but are necessary for the operation of a business or institution, such as drinking, sanitation, and landscape irrigation. Major commercial water users include service industries, such as restaurants, car washes, laundries, hotels, and golf courses. Economic indicators developed by the Greater San Diego Chamber of Commerce indicate that almost half of San Diego's residents are employed in commercial (trade and service) industries.

Industrial water consumption consists of a wide range of uses, including product processing and small-scale equipment cooling, sanitation, and air conditioning.

tural demands that are about 9 percent greater than normal. Conversely, these percentages can also be used to estimate below-normal demands resulting from wet weather.

1.5.3 Population

San Diego County's population has increased every year since the Authority was formed in 1944, due to several periods of rapid population growth associated with military and/or economic activity. When the Authority was formed, the population in San Diego County totaled 260,000 people. In 1999, total population within the service area reached 2.7 million people. The City of San Diego has the largest population of any member agency, with approximately 1.2 million. The agency with the least population is the Yuima Municipal Water District at approximately 2,000 people. Average population density is 4.32 people per acre, with National City having the highest density (9.42/acre) and Yuima Municipal Water District the lowest (0.46/acre).

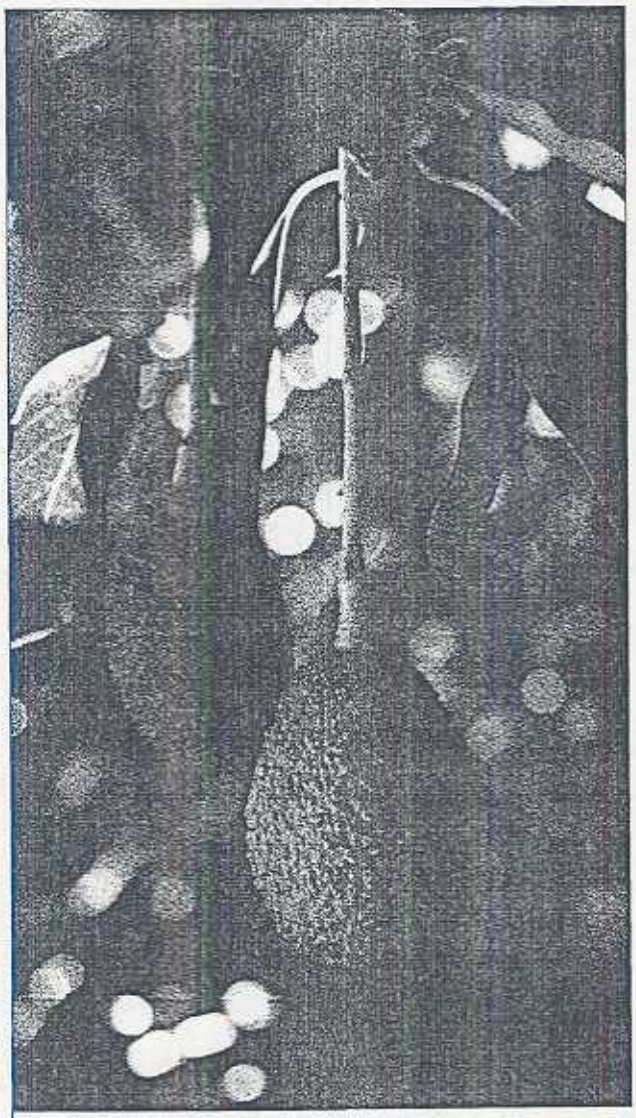
The San Diego Association of Governments (SANDAG) projects an increase of over 900,000 people between 2000 and 2020, for a total county population in excess of 3.8 million. This gain represents an average annual increase of about 50,000 people, for an annual growth rate of roughly 1.5 percent. These regional growth projections are based on SANDAG's 2020 Cities/County Forecast. Projected population estimates within the Authority's service area are also based on the 2020 Cities/County Forecast and are shown in **Table 1-3**.

TABLE 1-3
POPULATION FORECAST WITHIN
AUTHORITY SERVICE AREA
(2000-2020)

YEAR	POPULATION
2000	2,845,000
2005	3,113,000
2010	3,319,000
2015	3,494,000
2020	3,673,000
Average Annual Growth	41,000

Based on SANDAG 2020 Cities/County Forecast

Authority member agencies are projected to have varying future growth. Some, such as the Santa Fe Irrigation District and the city of Del Mar, are expected to experience relatively little growth. Others, including the Otay and Vallecitos water districts, anticipate large increases in both population and water demand.



Water-intensive industrial uses in the City of San Diego, such as kelp processing, electronics manufacturing, and aerospace manufacturing, typically require smaller amounts of water when compared to other water-intensive industries found elsewhere in Southern California, such as petroleum refineries, smelters, chemical processors, and canneries.

The tourism industry in San Diego County affects water usage within the Authority's service area by not only the number of visitors, but also through expansion of service industries and attractions, which tend to be larger outdoor water users. Tourism is primarily concentrated in the summer months and affects seasonal demands and peaking. SANDAG regional population forecasts do not specifically account for tourism, but tourism is reflected in the economic forecasts and causes per capita use to increase.

2.2 AGRICULTURAL WATER DEMAND

The coastal and inland valley areas of the county possess a moderate and virtually frost-free climate able to support a variety of sub-tropical crops, making the San Diego area a unique agricultural region. The primary crops grown for the national and international markets are avocados, citrus, cut flowers, and nursery products. To a lesser extent, local fresh market crops and livestock are produced in the Authority's service area. In recent years, agriculture has accounted for 10 to 20 percent of the Authority's total water demand.

The Authority is the largest consumer of agricultural water within Metropolitan's service area, comprising over 60 percent of Metropolitan's total agricultural water demands each year. Agricultural water use within the Authority's service area is concentrated mainly in north county including member agencies such as: Rainbow, Valley Center, Ramona, and Yuima Municipal Water Districts, the Fallbrook Public Utility District, and the city of Escondido.

2.3 TOTAL CURRENT AND HISTORIC WATER USE

Water use in the San Diego area is closely linked to the local economy, population, and weather. Over the last half century a prosperous local economy has stimulated population growth, which in turn produced a relatively steady increase in water demand. However, fluctuating economic and weather conditions in the 1990s and lingering effects from the 1987-1992 drought resulted in deviations from historic demand patterns. By 1999 a new combination of natural population increase and job creation surfaced as the primary drivers of long-term water consumption increases.

Until FY2000, the peak year water demand in the Authority's service area occurred in 1990, when member agency use crested at 646,645 AF. The FY2000 demands did exceed the 1990 historic peak and reached an estimated total water use of 695,000 AF. Following the 1987-1992 drought, the Authority's service area experienced significant reductions in water use. This reduction in water use was attributable to several factors, including the economic recession, water conservation measures implemented by the Authority and its member agencies as a result of the 1987-92 drought, and relatively plentiful rainfall. From 1996 to 1999, yearly water demand remained fairly constant at the low 600,000 AF range, (excluding the 1998 decrease, due to extreme El Niño weather conditions), **Table 2-1** shows the historic water demand within the Authority's service area.

TABLE 2-1
HISTORIC WATER DEMAND WITHIN
AUTHORITY SERVICE AREA
(1990-2000)

YEAR	WATER USE (AF)
1990	646,645
1991	585,619
1992	503,210
1993	548,673
1994	536,907
1995	526,053
1996	615,900
1997	621,739
1998	562,225
1999	619,409
2000	695,000

Source: Authority Annual Reports

FIGURE 2-1
CATEGORIES OF REGIONAL WATER DEMAND-1997

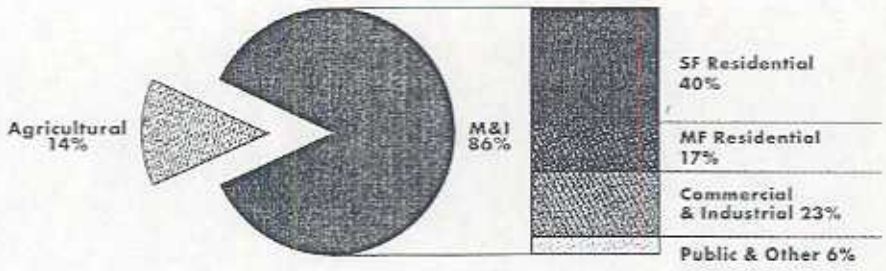


Figure 2-1 shows the relative percentages of various categories of water demand. In this figure, residential demand has been split between single-family residential (SF), and multi-family residential (MF). The "Public & Other" category includes water used for government and institutional purposes, as well as water system losses, including evaporation, meter losses (± errors), leaks, and seepage.

2.4 PROJECTED WATER DEMANDS

To forecast future M&I water use, the Authority selected the IWR-MAIN (Institute for Water Resources - Municipal And Industrial Needs) computer model. Versions of this econometric model have evolved over a 20-year period and are being used by many U.S. cities and water agencies. The IWR-MAIN system is designed to translate local demographic, housing, and business statistics into estimates of existing water demand and to utilize projections of local population, housing, and employment to forecast M&I water demand.

The Authority's version of the model, called "CWA-MAIN," utilizes demographic data from SANDAG. In 1992, the Authority and SANDAG entered into a memorandum of agreement (MOA) whereby the Authority agreed to use SANDAG's most recent regional growth forecasts for planning purposes. In addition, the MOA recognizes that water supply reliability must be a component of San Diego County's regional growth management strategy. As required in Proposition C, which was passed by the San Diego County voters in 1988, SANDAG has prepared a growth management strategy that includes a water supply element. The MOA ensures that the water demand projections for the San Diego region are linked with SANDAG's demographic projections and that water supply is a component of the overall regional growth management strategy.

In 1996, the Authority completed the development of a computer model that accounts for local demographic factors. M&I demands forecasted by the model served as the basis for the 1997 Water Resources Plan.

In 1999, the Authority modified the 1996 model to incorporate the latest member agency demographic projections from SANDAG and extend its forecast range from 2015 to 2020. The updated model incorporates SANDAG's 2020 Cities/County demographic forecast for member agencies through 2020.

Projecting future conservation is the last step in the development of the M&I forecast. The Authority developed the estimates of water savings based on implementation of the conservation Best Management Practices and SANDAG demographic information for the period 2000 through 2020. These savings are then used to adjust the baseline forecast.

The future water demands of the Camp Pendleton Military Reservation were forecasted by Camp Pendleton and included in the adjusted M&I forecast and agricultural forecast.

In addition to updating the CWA-MAIN model, a new agricultural water use model has also been developed. The new model estimates agricultural demand met by Authority's member agencies based on agricultural acreage projections provided by SANDAG, crop distribution data derived from DWR and California Avocado Commission, and average watering requirements.

Table 2-2 shows the total projected water demand for the Authority through 2020. The baseline M&I demand forecast has been adjusted for the estimated water conservation, inclusion of Camp Pendleton demands, and the forecasted agricultural water use added to produce the total projected demand. Water conservation measures are expected to reduce total M&I demands by approximately 12 percent in 2020, with an estimated savings of 93,000 AF/YR. Agricultural demand will decrease about 17 percent over the 20 year period to an estimated demand of 91,500 AF.

TABLE 2-2
NORMAL YEAR WATER USE FORECASTS
ADJUSTED FOR WATER CONSERVATION
(2005-2020)

YEAR	M&I BASELINE FORECAST (AF)	ESTIMATED CONSERVATION SAVINGS (AF)	M&I FORECAST REDUCED BY CONSERVATION[1] (AF)	AGRICULTURAL FORECAST[2,3] (AF)	TOTAL PROJECTED DEMAND (AF)
2005	643,900	54,900	596,200	109,900	706,100
2010	693,600	74,400	628,100	105,200	733,300
2015	747,100	83,400	672,600	99,400	772,000
2020	805,800	93,200	721,500	91,500	813,000

Source: CWA-MAIN Forecast (July 2000)
[1]Includes M&I demands from Camp Pendleton Marine Corps Base (7,200 AF/YR in year 2005 and 8,900 AF/YR in years 2010, 2015 and 2020).
[2]Includes non-certified IAWP agricultural water.
[3]Includes agricultural demands from Camp Pendleton Marine Corps Base (1,600 AF/YR in year 2005 and 2,300 AF/YR in years 2010, 2015 and 2020).

FIGURE 2-2
REGIONAL HISTORIC AND PROJECTED
NORMAL WATER DEMANDS

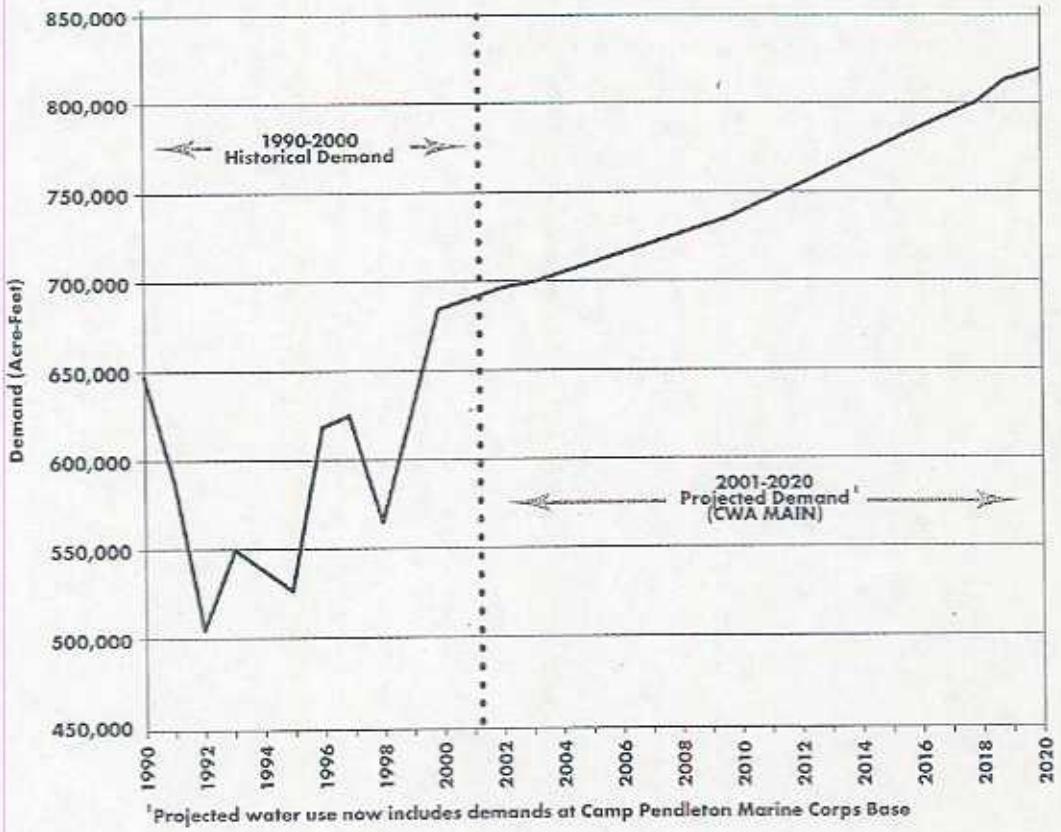
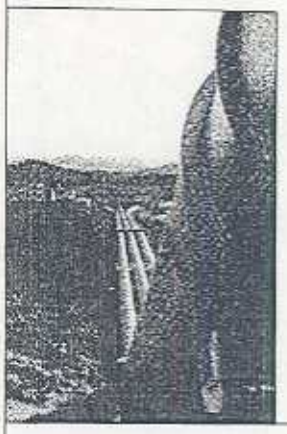


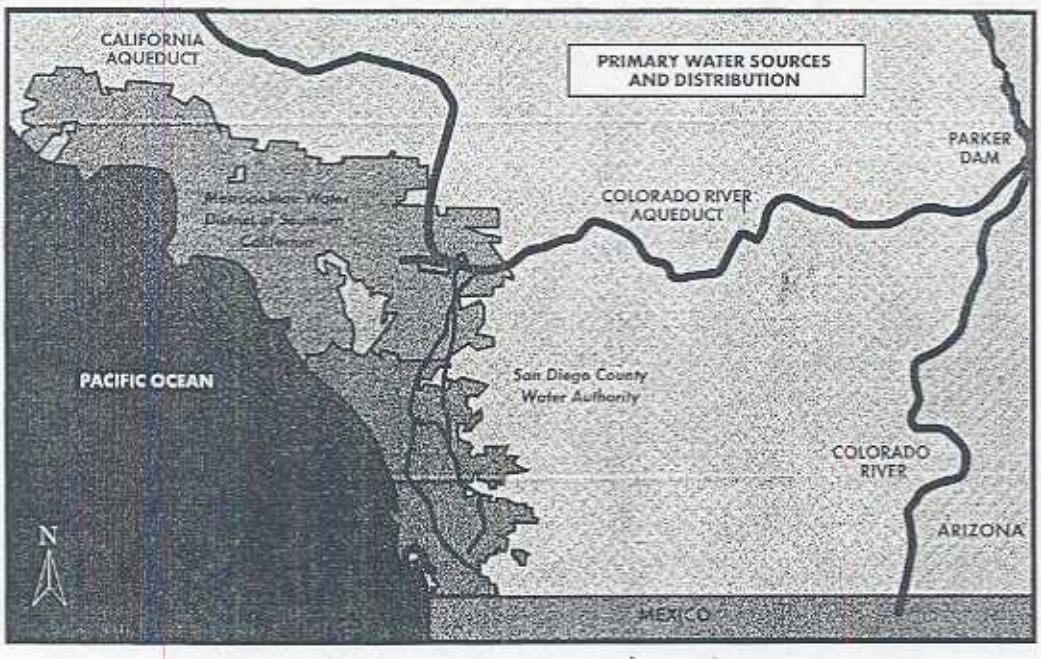
Figure 2-2 shows how water demand is projected to behave over the projected period of 2000 to 2020. This figure combines historical water use and the updated projected demands using the CWA-MAIN model and SANDAG 2020 Cities/County demographic and economic forecast data.

SECTION 3 – IMPORTED WATER SUPPLIES



As San Diego County has grown, so has the region's reliance on imported water supplies. Historically, the Authority has imported 75 to 95 percent of the region's water supply. In FY2000, the Authority supplied 83 percent of the water used in the region. Metropolitan is currently the sole source of imported water supply to the Authority. Metropolitan's ability to provide reliable supplies, particularly in a dry year, is constrained by the preferential right of each of its member agencies, as well as by current uncertainties regarding the continued reliability of the State Water Project and the Colorado River. Therefore, the Authority is taking steps to reduce dependence upon Metropolitan and diversify imported supplies. In April 1998, the Authority entered into an agreement with the Imperial Irrigation District (IID) for the transfer of 200,000 AF of conserved water as a major component of its diversification effort. The transfer is a cornerstone of the California Colorado River Water Use Plan. During the next five years, it is expected that the water transfer agreement with IID, along with other water transfers, will be implemented to increase the Authority's water supply reliability and reduce sole reliance on Metropolitan. This section describes the existing and anticipated future imported water supplies for the San Diego region.

FIGURE 3-1
METROPOLITAN SERVICE AREA
INCLUDING SAN DIEGO COUNTY WATER AUTHORITY



3.1 METROPOLITAN WATER DISTRICT

Formed in 1928 to develop, store, and distribute supplemental water in Southern California for domestic and municipal purposes, Metropolitan now supplies water to approximately 16 million people in a service area that includes portions of Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego counties.The Metropolitan service area, shown in **Figure 3-1**, covers a 70-mile-wide strip of the Southern California coastal plain, extending from the city of Oxnard on the north to the Mexican border. Close to half of the water used in this 5,200-square-mile region is supplied by Metropolitan, and about 90 percent of its population receives at least some of its water from Metropolitan. The extent to which Metropolitan's member agencies rely upon Metropolitan supplies varies. The ability of Metropolitan to provide supplies in a given year may depend upon the extent to which member agencies exercise their respective preferential right to purchase water.

The Authority, one of 27 Metropolitan member agencies, is the largest agency in terms of deliveries, purchasing about 30 percent of all the water Metropolitan delivered in FY1989-99. **Table 3-1** shows water use by Metropolitan's member agencies for fiscal year 1998-99 and preferential right to water based on 2.1 million acre-feet (MAF) of supply, which is what Metropolitan has represented as its firm supply. Metropolitan obtains its water from two sources: the Colorado River Aqueduct (CRA), which it owns and operates, and the State Water Project (SWP).

3.1.1 Colorado River

Metropolitan was formed to import water from the Colorado River. During the 1930s, Metropolitan built the Colorado River Aqueduct (CRA) to convey this water. The first deliveries were made to Metropolitan member agencies in 1941. The aqueduct is more than 240 miles long, beginning at Lake Havasu on the Arizona/California border and ending at Lake Mathews in Riverside County. The aqueduct has capacity to deliver up to 1.3 MAF each year. **Figure 3-1** shows the location of the aqueduct.

For many years, Metropolitan has chosen, for financial reasons, to minimize SWP deliveries to the Authority so that its water supply comes primarily from the Colorado River. Because the high salinity Colorado River water has been shown to cause extensive economic damage in San Diego County, the Authority has long sought to obtain its share of SWP supplies for which it pays Metropolitan. **Section 3.1.3** contains additional information on the issue of salinity in Metropolitan's supplies.

TABLE 3-1
MWD 1998-99 WATER DELIVERIES AND LOCAL SUPPLIES (AF)

MWD MEMBER AGENCIES	LOCAL WATER SUPPLY	MWD WATER DELIVERIES[1]	TOTAL WATER USE	PREFERENTIAL RIGHT TO MWD SUPPLY[2]
Anaheim	59,531	15,238	74,769	16,380
Beverly Hills	0	13,545	13,545	21,420
Burbank	8,876	14,107	22,983	20,580
Calleguas M.W.D.	21,582	105,760	127,342	68,460
Central Basin M.W.D.	179,645	65,073	244,718	184,170
Coastal M.W.D.	19,863	27,579	47,442	50,400
Compton	4,914	4,734	9,648	5,880
Eastern M.W.D.	137,528	61,534	199,062	59,220
Foothill M.W.D.	8,367	8,824	17,191	14,490
Fullerton	24,751	6,431	31,182	12,810
Glendale	4,819	26,604	31,423	26,040
Inland Empire Utilities	169,323	48,629	217,952	49,980
Las Virgenes M.W.D.	3,798	19,413	23,211	13,440
Long Beach	27,911	44,857	72,768	58,170
Los Angeles	553,197	70,724	623,921	482,580
M.W.D. of Orange County	248,049	199,792	447,841	238,770
Pasadena	21,229	15,508	36,737	23,310
San Diego C.W.A.	150,173	454,436	604,609	302,190
San Fernando	3,481	0	3,481	2,520
San Marino	6,089	948	7,037	4,620
Santa Ana	36,962	12,436	49,398	15,330
Santa Monica	2,687	11,721	14,408	20,370
Three Valleys M.W.D.	66,590	62,410	129,000	48,930
Torrance	11,244	21,683	32,927	24,990
Upper San Gabriel Valley M.W.D.	170,191	7,131	177,322	93,450
West Basin M.W.D.	54,896	144,342	199,238	171,360
Western M.W.D.	193,397	70,194	263,591	70,560
TOTALS	2,189,093	1,533,653	3,722,746	2,100,000

Source: Metropolitan Water District
[1] Includes MWD's replenishment deliveries.
[2] Member agencies' preferential right to Metropolitan supplies in FY98-99 based on 2.1 MAF, which is what Metropolitan has represented as its firm supply.

Reliability Issues

Before 1964, Metropolitan had a firm allocation of 1.212 MAF of Colorado River water through contracts with the U.S. Department of the Interior, which was enough to keep Metropolitan's aqueduct full. However, as a result of the U.S. Supreme Court decision in Arizona vs. California, Metropolitan's firm supply fell to 550,000 AF. In recent years, Metropolitan has kept its aqueduct full through access to unused apportionments from other states or declarations of surplus water from the Department of Interior. This reduction in firm allocation is the most pressing issue Metropolitan faces regarding its Colorado River supplies.

Water availability from the Colorado River is governed by a system of priorities and water rights that has been established over many years. The Colorado River Lower Basin states (California, Arizona, and Nevada) have an annual apportionment of 7.5 MAF of water. This supply is divided as follows: (1) California, 4.4 MAF; (2) Arizona, 2.8 MAF; and (3) Nevada, 300,000 AF. California agency priorities for water were established by the 1931 Seven Party Agreement. These priorities are shown in **Table 3-2**. As shown in the table, Metropolitan's 4th priority of 550,000 AF is junior to that of the first three priorities (3.85 MAF), which go to California agricultural agencies. Water used to satisfy priorities 5(a)-6(b) must come from unused allocations within California, Arizona, or Nevada or from surplus.

TABLE 3-2
SEVEN PARTY AGREEMENT PRIORITIES

PRIORITY	DESCRIPTION	AF/YR
1	Palo Verde Irrigation District	Priorities 1, 2, and 3 shall not exceed 3.85 MAF/YR
2	Yuma Project Reservation Division	Same as above
3 (a)	Imperial Irrigation District and lands in Imperial and Coachella valleys to be served by All-American Canal	Same as above
3 (b)	Palo Verde Irrigation District	Same as above
4	Metropolitan Water District	550,000
5 (a)	Metropolitan Water District	550,000
5 (b)	City/County of San Diego[1]	112,000
6 (a)	Imperial Irrigation District	
6 (b)	Palo Verde Irrigation District	300,000
	TOTAL	5,362,000

[1] In 1946 San Diego's rights were merged with and added to the rights of the Metropolitan Water District as one condition of the Authority's annexation to Metropolitan.

In recent years, Metropolitan has filled its aqueduct to capacity, using an average of 1.2 million acre-feet per year (MAF/YR) from the Colorado River. To do this, Metropolitan has relied on unused apportionments from Arizona and Nevada, unused apportionment from California agricultural agencies, and surplus water. But in recent years, Arizona and Nevada have increased water demand to near-apportionment levels, limiting the availability of unused apportionments to Metropolitan. Arizona's demand has been substantially increased by deliveries to an in-state groundwater banking program. Nevada is expected to begin banking water soon under an interstate water banking rule established by the Department of Interior in 1999, which allows Nevada to bank water in Arizona for Nevada's future use.

Metropolitan has been able to keep its aqueduct full in recent years through a successive string of annual surplus declarations by the Department of the Interior, beginning in 1996. Surplus water is also available for calendar year 2000. This has been made possible because above-normal precipitation has filled the river's

reservoirs to near-capacity. Without annual surplus declarations or revisions to the current surplus criteria, and absent any agreements to otherwise obtain Colorado River supplies, Metropolitan lacks the ability to maintain a full CRA.

Environmental Considerations In 1994, the U.S. Fish and Wildlife Service (USFWS) designated 1,980 miles of the Colorado River and its tributaries in Colorado, Utah, New Mexico, Arizona, California, and Nevada as critical habitat for four endangered species of native fish. In response to the 1994 designation, the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) was formed. The program is a partnership of federal agencies; state and local agencies in Arizona, California, including the Authority, and Nevada; Native American tribes; and other non-federal participants. The partnership is responding to the need to balance the legal use of lower Colorado River water resources and the conservation of threatened and endangered species and their habitats in compliance with the federal Endangered Species Act (ESA). To fulfill requirements of ESA, an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) will be prepared that will evaluate the impacts associated with implementing the LCRMSCP. The LCRMSCP is currently in the scoping phase of project development and anticipates release of the draft EIS/EIR for public review by the first half of 2001. Until this effort is accomplished and a comprehensive plan for managing the river's resources is established, there will be some degree of uncertainty over the availability and costs of future river water supplies and power generation.

Current Supplies

Metropolitan currently has a firm supply comprised of two sources, its 4th priority of 550,000 AF, and the yield of a conservation program that Metropolitan completed with IID in 1988. This program currently yields about 106,000 AF, giving Metropolitan a total supply about 650,000 AF. Under certain conditions, however, Metropolitan must provide 50,000 AF of the conservation program water to the Coachella Valley Water District. Thus, Metropolitan's firm supply is now about 600,000 AF. The remaining 600,000 AF of water needed to fill the CRA must come from the unused apportionments of other states or from surplus water.

Future Supplies and California's Colorado River Use Plan

Metropolitan is working with other California agencies and other Colorado River Basin states to increase its river supplies and improve its water reliability. The primary vehicle for this effort is California's Colorado Water Use Plan (Water Use Plan), which is designed to reduce California's demand on the river to its 4.4 MAF apportionment when surplus water or other states' apportionment is not available. One element of the Water Use Plan would provide interim (through 2016) surplus guidelines for operating Lake Mead. The guidelines would provide Metropolitan additional surplus water while conservation and transfer programs are developed to reduce California demand. New water supply programs identified in the Water Use Plan include the Authority's

200,000 AF of water transfers with IID. In April 1998, the Authority entered into an agreement with IID for the transfer of conserved water. Deliveries into San Diego County from the transfer are expected to begin by 2002. The Authority will receive between 130,000 and 200,000 AF of water per year after an initial 10-year ramp-up in the water deliveries. (Refer to **Section 3.2** on IID water transfer.) Other supplies include about 93,700 AF from a conservation project to line the All American and Coachella Valley canals, located in Imperial and Coachella valleys, and several off-stream storage programs that would develop about 400,000 AF of dry-year supplies. These programs are intended to offset the reduced availability of unused apportionment and surplus water supplies.

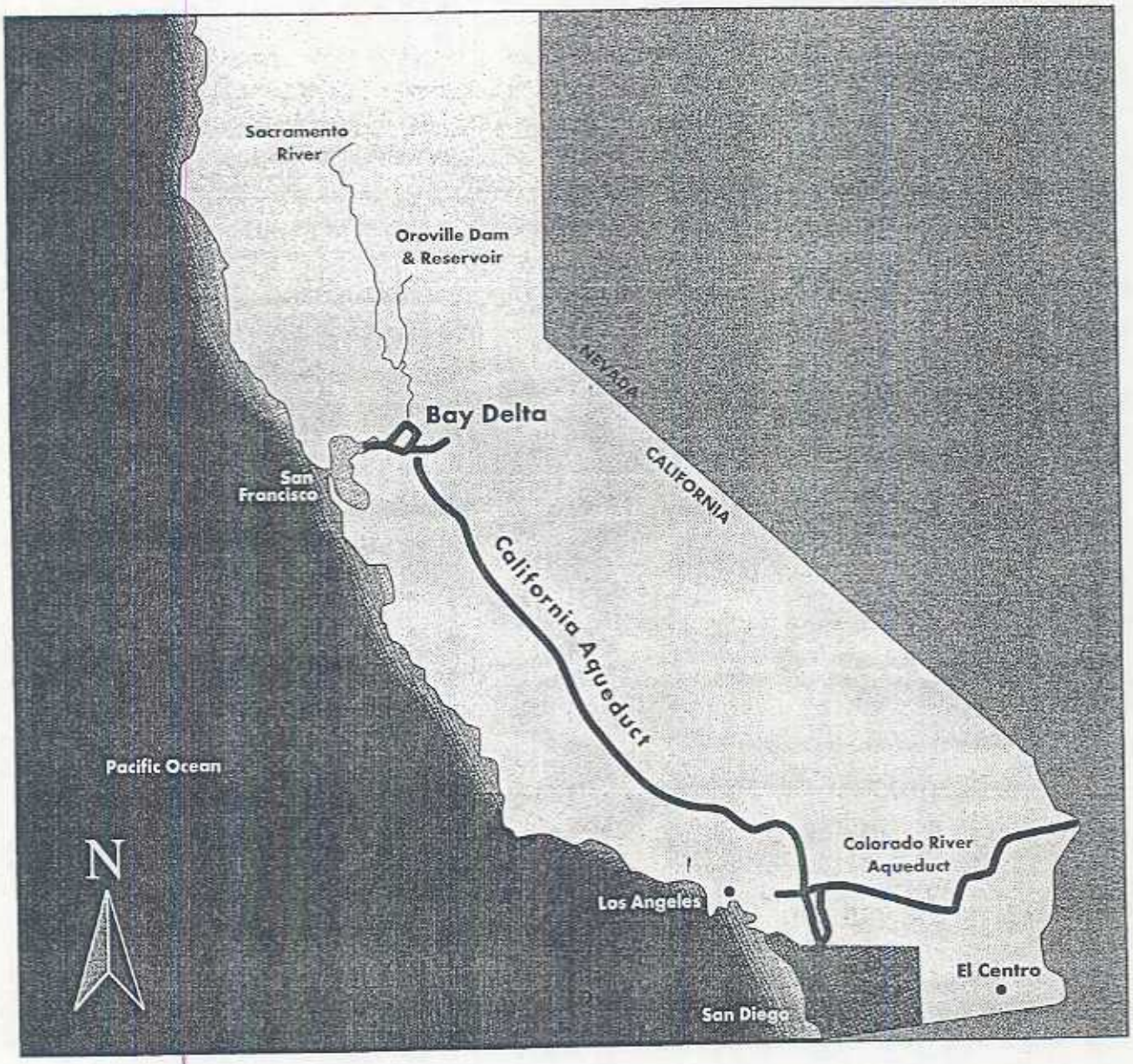
The Water Use Plan is being drafted by California agencies to incorporate the terms of a quantification settlement among Metropolitan and the state's agricultural agencies. This settlement sets limits to the amounts of water that each agricultural agency may take from the 3.85 MAF 1st priority described previously in this section. The settlement also provides for the allocation of future water supplies and transfers among California's river water users. The Water Use Plan is expected to be completed by early 2001. It must be accepted by the other Colorado River Basin states and approved by the Department of Interior.

The seven Colorado River Basin states have jointly proposed interim Lake Mead operating criteria. The Department of Interior has also begun a process to develop interim surplus operating criteria, and this year released a draft environmental impact statement comparing several criteria alternatives. The seven states' proposal will be reviewed as public comment on the EIS. All parties view the development of operating criteria as one of the key issues to be negotiated for a successful Water Use Plan.

3.1.2 State Water Project

Metropolitan's other water source, the SWP, is owned by the State of California and operated by the DWR. The project stretches more than 600 miles, from Lake Oroville in the north to Lake Perris in the south. Water is stored at Lake Oroville and released when needed into the Feather River, which flows into the Sacramento River and to the Sacramento-San Joaquin River Delta (Delta). In the north Delta, water is pumped into the North Bay Aqueduct for delivery to Napa and Solano counties. In the south Delta, SWP pumps lift water into the 444-mile-long California Aqueduct. Some water flows into the South Bay Aqueduct, to serve areas in Alameda and Santa Clara counties. The remainder flows southward to cities and farms in central and southern California. In the winter, when demands are lower, water is stored at the San Luis Reservoir located south of the Delta. The California Aqueduct is shown on **Figure 3-2**.

FIGURE 3-2
MAJOR WATER CONVEYANCE FACILITIES SERVING SAN DIEGO COUNTY



Reliability Issues

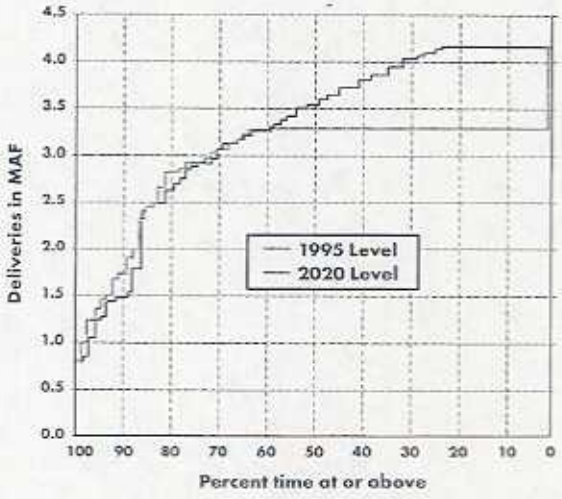
The reliability of SWP supplies is limited by both the level of SWP supply development compared to current and future demands and, increasingly, by pumping restrictions due to state and federal environmental regulations. The SWP was initially planned to delivery 4,230,000 AF to 32 contracting agencies. Subsequent contract amendments reduced total contracted deliveries to 4,172,786 AF and the number of contracting agencies to 29. Metropolitan's contracted entitlement is 2,011,500 AF or about 48 percent of the total. An important feature of the SWP contracts is that the full amount of water was not anticipated to be needed for at least the first 20 to 30 years of the project. Facilities needed to produce the full 4,230,000 AF were expected to be constructed over time as demands on the system increased. However,

as decisions on these additional facilities were repeatedly deferred, public attitudes and environmental regulations changed. New state and federal environmental laws put some potential water supply sources off limits to development. More stringent water quality standards adopted by the State Water Resources Control Board (SWRCB) to protect the San Francisco Bay/Sacramento-San Joaquin River Delta (Bay-Delta) have also reduced the amount of water available for diversion.

By the late 1980s, the SWP was unable to meet contractor demands during drought periods. During the initial years of the 1987 – 1992 drought, DWR maintained SWP deliveries using water stored at Lake Oroville and the San Luis Reservoir. In 1991, however, the SWP delivered only 549,113 AF of entitlement water. Of this amount, Metropolitan received 381,070 AF, or about 20 percent of its entitlement.

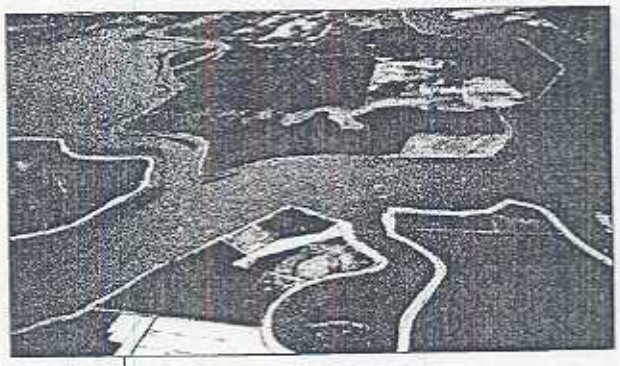
SWP shortages are expected to become more frequent as demands on the system increase. **Figure 3-3**, from DWR's Bulletin 160-98 shows existing (1995 demand level) and future (2020 demand level) SWP delivery capability, as estimated by operations studies, under the SWRCB's 1995 Water Quality Control Plan. According to Bulletin 160-98, existing SWP facilities have a 65 percent chance of making full deliveries under 1995 level demands and an 85 percent chance of delivering 2.0 MAF to contractors in any given year. Under a 2020 demand scenario, existing SWP facilities have a less than 25 percent chance of making full deliveries.

FIGURE 3-3
1995 AND 2020 STATE WATER PROJECT DELIVERY CAPABILITY WITH EXISTING FACILITIES



Environmental Considerations In recent years, actions taken to protect the ecosystem of the Bay-Delta have placed additional restrictions on SWP operations. The Bay-Delta is the largest estuary on the west coast and supports more than 750 plant and animal species. But 150 years of human activity, dating back to 19th century gold mining, has taken its toll on the Bay-Delta ecosystem and the fish that live there. In 1989, the winter-run Chinook salmon was designated, or "listed", as a threatened species under the federal Endangered Species Act (ESA). Over the next ten years, the Delta smelt, steelhead trout and spring-run Chinook salmon joined the list of threatened species and the winter-run Chinook salmon's population declined to such an extent that its status was changed to endangered.

The decline of Delta fisheries can be traced to numerous factors – habitat loss, water diversions, pollution, over-fishing, and the introduction of non-native species have all contributed to the degradation of the Bay-Delta ecosystem. Regulatory protection efforts have nevertheless tended to focus on the operations of the SWP and the federal Central Valley Project (CVP). In 1999, the SWP was forced to reduce pumping by about 500,000 AF to protect Delta smelt and spring-run Chinook salmon. These



pumping reductions were in addition to fish protection measures built into the water quality standards established by the SWRCB. Although the SWP was able to offset some of the water supply impact by increasing pumping rates later in the year, SWP contractors lost access to more than 150,000 AF of water for storage and suffered a significant reduction in water quality.

Water Quality Considerations The quality of SWP water as a drinking water source is affected by a number of factors, most notably by seawater intrusion and agricultural drainage from peat soil islands in the Delta. SWP water contains relatively high levels of bromide and total organic carbon, two elements that are of particular concern to drinking water agencies. Bromide and total organic carbon combine with chemicals used in the water treatment process to form disinfection by-products that are strictly regulated under the federal Safe Drinking Water Act. Wastewater discharges from cities and towns surrounding the Delta also add salts and pathogens to Delta water, which reduce its suitability for drinking and recycling.

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to customers. However, source water of poor quality will make it increasingly expensive and difficult to meet such standards. The California Urban Water Agencies (CUWA) retained the assistance of a panel of drinking water quality and treatment experts to evaluate the source water quality that would be needed to allow agencies treating Delta water to comply with future drinking water regulations under a plausibly conservative regulatory scenario. The expert panel identified target bromide and total organic carbon concentrations of 50 parts per billion (ppb) and 3 parts per million (ppm), respectively. By comparison, the average bromide concentration of SWP water is 290 ppb, about six times the target level. The average concentration of total organic carbon in SWP water is about 3.3 ppm, about ten percent above the target level.

Actions to protect Delta fisheries have exacerbated existing water quality problems by forcing the SWP to shift its diversions from the springtime to the fall, when salinity and bromide levels are higher. Closure of the Delta Cross Channel gates to protect migrating fish has also degraded SWP water quality by reducing the flow of higher quality Sacramento River water to the SWP pumps.

Current Supplies

SWP delivery contracts were amended in 1995 to reflect principles developed under the December 1994 Monterey Agreement. Under the Monterey amendments, all SWP supplies are allocated to contractors in proportion to their contractual entitlements. Metropolitan's approximately 48 percent share of total SWP contract entitle-

ments entitles it to a proportionate share of SWP supplies. Metropolitan estimates that existing SWP facilities, operated in accordance with the 1995 Water Quality Control Plan, will produce about 1.2 MAF in a dry year and 2.7 MAF a year on average. Metropolitan's proportionate share of dry year and average year SWP supplies is estimated at 0.6 MAF and 1.35 MAF, respectively.

The Monterey Agreement includes a number of other provisions, which allow for the improved management of SWP supplies. The agreement allows contractors to store SWP water outside their service areas for later use and provides contractors such as Metropolitan, that pay for terminal reservoirs, access to additional storage. Other provisions include the elimination of a permanent shortage provision that existed in the original SWP contracts, the transfer of Kern Water Bank lands to two contractors, and the sale of 130,000 AF of agricultural contractor entitlements to urban contractors. DWR's implementation of the Monterey Agreement has been challenged by the Planning and Conservation League and others. On September 15, 2000, the Third District Court of Appeal reversed a trial court ruling for DWR and ordered a new environmental impact report and a trial on the validity of the agreement. DWR has filed an appeal asking the California Supreme Court to review the appellate court decision.

Future Supplies and the CALFED Bay-Delta Program

Work being done by the CALFED Bay-Delta Program is expected to provide the greatest opportunity for SWP supply reliability and water quality improvements, though presently the outcome is uncertain. The state and federal governments organized the CALFED Program in 1995 to develop a comprehensive long-term solution to the ecosystem, levee stability, water quality and water supply reliability problems affecting the Bay-Delta system. The CALFED Program began its transition from planning to implementation in June 2000 with the release of a document entitled, California's Water Future: A Framework for Action (Framework). The Framework, which focuses on the first seven years ("Stage 1") of what CALFED envisions to be a 30-year program, outlines a number of specific steps to improve the quality and reliability of Bay-Delta water supplies, increase the efficient use of water throughout the state, restore the Bay-Delta ecosystem, stabilize Delta levees, and foster the water transfer market. The Framework was followed in July 2000 by a final programmatic environmental EIS/EIR that sets the stage for implementation of the CALFED Program. Three separate legal challenges were filed during the 30-day period following the certification of the EIS/EIR. It is not clear at this time what impact those legal challenges will have on the implementation of the CALFED Program.

The elements of the CALFED Program that have the greatest potential for increasing the reliability and quality of SWP supplies involve improvements to the existing Delta conveyance system, including expansion of the permitted capacity of the SWP pumping plant from its current level of 6,680 cfs to 8,500 cfs and ultimately to

10,300 cfs subject to certain conditions; and a new water "budget" for protection of fish known as the Environmental Water Account (EWA). The conveyance system improvements would improve the reliability and quality of SWP supplies by allowing the SWP to increase pumping during those times of the year when additional water is available and when water quality is highest, and reduce pumping when endangered fish are migrating through the Delta. The improvements will also increase the amount of pumping capacity available for other purposes, such as water transfers.

New surface and groundwater storage could also enhance the reliability and quality of SWP supplies. The CALFED Framework calls for the construction of up to 4.75 MAF of new surface and groundwater storage over the life of the CALFED Program; however, it is not known whether any of the new storage would be constructed as part of the SWP.

The amount of water produced through the proposed conveyance improvements will depend on how the individual facilities are operated and on the level of assurances provided by the state and federal regulatory agencies. The EWA, as proposed in the Framework, will be used to provide the SWP and CVP regulatory assurances for the first four years of the CALFED Program, with the expectation that the assurances will be extended periodically thereafter. The regulatory assurances are intended to ensure that the projects will not face additional water supply impacts due to regulatory actions taken under the federal ESA or other federal or state laws or regulations. If CALFED succeeds in its mission of restoring stability to the Bay-Delta system, and the regulatory assurances are extended beyond the initial four-year period, then the improvements called for in the CALFED Framework have the potential to increase Metropolitan's share of average SWP supplies by about 0.15 MAF, to a total of 1.5 MAF. If CALFED is not successful, and the Bay-Delta system continues to decline, then the improvements proposed in the Framework may produce little or no supply reliability or water quality improvement and Metropolitan's SWP supplies could even decrease relative to existing levels.

3.1.3 Salinity Issues

The level of salinity can vary greatly between Metropolitan's two sources of imported water. Supplies from the CRA can reach 700 milligrams per liter (mg/l) total dissolved solids (TDS). By comparison, the SWP provides an average 250 mg/l from the East Branch and 325 mg/l from the West Branch (San Diego County is served from the East Branch of the State Project). Salinity control has long been an issue on the Colorado River. Agricultural development and water diversions over the past 50 years have increased the already high naturally occurring levels of TDS. High salinity levels can damage water delivery systems and home appliances and also cause problems for water recycling projects in the Authority's service area,

especially for marketing recycled water to agricultural users growing salt-sensitive crops. (Refer to **Section 4.3.2** for details on salinity impacts to water recycling.)

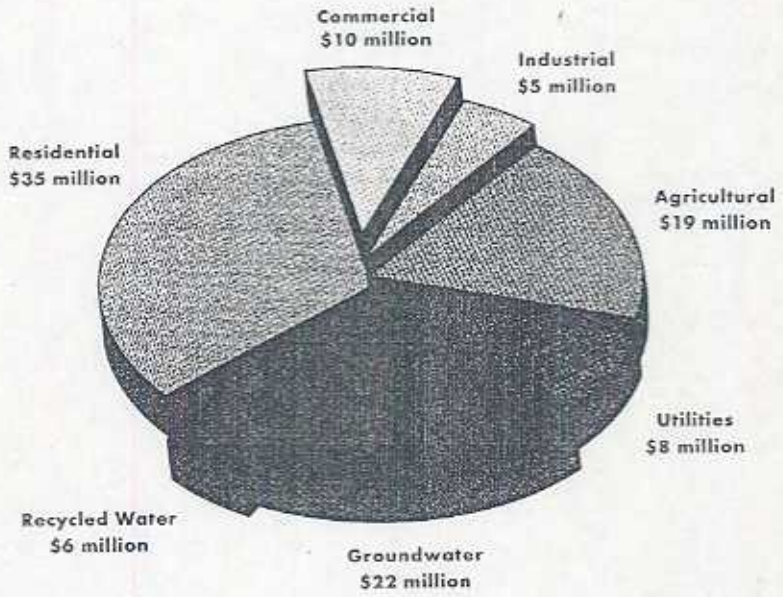
In recognition of the lower TDS offered by SWP supplies, the Metropolitan Act (Section 136) states that Metropolitan will deliver a 50/50 Colorado River/SWP blend to its member agencies, to the extent reasonable and practical. Metropolitan has for many years provided the Authority with predominately more saline Colorado River supply in order to reduce their operating costs. This has resulted in higher salinity water for the Authority and consequently in economic damages to the consumer. At the prompting of the Authority, Metropolitan instituted an interim blending policy in 1995 to provide the Authority a 25% blend of SPW during the heavy irrigation months of April through September. This blending policy was adopted in order to partially mitigate salinity impacts that were placing at risk millions of dollars in local water recycling investments. The salinity of imported water was resulting in a recycled water salinity that was in excess of what many of the recycled water customers could use for irrigation. However, this did not offset the economic damages that occurred during the remainder of the year to a much more widespread group of consumers. The Authority continued to be concerned over the high salinity of its supplies.

In June 1999 Metropolitan, in coordination with the U.S. Bureau of Reclamation (USBR), completed a Salinity Management Study (Study). The Study quantifies the impacts associated with high salinity water supplies and identifies an action plan to manage salinity concentrations in Southern California water supplies.

The Study determined that a 100 mg/l increase in imported water supplies within Metropolitan's service area will cause approximately $105 million in economic damages annually. **Figure 3-4** provides a breakdown based on specific categories.

There are ten actions included in the Salinity Management Action Plan that focus on imported water source control, Metropolitan's distribution system, collaborative actions with other agencies and local salinity management actions. One of the actions includes establishment of a TDS concentration objective of 500 mg/l in Metropolitan's distribution system. Metropolitan can satisfy this target by blending its Colorado River supplies with increased deliveries of State Project water and meet the objective year-round. In the interim, if water resources are limited, Metropolitan has stated it would first focus on meeting the TDS target in the April-through-September period, which would provide some benefit of reduced salinity to peak irrigation customers and water recycling projects. Metropolitan has been able to maintain the 500 mg/l objective since initiation of the objective in April 1999. Although Metropolitan has adopted the 500 mg/l TDS objective, they will not provide a guaranteed blend of SWP and Colorado River supplies and therefore, improvements in the salinity of imported supplies remain uncertain. The Authority Board of Directors has considered obtaining additional imported supplies to improve salinity levels.

FIGURE 3-4
ANNUAL DAMAGES OF 100 MG/L SALINITY INCREASE
IN IMPORTED WATER SUPPLIES WITHIN
METROPOLITAN SERVICE AREA ($105 MILLION)



3.1.4 Water Supply from Metropolitan

For many years, Metropolitan has been the sole provider of imported water to the Authority; however, circumstances have changed dramatically since the Authority joined Metropolitan in 1944. Today, the Authority is in the process of negotiations with Metropolitan to determine the nature and extent of their future relationship. Among the key issues to be addressed are:

1. *Preferential rights:* Under Section 135 of the Metropolitan Act, each member agency has a preferential right to water. This right is determined by each agency's total historic payments to Metropolitan from property taxes, stand-by charges, readiness-to-serve charges and other revenue, excluding revenue from the purchase of water even though a portion of such revenues are used to pay for capital projects. At any time under preferential rights rules, Metropolitan could allocate water without regard to historic water use or dependence on Metropolitan. This could leave the Authority short by more than half of its water supply in a hypothetical 20 percent shortage.

While there are a variety of legal opinions stating different interpretations of Section 135, it remains a cloud on the reliability of a significant portion of San Diego's water supply, which is in excess of its preferential rights. The Authority believes that Metropolitan should take the steps necessary to eliminate the conflict that surrounds Section 135 by either taking steps to remove it, or, by accepting it and requiring the

agencies who benefit from Section 135 to match the rights they claim with a proportionate share of the liabilities Metropolitan has incurred and continues to incur to satisfy those claims.

2. *Cost of service:* The Authority believes that there must be a nexus between benefits and burdens at Metropolitan and that the Authority and all of Metropolitan's member agencies should get what they pay for and pay for what they get. The Authority believes that Metropolitan must levy a charge for unused capacity and water held ready to serve member agencies on a standby basis; currently, Metropolitan shifts those costs to the member agencies who are buying water.

3. *Future investments:* The Authority has proposed that Metropolitan should only make investments that its member agencies are willing to pay for; the Authority believes that Metropolitan must change its current rate structure, which allows member agencies to "roll off" its system, thus shifting the burdens of its investments to those who remain.

4. *Establishment of rights and liabilities:* The Authority believes that Metropolitan's member agencies must, by contract or otherwise, be able to ascertain and fix their rights and liabilities in the Metropolitan system.

5. *Governance and voting:* The current voting structure at Metropolitan, like the preferential rights formula, is based on assessed valuation. While the system may have made sense when Metropolitan revenues were collected from taxes, it no longer makes sense when the majority of revenues are collected from water rates. The Authority believes that Metropolitan's governance and voting structure should be changed to reflect the interests of those member agencies who are paying the bills.

6. *Water quality:* As noted earlier, the Authority pays for but is not served water from the SWP that could bring its water quality up to the standards required by Section 136 of the Metropolitan Act. It is unfair for the Authority to be charged by Metropolitan for water it refuses to serve to the Authority; at a minimum, a price adjustment should be implemented.

The Authority is committed to taking all steps necessary to resolve these critical issues with Metropolitan; it has made a proposal to firm up its right to water, and it is seeking changes both within and outside of Metropolitan. Until the preferential rights issue is resolved, the Authority must assume for planning purposes that its firm water supply from Metropolitan is limited to 303,630 AF, representing its existing preferential right to water under the Metropolitan Act.

3.2 AUTHORITY-IID WATER TRANSFER

Water transfers have emerged as one of the Authority's greatest potential resources for meeting future demands. Water transfers are typically defined as the purchase of water during a specified period from an agency or district that then reduces its water use by that amount. In 1998, the Authority signed a historic agreement with the IID for the long-term transfer of conserved Colorado River water to San Diego County. The Authority-IID Water Conservation and Transfer Agreement will increase the reliability of the Authority's future imported water supplies.

3.2.1 The Authority-IID Water Conservation and Transfer Agreement

On April 29, 1998, the Authority and IID signed a Water Conservation and Transfer Agreement. The agreement is the largest agriculture-to-urban water transfer in United States history. Colorado River water will be conserved by Imperial Valley farmers who voluntarily participate in the program and then transferred to the Authority for use in San Diego County. Imperial Valley farmers will conserve the water by employing extra-ordinary conservation measures. Deliveries into San Diego County from the transfer are expected to begin by 2002. The Authority will receive between 130,000 and 200,000 AF/YR after an initial 10-year ramp-up in the water deliveries.

The initial term of the agreement is for 45 years, with a provision that either agency may extend the agreement for an additional 30-year term. Under certain conditions, up to 34,000 AF can be recalled by IID at the end of the initial 45-year term.

In the contract's first year, the price for the transfer water will be approximately $250/AF. The price will be indexed to the Metropolitan rate at a discount. The discount is 25 percent for the first year, declining to a long-term value of five percent by year 17. The agreement allows for a "price redetermination" process to adjust the price to market values 10 years after the start of deliveries.

During dry years, when water availability is low, the conserved water will be transferred under IID's Colorado River rights, which are among the most senior in the Lower Colorado River Basin. Without the protection of these rights, the Authority could suffer delivery cutbacks. In recognition for the value of such reliability, the contract requires the Authority to pay a premium on transfer water under defined regional shortage circumstances.

Before the transfer can be implemented, the Authority and IID must resolve a number of contingencies. These contingencies are included in **Table 3-3** along with the status and estimated completion date.

TABLE 3-3
STATUS OF CONTINGENCIES ASSOCIATED WITH AUTHORITY-IID AGREEMENT

CONTINGENCY	STATUS	DATE COMPLETE
Secure transportation of transfer water to San Diego County.	The Authority and Metropolitan signed a water exchange agreement to allow delivery of transfer water through the CRA.	November 1998
Both agencies must complete required review and assessments of any potential environmental impacts of the water transfer.	A full environmental impact review is under way by the IID, the Authority, and USBR to assess any potential environmental impact associated with the agreement.	The EIR/EIS should be finalized and the environmental process completed by early 2001.
The two agencies must receive approval of the agreement from the appropriate state and federal authorities.	The Authority and the IID filed a petition for approval with the SWRCB on July 22, 1998.	SWRCB approval is expected by early to mid 2001.
IID must reach voluntary agreements with Imperial Valley landowners to conserve at least 130,000 AF/YR for transfer.	IID notified the Authority that it had potential interest from landowners and tenants in conserving at least 134,000 AF of water. Additional landowners may participate upon completion of the environmental studies and development of on-farm guidelines for conservation.	October 1999

Future Supplies

Based on the Authority-IID transfer agreement, the anticipated delivery schedule is shown in **Table 3-4** in five-year increments.

TABLE 3-4
PROJECTED IID TRANSFER SUPPLY[1]
(AF/YR)

2005	2010	2015	2020
80,000	180,000	200,000	200,000

[1]Assumes transfers begin in year 2002 at 20,000 AF and ramp-up in 20,000 AF increments each year.

3.2.2 The Authority-Metropolitan Water Exchange Agreement

A contingency of the transfer agreement is securing transportation of the water from the Colorado River to San Diego County. To satisfy this contingency, the Authority entered into a water exchange agreement with Metropolitan on November 1998. Under the exchange agreement, Metropolitan will take delivery of the transfer water through its CRA. The Authority will pay Metropolitan a delivery fee. In exchange, Metropolitan will deliver to the Authority a like quantity and quality of water. The duration of the agreement is 30 years.

The exchange agreement calls for the Authority to pay Metropolitan a per-acre-foot delivery fee of $90 in the first 20 years, and $80/AF from years 21 through 30. Both figures would escalate each year based upon an agreed-to rate of 1.55 percent for the first 20 years and 1.44 percent for the final 10 years of the agreement. The financial terms of the agreement could be adjusted in the 10th and 20th years to address impacts of potential catastrophes and changes in regulatory requirements.

In addition to the contingencies of the Authority-IID agreement, there are conditions associated with the Authority-Metropolitan agreement that will need to be satisfied before deliveries can be made. **Table 3-5** shows the conditions along with status and estimated completion date.

3.2.3 Regional Colorado River Conveyance Feasibility Study

The exchange agreement with Metropolitan allows the Authority to terminate the agreement if alternative conveyance facilities are developed. The Regional Colorado River Conveyance Feasibility Study (Regional Study) will provide a comprehensive feasibility level evaluation of the opportunities for a separate conveyance system that could transport and store conserved Colorado River water for San Diego County. The State of California will provide $2.5 million of the Regional Study's cost from Proposition 204. The Authority will contribute $500,000 towards preparation of the Regional Study.

TABLE 3-5
STATUS OF CONDITIONS ASSOCIATED WITH
AUTHORITY-METROPOLITAN AGREEMENT

CONDITIONS	STATUS	DATE COMPLETE
Quantification of the agricultural agencies' entitlements within their 3.85 million AF apportionment of Colorado River Water.	In October 1999, the state of California, IID, Coachella Valley WD, and Metropolitan reached agreement on the terms of a quantification settlement. This settlement sets limits to the amounts of water that each agricultural agency may take from the 3.85 MAF 1st priority shown in Table 3-2. The settlement also provides for the allocation of future water supplies and transfers among California's river water users. A series of agreements and contracts must be developed and executed before the quantification settlement takes effect.	Approval of the settlement by the Department of Interior is expected by early to mid 2001.
Development by the federal government of surplus criteria on the Colorado River to help assure a full Colorado River Aqueduct for Metropolitan at least through 2015.	The Department of Interior released a draft EIS in July 2000 comparing several surplus operating criteria alternatives. The seven basin states have since reached agreement on surplus criteria guidelines and the DOI has accepted the proposal as public comment on the draft EIS.	Early 2001
State funding must be allocated for the lining of the All-American Canal and its Coachella branch and for construction of conjunctive use storage facilities along the CRA.	A California law passed, providing $235 million in state funding for the canal lining and storage projects.	September 1998

In addition, Proposition 13, passed by the voters in March 2000, allocates $3 million to the Authority for environmental and engineering studies associated with a San Diego regional conveyance facility. Pending approval by the State, a portion of these funds will be used for the existing effort and remainder to be utilized for further studies, if necessary, upon completion of the Regional Study.

The Regional Study is separated into two components: 1) refinement of costs for alignments in the United States; and 2) evaluation of options from a binational perspective, which includes evaluating alignments in Mexico or partly in each country.

The first component of the Regional Study will include a refinement of the cost estimates for conveyance alignments in the United States that were provided in the September 1996 Feasibility Report for Facilities to Transfer Water from the Imperial Irrigation District. The cost includes pipelines, tunnels, power generation and pumping facilities, water storage, and water treatment. Annual operations and maintenance costs are projected to be about $73 million. The costs included in the report contained contingencies of 25 to 50 percent due mainly to unknown geologic

conditions for tunneling and pipeline alignments. The refined cost estimates should be available by the end of year 2000.

The second component of the Regional Study, which will occur concurrently with the first element, is to conduct a joint feasibility level study with Mexico to evaluate conveyance and storage options that could benefit both regions. The Regional Study will be the first comprehensive evaluation of a potential binational conveyance system to transport and store Colorado River water. At this point, neither country is committing to go beyond the feasibility stage of the Regional Study. In defining the parameters of the Regional Study, the participating agencies also agreed that each country would transport water it owns in any future aqueduct. Technical data from the Regional Study will help the Authority determine whether a binational aqueduct could deliver transferred water efficiently and cost-effectively.

In October 1999, the International Boundary and Water Commission (IBWC) Minute 301 was approved, authorizing the two countries to work together on the Regional Study. Minute 301 also authorized formation of a Binational Technical Committee (BTC) to oversee preparation of the Regional Study. The binational component of the Regional Study should be competed in year 2001.

3.3 OTHER COMPETITIVE IMPORTED WATER SOURCES

Supplies from the IID water transfer and the Authority's preferential rights from Metropolitan are not sufficient to meet the imported water needs of the region. Therefore, the Authority must pursue additional supplies, either local and/or imported. Potential imported sources include various types of water transfers and/or Metropolitan non-firm supplies that may be available to the Authority.

3.3.1 Other Transfers

There is the potential to obtain additional transfer supplies, beyond the IID transfer, to meet the future demands of the San Diego region. There are various types of transfers available that are typically categorized into the following types:

- Core Transfers - Core transfers make water available through multi-year contracts that convey a specific amount of water to the purchaser each year. The IID water transfer is defined as a core transfer.

- Spot Transfers - Spot transfers make water available for a limited duration (typically one year or less) through a contract entered into in the same year that the water is delivered.

- Option Transfers - Option transfers are multi-year contracts that allow the purchaser to obtain a specified quantity of water at some future date. They usually require a minimum payment for water even if the water is not needed. For

example, an agreement may require water to be purchased one out of every five years.

- Storage Transfers - Storage transfers allow the purchaser to place water into storage for delivery at some time in the future.

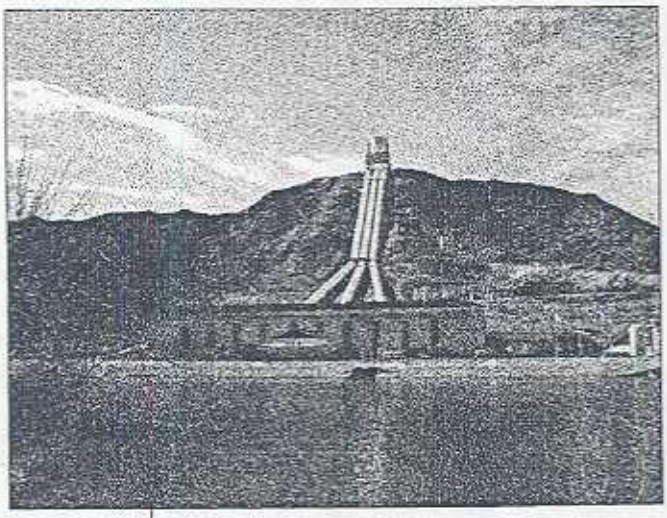
- Water Exchanges - Water exchanges are agreements between the purchasing agency and selling agency that allow for the exchange of water from one source for water from a different source.

The IID transfer supply is conserved water from the Colorado River. The other two geographic regions where transfer water is currently available are central and northern California. Transfers from northern and central California would utilize SWP conveyance capacity. One example for how such transfers could be made available is the State Water Bank created during the end of the recent drought. In 1991, as a drought emergency measure, DWR created the bank to enable water-short districts and agencies to purchase supplies from willing water sellers. DWR purchased the water supplies primarily from northern California agricultural entities and sold these supplies to entities experiencing drought shortages. DWR purchased the water for $125/AF and sold it for $175/AF (1991 costs). Metropolitan purchased 215,000 AF in 1991; the Authority, due to cutbacks in supply from Metropolitan, had to separately purchase 21,600 AF through Metropolitan.

Under the recently adopted CALFED Bay-Delta Framework, described in **Section 3.1.2**, a Water Transfers Program will be initiated whose goal is to, "encourage the development of a more effective water transfer market that facilitates water transfers and streamlines the approval process while protecting water rights, environmental conditions, and local economic interests." This effort will assist agencies, such as the Authority, in implementing water transfers from northern and central California.

Additional transfer supplies for the San Diego region would not only help meet demands but could also provide lower salinity water for purposes of blending with IID transfer water. Water lower in TDS is required to blend with the higher TDS Colorado River water that will be supplied by IID in order to achieve a lower overall TDS in the Authority's supplies.

In 1998, the Authority's Board of Directors authorized staff to prepare and distribute a request for proposal for additional transfers. The Authority has explored and will continue to explore transfer and water storage opportunities throughout California that have the potential to provide a reliable imported water supply to help meet the Authority's supplemental water needs. However, all such programs are dependent on obtaining access to the water conveyance facilities operated by Metropolitan. The Authority is taking all steps necessary to obtain access to those facilities on a fair and equitable basis including, but not limited to, seeking review of the wheeling



statutes by the California Supreme Court in Metropolitan Water District of Southern California vs. Imperial Irrigation District, et al., S089760.

3.3.2 Non-firm Supplies from Metropolitan

In addition to transfers supplies, other imported supplies from Metropolitan may be available to the Authority. This water is considered a non-firm supply because it would be subject to call by other Metropolitan agencies having a preferential right to such supplies. In addition, Metropolitan is in the process of formulating a new rate structure and it is unknown at this time what final rights and cost structure will emerge from this process.

3.4 SUMMARY OF IMPORTED WATER SUPPLIES

Table 3-6 shows the Authority's projected mix of future imported water supplies. In year 2000 imported deliveries will of necessity still be met by Metropolitan and equal an estimated 580,000 AF. The Authority's 2000 Plan is to pursue water transfers to help meet future demands and improve the water quality of the Authority's imported supplies, to the extent that these needs cannot be satisfied from the development and enhancement of local water supplies (Refer to **Section 4**). Staff will conduct an ongoing evaluation of the most advantageous mix of supplies to best meet future water supply needs. A critical but unknown factor as of the date of this 2000 Plan is the outcome of the key issues pending at Metropolitan (Refer to **Section 3.1.4**).

TABLE 3-6
PROJECTED IMPORTED WATER SUPPLIES
(AF/ YR)

	2005	2010	2015	2020
IID Water Transfer	80,000	180,000	200,000	200,000
Firm Supply from Metropolitan[1]	303,630	303,630	303,630	303,630
Other Competitive Imported Sources	172,370	65,470	73,470	85,870
TOTAL IMPORTED SUPPLIES	**556,000**	**549,100**	**577,100**	**589,500**

[1] Firm supply from Metropolitan is based on the Authority's existing preferential right at Metropolitan.

SECTION 4 – LOCAL WATER SUPPLIES

Although imported water meets the majority of the region's needs, local resources are also an important component of the water resources mix. Local resources provide the Authority and its member agencies with highly reliable water, under local control, with more price certainty than is provided by Metropolitan, the Authority's main supplier of imported water. Additionally, capital investments in local supplies, in the long-term, will result in lower cost sources once associated debt service is retired.

Local resources include surface and groundwater supplies, recycled water, demand management (water conservation) measures, and in the future, desalinated seawater. This section describes the existing and future local supplies for the San Diego region. The estimates for future local supplies included in this section could be even greater depending upon a variety of factors such as, increased funding opportunities, technology advances and cost-effectiveness of local projects.

Before 1947, the San Diego region relied upon local surface water runoff in normal and wet weather years, and upon groundwater pumped from local aquifers during dry years, when stream flows were reduced. As the economy and population grew, local resources were not sufficient to meet the region's water supply needs. From the 1950's onward, the region became increasingly reliant on imported water supplies. Since 1980, a range of 5 to 30 percent of the water used within the Authority's service area has come from local sources, primarily from surface water reservoirs that have yields varying directly with annual rainfall. A small but growing share of local supply comes from recycled water and groundwater recovery projects. In 1998-99, total local water sources provided 25 percent of the water used in the Authority's service area. Water conservation and demand management measures represent another type of local resource. By making more efficient use of existing water supplies, area residents and industries can reduce the need for imported water supplies.

4.1 DEMAND MANAGEMENT

4.1.1 Description

Demand management, or water conservation, is frequently the lowest-cost resource available to the Authority and its member agencies. Water conservation is a critical part of the Authority's 2000 Plan and long-term strategy for meeting the water supply needs of the San Diego region. The goals of the Authority's water conservation program are to: reduce demand for more expensive, imported water; demonstrate continued commitment to the Best Management Practices (BMPs) and Agricultural Efficient Water Management Practices (EWMPs); and to ensure a reliable future water supply.

Best Management Practices

The California Urban Water Conservation Council (CUWCC) was formed in 1991 through a Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). The urban water conservation practices, or BMPs, included in this MOU are intended to reduce California's long-term urban water demands. **Table 4-1** provides an overview of the Authority and its member agencies' progress in the implementation of the recently updated BMPs as outlined by the CUWCC. The Authority's FY1999 and FY2000 BMP Report is included in **Appendix D**. Major Authority activities include: active participation in the development and implementation of statewide BMPs; participation with member agencies, Metropolitan and American Water Works Association Research Foundation in research and development activities; and implementation of public information and education programs.

Implementation of BMPs

Since program inception, the Authority and its member agencies have provided incentives for the installation of 383,948 ultra-low-flow toilets (ULFTs). Financial incentives have also been provided for installation of 4,479 residential high-efficiency clothes washers (HEWs) and 1,707 coin-operated HEWs. The Authority, member agencies and San Diego Gas and Electric (SDG&E) have also distributed over half a million showerheads to customers. Since 1990, the Authority has spent close to $9 million on implementation of these and other conservation programs.

The Authority's FY200 budget includes $1.2 million for conservation programs that are anticipated to save 38,000 AF/YR over the useful life of the measures. This funding is augmented by Authority member agencies, the USBR, SDG&E, and Metropolitan. In FY2000 this additional funding totaled $5.1 million. Therefore, the total amount expected to be spent during FY2000 for all conservation programs is $6.3 million. The Authority provides approximately 19 percent of all conservation funding. The Authority and its member agencies also administer both the Agriculture Audit Program and California Irrigation Management Information Systems (CIMIS) for agricultural use. Additional information on implementation of the BMPs by the Authority is available in **Appendix D**, CUWCC BMP Report.

TABLE 4-1
BEST MANAGEMENT PRACTICES FOR URBAN WATER CONSERVATION IN CALIFORNIA

BMP #	DESCRIPTION	CONSERVATION PROGRAMS	COMPLIANCE
1	Residential Surveys	• Residential Survey Program	Yes
2	Residential Plumbing Retrofit	• Showerhead distribution	Yes
3	Distribution System Water Audits		Yes
4	Metering with Commodity Rates		Yes
5	Large Landscape Programs and Incentives	• Professional Assistance for Landscape Management (PALM) Program • Protector Del Agua	Yes
6	High-Efficiency Clothes Washer Rebates	• Residential High-Efficiency Clothes Washer (HEW) Program	Yes
7	Public Information Programs	• Media Coverage • Xeriscape Awards • WebSite • Water Conservation Literature	Yes
8	School Education Programs	• Classroom Presentations • Splash Science Mobile Lab • Youth Merit Badge Program • Magic Show • Teaching Garden • Mini-grants of up to $250	Yes
9	Commercial, Industrial & Institutional (CII) Water Conservation	• CII Voucher Program	Yes
10	Wholesale Agency Assistance Programs	Ongoing	Yes
11	Conservation Pricing	Ongoing	Yes
12	Water Conservation Coordinator	Water Resources staff	Yes
13	Water Waste Prohibition		Yes
14	Residential ULFT Replacement Programs	• Residential ULFT Voucher and Rebate Programs • Community Based ULFT Distribution Program	Yes

4.1.2 Issues

Revenue Impacts

Water conservation is a well established component in ensuring that there will be a reliable water supply in the future for the increasing population and commerce of our local region. However, conservation occasionally suffers from the perception that it reduces commodity-based rate revenues. Over the long-term, conservation measures actually serve to defer or limit rate increases by reducing the region's need for other, more expensive supplies and increased infrastructure. The Authority's FY2001 budget included $1.6 million for conservation programs, which represents an average cost of $3.00/AF of projected water sales during FY2000.

4.1.3 Future Water Conservation Savings

Projected water savings and effectiveness provided in the 2000 Plan are based on industry standard methodologies for calculating savings, as defined by CUWCC. The Authority assists the CUWCC in conducting pilot programs and analyzing ways to increase the accuracy of savings calculation methodologies. It is projected that the implementation of existing and proposed urban BMPs would produce water savings of approximately 93,000 AF/YR by the year 2020 within the Authority's service area. (**Table 4-2**)

TABLE 4-2
POTENTIAL WATER CONSERVATION SAVINGS THROUGH 2020 WITHIN AUTHORITY SERVICE AREA

BEST MANAGEMENT PRACTICES	2005 AF	2010 AF	2015 AF	2020 AF
EXISTING BMPs				
Residential Surveys	1,100	1,100	1,100	1,100
Plumbing Retrofits	8,100	8,100	8,100	8,100
New Residential Construction	6,800	10,900	14,100	17,300
Main Line Leak Detection	13,230	18,320	18,360	19,310
Large Landscape Audits	1,400	1,600	1,900	2,200
Commercial, Industrial & Institutional	1,100	1,100	1,100	1,100
Residential Landscape	900	900	900	900
ULFT Incentives	20,800	28,280	31,240	31,240
Clothes Washer Incentives	1,000	3,000	4,000	5,000
Subtotal	**54,430**	**73,300**	**80,800**	**86,250**
PROPOSED BMPs				
Appliance Efficient Standards	200	560	2,060	6,400
Car Wash Retrofits	250	500	500	500
Greywater 200	30	40	40	50
Subtotal	470	1,100	2,600	6,950
TOTAL	**54,900**	**74,400**	**83,400**	**93,200**

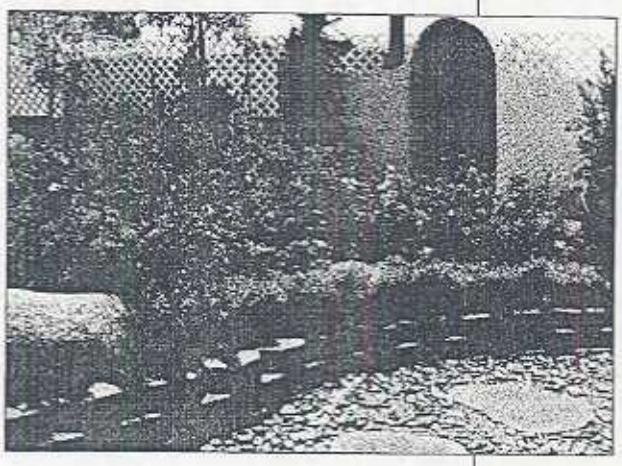
This conservation target is appropriate for the current staffing and funding levels set by the Authority's Board of Directors. Additionally, this target coincides with the availability of anticipated member agency, Authority and/or Metropolitan funds. The estimates presented in **Table 4-2** are based on savings projections from implementation of various conservation measures. Updated SANDAG demographic information is also used to determine savings through BMP implementation. This data is incorporated into the Authority's revised demand forecast as discussed in **Section 2.4**.

Some of the BMPs that are not quantified in **Table 4-2** such as public information and school education do not directly result in water savings. These BMPs instead result in a decision by a water user to take an action that will result in savings. For example, a water user may learn about the availability of showerheads through a public information program, but water will not be saved until the user installs a water saving showerhead, available through the plumbing retrofit program. To

avoid double counting, the projected savings from the showerhead is reflected only in the plumbing retrofits BMP.

The Authority is a leader of innovative programs in water conservation. Efforts have been so successful, however, that many of the conservation programs which were implemented in the early 1990's are maturing. There are additional measures that could be taken to achieve further water savings. Commercial, Industrial, and Institutional (CII), residential, and landscape are areas where such measures have not been implemented to their fullest potential.

Landscape



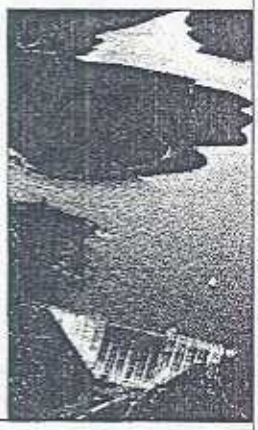
Additional landscape water savings can potentially be achieved through both incentives and mandated regulations/rates. Future potential incentives include: vouchers for purchase of improved efficiency irrigation devices; additional conservation literature; expanded water user efficient irrigation training programs; more landscape audits and increased support for member agency landscape design demonstration gardens. More aggressive enforcement of the landscape design standards included in State Assembly Bill 325 regulations could be pursued. Additionally, the Authority's member agencies could be encouraged to consider retail rate structures and water budgets that incorporate pricing signals designed to sway residential customers to make decisions that lead to increased landscape water use efficiency. Finally, water budgets and pricing signals could be encouraged for CII customers as well.

Commercial, Industrial, & Institutional

There is a potential to achieve additional savings from CII water users. Participation in the existing CII Voucher Program could potentially be increased with an enhanced marketing effort. Additionally, maximum per device voucher incentives could be increased when cost effective. The CII Voucher Program could also be expanded to include additional devices, like water efficient commercial dishwashers and multi-load HEWs. Finally, opportunities may exist to enhance participation in the Commercial HEW Program through very targeted marketing.

Residential

Installation of hot water on demand systems in new homes could be investigated. Additionally, incentives for undersink hot water demand systems for existing homes could be explored. The Residential HEW Program could be expanded, and if



appropriate, the per machine voucher amount could be increased. While the Residential ULFT Program has reached a significant portion of the homes in the Authority's service area, untapped markets may exist. An effort to identify those markets and overcome any obstacles to participation could be undertaken.

Finally, the Authority and its member agencies will continue to cooperate with the CUWCC and Metropolitan to identify future opportunities for water conservation savings.

4.2 SURFACE WATER

4.2.1 Description

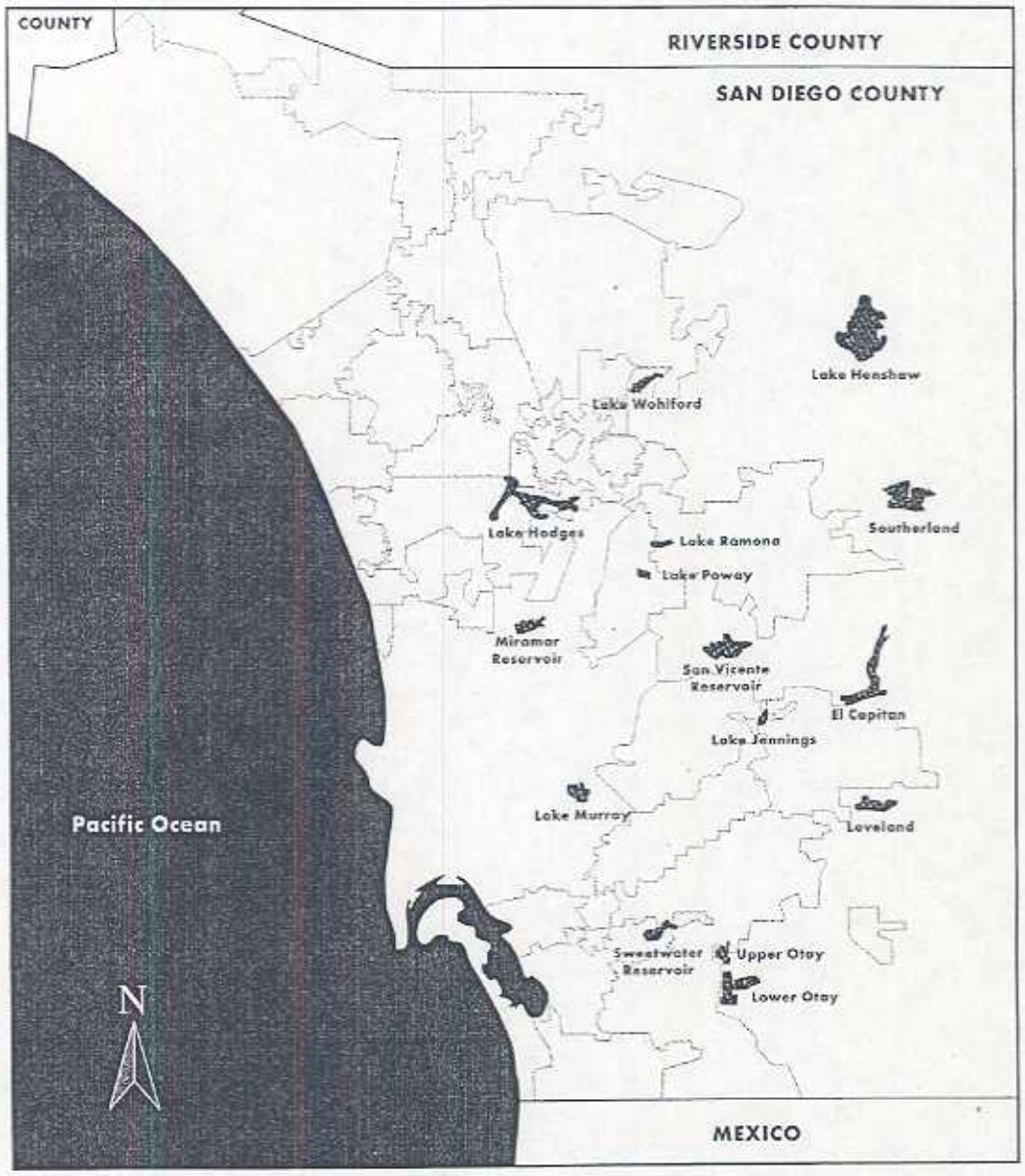
Seven major stream systems originate in the mountains of San Diego County and drain into the Pacific Ocean. Runoff within these watersheds has largely been developed over the last century. Twenty-four surface reservoirs are located within the Authority's service area, with a combined capacity of approximately 571,000 AF. **Table 4-3** lists the largest reservoirs in the county, which have a combined storage capacity of approximately 556,000 AF. The Sutherland Reservoir, which was completed in 1953, was the last major reservoir completed in the Authority's service area (**Section 1.4.1** describes work proceeding on construction of a new reservoir as part of ESP). **Figure 4-1** shows the location of several local reservoirs.

TABLE 4-3
MAJOR SAN DIEGO COUNTY RESERVOIRS

MEMBER AGENCY	RESERVOIR	CAPACITY (AF)
City of Escondido	Wohlford	6,506
♦ City of Poway Lake	Lake Poway	3,200
City of San Diego	Barret	37,947
♦ City of San Diego	El Capitan	112,807
[1] City of San Diego	Hodges	33,550
♦ City of San Diego	Miramar	7,185
City of San Diego	Morena	50,207
♦ City of San Diego	Lower Otay	49,510
♦ City of San Diego	San Vicente	90,230
City of San Diego	Sutherland	29,685
Helix W D	Cuyamaca	8,195
♦ Helix WD	Jennings	9,790
♦ Ramona MWD	Ramona	12,000
Sweetwater Authority	Loveland	25,400
♦ Sweetwater Authority	Sweetwater	28,079
Vista ID	Henshaw	51,774
Total Storage-16 Major Reservoirs		**556,065**

♦ Connected to Authority aqueduct system
[1] Imported water can be delivered via San Vicente
[2] System connection is proposed as part of the Emergency Storage Project

FIGURE 4-1
MAJOR SAN DIEGO COUNTY RESERVOIRS



4.2.2 Issues

Optimization of Reservoir Operations

The management of the region's extensive reservoir system to achieve the optimal use of local and imported water is an important element of resources planning. Local surface water supplies can be used to offset dry-year shortfalls in imported water. However, water use records indicate that local reservoirs are generally operated to maximize the use of local supplies in wet and normal years to reduce the need for imported water purchases. While this mode of reservoir operation

reduces losses due to evaporation and spills, it also results in increased demands for imported water during dry years, when imported water is more likely to be in short supply. Many local reservoirs could be operated to maintain carry-over storage, but this would tend to decrease their average annual yield.

4.2.3 Future Surface Water Supplies

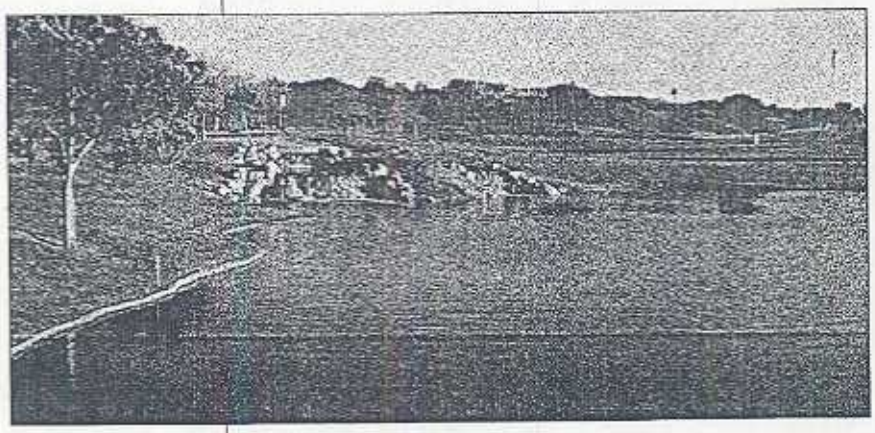
Surface water supplies represent the largest single local resource in the Authority's service area. However, annual surface water yields can vary substantially due to fluctuating hydrologic cycles. Since 1980, annual surface water yields have ranged from a low of 33,000 AF to a high of 174,000 AF. For planning purposes, local surface water supplies are assumed to have a dependable yield of 25,000 AF and a normal yield of 85,600 AF (based on a historic 24-year average). Table 4-4 shows the projected average surface water supply within the Authority's service area.

TABLE 4-4
PROJECTED SURFACE WATER SUPPLIES
NORMAL YIELD (AF/YR)

2005	2010	2015	2020
85,600	85,600	85,600	85,600

4.3 WATER RECYCLING

4.3.1 Description – Water Recycling



Water recycling is defined as the treatment and disinfection of municipal wastewater to provide a water supply suitable for non-potable reuse. Non-potable reuse is the term applied to recycled water used for non-drinking water purposes. Examples range from landscape irrigation to recreational impoundments. Agencies in San Diego County use recycled water to fill lakes, ponds, and ornamental fountains; to irrigate parks, campgrounds, golf courses, freeway medians, community greenbelts, school athletic fields, food crops, and nursery stock; to control dust at construction sites; and to recharge groundwater basins. Recycled water can also be used in certain industrial processes and for flushing toilets and urinals in non-residential buildings. As an example, the newly constructed detention facility in the Otay Mesa area of San Diego County was dual-plumbed to allow use of recycled water for toilet and urinal flushing. However, current regulations allow only new buildings to be dual-plumbed for this specific

use. Additional uses for recycled water are being identified and approved as local agencies and regulators become comfortable with its use.

Water recycling is an important component of the area's local water resources. A number of agencies in the San Diego region continue to implement and expand their water recycling projects. Currently, about 13,700 AF of recycled water is beneficially reused within the Authority's service area annually. Approximately 94 percent of the water is used for agriculture, landscape irrigation, and other M&I uses; the remaining 6 percent is recharged into groundwater basins.

4.3.2 Issues

There are a number of issues that local agencies have to consider when developing recycled water projects. These include economic and financial considerations, water quality, regulatory, institutional, and public acceptance. These issues, if left unresolved, can limit the amount of wastewater that can be recycled in San Diego County. Recycled water development issues are discussed in greater detail below.

Economic and Financial Considerations

The capital intensive cost of constructing recycled water projects has traditionally been a barrier to project implementation. The up-front capital cost for construction of treatment facilities and recycled water distribution systems can be expensive, while full market implementation is usually phased in over a number of years, thus effecting the cash flow in the early project years. This situation is compounded by the seasonal nature of recycled water demands. Recycled water demands tend to peak during the hot summer months and drop off during the winter months when landscape irrigation demands are low. Projects that serve a large portion of irrigation demands, like the majority of the projects in the Authority's service area, often utilize only half of their annual production capacity due to these seasonal demand patterns. The costs of these projects tend to be higher than those of projects that serve year-round demands, since the project facilities must be sized to accommodate seasonal peaking. Projects that serve mostly irrigation demands also tend to have less stable revenue bases, since irrigation demands are heavily influenced by hydrologic conditions.

There are significant benefits to implementing a water recycling project and as uncertainty over purchasing imported supplies from Metropolitan increases in the future, recycling projects become more economically viable.

To be financially feasible, a project's benefits must offset or exceed its associated costs. Project benefits can take the form of: (1) revenues from the sale of recycled water; (2) increased supply reliability; (3) increased control over the cost of future water supplies; (4) avoided water and wastewater treatment, storage, and conveyance costs; and (5) financial incentives from the Authority, Metropolitan, and

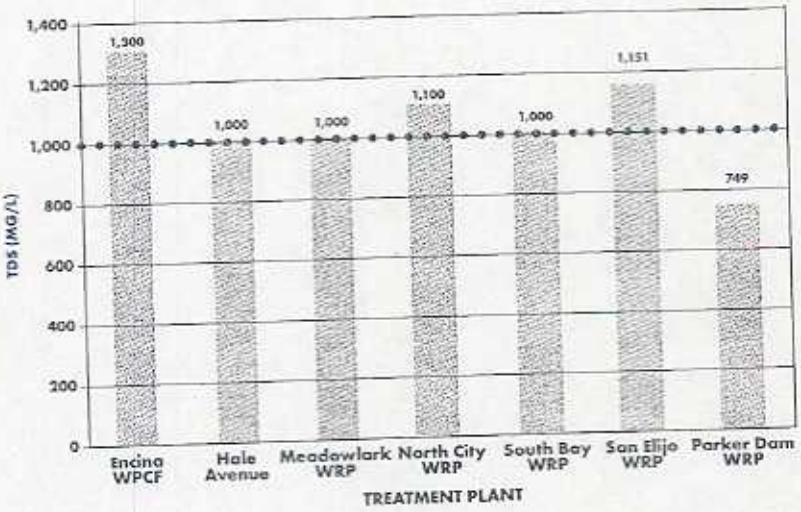
federal and state agencies. Agencies developing recycled water projects must be able to quantify these benefits in order to determine the financial feasibility of a project. Many of the economic issues can be offset in the long term through investment in a supply that when debt service is retired only operating costs remain, thus making it a low-cost supply. When the long-term economics are considered along with the increased reliability, water recycling is a viable option.

Water Quality

Water quality, as it pertains to high salinity supplies, is another significant issue. As described in the **Section 3.1.3**, Metropolitan's historic deliveries to the Authority have consisted primarily of Colorado River water, which has a high salinity content, expressed in terms of TDS. High TDS source water poses a special problem for water recycling facilities because conventional treatment processes are designed to remove suspended, but not dissolved, particles. TDS removal, or demineralization, requires an advanced treatment process, which can significantly increase project costs.

Residential use of water typically adds 200 to 300 mg/l of TDS to the wastewater stream. Self-regenerating water softeners can add another 60 to 100 mg/l. Infiltration of brackish groundwater into sewer lines can also cause an increase in TDS. If an area receives a water supply that has a TDS of more than 700 mg/l, and residents add 300 mg/l or more through normal use, the recycling facility will produce recycled water with a TDS concentration of 1,000 mg/l or higher. **Figure 4-2** shows the average TDS at several of the existing and projected water recycling treatment plants. In general, TDS over 1,000 mg/l becomes problematic for irrigation and industrial reuse customers. This greatly limits the potential uses and marketability of recycled water, particularly for agricultural purposes, because certain crops and nursery stock cannot be irrigated with high-TDS water.

FIGURE 4-2
TREATMENT PLANT AVERAGE EFFLUENT TDS (MG/L)



One of the actions included in Metropolitan's 1999 Salinity Management Study, to reduce the salinity impact on water recycling development, is establishment of a TDS concentration objective of 500 mg/l in Metropolitan's distribution system. Metropolitan has been able to maintain the 500 mg/l objective since initiation of the objective in April 1999. Although Metropolitan has adopted the 500mg/l TDS objective, there is no guarantee, due to natural events and other factors, that Metropolitan will be able to continuously meet the objective, thus putting this sizeable investment in recycling projects at risk.

Regulatory

There are two state agencies primarily responsible for regulating the application and use of recycled water; the State Department of Health Services (DHS) and the California Regional Water Quality Control Board (Regional Board). Planning and implementation of water recycling projects could entail numerous interactions with these regulatory agencies prior to project approval.

The DHS establishes the statewide effluent bacteriological and treatment reliability standards for recycled water uses in Title 22 of the California Administrative Code. Under Title 22, the standards are established for each general type of use based on the potential for human contact with recycled water. The highest degree of standards is established for recycled water used for unrestricted body contact.

The Regional Board is charged with establishing and enforcing requirements for the application and use of recycled water within the state. Permits are required from the Regional Board for each water recycling operation. As part of the permit application process, applicants are required to demonstrate that the proposed recycled water operation will not exceed the ground and surface water quality objectives in the Basin Plan and is in compliance with Title 22 requirements.

A regulatory issue that will hinder development of projects is the DHS groundwater recharge rule that requires treatment prior to injection of recycled water in order to reduce the total organic carbon (TOC) concentration to less than 2.0 mg/l. This would increase the cost and thereby limit development of groundwater recharge.

Institutional

One of the primary institutional issues, related to the development of water recycling in San Diego County, is interagency coordination. The most common example is where the wastewater agency that produces the recycled water is not the water purveyor within the reuse area. Effective communication and cooperation between both agencies regarding distribution of recycled water and providing service to the water customer is vital and should begin early in the planning process.

These institutional arrangements require the establishment of contracts and/or agreements between the parties and/or agencies involved. The terms of these agreements are established on a case-by-case basis. The agreements usually define reporting and compliance responsibilities, the amount of water deliveries, water pricing, and financing plan that identifies which agency will be receiving financial incentives.

Public Acceptance

Without public acceptance it would be difficult for any agency to site, finance, construct, and operate a water recycling project. It has been found that the most successful means to obtain public acceptance is through education and involvement. Agencies in the San Diego region have formed citizen advisory groups and held public workshops in order to get the public more involved in development of their projects.

4.3.3 Encouraging Recycled Water Development

The Act requires agencies to describe in their plan the actions, including financial incentives, which may be taken to encourage the use of recycled water. **Table 4-5** summarizes a list of the programs used by the Authority's member agencies to assist and encourage development of recycled water. A description of the major programs is also included. Some of these programs are developed by the water recycling agencies while others, such as the funding programs, are primarily provided by the Authority, Metropolitan, and state and federal agencies.

TABLE 4-5
PROGRAMS TO ENCOURAGE RECYCLED WATER USE

Incentive Programs • Reclaimed Water Development Fund (Authority) • Local Resources Program (Metropolitan)
Grants • Title XVI Funding Program (Bureau) • Proposition 13 Grant (State of California)
Low Interest Loans • Financial Assistance Program (Authority) • State Revolving Fund (State of California) • Water Reclamation Loan Program (State of California) • Proposition 13 Loan (State of California)
Long-Term Contracts (Price/Reliability)
Rate Discounts
Public Education/Information
Regional Planning
Model Water Reclamation Ordinance • Dual Plumbing Standards • Prohibits Specific Potable Water Uses
Guidance Documents • Model Rules and Regulations for Recycled Water Service • Construction Specifications for Recycled Water Systems • Recycled Water Retrofit Guidelines • Recycled Water User's Manual

Funding Programs

One of the most significant pieces in creating a successful recycling project is diversified funding and funding partnerships. The Authority has focused on providing and facilitating the acquisition of outside funding for water recycling projects as a very high priority. The several programs detailed in this section are critical success factors in the implementation of water recycling in San Diego County.

There are a number of financial assistance programs available to San Diego County agencies that include: the Authority's Financial Assistance Program (FAP) and Reclaimed Water Development Fund (RWDF); Metropolitan's Local Resources Program (LRP); the USBR Title XVI Grant Program; and the SWRCB low-interest loan programs. Together, these programs offer funding assistance for all project phases, from initial planning and design to construction and operation. Financial assistance programs administered by the Authority, Metropolitan, and the USBR provided $12 million to San Diego County agencies during the fiscal year ending June 30, 1999.

Financial Assistance Program As an impetus to begin local projects, the Authority offers the FAP to encourage, through the provision of matching funds, facility planning, feasibility investigations, preliminary engineering studies, environmental impact reports, and research projects related to water recycling and groundwater development. Since its inception in June 1988, the FAP has provided local agencies more than $1.8 million for water recycling studies and nearly $797,000 for groundwater development studies. Agencies receiving FAP funds are required to reimburse the Authority when implementation of the project results in funding from other sources, such as the LRP or RWDF, or within five years of certification of the project environmental report, whichever occurs first.

Reclaimed Water Development Fund In response to significant up-front costs of many water recycling projects, the RWDF, adopted by the Authority's Board of Directors in April 1991, contributes up to $100/AF of beneficial reuse for recycling projects that demonstrate a financial need. This contribution is to offset costs, especially in the early years of project start-up. In order to qualify, project expenses must exceed project revenues. To date, the Authority has entered into RWDF agreements for ten projects with a combined ultimate yield of 32,000 AF/YR. In FY2000, the Authority provided local agencies $704,810 in RWDF incentives. These funds are received after projects are operating.

Local Resources Program Metropolitan also has a program that currently underwrites local projects during the initial years of operation. Metropolitan's local resources program provides subsidies of up to $250/AF for recycled water and groundwater development projects. Historically, while San Diego area agencies received funding from these programs, it was far less than San Diego area ratepayers paid to Metropolitan on account of Metropolitan subsidy programs. Metropolitan

is developing a new rate structure and the availability of the LRP for new projects is uncertain; the Authority will consider whether it would be better served to expand existing programs for local area agency funding on its own account.

The Reclamation Wastewater and Groundwater Study and Facilities Act – Title XVI The Title XVI Grant Program is a significant source of funding for San Diego area recycling projects. Title XVI of Public Law 102-575, the Reclamation Wastewater and Groundwater Study and Facilities Act, authorizes the federal government to fund up to 25 percent of the capital cost of authorized recycling projects, including the San Diego Area Water Reclamation Program, an inter-connected system of recycling projects serving the Metropolitan Sewage System service area. PL104-266, the Reclamation Recycling and Water Conservation Act of 1996, authorized two additional projects in northern San Diego County: the North San Diego County Area Water Recycling Project and the Mission Basin Brackish Groundwater Desalting Demonstration Project. To date, the USBR has obligated more than $38 million in Title XVI funds for San Diego projects, including more than $10.1 million obligated during Federal Fiscal Year (FFY) 1999. The FFY2000 Budget includes an additional $12.1 million for San Diego area projects.

State Revolving Fund/Water Reclamation Loan Program The State Revolving Fund (SRF) and the Water Reclamation Loan Program (WRLP) provide agencies with low-interest construction loans for water recycling and groundwater projects. The SRF and WRLP loans carry an interest rate equal to 50 percent of the state's general obligation bond interest rate. This below-market interest rate can result in substantial savings on debt service. In November 1996, Proposition 204 was approved by the voters and provided $80 million for the SRF and $60 million for WRLP. Proposition 13, approved by the voters in March 2000, provides an additional $40 million for low-interest loans and grants for design and construction of water recycling projects to the existing water recycling funding program. Combining this with loan repayments from prior loans and funds remaining from Proposition 204, over $100 million is available.

Policies, Ordinances, and Guidance Documents

The Authority has adopted a number of policies, guidance documents, and a model ordinance to assist local agencies with water recycling project implementation. Many local agencies have adopted the Authority-sponsored ordinance. The ordinance includes provisions that typically require new development projects to install recycled water systems. The ordinance also states that where allowed by law and available in sufficient quantities, at a reasonable cost and quality, recycled water shall be the sole water supply delivered for non-potable uses.

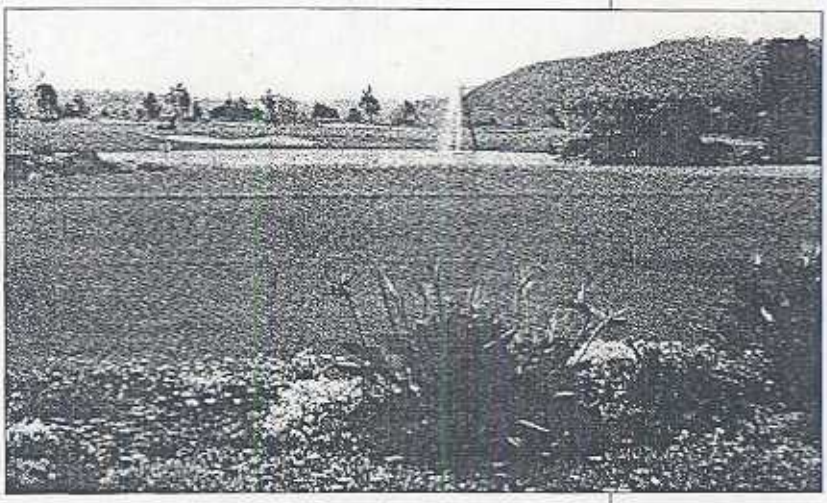
Water recycling guidance documents available from the Authority include, Model Rules and Regulations for Recycled Water Service, Construction Specifications for Recycled Water Systems, Retrofit Guidelines, and a recycled water user's manual.

Training

The Authority, in partnership with other water agencies, offers a one-day certified course designed to provide irrigation supervisors with a basic understanding of recycled water. Completion of the Recycled Water Site Supervisor Training fulfills the training requirement as mandated by regulatory authorities. The class provides information to supervisors on the water recycling process, recycled water quality and safety issues, the duties and responsibilities of the supervisor, landscape irrigation fundamentals, maintenance and management, and cross connection control shut-down tests and inspections. Understanding similarities and differences between recycled and potable water is important to the successful operation of a recycled water system.

The first class started in 1993 with 14 participants. At this time over 500 participants have been certified. Instructors include a state registered environmental health specialist and environmental assessor, water quality chemist/reclamation specialist and landscape specialists.

Optimizing the Use of Recycled Water – Regional Perspective



While local agencies typically expand and develop their respective recycled water projects independently based on local interests, the Authority is conducting a study that will identify opportunities to expand the region's recycled water projects and develop a regional system or systems that could maximize reuse on a regional scale. This study, named the "Regional Recycled Water System Alternatives Analysis (Regional Recycling Study)" is scheduled for completion in early 2001. The Regional Recycling Study will identify opportunities to develop a regional recycled water system(s) that would potentially utilize Authority and local agency facilities. The USBR is conducting a similar study, on a much larger study area, called the "Southern California Comprehensive Water Reclamation and Reuse Study (SCCWRRS)." The SCCWRRS was started about five years ago and is in its final phase. It is due for completion by the end of year 2000. The Authority's Regional Recycling Study will build on work from SCCWRRS and has a more focused and detailed objective than SCCWRRS. The two studies will be closely coordinated and the Authority's Regional Recycling Study will utilize the data previously collected for the SCCWRRS.

4.3.4 Future Recycled Water Use

As noted previously, San Diego agencies currently beneficially reuse about 13,700 AF/YR of recycled water, primarily for groundwater recharge, landscape irrigation and other industrial, and commercial uses. The region's demand for recycled water is projected to increase to about 45,100 AF/YR in 2010 and about 53,400 AF/YR in 2020. **Figure 4-3** shows the location of the recycled water treatment plants. **Table 4-6** displays the total projected recycled water use anticipated through the year 2020 within the Authority's service area. These projections were provided by the local agencies implementing the projects. **Table E-1** in **Appendix E** includes detailed information on the recycling projects, including the sponsoring agency, location, projected supply, and type of reuse.

TABLE 4-6
PROJECTED RECYCLED WATER USE (AF/YR)

2005	2010	2015	2020
33,400	45,100	51,800	53,400

4.3.5 Wastewater Generation, Collection, Treatment and Disposal

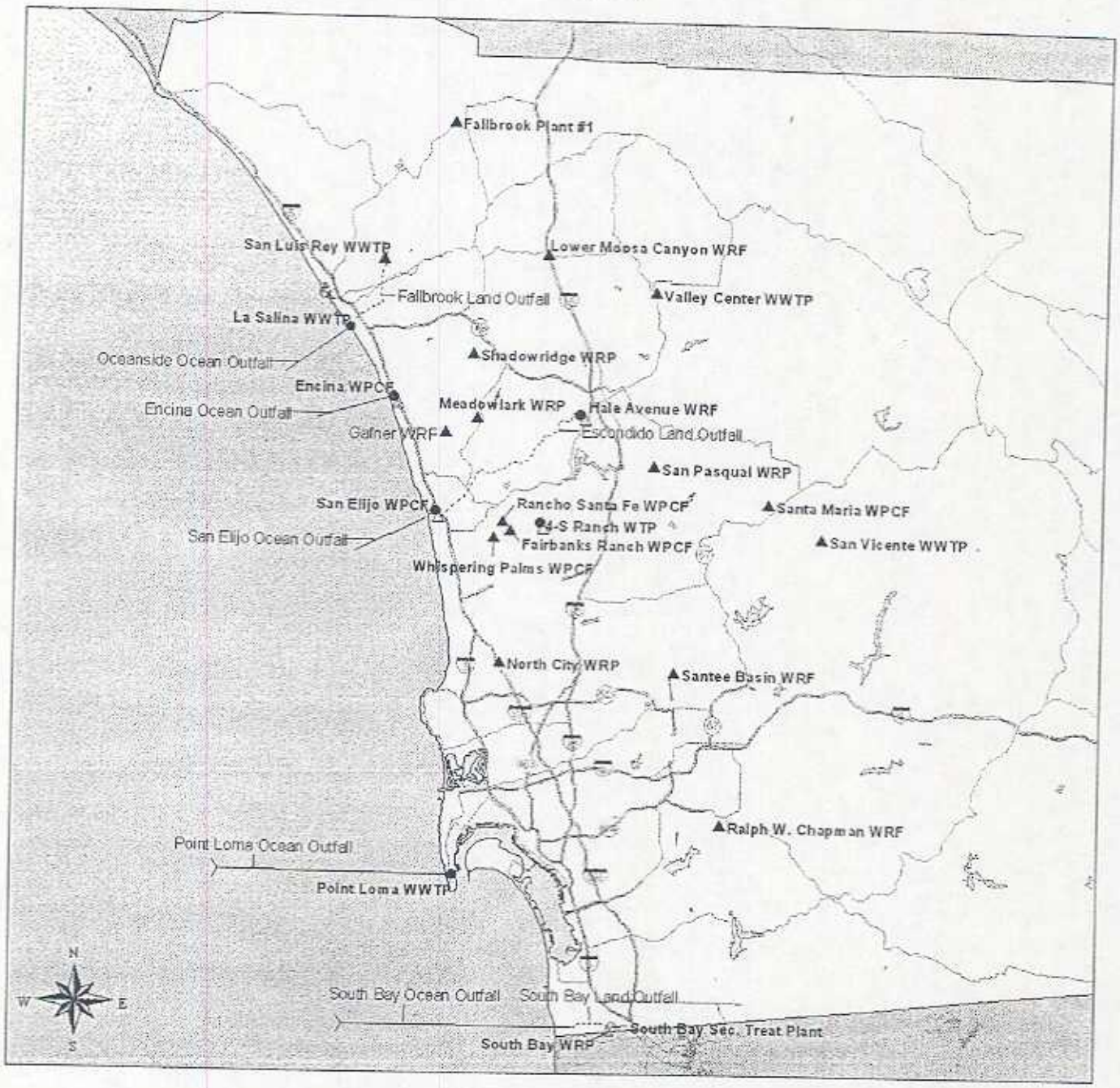
As required by the Act, the following is a review of the collection, treatment, and disposal of wastewater within the Authority's service area. Approximately 300 million-gallons-per-day (mgd) of wastewater is currently being generated, collected, and treated. Most of the large wastewater treatment plants are located along the coast for easy and convenient access to an ocean outfall. These plants serve most of the San Diego region's highly urbanized areas. Figure 4-3 identifies the location of the wastewater treatment plants and the associated outfall systems. The coastal location of the plants is not always conducive to development of recycled water. Most of the market for recycled water is located at higher elevations making it costly to construct distribution systems to serve the customers. A detailed list of the wastewater treatment plants within the county, showing their capacities at various levels of treatment, average effluent TDS, and type of disposal is included in **Table E-2, Appendix E**. In addition approximately 10 to15 mgd of wastewater within the Authority's service area generated and disposed of through private systems such as septic tanks.

4.4 GROUNDWATER

4.4.1 Description

Agencies within the Authority's service area currently use about 24,000 AF of groundwater annually. In addition, private well owners also draw on local basins for their water supplies, which offset imported water demands. The amount of groundwater pumped by private wells is suspected to be significant, but has not to date been accurately quantified for the region.

FIGURE 4-3



Existing
- Wastewater Treatment Plant
- Water Recycling Plant

Proposed
- Wastewater Treatment Plant
- Water Recycling Plant

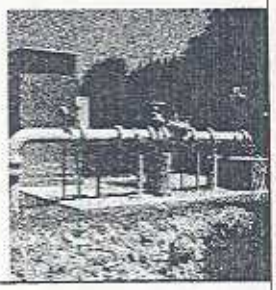
Outfalls
- Land Outfall
- Ocean Outfall

5 0 5 10 15 Miles

Source: SDCWA, SANDAG, CH2MHill

San Diego County Water Authority
WATER RESOURCES GIS

San Diego County Wastewater Treatment and Water Recycling Facilities



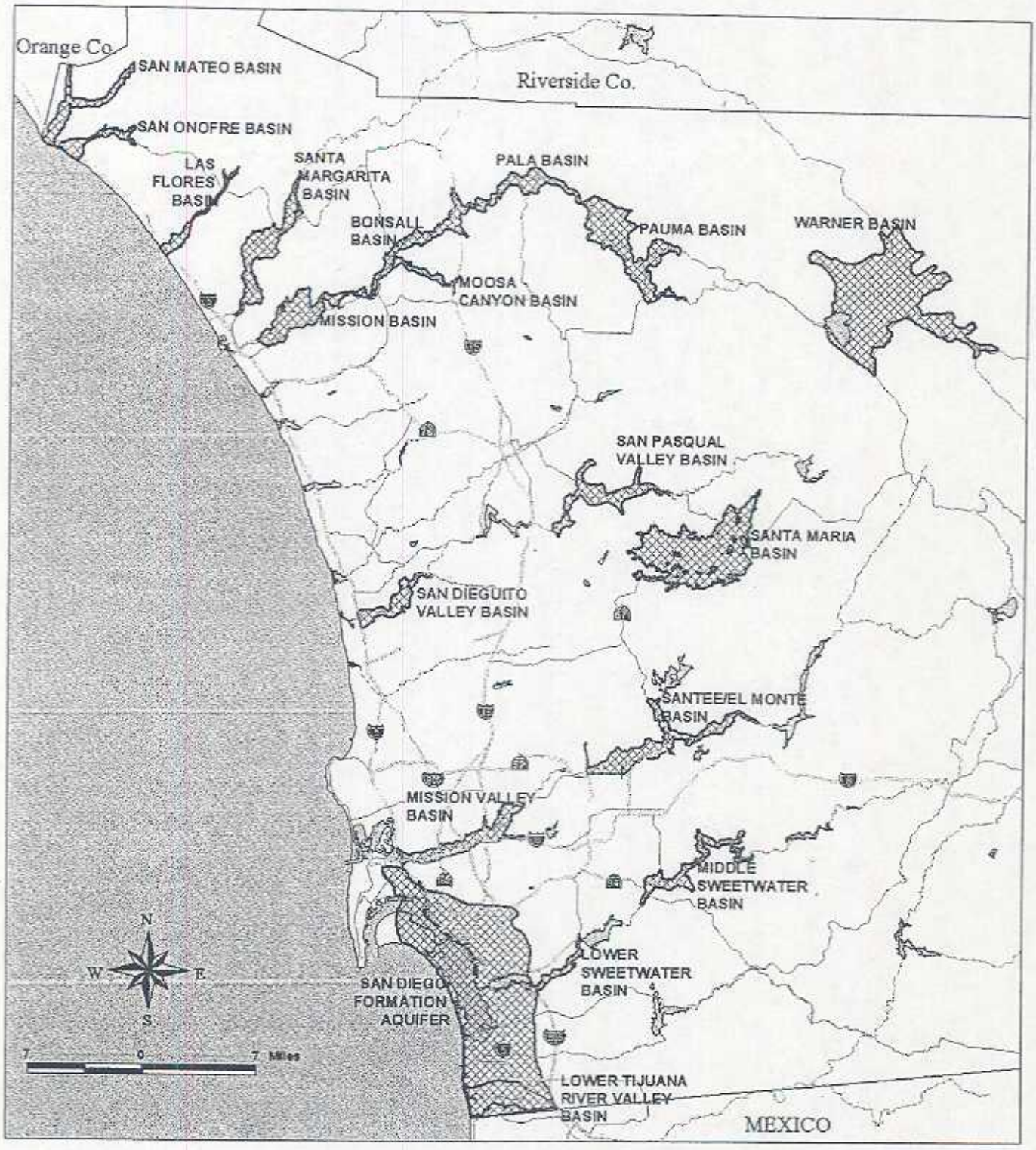
Groundwater supplies in the Authority's service area are limited by both the geology and the semi-arid hydrologic conditions of the region. Narrow river valleys with shallow alluvial deposits are characteristic of many of the more productive groundwater basins. Additionally, irrigation with saline imported water and over pumping has led to excessive salinity in many of the most promising basins. Outside of these alluvial basins, much of the geology consists of fractured crystalline bedrock and fine-grained sedimentary deposits that are generally capable of yielding only small amounts of groundwater to domestic wells. One notable exception is the San Diego Formation, located in the southwestern portion of the county. This large and complex aquifer shows promise for groundwater recharge and recovery. However, additional hydrogeologic investigations must be completed before the aquifer's groundwater development potential can be fully determined. **Figure 4-4** shows the location of the principal alluvial groundwater basins located within the Authority's service area.

Although groundwater supplies are less plentiful in the San Diego region than in some other areas of Southern California, such as the Los Angeles Basin, sufficient undeveloped supplies exist to help meet a portion of the region's future water needs. Several agencies within the Authority's service area have identified potential projects that could provide an additional 35,000 AF/YR of groundwater production in the coming years, although the total development potential may be several times greater. The potential projects can be grouped into three categories:

Groundwater Extraction and Disinfection Projects These projects are generally located in basins with higher water quality levels, where extracted groundwater requires minimal treatment for use as a potable water supply. Examples of this type of groundwater project includes projects currently operated by USMC Camp Pendleton, Yuima MWD, and the Sweetwater Authority (National City Well Field). The unit cost of water produced from simple groundwater extraction and disinfection projects is generally well below the cost of imported water. Because most of the higher quality groundwater within the Authority's service area is already being fully utilized, a relatively small amount of this "least cost" groundwater is available for the development of new supplies.

Brackish Groundwater Recovery Projects Brackish water is typically found in basins which have been impacted by imported water irrigation or by seawater intrusion resulting from the overdraft of coastal basins. Brackish groundwater recovery projects use desalination technologies, such as reverse osmosis (RO), to treat extracted groundwater to potable water standards. The City of Oceanside's 2 mgd Mission Basin desalter is an example of a brackish groundwater recovery project, as well as Sweetwater Authority's existing 4 mgd Richard A. Reynolds Groundwater Demineralization Facility. Unit costs for brackish groundwater recovery projects are considerably higher than those for simple groundwater extraction projects due to the additional treatment requirements, including concentrate disposal needs.

FIGURE 4-4



San Diego County Water Authority GIS
WATER RESOURCES GIS

Principal Aquifers in Western San Diego County

Groundwater Recharge and Recovery Projects Recharge projects improve groundwater basin yields by supplementing natural recharge sources with potable or possibly recycled water. Projects proposed in the San Pasqual Basin, the Lower San Dieguito Basin, and the Lower Santa Margarita River are good examples. In addition, the potential for groundwater storage and recovery in the San Diego Formation near the San Diego Bay and the Mission and Bonsall Basins located in the Lower San Luis Rey River Valley are under evaluation (See **Figure 4-4**).

4.4.2 Issues

Economic and Financial Considerations

Because of the saline nature of the groundwater basins in San Diego County, the cost of groundwater development usually includes demineralization, which can be costly to construct and operate. However, because treated groundwater is suitable for all potable uses, groundwater recovery projects face less variation in demand than recycling projects and do not require the construction of separate distribution facilities. In addition, reductions in the cost and operation of low pressure RO membranes have made the demineralization of saline groundwater less expensive and these types of projects are continuing to be more cost-effective and competitive with the development of other supplies. Projects dependent on natural recharge sources, such as surface runoff, can be affected by local hydrologic conditions, which are highly variable and therefore provide less supply reliability than recycled water projects. Therefore, agencies are pursuing development of conjunctive use projects that rely in part on imported or recycled water as a source of recharge to increase reliability. Additionally, project costs could be optimized through the purchase of imported and recycled water during off-peak periods when supplies are more plentiful and prices are lower. After retirement of debt service, these projects may be the lowest cost option available.

Institutional, Legal Issues, Water Quality Issues

Institutional and legal issues can be another obstacle to project development. Because most basins contain multiple water agencies and numerous private wells, water rights are a primary concern. Agencies are often reluctant to implement groundwater development projects unless jurisdictional and water rights issues are resolved beforehand.

Uncertainty over future regulatory requirements for drinking water supplies can pose another barrier to project development. When developing facilities and compliance plans for groundwater recharge projects, agencies must take into account proposed or potential regulatory changes related to water quality issues. Some of the regulations for which changes are expected over the next decade include: (1) state and federal drinking water standards; (2) federal storm water regulations; and (3) DHS groundwater recharge regulations.

Environmental Regulatory Constraints

Regulatory issues related to environmental protection are common to many of the groundwater projects proposed within the Authority's service area. They include potential impacts from groundwater pumping to endangered species or groundwater-dependent vegetation. Such impacts may occur if a project results in seasonal or long-term increases in the depth to groundwater. Although potential environmental impacts can generally be mitigated, mitigation costs can reduce the cost-effectiveness of a project. Concentrate disposal requirements for brackish groundwater recovery projects can also be a constraint for projects sited in inland basins without access to an ocean outfall.

4.4.3 Future Groundwater Supplies

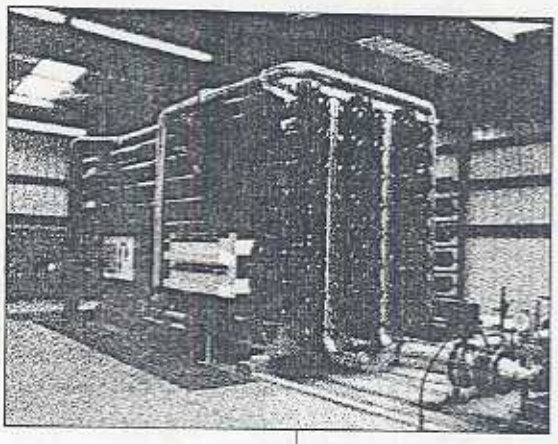
In an effort to inventory existing and proposed groundwater use, the Authority prepared the 1997 Groundwater Report. This report surveyed existing groundwater use, and evaluated planned projects and projects that were currently under study in the Authority's service area at that time. The report estimated a possible annual production (including some recovery of stored imported water) of 92,000 AF. Since then, project planning has continued and project concepts have been revised and/or refined. Current project planning by the Authority's member agencies is reflected in **Table E-3**, **Appendix E**.

The Authority has identified at least eight potential groundwater development projects in its service area. These projects are far enough along in the planning process to support a forecasted potential yield. Estimates of total projected supply from these potential projects along with existing groundwater supplies are shown in **Table 4-7**. These projections were provided by the local agencies proposing to implement the projects. It should be noted that as local agencies continue to evaluate the feasibility of potential groundwater projects, an even greater potential supply could be realized. A detailed list of the projects and projected supplies can be found in **Table E-3, Appendix E**. Two of the projects, the City of Oceanside's proposed 6.37 mgd (approximately 4 mgd expansion) demineralization facility and the Sweetwater Authority's proposed 8 mgd demineralization facility (4 mgd expansion), are expansions of existing brackish groundwater recovery projects. The other projects would require the construction of new facilities.

TABLE 4-7
PROJECTED GROUNDWATER SUPPLY
(AF/YR)

2005	2010	2015	2020
31,100	53,500	57,500	59,500

The City of Oceanside anticipates that its 6.37 mgd Mission Basin Desalter expansion will be completed by the end of the year 2002. The project will include the development of the estimated remaining "safe yield" of the basin through expansion of the existing demineralization facility. The Sweetwater Authority's planned Richard A. Reynolds Demineralization Facility 8-mgd expansion is currently in the preliminary design phase. The project will include the completion of additional extraction wells needed to supply brackish groundwater to planned demineralization facility expansion(s). The project is also expected to include an aquifer recharge component.



Current planning efforts indicate that other potential projects in the Authority's service area may also be feasible. A number of groundwater storage and recovery projects are currently being studied by the Authority and its member agencies. These groundwater project concepts will be candidates for possible inclusion in the next plan update. These studies include the San Diego Formation Aquifer Storage and Recovery Project and the Lower San Luis Rey River Valley Groundwater Storage and Recovery Project.

The City of San Diego has indicated to the Authority that they are developing plans to maximize the development of the City of San Diego's rights or interests in several groundwater basins. These plans would utilize basins for groundwater extraction and disinfection, brackish groundwater recovery, and recharge and recovery of imported and recycled water. Other Authority member agencies are also considering additional groundwater projects including the Otay Water District which is currently studying numerous groundwater development options within their service area.

4.5 SEAWATER DESALINATION

Desalinated seawater is used throughout the world as a potable water supply and is sometimes described as the ultimate solution to Southern California's water supply needs. In some areas of the world, such as the Middle East, desalinated seawater represents the primary source of potable water. Until recently, the cost of seawater desalting has limited its large-scale application in the United States. Current projects being developed in Tampa, Florida and the island of Trinidad seem to indicate that the cost of seawater desalting may have decreased to a point where it could be considered a potential resource option for coastal areas such as San Diego County. Therefore, seawater desalination should be considered in the development of any comprehensive water resources management plan for the San Diego region.

4.5.1 Description

Processes commonly used for large-scale seawater desalination fall into two general categories: (1) thermal processes and (2) membrane processes. Thermal processes

use heat to separate salt and other impurities from seawater. Membrane processes, such as RO, use pressure to force seawater through a semi-permeable membrane. The membrane is constructed of materials that will allow water molecules, but not dissolved impurities, to pass through. Thermal facilities currently represent the largest volume of installed seawater desalination capacity. However, these facilities tend to be located in areas of the world where fuel is inexpensive. As membrane technology continues to improve, RO is gaining popularity as a less costly, more energy-efficient desalination technique.

Since 1991, the Authority has closely studied the development of seawater desalination facilities. Early studies evaluated both thermal and membrane processes and concluded that RO would be the most cost-effective desalination technology for this region. Subsequent studies focused on the construction of an RO facility in conjunction with the proposed repowering of the SDG&E South Bay Power Plant. A first year water cost of $1300/AF (1999 dollars) was estimated. Although the project was found to be technically feasible, many of the benefits anticipated from collocating the facility failed to materialize. In 1993, the study concluded that environmental, regulatory, and cost issues combined to make desalinated seawater more expensive than other available water resource options. Since 1993, the Authority has continued to monitor efforts to advance and develop seawater desalination technology into a viable, cost-effective water resource option.

4.5.2 Issues

Economic Considerations

As with other water supply projects, cost remains the primary barrier to project development. However, recent seawater desalination projects in Tampa, and Trinidad, seem to indicate that the cost of seawater desalination, in some site-specific situations, has decreased since the Authority's last seawater desalination study was completed in 1993.

Authority staff has been closely monitoring the progress of the 25 mgd seawater desalination project proposed in Tampa, Florida. The competitive proposal process for the design, construction, and operation of this project gained worldwide attention - with the best and final offer having a first-year water cost (expressed in 1999 dollars) of $560/AF and a 30 year nominal cost of water of $680/AF. The Tampa project includes several factors that contribute to the extraordinarily low water pricing, including:

- Lower feedwater salinity at 26,000 mg/l (average TDS in Tampa Bay) vs. 35,000 mg/l (normal seawater salinity).
- Interruptible power cost at slightly less than $0.04/kilowatt-hour.
- Availability of the power plant's existing cooling water canals for intake and discharge.
- Design modifications to comply with some existing permits.

- Use of large-scale RO trains.
- Economies of scale at the relatively large capacity of 25 mgd.
- Long-term financing over a 30-year contract period.
- Use of tax-exempt private activity bonds.

In Trinidad, a 23-year contract was awarded to build, own, and operate a 28.8 mgd seawater desalination facility for the Water and Sewerage Authority of Trinidad and Tobago. The plant will supply water at a first-year price of $865/AF (1999 dollars).

Although these projects have significantly lower cost then previously identified for San Diego projects, there are concerns relative to their transferability. Both projects possess unique site-specific attributes such as a lower feedwater salinity and extremely competitive power costs that do not provide a comparative cost for a desalination project in San Diego County.

Environmental Constraints

Facility siting constraints can also act as a barrier to project development. Given the environmental sensitivity and land use restrictions associated with most of the San Diego County coastline, it is unlikely that many large-scale desalination facilities could be sited along the coast. Coastal power stations are among the few sites along the coastline where large desalination facilities could likely meet permitting and land use restrictions. Although desalination facilities could be sited farther inland, the expense of pumping seawater and brine concentrate over long distances would add significantly to the cost.

When siting facilities, agencies must also consider the proximity of the site to existing potable water distribution systems. For example, the Authority's distribution system is located several miles from the coast. A large-scale coastal desalination facility would likely require a costly pipeline and pumping system to move product water inland to the Authority's distribution system. Smaller desalination facilities may be able to utilize the local distribution system to serve users along the coast.

Another significant issue affecting the development of seawater desalination facilities is disposal of the brine concentrate produced when fresh water is separated from seawater. For a typical RO seawater desalination facility, the brine concentrate discharge will have a salinity approximately twice that of the source water. Should the concentrate be discharged to the ocean, regulatory agencies are concerned that the high salt concentration could adversely impact the marine environment near the discharge point. Authority studies conducted as part of the South Bay project indicated that the salinity of the concentrate discharge could be reduced by mixing the discharge with another discharge stream, such as treated wastewater or power plant cooling water. In fact, the Tampa project will utilize existing power plant cooling water discharge facilities to dilute concentrate from the desalting plant.

4.5.3 Future Seawater Desalination Supplies

Current projects being developed in Tampa, Florida and Trinidad would seem to indicate that the cost of seawater desalting is at, or very near a point where it should be considered as a viable resource option for San Diego County in the future. Given the current interest in seawater desalination as a resource option and anticipated continued technology improvements, it is reasonable to conclude that at least one seawater desalination facility will be developed in the Authority's service area by 2020.

Given the studies that the Authority has conducted as well as the model that has been established by the upcoming Tampa project, the most likely location for a seawater desalination facility (>20 mgd) along the San Diego County coastline would be at or near an existing coastal power station. The primary reasons for this include:

- The availability of the power plant intake and discharge facilities, particularly so that brine discharge can be mixed with the cooling water discharge to blend down the high salinity of the brine.
- Locating a significant electrical load in close proximity to the power plant, thus minimizing electrical distribution costs.
- The compatible land use offered by a power station site.

Of the two existing power station sites along our coastline (South Bay and Encina), Encina, which is located in the City of Carlsbad, appears to offer the most promise. Encina possesses ocean discharge facilities which should offer an environmentally sensitive, cost-effective means of disposing of the brine from a seawater desalination facility. In addition, the Encina site is located in a part of the Authority's service area where nearby member agencies, at selectively low elevations, would benefit greatly from the development of an additional, drought-resistant local supply. In order to take advantage of economies of scale, it is likely that the minimum anticipated size of a seawater desalination facility developed at Encina would be 25 mgd and potentially on-line by 2020 (See **Table 4-8**).

TABLE 4-8
PROJECTED SEAWATER DESALINATION SUPPLY
(AF/YR)

2005	2010	2015	2020
0	0	0	25,000

4.6 SUMMARY OF LOCAL SUPPLIES

Table 4-9 shows the Authority's projected mix of local water supplies. The estimates for future local supplies included in this section could be even greater depending upon a variety of factors such as, increased funding opportunities, technology

advances and cost-effectiveness of local projects. Local water resources are an important component of the Authority's overall mix of resources and is critical to meeting future demands within the San Diego region.

TABLE 4-9
PROJECTED LOCAL WATER SUPPLIES
(AF/YR)

	2005	2010	2015	2020
Surface Water	85,600	85,600	85,600	85,600
Water Recycling	33,400	45,100	51,800	53,400
Groundwater	31,100	53,500	57,500	59,500
Seawater Desalination	0	0	0	25,000
TOTAL LOCAL SUPPLIES	**150,100**	**184,200**	**194,900**	**223,500**

SECTION 5 - WATER SUPPLY RELIABILITY

As stated in the Act, every urban water supplier shall include, as part of its plan, an assessment of the reliability of its water supply. The water supply and demand assessment must compare the total projected water use with the expected water supply over the next 20 years in five-year increments. The Act also requires an assessment for a single dry year and multiple dry water years. This section presents a summary of the water demands and supplies within the Authority's service area along with the reliability assessment.

5.1 DEVELOPMENT OF PROJECTED WATER RESOURCES MIX

In summary, development of the projected mix of resources to meet future supplies was based on the following factors:

- Update of the Authority's 1997 Water Resources Plan to reflect current conditions
- Local agency input into future projected water recycling and groundwater supplies
- Authority staff technical evaluations of potential new supplies (i.e., seawater desalination)
- Previous actions taken by the Board of Directors regarding imported supplies (discussed in **Section 3**):
  - Authority/IID Conservation and Transfer Agreement
  - Authority/Metropolitan Exchange Agreement
  - Direction to diversify supplies
  - Direction to address Metropolitan issues discussed in **Section 3.1.4**
  - Framework of Key Contract Terms Authority/Metropolitan

Refer to previous sections in this plan for detailed information on derivation of the projected local and imported water supplies contained in the proposed resource mix.

The Act requires that for any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climactic factors, that the agency describe plans to replace that source with alternative sources or water demand management measures. The Authority recognizes the uncertainties regarding imported water supplies from Metropolitan (**Section 3.1.4**) and as stated throughout the 2000 Plan, the Authority is taking steps to reduce dependence on this supply through water transfers and development of local projects (including demand management). The Authority's success in achieving imported water supply reliability depends, in part, on the implementation of the California Colorado River Water Use Plan, legislative efforts to further facilitate water transfers, and the establishment of fair charges for the movement of water through available capacity in existing Metropolitan conveyance facilities. The Authority intends to continue to

actively implement water conservation BMPs within its service area and to pursue other opportunities to secure reliable imported water supplies.

5.2 AVERAGE/NORMAL WATER YEAR ASSESSMENT

Table 5-1 shows the average/normal year assessment, summarizing the total water demands for the Authority through the year 2020 along with the supplies to meet demands. If projected imported and local supplies are developed as indicated, no shortages are anticipated within the Authority's service area in an average year through 2020. The average year demands within the Authority's service area are discussed in **Section 2**. Imported supplies and local supplies are described in **Section 3** and **Section 4**, respectively.

TABLE 5-1
AVERAGE/NORMAL WATER YEAR SUPPLY
AND DEMAND ASSESSMENT
(AF/YR)

LOCAL SUPPLIES	2005	2010	2015	2020
Surface Water	85,600	85,600	85,600	85,600
Water Recycling	33,400	45,100	51,800	53,400
Groundwater	31,100	53,500	57,500	59,500
Seawater Desalination	0	0	0	25,000
IMPORTED SUPPLIES				
IID Water Transfer	80,000	180,000	200,000	200,000
Firm Supply from Metropolitan[1]	303,630	303,630	303,630	303,630
Other Competitive Imported Sources	172,370	65,470	73,470	85,870
TOTAL PROJECTED SUPPLIES	706,100	733,300	772,000	813,000
TOTAL ESTIMATED DEMANDS	706,100	733,300	772,000	813,000
DIFFERENCE	0	0	0	0

[1]Firm supply from Metropolitan is based on the Authority's existing preferential right at Metropolitan.

5.3 DRY WATER YEAR ASSESSMENT

The dry year assessment is shown in **Table 5-2** and includes demands and supplies during a single and multiple dry water years. The Act requires an estimate of the minimum water supply available during each of the next three water years. Therefore the estimated demands and supplies for multiple dry years are reflective of years 2001, 2002 and 2003. The anticipated dry-year projected demands and supplies in year 2010 were utilized for the single dry-year analysis. The year 2010 is being utilized in order to show the results of local and imported water supply development over the next ten years.

TABLE 5-2
DRY WATER YEAR SUPPLY AND DEMAND ASSESSMENT
(AF/YR)

	Single Dry Water Year (2010)	Multiple Dry Years		
		Year 1 2001	Year 2 2002	Year 3 2003
LOCAL SUPPLIES				
Surface Water and Groundwater	38,100	40,100	38,100	53,500
Water Recycling	45,100	14,300	19,200	25,200
Groundwater Recovery	34,900	6,900	10,500	10,500
Seawater Desalination	0	0	0	0
IMPORTED SUPPLIES				
IID Water Transfer	180,000	0	20,000	40,000
Firm Supply from Metropolitan	303,630	303,630	303,630	303,630
Other Competitive Imported Sources[1]	185,870	341,870	328,270	299,870
TOTAL PROJECTED SUPPLIES	787,600	706,800	719,700	732,700
TOTAL ESTIMATED DRY YEAR DEMANDS	787,600	706,800	719,700	732,700
DIFFERENCE	0	0	0	0

[1]Metropolitan projects that it will have at least 2.1 MAF/YR of available dry-year supplies during this next 3- year period.

If projected imported and local supplies are developed as indicated, no shortages are anticipated within the Authority's service area in the dry-year scenarios analyzed. A more detailed discussion on the issues facing implementation of local supplies is contained in **Section 4**. The factors effecting reliability of imported supplies from Metropolitan and the Authority's efforts at securing other reliable sources of imported water through transfers is addressed in **Section 3**. The Authority's objective is to secure firm supplies to meet dry year demands. At this time we rely on a supply from Metropolitan which, for quantities above our preferential right, is not considered reliable. The Authority's planning direction is to work with our member agencies to increase reliable local supplies and to secure additional cost-competitive and reliable sources of imported supplies.

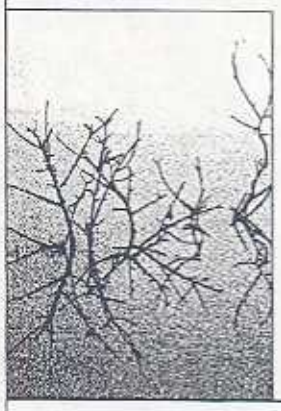
Studies have shown that hot, dry weather may generate urban water demands that are about 7 percent greater than normal and agricultural demands that are about 9 percent greater than normal. These percentages were utilized to generate the dry year demands shown in **Table 5-2**. No extraordinary conservation measures, beyond BMP implementation, are reflected in the demand projections.

The surface and groundwater supplies shown in **Table 5-2** are reflective of supplies available during the 1987-92 drought in years 1990, 1991 and 1992. The supplies available from recycling and groundwater recovery projects are assumed to experience little, if any, reduction in a dry-year. Therefore, estimated normal supply yields are included in the analysis.

As discussed in **Section 6.2.2**, the IID transfer supply is highly reliable in a dry-year scenario and therefore full deliveries are expected as shown in **Table 5-2**. The firm supply from Metropolitan is fixed at 303,630 AF, based on the Authority's existing preferential right to water from Metropolitan (Refer to **Section 3.1.4**).

The additional supplies necessary to meet future demands in dry-years will be obtained through development of additional transfers and purchase of other supplies from Metropolitan. Metropolitan projects that they will have at least 2.1 MAF/YR of dry-year supplies during the 3-year period analyzed in **Table 5-2**. This is contingent upon successful completion of California's Colorado Water Use Plan, as discussed in **Section 3.1.1**, which will enable Metropolitan to maintain a full CRA. However, the California Colorado Water Use Plan is not yet completed or fully funded; similarly, the outcome of the CALFED Framework remains uncertain (**Section 3.1.2**). Moreover, Metropolitan has not addressed key issues raised by the Authority, or produced a strategic plan or rate structure that would allow for a meaningful analysis of proposed Metropolitan water resources planning initiatives. The Authority is actively participating in each of these arenas and will make recommendations to the Authority Board of Directors when and as information is available to achieve the Authority's objective of reliability and cost certainty.

SECTION 6 - SHORTAGE CONTINGENCY ANALYSIS



The Act requires that urban water agencies conduct a water shortage contingency analysis as part of their 2000 plan. This section includes the Authority's analysis, which addresses a catastrophic shortage situation and drought management.

6.1 CATASTROPHIC WATER SHORTAGE

A catastrophic water shortage occurs when a disaster, such as an earthquake, results in insufficient water available to meet the region's needs or eliminates access to imported water supplies. The following is a description of the Authority's Emergency Response Plan (ERP) and Emergency Storage Project (ESP), both developed in order to protect public health and safety and to prevent or limit economic damage that could occur from a severe shortage of water supplies.

6.1.1 Emergency Response Plan

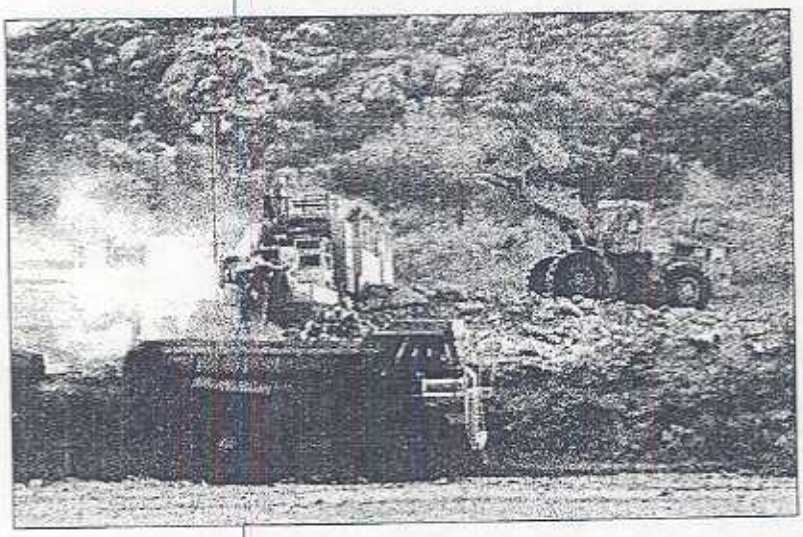
The purpose of the Authority's ERP is to provide staff with the information necessary to respond to an emergency situation that results in severe damage to the Authority's water distribution system or impedes the Authority's ability to provide reliable water service to its member agencies. The ERP describes the emergency situations and incidents that will trigger the activation of the Authority's ERP and Emergency Operations Center (EOC) in addition to providing direction and strategies for responding to a crisis situation. The Authority's ERP includes:

- Authorities, policies, and procedures associated with emergency response activities;
- EOC activities - including EOC activation and deactivation guidelines;
- Multi-agency and multi-jurisdictional coordination, particularly between the Authority, its member agencies, and Metropolitan in accordance with Standardized Emergency Management System (SEMS) guidelines;
- Emergency staffing, management, and organization required to assist in mitigating any significant emergency or disaster;
- Mutual Aid Agreements and Covenants which outline the terms and conditions under which mutual aid assistance will be provided;
- Pre-emergency planning as well as emergency operations procedures.

In addition, the Authority's ERP Manual uses a step-by-step approach to emergency response planning by providing such procedural tools as action checklists, resource and information lists, personnel rosters, and listings of established policies and procedures. The Authority's plan parallels many of the same plan components contained in the Unified San Diego County Emergency Services Organization's "Operational Area Emergency Plan" (OAEP). In turn, the OAEP serves to support and supplement the Authority's ERP.

6.1.2 Authority's Emergency Storage Project

In 1998 the Authority's Board approved implementation of the ESP, to reduce the risk of potentially catastrophic damages that could result from a prolonged interruption of imported water due to earthquake, drought or other disaster. As described in **Section 1.2.6**, the ESP is a system of reservoirs, pipelines and other facilities that will work together to store and move water around the county in the event of a natural disaster. The project will also provide an additional 90,100 AF of stored water. Combined with the storage space already dedicated to emergency use, the additional storage capacity is projected to meet the county's emergency needs through at least 2030.



In sizing the ESP, the Authority assumed a 75 percent level of service to all Authority member agencies during an outage and full implementation of the water conservation BMPs. The allocation of the ESP supplies to the Authority's member agencies in a prolonged outage situation without imported supplies is calculated as follows:

1. Estimate the duration of the emergency. (i.e., time to repair damaged pipeline(s)).

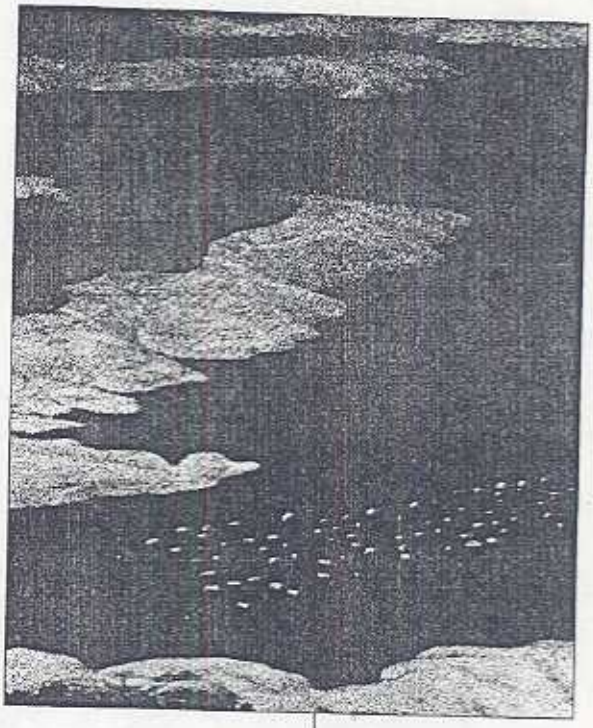
2. Calculate the total estimated annual M&I and agricultural water demand for each member agency for the duration of the emergency.

3. Determine demands at 75 percent level of service for M&I customers and 50 percent level of service for agricultural customers. (Agriculture has agreed to a reduction in deliveries at twice the rate of system-wide demands during an emergency in order to pay a reduced Special Agricultural Water Rate (SAWR) to the Authority.)

4. After determining the appropriate level of service demand for the agency, subtract the amount of water that the agency can self supply from local sources during the emergency up to a limit of four average months of demand. Local supplies include groundwater, recycled water and local surface water.

5. The remaining unmet demand is the agency's need for water from the ESP. This supply coupled with any local supplies, will maintain a 75 percent level of service to M&I customers in a catastrophic emergency.

Additionally, if there is extra water available in the ESP, from the reduced level of service provided to SAWR customers, such supplies are reallocated to commercial and industrial customers to limit economic damages during a catastrophic shortage situation. Construction has begun on Phase 1 of the ESP with completion of the entire project expected in 2010. Supplies from the ESP can also be utilized in a prolonged drought situation where imported and local supplies are not adequate to meet 75 percent of the Authority's member agencies M&I demands. In July 2000, the Authority Board adopted a Memorandum of Understanding regarding the ESP, which states that the Authority will develop a Water Shortage Management Plan for Authority water, including supplies from the ESP.



6.2 DROUGHT MANAGEMENT

6.2.1 Background – 1987-1992 Drought

The last major drought in California occurred between 1987 and 1992 and caused severe water supply shortages throughout the state. During early March 1991, at the peak of the drought, Metropolitan's SWP supplies were reduced by 90 percent. Subsequently, Metropolitan voted to impose a 50 percent reduction in imported deliveries to the Authority. The results of Metropolitan's cutback would have been devastating to the Authority's businesses and residents except for the miracle March rainfall that occurred later that month. These rains allowed the SWP to reduce its level of cutback to 80 percent, and Metropolitan later rolled back its call for reduction from 50 percent to 31 percent. Even at this level the Authority was impacted much more than other Metropolitan members, because of its high dependence upon imported supplies from Metropolitan. Other agencies with more local supplies, particularly groundwater agencies faced retail cutbacks of only 10 to 20 percent. Metropolitan had the ability to purchase additional supplies from the State Water Bank to reduce the Authority's level of shortage, but chose not to do so. The Authority purchased State Water Bank supplies at a cost of over $8.5 million on its own behalf and this, coupled with maximizing local surface supplies kept retail cutback to the 20 percent level. This level of cutback lasted a year until in April 1992 when the level of reduction was reduced to a voluntary level of conservation.

In a water shortage emergency, it is reasonably likely that the Authority's Board of Directors would declare an emergency and allocate its water to meet requirements for human consumption, sanitation and fire protection. However, in addition to planning to meet such emergency needs at the time that such conditions might exist, the Board of Directors may also determine, as it did during the last drought, to adopt a drought plan that does not invoke Section 350 of the Water Code. Any such drought plan could take into account the differing needs of the Authority's member

agencies. Finally, the Authority, in cooperation and consultation with its member agencies, as water retailers, will be developing rules and regulations for water management and shortage allocation as authorized by the County Water Authority Act. This is discussed further in the following sections.

6.2.2 Plan for Diversifying Supplies

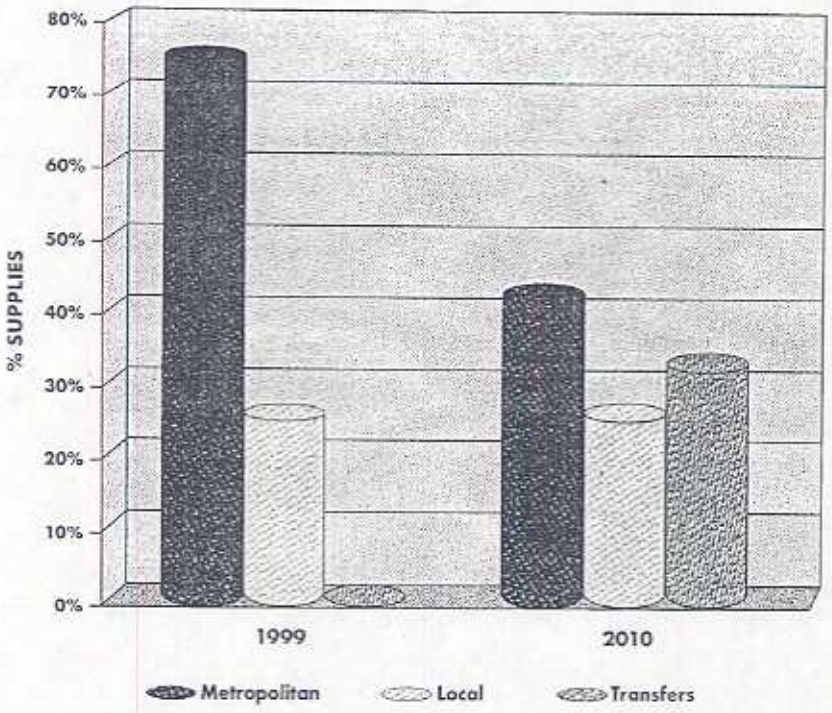
The Authority responded to the 1987-92 drought by developing a comprehensive plan to diversify the regions' water supply. A Water Resources Plan that assessed the availability of traditional local water supplies and identified major new water sources was developed in 1993 to guide the Authority's efforts to ensure a reliable water supply for the region. The plan, updated in 1997, describes the steps the Authority is taking to ensure San Diego County achieves a cost-effective, safe, reliable water supply mix through the year 2015. While recognizing that the Authority will continue to import the majority of its water supply from Metropolitan over the next few years, the plan supports diversification of the Authority's supplies, including, but not limited to, enhanced local water supply programs, core water transfers (such as the Authority/IID transfer of conserved water), other reliable transfers and additional programs to enhance the Authority's supply reliability. The Authority plans to assist and cooperate with its member agencies in the development of these diverse sources of supply.

Consistent with the direction provided in the 1997 plan, the Authority, in 1998, entered into a Water Conservation and Transfer Agreement with the IID, an agricultural district in neighboring Imperial County. As described in detail in **Section 3.2**, the 75-year term Agreement calls for up to 200,000 AF of Colorado River water to be conserved by Imperial Valley growers through the implementation of extraordinary conservation measures. The conserved water will be transferred to the Authority via Metropolitan's CRA, through terms established in a 1998 Contract for the Exchange of Water between the Authority and Metropolitan. This transfer supply will provide increased reliability for the region. During dry years, when water availability is low, the conserved water will be transferred under IID's Colorado River rights, which are among the most senior in the Lower Colorado River Basin. In addition, under the exchange agreement with Metropolitan, the Authority's water acquired from IID will be treated as independently owned local water in the same manner as independently owned local water supplies of other Metropolitan member agencies.

Water recycling projects also provide an excellent "drought-proof" supply of water that is available when other supplies may be reduced. Combining transfers, water recycling, groundwater supplies and potential seawater desalination, the region will have reduced dependence upon a single source and have a mix of supplies that will provide increased reliability in normal years and drought situations.

The graph shown in **Figure 6-1** illustrates how the Authority plans to diversify the regions supply and reduce dependence upon Metropolitan through the development of potential local supplies and water transfers.

FIGURE 6-1
DIVERSIFICATION OF AUTHORITY'S SUPPLY CURRENT AND PROJECTED SOURCES



6.2.3 Metropolitan Water Surplus and Drought Management Plan

Over the next five to ten years, the Authority will continue to import the majority of its water supply from Metropolitan. Accordingly, the reliability of the Authority's water supply is subject to change at the discretion of the Metropolitan Board of Directors. The Authority's shortage contingency analysis for the 2000 Plan assumes that under Metropolitan's Water Surplus and Drought Management Plan (WSDM Plan), adopted by the Metropolitan Board of Directors in April 1999, remains unchanged. However, the Authority recognizes that Board actions at Metropolitan could change the terms of the WSDM Plan at anytime and therefore the WSDM Plan cannot be relied upon to ensure the reliability of Authority supplies.

Subject to the foregoing, the WSDM Plan states that in an extreme shortage situation, Metropolitan would implement an allocation plan. The WSDM Plan does not contain a methodology for allocating imported water supplies during an extreme drought situation. Metropolitan plans to adopt an allocation formula as part of the WSDM Plan following approval of a new rate structure in FY2001.

The Authority believes that Metropolitan cannot change Section 135 of Metropolitan's Act through the adoption of the WSDM plan or otherwise; and that Section 135 puts a cloud on the reliability of the Authority's water purchases in excess of its preferential right to water. While all parties appear to concur that water code Section 350 would override Section 135 in a situation in which Section 350 is invoked to protect public health and safety, the Authority believes Section 350 cannot be relied upon to validate any WSDM Plan allocation absent concurrence and a waiver by the member agencies who hold preferential rights, most notable the City of Los Angeles. The Authority has proposed the elimination of preferential rights at Metropolitan, but until the cloud of Section 135 is removed, the reliable supply of water the Authority can expect from Metropolitan in a shortage situation is the amount of the Authority's preferential right, which leaves the Authority's position in a shortage situation uncertain.

6.3 SUMMARY

The shortage contingency analysis included in this section demonstrates that the Authority and its member agencies, through the ERP and ESP, are taking actions to prepare for and appropriately handle a catastrophic interruption of water supplies. The analysis also describes actions being taken by the Authority to firm-up its supplies from Metropolitan to provide increased reliability in a drought and reduce if not eliminate shortages.

The Authority does not currently have a shortage allocation plan. The Authority's last allocation plan was adopted in 1994 (Ordinance 94-3) and expired on December 31, 1995. With the majority of supplies within the region still imported from Metropolitan, it is difficult for the Authority to adopt a comprehensive shortage allocation plan without knowing the amount of supplies that will be available from Metropolitan in a shortage situation. The Authority Board will develop a Water Shortage Management Plan that will include the appropriate elements outlined in the Act that are applicable to the Authority. The Authority anticipates adopting the WSMP in FY2002 and will include a shortage contingency plan in the 2005 update of the plan.

2000 Urban Water Management Plan
APPENDICES

CALIFORNIA
URBAN WATER MANAGEMENT PLANNING ACT

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. The Legislature finds and declares as follows:

(a) The waters of the state are a limited and renewable resource subject to ever increasing demands.

(b) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(c) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(d) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(e) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet the needs of both existing customers and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, and reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 7 (commencing with Section 4010) of Part 1 of Division 5 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS

Article 1. General Provisions

10620. (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier after December 31, 1984, shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a).

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.

(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments as described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Interior and exterior water audits and incentive programs for single-family residential, multifamily residential, governmental, and institutional customers.

(B) Enforcement of plumbing fixture efficiency standards and programs to retrofit less efficient fixtures.

(C) Distribution system water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape water audits and incentives.

(F) Landscape water conservation requirements for new and existing commercial, industrial, institutional, governmental, and multifamily developments.

(G) Public information.

(H) School education.

(I) Commercial and industrial water conservation.

(J) New commercial and industrial water use review.

(K) Conservation pricing for water service and conservation pricing for sewer service, where the urban water supplier also provides sewer service.

(L) Landscape water conservation for new and existing single-family homes.

(M) Water waste prohibitions.

(N) Water conservation coordinator.

(O) Financial incentives to encourage water conservation.

(P) Ultra-low-flush toilet replacement.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of such savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, which offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to the council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

(e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.

Article 2.5 Water Service Reliability

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within

which it provides water supplies within 60 days of the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any future, potential customers.

Article 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) An urban water supplier shall file with the department a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of individual plans. The department shall provide a copy of the report to each urban water supplier that

has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be

satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive drought assistance from the state until the urban water management plan is submitted pursuant to Article 3 (commencing with Section 10640) of Chapter 3.

SEC. 2. No appropriation is made and no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution or Section 2231 or 2234 of the Revenue and Taxation Code because the local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act.

RESOLUTION NO 00 – 30

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN DIEGO COUNTY WATER AUTHORITY TO ADOPT THE 2000 URBAN WATER MANAGEMENT PLAN

WHEREAS, California Water Code Section 10610 et. seq., known as the Urban Water Management Planning Act mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an urban water management plan (Plan), the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, the San Diego County Water Authority ("Authority"), as the regional wholesale agency, delivers water supplies to a population of over 2.8 million; and

WHEREAS, the Plan shall be periodically reviewed at least once every five years, and that the Authority shall make any amendments or changes to its Plan which are indicated by the review; and

WHEREAS, the Plan must be adopted by December 31, 2000, after public review and hearing, and filed with the California Department of Water Resources within thirty days of adoption; and

WHEREAS, the Authority has therefore, prepared and circulated for public review a draft 2000 Urban Water Management Plan (2000 Plan), and a properly noticed public hearing regarding said 2000 Plan was held by the Authority on October 26, 2000; and

WHEREAS, the Authority did prepare and shall file said 2000 Plan with the California Department of Water Resources.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the San Diego County Water Authority as follows:

1. That the above recitals are true and correct.

2. The Authority's 2000 Plan is hereby adopted and the General Manager is hereby authorized and directed to file the 2000 Plan with the California Department of Water Resources within thirty days after this date.

3. The General Manager is hereby authorized and directed to implement the 2000 Plan, which includes, but is not limited to the following:

   a. Within the policies established by the Board, coordinate with and assist where

necessary the Authority's member agencies in implementation of water conservation programs and development of water recycling, groundwater and seawater desalination projects as set forth in the 2000 Plan;

b. Evaluate and recommend to the Board additional supplies necessary to diversify the Authority's imported water supplies identified in the 2000 Plan; and

c. Develop, in coordination with the member agencies, a Water Shortage Management Plan as set forth in the 2000 Plan and present it to the Board for approval prior to the 2005 update to the 2000 Plan.

PASSED, APPROVED AND ADOPTED, this 16th day of November, 2000.

AYES: Unless noted below, all Directors voted aye.

NOES:

ABSTAIN:

ABSENT: Bowersox, Christensen, Jaeschke, Leach, Lewis, McMillan, Mason, Newton, Poole, Thompson, Tinker and Watton

Joseph Parker, Chairman
Board of Directors

ATTEST:

Francesca M. Krauel, Secretary
Board of Directors

I, Janet R. Maltman, Board Secretary of the Board of Directors of the San Diego County Water Authority, do hereby certify that the above and foregoing is a full, true and correct copy of said Resolution No. 00-30 of said Board and that the same has not been amended or repealed.

Janet R. Maltman
Board Secretary

APPENDIX C

DWR 2000 Urban Water Management Plan Checklist

Section(s) In Plan	Page # In Plan	Section of Law	Items to address
1.2	1-2	10642	Make plan available for public inspection before its adoption.
1.2	1-2		Adopt plan as prepared or as modified after the public hearing.
1.2	1-2	10620 (d) (2)	Coordinate the preparation of its plan with other appropriate agencies, including direct and indirect suppliers, wastewater, groundwater, and planning agencies (refer to Section 10633).
1.5.3	1-10	10631 (a)	Provide current and projected population in 5-year increments to 20 years.
1.5.2	1-9		Describe the climate and other demographic factors.
3.4, 4.6	3-27, 4-33	10631 (b)	Identify and quantify the existing and planned sources of water available in 5-year increments to 20 years.
3.2, 3.3	3-19, 3-25	10631 (d)	Describe opportunities for exchanges or transfers of water on short-term or long-term basis.
2.3	2-3	10631 (e) (1)	Quantify current and past water use in 5-year increments to 20 years.
2.3	2-4	10631 (e) (2)	Identify projected water uses among water use sectors in 5-year increments to 20 years.
5	5-1	10631 (c)	Describe average, single dry and multiple dry water year data.
5.1	5-1		Describe any plans to replace inconsistent water sources.
5.3	5-3	10632 (b)	Provide minimum water supply estimates based on driest three-year historic sequence.
5	5-1	10631 (c)	Describe the reliability of water supply.
5.3	5-3		Describe the vulnerability of water supply to seasonal or climatic shortage.
4.3.5	4-21	10633 (a)	Describe the wastewater collection and treatment systems in the supplier's service area.
4.3.5	4-21		Quantify the amount of wastewater collected and treated in the supplier's service area.
Apndx. E Table E-2	Apndx. E Table E-2		Describe the methods of wastewater disposal in the supplier's service area.
Apndx. E Table E-1	Apndx. E Table E-1	10633 (b)	Describe the type, place, and quantity of recycled water currently used in the supplier's service area.
4.3.4 Apndx. E Table E-1	4-20 Apndx. E Table E-1	10633 (c) (d)	Describe and quantify potential uses of recycled water in 5-year increments to 20 years.

Section(s) In Plan	Page # In Plan	Section of Law	Items to address
4.3.2	4-11		Describe the technical and economic feasibility of serving the potential users of recycled water.
4.3.3	4-16	10633 (e)	Describe the actions that may be taken to encourage recycled water use.
4.3.4 Apndx. E Table E-1	4-20 Apndx. E Table E-1	10633 (e)	Provide the projected acre-feet results of recycled water used per year.
4.3.3	4-20	10633 (f)	Provide a plan for optimizing the use of recycled water in the supplier's service area.
4.3.3	4-16		Provide actions to facilitate the installation of dual distribution systems and to promote recirculating uses.
5	5-1	10635 (a)	Provide an assessment of the reliability of the water supplier's water service to its customers during normal, single dry, and multiple dry water years.
5.2	5-2		Compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in 5-year increments (refer to 10631 (c)).
5	5-1		Compare normal, single dry, and multiple dry water year projected water supply sources available to the water supplier with the normal, single dry, multiple dry water year projected water uses (refer to 10631 (c)).
6.1	6-1	10632 (c)	Provide actions a water supplier will take to prepare for a catastrophe.
*	*	10632 (h)	Provide a copy of a draft water shortage contingency resolution or ordinance.
*	*	10632 (a)	Provide water shortage stages of action, including up to a 50 percent reduction outlining specific water supply conditions at each stage.
*	*	10632 (d)	Provide mandatory prohibitions.
*	*	10632 (f)	Provide penalties or charges.
*	*	10632 (e)	Provide consumption reduction methods.
*	*	10632 (g)	Provide an analysis of the impacts on the water supplier revenues and expenditures.
*	*		Provide measures to overcome revenue and expenditure impacts.
*	*	10632 (i)	Provide a mechanism for determining actual reductions in water use.

*Refer to Section 6.2, page 6-3 in the 2000 Plan. Metropolitan Water District's Water Surplus and Drought Management Plan does not currently contain a methodology for allocating imported water supplies during an extreme drought situation. With the majority of supplies within the region still imported from Metropolitan, it is difficult for the Authority to adopt a comprehensive shortage allocation plan at this time. Metropolitan anticipates adoption of an allocation formula following approval of a new rate structure in FY 2001. The Authority will then develop a Water Shortage Management Plan (WSMP) that will include the appropriate elements outlined in the Act that are applicable to the Authority. The Authority anticipates adopting the WSMP in FY 2002 and will include a shortage contingency plan in the 2005 update of the Urban Water Management Plan.

BEST MANAGEMENT PRACTICES REPORT

SAN DIEGO COUNTY WATER AUTHORITY
WHOLESALE REPORT

FISCAL YEAR 1999

Wholesale Agency Report includes:

Water Supply & Reuse
And
All required BMPs for a Wholesale Agency

BMP 3. System Water Audits
BMP 7. Public Information Programs
BMP 8. School Education Programs
BMP 10. Wholesale Agency Assistance
BMP 11. Conservation Pricing
BMP 12. Conservation Coordinator

Best Management Practices Report Filing

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California Urban Water Conservation Council

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Memorandum of Understanding

Welcome Rose Smutko, to San Diego County Water Authority's own BMP Report Filing HOME page dated October 27, 2000. If this is your first visit, we recommend reviewing the FAQs and the What to do First sections.

- **BACKGROUND / ONE-TIME FORMS:**

  Signatory / Reporting Unit Profile

- **ANNUAL BMP AND REPORT FORMS: Complete Annually / File Biennially**

  Select any VIEWER icon to enter data or edit your annual report. Select the linked % number to view your report form with a status report which includes any missing or invalid responses.

Annual BMP and Report Form Status Overview

REPORT FORM NAME	Year: 1999		Year: 2000	
	Form With Status Report	Input Form	Form With Status Report	Input Form
Water Supply & Reuse	NA		NA	
BMP 03: System Water Audits, Leak Detection and Repair	Submitted to CUWCC 10/27/2000		Submitted to CUWCC 10/27/2000	
BMP 07: Public Information Programs	Submitted to CUWCC 10/27/2000		Submitted to CUWCC 10/27/2000	
BMP 08: School Education Programs	Submitted to CUWCC 10/27/2000		Submitted to CUWCC 10/27/2000	
BMP 10: Wholesale Agency Assistance Programs	Submitted to CUWCC 10/27/2000		Submitted to CUWCC 10/27/2000	
BMP 11: Conservation Pricing	Submitted to CUWCC 10/27/2000		Submitted to CUWCC 10/27/2000	
BMP 12: Conservation Coordinator	Submitted to CUWCC 10/27/2000		Submitted to CUWCC 10/27/2000	

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BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	**1999**

A. Implementation

?	1. Has your agency completed a pre-screening system audit for this reporting year?	Yes ○ No ◉
?	2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production: Unit Conversion Calculator	
	a. Determine metered sales (AF)	478029.7
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	450709
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. *(This number will automatically calculate when you Save the Session)*	1.06
?	3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	Yes ◉ No ○
	4. Did your agency complete a full-scale audit during this report year?	Yes ○ No ◉
?	5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	Yes ○ No ◉
	6. Does your agency operate a system leak detection program?	Yes ◉ No ○

a. If yes, describe the leak detection program:
AQUEDUCT PROTECTION PROGRAM. The Water Authority strategically shuts down and drains sections of its 274 miles of pipeline. Engineers enter the pipeline and inspect them internally. When deterioration is discovered, the Water Authority repairs or replaces the affected sections of pipe before they can fail. Since the program was initiated in 1990, no section of inspected pipeline has failed.

B. Survey Data

	1. Total number of miles of distribution system line:	274
	2. Number of miles of distribution system line surveyed:	25

C. System Audit / Leak Detection Program Expenditures

		This Year	Next Year
?	1. Budgeted Expenditures	800000	610000

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BMP 07: Public Information Programs

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	**1999**

A. Implementation

1.	1. Does your agency maintain an active public information program to promote and educate customers about water conservation?	Yes (●) No ( )

a. If YES, describe the program and how it's organized. The Water Authority provides informational materials – brochures, magnets, magazine article reprints – that promote conservation as a way of life in San Diego County. These materials are distributed at information fairs, public events, community meetings and by request via phone or other public contact. The conservation message is conveyed by the Authority's Speakers Bureau in presentations to a wide range of audiences throughout the county. Water Authority newsletters, press releases and letters to the editor of local publications also deliver conservation messages.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	Yes ( ) No (●)	0
b. Public Service Announcement	Yes (●) No ( )	1
c. Bill Inserts / Newsletters / Brochures	Yes (●) No ( )	22
d. Bill showing water usage in comparison to previous year's usage	Yes ( ) No (●)	
e. Demonstration Gardens	Yes (●) No ( )	1
f. Special Events, Media Events	Yes (●) No ( )	1
g. Speaker's Bureau	Yes (●) No ( )	12
h. Program to coordinate with other government agencies, industry and public interest groups and media	Yes (●) No ( )	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1460839	887605

2. Actual Expenditures	918120	
1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?		Yes ○ No ◉
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."		

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BMP 08: School Education Programs

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	**1999**

A. Implementation

1. Has your agency implemented a school information program to promote water conservation? — Yes ◉ No ○

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	Yes ◉ No ○	241	23243	6
Grades 4th-6th	Yes ◉ No ○	518	38534	59
Grades 7th-8th	Yes ◉ No ○	0	1223	16
High School	Yes ◉ No ○	0	2127	27

3. Did your Agency's materials meet state education framework requirements? — Yes ◉ No ○

4. When did your Agency begin implementing this program? (Year must be four digit mm/dd/yyyy) — 09/01/1990

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	400554	406167
2. Actual Expenditures	361958	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? — Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

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Memorandum of Understanding

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	**1999**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	Yes ◉ No ○	32000	18960	8	Yes ◉ No ○	400554	361958
2	Yes ○ No ◉			9	Yes ◉ No ○	100000	74148
3	Yes ○ No ◉			10	Yes ◉ No ○	$1,800,664 ↑	$1,752,904 ↓
4	Yes ○ No ◉			11	Yes ○ No ◉		
5	Yes ◉ No ○	50000	27517	12	Yes ◉ No ○	85000	85000
6	Yes ◉ No ○	20000	20000	13	Yes ○ No ◉		
7	Yes ◉ No ○	$1,460,839 ↓	918120	14	Yes ◉ No ○	700000	649516

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	Yes ◉ No ○
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	Yes ◉ No ○
c. Has your agency conducted or funded workshops addressing:	

	1) ULFT replacement	Yes ◉ No ○
	2) Residential retrofits	Yes ◉ No ○
	3) Commercial, industrial, and institutional surveys	Yes ◉ No ○
	4) Residential and large turf irrigation	Yes ◉ No ○
	5) Conservation-related rates and pricing	Yes ○ No ◉

3. Staff Resources by BMP

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	Yes ◉ No ○	1	8	Yes ◉ No ○	3
2	Yes ○ No ◉		9	Yes ◉ No ○	1
3	Yes ○ No ◉		10	Yes ◉ No ○	16
4	Yes ◉ No ○	1	11	Yes ○ No ◉	
5	Yes ◉ No ○	1	12	Yes ◉ No ○	1
6	Yes ◉ No ○	1	13	Yes ○ No ◉	
7	Yes ◉ No ○	8	14	Yes ◉ No ○	1

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	Yes ◉ No ○	8	Yes ◉ No ○
2	Yes ○ No ◉	9	Yes ◉ No ○
3	Yes ○ No ◉	10	Yes ◉ No ○
4	Yes ○ No ◉	11	Yes ○ No ◉
5	Yes ◉ No ○	12	Yes ◉ No ○
6	Yes ◉ No ○	13	Yes ○ No ◉
7	Yes ◉ No ○	14	Yes ◉ No ○

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1800664	1804466
2. Actual Expenditures	1752904	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

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BMP 11: Conservation Pricing

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	**1999**

A. Implementation

	Rate Structure Data Volumetric Rates for Water Service by Customer Class	
	1. Residential	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	2. Commercial	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	3. Industrial	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	4. Institutional / Government	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	5. Irrigation	
	a. Water Rate Structure	Uniform

	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	6. Other	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 208009685
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 67656415

B. Conservation Pricing Program Expenditures

		This Year	Next Year
?	1. Budgeted Expenditures	0	0
?	2. Actual Expenditures	0	

C. "At Least As Effective As"

?	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	Yes ○ No ◉
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

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BMP 12: Conservation Coordinator

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	**1999**

A. Implementation

1. Does your Agency have a conservation coordinator?	Yes ◉ No ○
2. Is this a full-time position?	Yes ◉ No ○
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	Yes ○ No ○

4. Partner agency's name: N/A

5. If your agency supplies the conservation coordinator:

a. What percent is this conservation coordinator's position? 100

b. Coordinator's Name: Bill Jacoby

c. Coordinator's Title: Water Resources Manager

d. Coordinator's Experience and Number of Years: 16 years in program implementation & policy making.

e. Date Coordinator's position was created (mm/dd/yyyy): 07/01/1988

6. Number of conservation staff, including Conservation Coordinator: 5

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	85500	95000
2. Actual Expenditures	85500	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

BEST MANAGEMENT PRACTICES REPORT

SAN DIEGO COUNTY WATER AUTHORITY
WHOLESALE REPORT

FISCAL YEAR 2000

Wholesale Agency Report includes:

Water Supply & Reuse
And
All required BMPs for a Wholesale Agency

BMP 3. System Water Audits
BMP 7. Public Information Programs
BMP 8. School Education Programs
BMP 10. Wholesale Agency Assistance
BMP 11. Conservation Pricing
BMP 12. Conservation Coordinator

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BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: San Diego County Water Authority	Submitted to CUWCC 10/27/2000	Year: 2000

A. Implementation

?	1. Has your agency completed a pre-screening system audit for this reporting year?	Yes ○ No ◉
?	2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production: Unit Conversion Calculator	
	a. Determine metered sales (AF)	589022
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	601627.9
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. *(This number will automatically calculate when you Save the Session)*	0.98
?	3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	Yes ◉ No ○
	4. Did your agency complete a full-scale audit during this report year?	Yes ○ No ◉
?	5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	Yes ○ No ◉
	6. Does your agency operate a system leak detection program?	Yes ◉ No ○

If yes, describe the leak detection program:

AQUEDUCT PROTECTION PROGRAM. The Water Authority strategically shuts down and drains sections of its 274 miles of pipeline. Engineers enter the pipeline and inspect them internally. When deterioration is discovered, the Water Authority repairs or replaces the affected sections of pipe before they can fail. Since the program was initiated in 1990, no section of inspected pipeline has failed.

B. Survey Data

	1. Total number of miles of distribution system line:	274
	2. Number of miles of distribution system line surveyed:	28

C. System Audit/Leak Detection Program Expenditures

		This Year	Next Year
?	1. Budgeted Expenditures	610000	610000

2. Actual Expenditures	610000

"At least as Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

Note on #2
Value includes pre-deliveries to be sold in later years.

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BMP 07: Public Information Programs

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	2000

A. Implementation

1.	Does your agency maintain an active public information program to promote and educate customers about water conservation?	Yes ◉ No ○

a. If YES, describe the program and how it's organized. The Water Authority provides informational materials – brochures, magnets, magazine article reprints – that promote conservation as a way of life in San Diego County. These materials are distributed at information fairs, public events, community meetings and by request via phone or other public contact. The conservation message is conveyed by the Authority's Speakers Bureau in presentations to a wide range of audiences throughout the county. Water Authority newsletters, press releases and letters to the editor of local publications also deliver conservation messages.

2. Indicate which and how many of the following activities are included in your public information program.

	Public Information Program Activity	Yes/No	Number of Events
	a. Paid Advertising	Yes ○ No ◉	
	b. Public Service Announcement	Yes ◉ No ○	1
	c. Bill Inserts / Newsletters / Brochures	Yes ◉ No ○	26
	d. Bill showing water usage in comparison to previous year's usage	Yes ○ No ◉	
	e. Demonstration Gardens	Yes ◉ No ○	1
	f. Special Events, Media Events	Yes ◉ No ○	2
	g. Speaker's Bureau	Yes ◉ No ○	16
	h. Program to coordinate with other government agencies, industry and public interest groups and media	Yes ◉ No ○	

B. Conservation Information Program Funding

		This Year	Next Year
1.	Budgeted Expenditures	887605	886120

2. Actual Expenditures	908369

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

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BMP 08: School Education Programs

Reporting Unit: San Diego County Water Authority	Submitted to CUWCC: 10/27/2000	Year: 2000

A. Implementation

1. Has your agency implemented a school information program to promote water conservation? — Yes ◉ No ○

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	Yes ◉ No ○	241	23243	6
Grades 4th-6th	Yes ◉ No ○	518	38534	59
Grades 7th-8th	Yes ◉ No ○	0	1223	16
High School	Yes ◉ No ○	0	2127	27

3. Did your Agency's materials meet state education framework requirements? — Yes ◉ No ○

4. When did your Agency begin implementing this program? (Year must be four digit mm/dd/yyyy) — 09/01/1990

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	406167	446783
2. Actual Expenditures	398153	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? — Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

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Memorandum of Understanding

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	2000

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	Yes ◉ No ○	32000	21559	8	Yes ◉ No ○	400554	361958
2	Yes ○ No ◉			9	Yes ◉ No ○	100000	64147
3	Yes ○ No ◉			10	Yes ◉ No ○	$1,804,466 ↑	$1,591,321 ↓
4	Yes ○ No ◉			11	Yes ○ No ◉		
5	Yes ◉ No ○	50000	30950	12	Yes ◉ No ○	95000	95000
6	Yes ◉ No ○	21000	31250	13	Yes ○ No ◉		
7	Yes ◉ No ○	887605	908369	14	Yes ◉ No ○	700000	573042

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	Yes ◉ No ○
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	Yes ◉ No ○
c. Has your agency conducted or funded workshops addressing:	

	1) ULFT replacement	Yes ◉ No ○
	2) Residential retrofits	Yes ◉ No ○
	3) Commercial, industrial, and institutional surveys	Yes ◉ No ○
	4) Residential and large turf irrigation	Yes ◉ No ○
	5) Conservation-related rates and pricing	Yes ○ No ◉

3. Staff Resources by BMP

BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP	BMP	Qualified Staff Available for BMP?	No. FTE Staff Assigned to BMP
1	Yes ◉ No ○	1	8	Yes ◉ No ○	3
2	Yes ○ No ◉		9	Yes ◉ No ○	1
3	Yes ○ No ◉		10	Yes ◉ No ○	16
4	Yes ◉ No ○	1	11[1]	Yes ○ No ◉	
5	Yes ◉ No ○	1	12	Yes ◉ No ○	1
6	Yes ◉ No ○	1	13	Yes ○ No ◉	
7	Yes ◉ No ○	8	14	Yes ◉ No ○	1

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	Yes ◉ No ○	8	Yes ◉ No ○
2	Yes ○ No ◉	9	Yes ◉ No ○
3	Yes ○ No ◉	10	Yes ◉ No ○
4	Yes ○ No ◉	11	Yes ○ No ◉
5	Yes ◉ No ○	12	Yes ◉ No ○
6	Yes ◉ No ○	13	Yes ○ No ◉
7	Yes ◉ No ○	14	Yes ◉ No ○

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	1804466	1757302
2. Actual Expenditures	1591321	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? Yes ○ No ◉

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

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BMP 11: Conservation Pricing

Reporting Unit: San Diego County Water Authority	Submitted to CUWCC 10/27/2000	Year: 2000

A: Implementation

◈	Rate Structure Data Volumetric Rates for Water Service by Customer Class	
	1. Residential	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	2. Commercial	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	3. Industrial	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	4. Institutional / Government	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	5. Irrigation	
	a. Water Rate Structure	Uniform

	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 0
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 0
	6. Other	
	a. Water Rate Structure	Uniform
	b. Sewer Rate Structure	Service Not Provided
	c. Total Revenue from Volumetric Rates	$ 251642169
	d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$ 86479615

B. Conservation Pricing Program Expenditures

		This Year	Next Year
?	1. Budgeted Expenditures	0	0
?	2. Actual Expenditures	0	

C. "At Least As Effective As"

?	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	Yes ○ No ◉
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

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BMP 12: Conservation Coordinator

Reporting Unit:	Submitted to CUWCC	Year:
San Diego County Water Authority	10/27/2000	2000

A. Implementation

	1. Does your Agency have a conservation coordinator?	Yes (●) No ( )
	2. Is this a full-time position?	Yes (●) No ( )
	3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	Yes ( ) No ( )
	4. Partner agency's name:	
	5. If your agency supplies the conservation coordinator:	
	a. What percent is this conservation coordinator's position? 100	
	b. Coordinator's Name: Bill Jacoby	
	c. Coordinator's Title: Water Resources Manager	
	d. Coordinator's Experience and Number of Years: 16 years in program implementation & policy making	
	e. Date Coordinator's position was created (mm/dd/yyyy): 07/01/1988	
	6. Number of conservation staff, including Conservation Coordinator. 5	

B. Conservation Staff Program Expenditures

		This Year	Next Year
?	1. Budgeted Expenditures	95000	104000
?	2. Actual Expenditures	95000	

C. "At Least As Effective As"

?	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	Yes ( ) No (●)
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

APPENDIX E
RECYCLED WATER AND GROUNDWATER PROJECTED SUPPLIES

Table E-1

Existing and Projected Recycled Water Supplies

(Acre-Feet/Year)

Purveyor	Supply Source	Demand Agencies Committed to Serve				Type of Reuse
	Treatment Plant/Agency	2005	2010	2015	2020	
Carlsbad MWD		4800	5000	5000	5000	
	Carlsbad WRP/Carlsbad MWD	2800	3000	3000	3000	Landscape
	Gafner WRF/Leucadia CWD	500	500	500	500	Landscape, Agriculture
	Meadowlark WRF/Vallecitos WD	1500	1500	1500	1500	Landscape, Agriculture
Del Mar, City of	San Elijo WRF/San Elijo JPA	150	150	150	150	Landscape
Escondido, City of	Hale Avenue RRF/WRF/City of Escondido	2700	3300	4200	4200	Landscape, Agriculture, Industrial
Fallbrook PUD	Fallbrook Plant #1/Fallbrook PUD	800	850	850	850	Landscape, Agriculture
Oceanside, City of	San Luis Rey WWTP/City of Oceanside	300	2700	2700	2700	Landscape, Environmental
Olivenhain MWD		1800	2800	3800	3800	
	4-S Ranch WWTP/Olivenhain MWD	1000	2000	3000	3000	Landscape
	Santa Fe Valley WRF/Olivenhain MWD	500	500	500	500	Landscape, Environmental Enhancement
	Whispering Palms WPCF/Whispering Palms CSD	300	300	300	300	Pasture Irrigation, Environmental Enhancement
Otay WD	R. W. Chapman WRF/OWD & SBWRP/City of SD	4900	6200	6900	7800	Landscape, Environmental
Padre Dam MWD	Padre Dam WRF/Padre Dam MWD	900	900	900	900	Landscape, Indust., Agri., Environmental
USMC Camp Pendleton	Camp Pendleton WWTPs/USMC	800	800	800	800	Landscape
Poway, City of	North City WRP & San Pasqual WRP/City of San Diego	2300	2700	2700	2700	Landscape, Agriculture
Ramona MWD	Santa Maria & San Vicente WPCF/Ramona MWD	1300	1300	1300	1300	Landscape, Agri., Environmental Enhancement
Rincon del Diablo MWD	Hale Avenue RRF/WRF/City of Escondido	400	400	400	400	Landscape, Industrial, Agriculture
San Diego, City of		10500	16100	19600	19700	
	North City WRP/City of San Diego	8000	13000	15000	15000	Landscape, Industrial
	San Pasqual WRP/City of San Diego	1500	2000	3500	3500	Landscape, Environmental Enhancement
	South Bay WRP/City of San Diego	1000	1100	1100	1200	Landscape, Industrial
San Dieguito WD	San Elijo WRF/San Elijo JPA	700	700	700	700	Landscape
Santa Fe ID		1090	1090	1090	1090	
	San Elijo WRF/San Elijo JPA	450	450	450	450	Landscape
	Rancho Santa Fe WRF/Rancho Santa Fe CSD[1]	340	340	340	340	Environmental Enhancement
	Fairbanks Ranch WRF/Fairbanks Ranch CSD[1]	300	300	300	300	Environmental Enhancement
Valley Center MWD		350	460	1100	1620	
	Lower Moosa Canyon WRF/Valley Center MWD	300	310	800	1120	Landscape, Environmental Enhancement
	Central Valley Area WRPs/Valley Center MWD	50	150	300	500	Landscape, Environmental Enhancement
Vista ID	Shadowridge WRP/Vista ID	300	300	300	300	Landscape
	Total Demand	33450	45110	51850	53370	

[1] Does not offset a municipally-supplied demand.

Abbreviations:

CSD - Community Services District
ID - Irrigation District
MWD - Municipal Water District
PUD - Public Utility District
WD - Water District
RRF - Resource Recovery Facility
WRF - Water Reclamation Facility
WRP - Water Reclamation Plant
WWTP - Wastewater Treatment Plant
WPCF - Water Pollution Control Facility

Table E-2
Wastewater Treatment
(Million Gallons/Day)

Treatment Plant Name	Agency	Location (City)	Plant Capacity															Average Effluent	Wastewater Disposal
			2000			2005			2010			2015			2020				
			P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	TDS (mg/l)	
4S Ranch WWTP	OMWD	Rancho Bernardo, CA	0.3	0.3	0.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	925	Ocean
Camp Pendleton WWTPs	USMC	Camp Pendleton, CA	8.0	8.0	0.7	9.0	9.0	3.0	10.0	10.0	5.0	10.0	10.0	8.0	10.0	10.0	10.0	1030	Stream
Encina WPCF/Carlsbad WRP	CMWD	Carlsbad, CA	32.0	32.0	0.0	32.0	32.0	2.0	32.0	32.0	4.0	32.0	32.0	4.0	36.0	36.0	4.0	1300	Ocean
Fairbanks Ranch WPCF	F'banks Ranch CSD	Fairbanks Ranch, CA	0.3	0.3	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	960	Percolation Ponds
Fallbrook Plant #1	Fallbrook PUD	Fallbrook, CA	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	720	Ocean
Gafner WRF	Leucadia CWD	Carlsbad, CA	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1300	Ocean
Hale Avenue RRF/WRP	City of Escondido	Escondido, CA	18.0	18.0	0.0	18.0	18.0	4.5	18.0	18.0	9.0	18.0	18.0	9.0	18.0	18.0	9.0	1000	Ocean
La Salina WWTP	City of Oceanside	Oceanside, CA	5.5	5.5	0.0	5.5	5.5	0.0	5.5	5.5	0.0	5.5	5.5	0.0	5.5	5.5	0.0	897	Ocean
Lower Moosa Canyon WRF	Valley Center MWD	Valley Center, CA	0.3	0.3	0.0	0.3	0.3	0.3	0.4	0.4	0.4	0.7	0.7	0.7	1.0	1.0	1.0	1000	Percolation Ponds
Meadowlark WRF	Vallecitos WD	Carlsbad, CA	2.0	2.0	2.0	2.5	2.5	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1000	Ocean
North City WRP	City of San Diego	San Diego, CA	23.0	23.0	4.0	27.0	27.0	8.0	30.0	30.0	30.0	30.0	30.0	30.0	45.0	45.0	45.0	1100	Ocean
Padre Dam WRF	Padre Dam MWD	Santee, CA	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	900	Ocean
Point Loma WWTP	City of San Diego	San Diego, CA	240.0	0.0	0.0	240.0	0.0	0.0	240.0	0.0	0.0	240.0	0.0	0.0	240.0	0.0	0.0	1850	Ocean
Ralph W. Chapman WRF	Otay WD	Spring Valley, CA	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	850	Ocean
Rancho Santa Fe WPCF	Rancho Santa Fe CSD	Rancho Santa Fe, CA	0.5	0.5	0.0	0.6	0.6	0.0	0.8	0.8	0.0	0.8	0.8	0.0	0.8	0.8	0.0	900	Percolation Ponds
San Elijo WPCF/WRP	San Elijo JPA	Encinitas, CA	5.3	5.3	0.0	5.3	5.3	2.5	5.3	5.3	2.5	5.3	5.3	2.5	5.3	5.3	2.5	1151	Ocean
San Luis Rey WWTP	City of Oceanside	Oceanside, CA	10.7	10.7	0.7	12.1	12.1	2.0	13.5	13.5	5.0	15.5	15.5	5.0	17.4	17.4	5.0	874	Ocean
San Pasqual WRP	City of San Diego	San Diego, CA	1.0	1.0	1.0	3.5	3.5	3.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	1020	Ocean
San Vicente WWTP	Ramona MWD	Ramona, CA	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	612	Stream
Santa Fe Valley WRF	Olivenhain MWD	Rancho Santa Fe, CA	0.0	0.0	0.0 —	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	925	Percolation Ponds
Santa Maria WPCF	Ramona MWD	Ramona, CA	0.8	0.8	0.35	1.1	1.1	0.35	1.5	1.5	0.35	1.5	1.5	1.0	1.5	1.5	1.5	867	Stream
Shadowridge WRP	Vista ID	Vista, CA	1.2	1.2	1.2	1.6	1.6	1.6	2.0	2.0	2.0	2.3	2.3	2.3	2.5	2.5	2.5	898	Ocean
South Bay WRP	City of San Diego	San Diego, CA	0.0	0.0	0.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	1000	Ocean
South Bay WWTP	City of San Diego	San Diego, CA	0.0	0.0	0.0	10.5	10.5	0.0	21.0	21.0	0.0	35.0	35.0	0.0	49.0	49.0	0.0	1100	Ocean
Valley Center WWTP	Valley Center MWD	Valley Center, CA	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1000	Percolation Ponds
Whispering Palms WPCF	Whispering Palms CSD	Whispering Palms, CA	0.4	0.4	0.0	0.4	0.4	0.0	0.4	0.4	0.0	0.4	0.4	0.2	0.4	0.4	0.4	963	Percolation Ponds
Total Capacity			**356.6**	**116.6**	**17.5**	**395.1**	**155.1**	**55.9**	**418.1**	**178.1**	**96.1**	**434.5**	**194.5**	**100.4**	**470.1**	**230.1**	**118.7**		

Abbreviations:

WRF - Water Reclamation Facility
WRP - Water Reclamation Plant
WWTP - Wastewater Treatment Plant
WPCF - Water Pollution Control Facility
RRF - Resource Recovery Facility
TDS - Total Dissolved Solids
mg/l - Milligrams per Liter

P - Primary Treatment
S - Secondary Treatment
T - Tertiary Treatment

TABLE E-3
EXISTING AND PROJECTED GROUNDWATER SUPPLIES (AF/YR)[a]

AGENCY	GROUNDWATER BASIN or LOCATION	2005	2010	2015	2020
Olivenhain MWD	Lower San Dieguito River Basin	0	2,000	2,000	2,000
Fallbrook PUD/Camp Pendleton[1]	Lower Santa Margarita River	0	6,000	6,000	6,000
Helix WD	Santee/El Monte Basin	200	200	200	200
City of Oceanside	Mission Basin	6,500	6,500	6,500	6,500
Otay WD[2]	Otay Mesa area (fractured bedrock and alluvium)	0	0	2,000	2,000
Padre Dam MWD[3]	Santee/El Monte Basin	1,500	3,500	3,500	3,500
USMC Camp Pendleton[4]	San Juan and Lower Santa Margarita	7,900	10,300	10,300	10,300
Ramona MWD	Santa Maria Basin	200	200	200	200
City of San Diego	San Pasqual Valley	1,000	2,000	3,000	4,000
City of San Diego	San Diego Formation[b]	1,000	2,000	3,000	4,000
Sweetwater Authority[5]	Lower Sweetwater Basin/San Diego Fm	4,000	10,000	10,000	10,000
Yuima MWD[6]	Pauma Basin	8,800	8,800	8,800	8,800
Tia Juana Valley CWD	Tijuana Valley/ San Diego Fm	0	2,000	2,000	2,000
TOTAL EXISTING AND PROJECTED[7]		31,100	53,500	57,500	59,500

a This table represents a compilation of information by Authority staff and is based on input from local agencies. As discussed in Section 4.4.2, there are a number of economic, legal and environmental considerations that bear on implementation of any identified project.

b The City of San Diego's proposed development of the San Diego Formation does not include potential uses of the aquifer for seasonal, emergency or long-term storage. Previous studies indicate that the storage potential may be as high as 90,000 acre-feet or more.

1 The Authority assumes that the planned Santa Margarita River Conjunctive Use Project will be implemented by 2010 using reclaimed water to replenish the Lower Santa Margarita Basin.

2 Otay WD is currently studying numerous groundwater development options. Although plans for projects have been not be finalized, it is assumed that Otay WD will develop at least 2,000 AF/YR of groundwater by the year 2015.

3 Groundwater production credited to Padre Dam MWD includes groundwater production of Lakeside and Riverview Water Districts. These two agencies purchase imported water from Padre Dam MWD and supplement that supply with groundwater. The projected production increase is anticipated to come from the possible construction of a small brackish groundwater extraction and treatment operation conceptualized by Padre Dam MWD.

4 It is assumed that recycled water production from Camp Pendleton's wastewater treatment plants is not used to recharge those portions of the basins used for groundwater production.

5 Sweetwater groundwater production comes from its National City Well Field (San Diego Fm.) and its newly constructed Richard A. Reynolds Groundwater Demineralization Facility and a planned 4,000 AFY expansion by 2010.

6 Yumia MWD's average annual groundwater production of roughly 2000 AFY plus 6,800 AF/YR of local water produced by individual mutual water companies served by Yuima MWD.

7 The above groundwater production summary and forecast does not include production by Vista ID from the Warner Basin because the groundwater has been counted as surface water because it is pumped to a surface water reservoir prior to being used. In addition, the City of San Diego has indicated to the Authority that they are developing plans to maximize the development of the City's rights and interests in the following groundwater basins: San Pasqual, Santa Maria, San Dieguito, Santee/El Monte, Mission Valley, Middle and Lower Sweetwater, Lower Tijuana River Valley, and San Diego Formation aquifer, including groundwater extraction and disinfection, brackish groundwater recovery, and recharge and recovery of imported and recycled water.