THE CITY OF SAN DIEGO

2010 Urban Water Management Plan

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DRAFT
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City of San Diego
PUBLIC UTILITIES
Water & Wastewater

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2010 Urban Water Management Plan

Prepared for
City of San Diego, CA
May 10, 2011

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of the work done or recommendations made by Brown and Caldwell.
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List of Abbreviations

AAC	All-American Canal
AF	acre-feet
AFY	acre-feet per year
Act	Urban Water Management Act
AWTP	Advanced Water Treatment Plant
AWWA	American Water Works Association
BMPs	Best Management Practices
CAB	Citizens Advisory Board
Cal-Am	California American Water Company
CC	Coachella Canal
CEQA	California Environmental Quality Act
CDPH	State of California Department of Public Health
CIMIS	California Irrigation Management Information System
City	City of San Diego
CLIP	Commercial Landscape Incentive Program
CLSP	Commercial Landscape Survey Program
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
Department	San Diego Public Utilities Department
DMM	demand management measures
DWR	California Department of Water Resources
ETo	evapotranspiration
FY	fiscal year
gpcd	gallons per capita day
gpm	gallons per minute
GMP	groundwater management plan
IID	Imperial Irrigation District
IPR	indirect potable reuse
IROC	Independent Rates Oversight Committee
IRWM	Integrated Regional Water Management
IWA	International Water Association
LAM	land area measurements
LRWRP	Long-Range Water Resources Plan
MAIN	Municipal and Industrial Needs
Master Plan	Recycled Water Master Plan
MCL	maximum contaminant level
MG	million gallons
MGD	million gallons per day
mg/L	milligrams per liter
MWD	Metropolitan Water District of Southern California
NCWRP	North City Water Reclamation Plant
NR&C	Natural Resources and Culture Committee
NRW	non-revenue water
Plan	Urban Water Management Plan
PLWTP	Point Loma Wastewater Treatment Plant
PVID	Palo Verde Irrigation District
QSA	Quantification Settlement Agreement
RA	reservoir augmentation
RAC	Regional Advisory Committee
RWMG	Regional Water Management Group
RWQCB	Regional Water Quality Control Board
RWS	recycled water study
SANDAG	San Diego Association of Governments
SB	Senate Bill
SBWRP	South Bay Water Reclamation Plant
SCADA	Supervisory Control and Data Acquisition
SDCWA	San Diego County Water Authority
SDG&E	San Diego Gas & Electric
SDWA	Safe Drinking Water Act
SWP	State Water Project
TDS	total dissolved solids
ULFT	ultra-low flush toilets
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
WBIC	Weather Based Irrigation Controllers
WPDP	Water Purification Demonstration Project
WSA	Water Supply Assessment
WSV	water supply verification
WTP	Water Treatment Plant

Section 1
Introduction

This Urban Water Management Plan (Plan) addresses the City of San Diego (City) water system and includes a description of the water supply sources, magnitudes of historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years. The City receives approximately 85 to 90 percent of its water from San Diego County Water Authority (SDCWA), which obtains water principally from the Metropolitan Water District of Southern California (MWD) and transferred water from Imperial Irrigation District (IID) that is then provided to its 24 member agencies in San Diego County. This Plan serves as a long-range planning document for the City's water supply.

This section provides background information on the Plan, an overview of coordination with other agencies, and a description of public participation and Plan adoption.

1.1 Urban Water Management Planning Act

This Plan has been prepared in accordance with the Urban Water Management Act (Act), as amended, California Water Code, Sections 10610 through 10656. The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually, to adopt and submit a plan every five years to the California Department of Water Resources (DWR). The Act was most recently amended in November 2009 with the adoption of Senate Bill (SB) X7-7. The most significant revision is the requirement for establishing per capita water use targets and the delay of the Plan adoption to July 1, 2011.

1.2 Water Supply Assessments (SB 610) and Written Verifications of Water Supply (SB 221)

On January 1, 2002, SB 610 and SB 221 took effect. The intent of SB 610 and SB 221 was to improve the link between information on water supply availability and certain land-use decisions made by cities and counties. Under SB 610 (codified in the Water Code beginning at Section 10910), a water supply assessment (WSA) must be furnished to cities and counties for inclusion in any environmental documentation of projects (defined in the Water Code) that propose to construct 500 or more residential units, or that will use an amount of water equivalent to what would be used by 500 residential units, and are subject to the California Environmental Quality Act (CEQA). Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply or water supply verification (WSV). SB 221 is intended as a mechanism to ensure that collaboration finding the needed water supplies to serve a new large subdivision occurs before construction begins.

A foundational document for compliance with both SB 610 and SB 221 is the Plan of the relevant water agency. Both of these statutes repeatedly identify the Plan as a planning document that can be used by a water supplier to meet the standards set forth in both statutes. Thorough and complete Plans will allow water suppliers to use Plans as a foundation to fulfill the specific requirements of these two statutes.

1.3 Resources Maximization and Import Minimization

The City has taken a variety of actions to maximize water resources and minimize the need to import water, as described below.

1. The City developed a Long-Range Water Resources Plan (LRWRP) that defines a plan to reduce reliance on water supply imports and develop and maximize the City's water resources. The process to update the LRWRP will begin in 2011 to reflect recent changes in the availability, costs and reliability of various water supply sources.
2. The City is a member of the San Diego Integrated Regional Water Management (IRWM) Planning Group that seeks an integrated regional approach to addressing water management issues, and is described in more detail in Section 1.4.
3. The City is conducting independent studies as well as participating with the United States Geological Survey (USGS) and the United States Bureau of Reclamation (USBR) in groundwater basin studies and hydrogeologic investigations to better understand the complex hydrogeology in the coastal San Diego area, the water supply potential of the local groundwater basins and the potential for desalination of local brackish groundwater.
4. The City has prepared a Water Facilities Master Plan and is completing its Recycled Water Study and Recycled Water Master Plan.
5. The City is conducting a Water Purification Demonstration Project (WPDP) to examine the feasibility to use advanced treated recycled water as a future source.

1.4 San Diego Integrated Regional Water Management Plan

This section describes the regional water planning process with which the City is involved.

San Diego Integrated Regional Water Management Program

In 2002, the California legislature enacted the IRWM Planning Act (Division 6, Part 2.2 of the Water Code §10530 et seq.), amended in 2008. The act encourages local water management aimed at securing long-term water supply reliability within California by first recognizing the inter-connectivity of water supplies and the environment and then pursuing projects yielding multiple benefits for water supplies, water quality, and natural resources.

The San Diego Region includes the portion of San Diego County that is tributary to coastal waters. The first-ever San Diego IRWM Plan was completed in 2007, and submitted to DWR, to coordinate water resource management efforts and to enable the San Diego Region to pursue grant and other funding opportunities.

Regional Water Management Group (RWMG)

The City, SDCWA, and the County of San Diego formed the Regional Water Management Group (RWMG) in 2005. The RWMG has funded, guided and managed the development of the IRWM Program to date. The IRWM Plan and grant applications are formally approved and adopted by the governing bodies of these three agencies.

Regional Advisory Committee (RAC)

The Regional Advisory Committee (RAC) was formed in December 2006 to assist in the completion of San Diego's 2007 IRWM Plan and prioritization of projects both within the Plan and for future funding application(s) as they arise. The RAC currently consists of 27 voting and 4 non-voting members with expertise in water supply, wastewater, recycled water, stormwater and urban runoff, natural resources, sustainability, tribal issues, military liaison and environmental stewardship. Of the 27 voting RAC members, 11 represent water, wastewater and stormwater agencies, 10 represent natural resources, watersheds, disadvantaged communities and sustainability non-profit organizations and the remaining 6 represent land-use planning, academia, business, military and tribal interests.

The RAC has played a critical role in shaping and developing such key elements of the IRWM Plan as goals and objectives, long-term targets, the proposed institutional structure, and project prioritization. The RAC currently meets on a bi-monthly basis to provide guidance on upcoming IRWM planning and funding application activities.

San Diego's IRWM Plan Vision is:

An integrated, balanced, and consensus approach to ensuring the long-term sustainability of San Diego's water supply, water quality, and natural resources.

San Diego's IRWM Plan Mission is:

To develop and implement an integrated strategy to guide the San Diego Region toward protecting, managing, and developing reliable and sustainable water resources. Through a stakeholder-driven and adaptive process, the Region can develop solutions to water-related issues and conflicts that are economically and environmentally preferable, and that provide equitable resource protection for the entire Region.

For more information, please see www.sdirwmp.org.

1.5 Coordination

The Act requires the City to 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.

The City coordinated the preparation of its Plan with its wholesale water supplier, the SDCWA. In addition, the City coordinated the preparation of the water demand projections in this Plan with the San Diego Association of Governments' (SANDAG) Series 12: 2050 Regional Growth Forecast demographic projections. Table 1-1 provides a summary of the City's coordination with the appropriate agencies. Other appropriate agencies include the agencies the City sells water or recycled water to.

To ensure consistency, meetings were held with the SDCWA to discuss demand and supply information. The City participated in several webinars and workshops hosted by DWR, which reviewed the DWR guidelines and requirements of the Act.

Table 1-1. Coordination with Appropriate Agencies

	San Diego County Water Authority	San Diego Association of Governments	County of San Diego	Otay Water District	Santa Fe Irrigation District	San Dieguito IrrigationDistrict	City of Del Mar	City of Poway	Olivenhain Municipal Water District	California American Water Company	Public Involvement
Participated in developing the plan	✓	✓									
Was contacted for assistance	✓	✓		✓						✓	
Was provided a copy of the draft plan[a]	✓	✓									✓
Provided 60-day notice of public hearing			✓				✓	✓			
Attended public meetings	✓			✓	✓	✓		✓	✓		✓
Was sent a notice of intention to adopt	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Not involved/No information											

DWR Table 1

[a] Draft Plan sent during IROC process.

1.6 Public Participation and Plan Adoption

In an effort to keep the public informed on water supply issues, the City of San Diego Public Utilities Department (Department) proactively reaches out to members of the community by conducting public presentations, attending community events, updating the City's website, and working with the media to ensure accurate and complete coverage of programs.

The Department commenced preparation of the 2010 Plan in June 2009. As of March 2011, the Department has conducted over 130 presentations and attended more than 110 community events. Some of the topics covered by these presentations and at the community events include:

- **Water Conservation:** The City's Water Conservation Program reduces water demand through promoting or providing incentives for water conserving devices that provide permanent water savings. It also provides services (e.g. water audits, surveys, rebates) and information to help San Diegans make better decisions about water use in their homes, landscaping and businesses. Additional information on the conservation public outreach effort can be found in Section 5.
- **Groundwater Development:** The City has several groundwater basins within its jurisdiction. In an effort to determine their potential as a water storage or water supply source, a program was created to investigate these groundwater basins. Development of these groundwater assets could provide water supply, water quality, and economic benefits to the city. The groundwater program includes public presentations to inform citizens of this effort. Topics covered in the presentation include general background information, including the benefits of this potential water source, groundwater basin identification, and the types of projects and investigations the City is conducting.
- **Water Purification Demonstration Project (WPDP):** As part of the ongoing process to maximize the beneficial use of recycled water, the City Council approved the second phase of a three phase water reuse program. The primary purpose of the project is to examine the feasibility of augmenting surface water reservoir supplies by using advanced water purification technology to produce water that can be sent to a reservoir and later be distributed as drinking water. In an effort to keep San

Diego citizens informed about this important project, an extensive public education and outreach program has been implemented throughout the City. This program includes public presentations, distribution of information at community events, a project website, and tours of the test facility. Additional information on the WPDP can be found in Section 4.6.4.

- **Water Supply Assessments (WSAs):** The Department is required by state law to prepare WSAs for large development projects exceeding specific thresholds. The Plan is the foundational document used in the preparation of WSAs. To aid developers in planning their projects and to help civic and community groups understand the steps the City is taking to increase water reliability for the region in times of drought, climate change and reduction in potable water supplies, presentations have been conducted for these stakeholders to educate them on the WSA process and to give an overview of the City's development of water supply sources.

Through these and other outreach efforts, the City is diligently working to keep the public informed and up to date on the many issues surrounding its water supplies.

The Plan was presented at public meetings to the Independent Rates Oversight Committee (IROC) Environmental and Technical Committee on April 11, 2011 and the San Diego City Council's Natural Resources and Culture Committee (NR&C) on April 20, 2011. These public meetings included a discussion of the Plan including the per capita water demand targets. The draft Plan was presented to IROC on_____ and to NR&C on _____. The Plan was presented at a public hearing before the San Diego City Council at one of its regularly scheduled meetings on_____, where it was approved for adoption. A notice of the public hearing was provided to all cities within San Diego County and to the County of San Diego 60-days before the hearing. Public hearing notifications were published and copies of the Plan were made available for public inspection at the City's office and on the web site two weeks before the public hearing.

Copies of the 60-day notification, published public hearing notification and adoption resolution are included in Appendix A. The Plan will be submitted to DWR, the California State Library and San Diego County within 30 days after adoption. The Plan will be available for public review on the City's web site within 30 days after filing a copy of the Plan with DWR. The City shall implement the adopted Plan in accordance with the schedule described in this Plan.

1.7 Plan Organization

This section provides a summary of the sections in the Plan. Section 2 provides a description of the service area, climate, water supply facilities, and distribution system. Section 3 presents historical and projected water use. Section 4 describes surface and groundwater supplies. Section 5 addresses water conservation. Section 6 provides a comparison of future water supply to demand. Appendices A through E provide relevant supporting documents.

DWR has provided a checklist of the items that must be addressed in each Plan based upon the Act. This checklist makes it simple to identify exactly where in the Plan each item has been addressed. The checklist is completed for this Plan and provided in Appendix D. It references the sections and page numbers where the specific items can be found. The tables that are recommended by DWR to be part of the Plan are identified with their applicable DWR table number using a footnote (DWR, 2011).

1.8 Assumptions

The evaluation and conclusions in this Plan are based in part upon assumptions made by the SDCWA regarding their water supply. The SDCWA's 2010 Plan should be consulted for details regarding the SDCWA's water supplies (SDCWA, 2011).

Section 2

Description of Existing Water System

This section describes the City's service area, climate, water department history, and water supply facilities.

2.1 Description of Service Area

The Department serves more than 1.3 million people populating more than 200 square miles of developed land. The service area is depicted in Figure 2-1, is generally located within the south central portion of San Diego County, and is approximately 340 square miles. In addition to supplying approximately 274,000 metered service connections within its own incorporated boundaries, San Diego conveys and sells water to the City of Del Mar, Santa Fe and San Dieguito Irrigation Districts, and California American Water Company (Cal-Am), which, in turn, serves the Cities of Coronado and Imperial Beach and portions of south San Diego. The City has agreements to sell surplus water to Otay Water District and exchange water to Ramona Municipal Water District. The City maintains several emergency connections to and from neighboring water agencies, including Santa Fe Irrigation District, Poway Municipal Water District, Otay Water District, Cal-Am, and Sweetwater Authority.

2.2 Climate

San Diego has a Mediterranean to semi-arid climate when classified using the Koppen climate classification system, which is characterized by warm, dry summers and mild winters with some rain. San Diego enjoys mild, mostly dry weather with an average of 201 days above 70 °F (21 °C). Summer, also known as the dry period, lasts from May to October. Winter, also known as the rainy period, lasts from November to April.

The climate in the San Diego area, like the rest of California, often varies dramatically over short geographical distances. This phenomenon is known as microclimate. In San Diego's case, this is mainly due to the City's topography (the Bay, and the numerous hills, mesas, and canyons). Frequently, particularly during the "May gray/June gloom" period, a thick marine layer cloud cover will keep the air cool and damp within a few miles of the coast, but will yield to bright cloudless sunshine approximately 5 to 10 miles inland. Even in the absence of June gloom, inland areas tend to experience much more significant temperature variations than coastal areas, where the ocean serves as a moderating influence.

Rainfall along the coast averages about 10 inches of precipitation annually, which occurs mainly during the cooler months of November through April. Though there are few wet days per month during the rainy period, rainfall can be heavy. Some of the higher elevation areas of San Diego County that include the local surface water supply watersheds can get 30 or more inches of rain a year.

Table 2-1 and Figure 2-2 summarize the average monthly temperatures, rainfall, and evapotranspiration rates (ETo). ETo is the sum of evaporation and plant transpiration and is an indication of plant water needs. The difference between the monthly ETo and precipitation in Figure 2-2 represents the irrigation needs. While the temperature and rainfall information in Table 2-1 are for San Diego airport, the climate varies across the City's service area. As shown in Figure 2-3, the average annual precipitation for the City's service area varies from 6 to 18 inches.

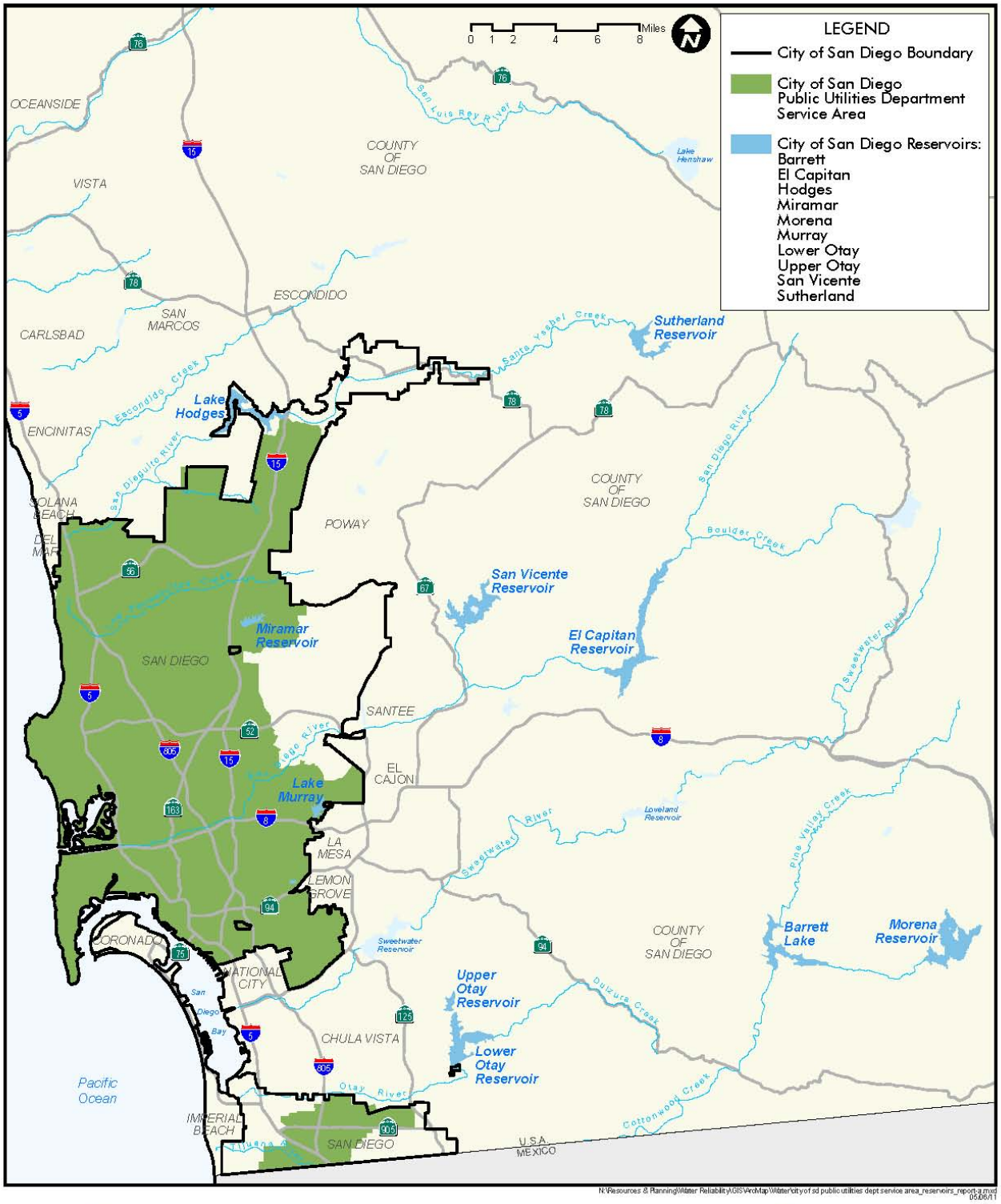


Figure 2-1. Location Map

Table 2-1. Climate			
	Average temperature[a] , °F	Average rainfall[a], in	Standard average ETo[b], in
January	56.4	2.03	2.07
February	57.4	1.99	2.42
March	58.9	1.64	3.44
April	61.1	0.78	4.61
May	63.3	0.21	5.07
June	65.9	0.05	5.33
July	69.6	0.02	5.66
August	71.0	0.06	5.59
September	69.8	0.17	4.33
October	66.1	0.49	3.56
November	61.4	0.95	2.39
December	57.2	1.74	2.03
Annual	63.2	10.13	46.50

Notes:

[a] 1914-2010 data recorded for San Diego Weather Service Office Airport station, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7740.

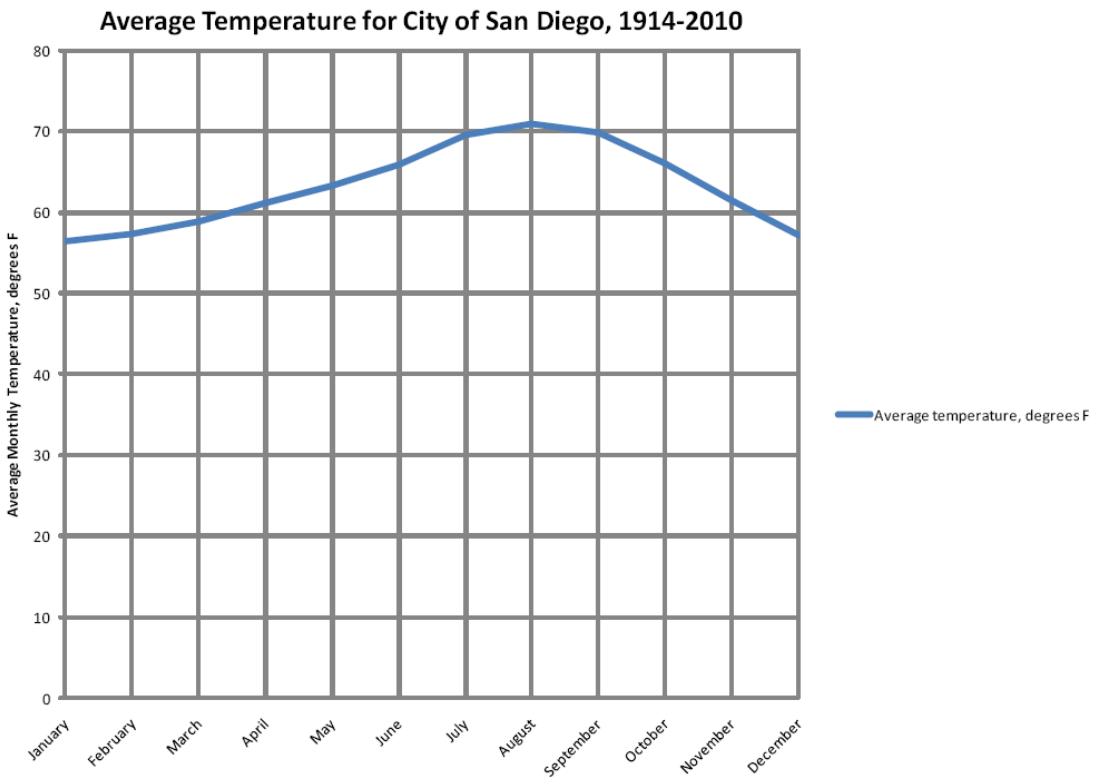
[b] Data represents the monthly average from 2002 to 2010 and was recorded from the San Diego station 184, CIMIS database (http://wwwcimis.water.ca.gov/).

2.3 City Water Department History

San Diego was established as a presidio (a military settlement) and mission in 1769 as part of the Spanish Colonial Empire. The presidio and mission were located on the south bank of what is now known as the San Diego River. Father Serra and the Friars built the region's first drainage ditches, wells, and a dam situated on the San Diego River.

The City was incorporated in 1850, and became a charter city in 1889, pursuant to the California Constitution and the California Government Code. Municipal ownership of the City's water supply and distribution system began in 1901, with the purchase, for $40 million, of the privately owned San Diego Water Company. By 1947, the City's publicly owned water supply system extended to dams, water rights, distribution lines, and associated facilities.

Expansion of the City’s water supply system began with the acquisition of existing reservoir systems and dams, including Lower and Upper Otay in 1913, and Morena Dam in 1914. The City purchased Lake Hodges and the San Dieguito Dam in 1925, and constructed El Capitan Dam in 1935. San Vicente Dam and pipeline were completed in 1943. Construction on Sutherland Dam began in 1927 and was completed in 1954.



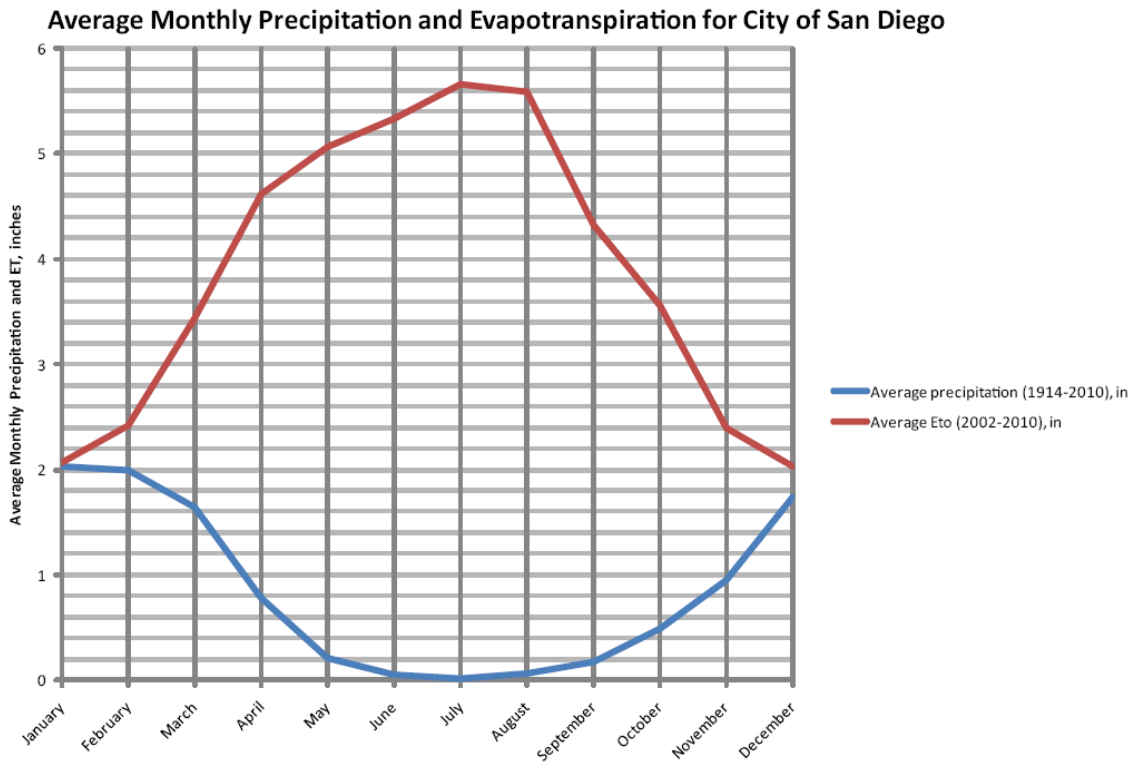


Figure 2-2. Average Monthly Climate

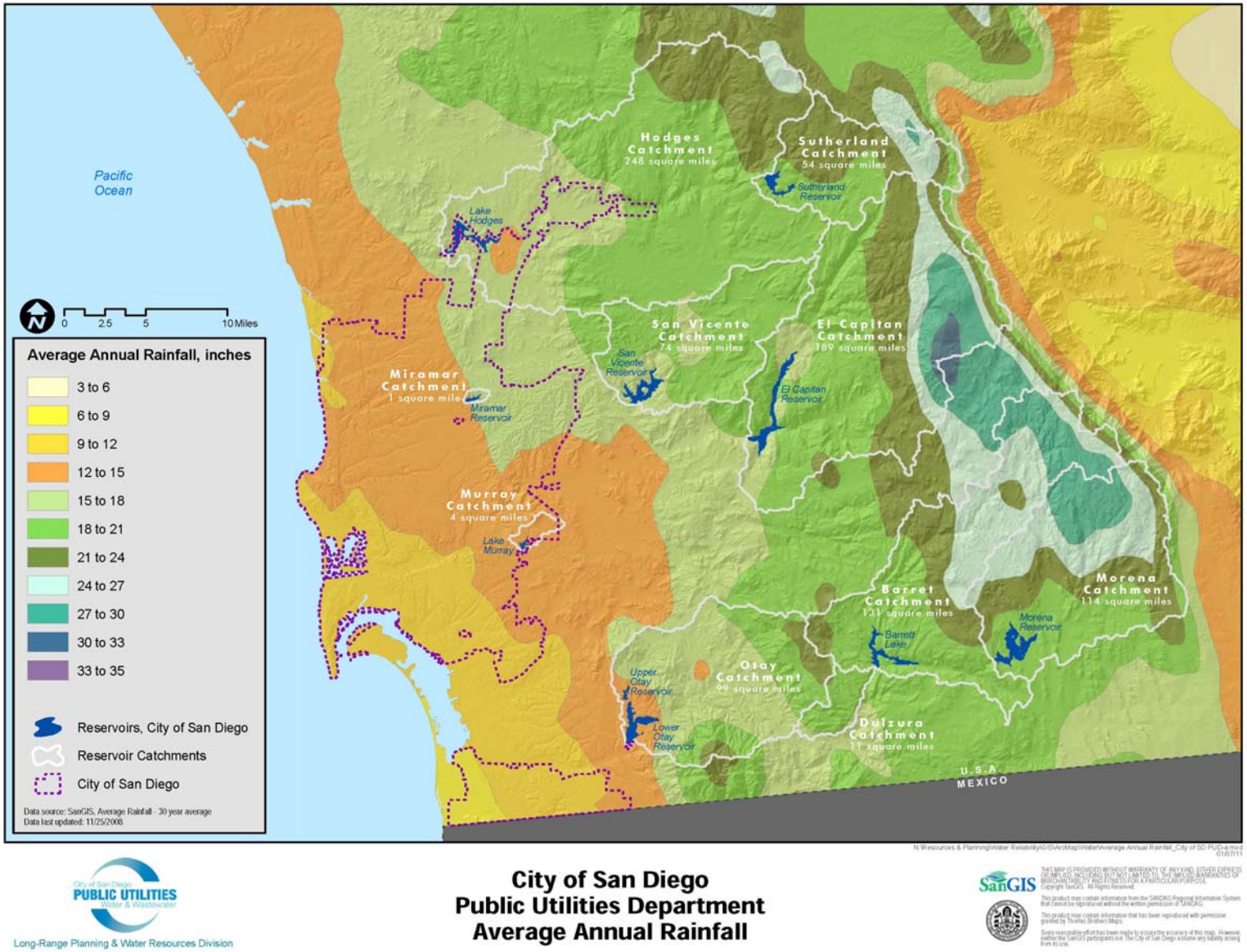


Figure 2-3. Precipitation Map

The need to import water emerged with the increased demand generated by the presence of the United States Navy before and during World War II, and the ensuing population boom. A wartime population of more than 400,000 people threatened a shortage in the City's water supply. As a result, the Navy requested that the City connect to the Colorado River Aqueduct (CRA), which was completed by MWD in 1941. The City and other local retail water distributors formed the SDCWA in 1944, and joined MWD in 1946, in order to economically import Colorado River water to the San Diego region. The San Diego Aqueduct, completed in 1947, became the region's first link to MWD's CRA. Thus began the City's reliance upon imported water, which now constitutes approximately 85 to 90 percent of its supply.

2.4 Water Supply Facilities

The City's water supply system consists of the imported water and local water supply facilities. This section describes the water supply facilities. The amounts of water available from these supply sources are discussed in Section 4.

2.4.1 Imported Water Supply Facilities

The City purchases imported water from SDCWA, which purchases imported water from MWD and other Colorado River sources. MWD's supplies come from the State Water Project (SWP) and the Colorado River. The SWP diverts water in northern California and delivers it to southern California through a 444 mile-long aqueduct. This water is captured in reservoirs north of Sacramento and released through natural rivers and streams into the Sacramento-San Joaquin Delta. A 242 mile-long aqueduct brings Colorado River water from Lake Havasu to MWD's service area. MWD blends Colorado River and SWP water at a facility in Riverside County, and then transfers it to the City's water treatment plants or City reservoirs via pipelines operated by MWD and SCDWA. Approximately 10 percent of the City's imported water is treated imported water from MWD's Lake Skinner Treatment Plant in Rancho, California or SDCWA's Twin Oaks Treatment Plant. Figure 2-4 depicts the major water conveyance facilities in California. Figures 2-5 and 2-6 show MWD's and SDCWA's service areas, respectively. More information is available from MWD's and SCWA's web sites (www.mwdh2o.com and www.sdcwa.org).

2.4.2 Local Water Supply Facilities

The City's local water supplies consist of surface water obtained from local watersheds and recycled water. The recycled water system is described in Section 4.

The City has nine local surface water reservoirs with more than 408,000 AF of capacity, which are connected directly or indirectly to three water treatment plants. These reservoirs capture local rainwater and runoff to supply approximately 12 percent of the City's water. The City's reservoir system operates in combination with the imported water system. Table 2-2 shows the City's surface water storage reservoirs and their capacities.

The Department maintains and operates three water treatment plants with a combined total rated capacity of 294.2 million gallons per day (MGD), as shown in Figure 2-7. The Miramar Water Treatment Plant (WTP), originally constructed in 1962, has a rated capacity of 140 MGD with the ability to increase to 215 MGD in the future with approval from the State of California Department of Public Health (CDHP) based upon a future treatment process study (High Filtration Rate Study) that is yet to be performed. The required study to increase the rated capacity to 215 MGD will be performed in anticipation and as required to ensure future demands are met. The Miramar WTP generally serves the City's geographical area north of the San Diego River (north San Diego). The Alvarado WTP, operational since 1951, had an initial capacity rating of 66 MGD. Several hydraulic improvements to the Alvarado WTP were constructed in the mid-1970s to increase the plant's capacity to 120 MGD. Upon completion of ongoing upgrades and improvements and approval of the operations plan by the CDHP, the rated capacity of the Alvarado

WTP is anticipated to increase to 200 MGD in FY 2012. The Alvarado WTP generally serves the geographical area from National City to the San Diego River (central San Diego). The Otay Water WTP was originally constructed in 1940, and has a current rated capacity of 34.2 MGD, which meets current and short-term forecasted demands. The Otay WTP has hydraulic capacity to increase to 40 MGD in the future. In order to do so, approval is required, similar to the process mentioned above for the Miramar WTP. The geographic areas served by the three WTPs are flexible such that areas of the City can be supplied by more than one of the treatment plants.

Table 2-2. City Owned Reservoirs

Reservoir	Capacity (AF)
Barrett	34,806
El Capitan	112,807
Hodges	30,251
Lower Otay	49,849
Miramar	6,682
Morena	50,694
Murray	4,684
San Vicente	89,312[a]
Sutherland	29,508
Total Capacity	408,593

Source: City of San Diego Public Utilities Department, Water Operations Branch, System Operations Division

Notes:

[a] San Vicente will be expanded to 242,000 AF by 2013. This additional storage is for SDCWA's regional emergency storage project

The Department maintains and operates 49 water pump plants, 127-plus pressure zones, 31 treated water storage facilities with more than 200 million gallons (MG) of potable water storage capacity, including steel tanks, standpipes, concrete tanks and rectangular concrete reservoirs, with capacities varying from less than 1 MG to 35 MG. The water system consists of approximately 3,213 miles of pipeline, including transmission lines up to 84 inches in diameter and distribution lines as small as four inches in diameter.

Figure 2-4. California Water Facilities

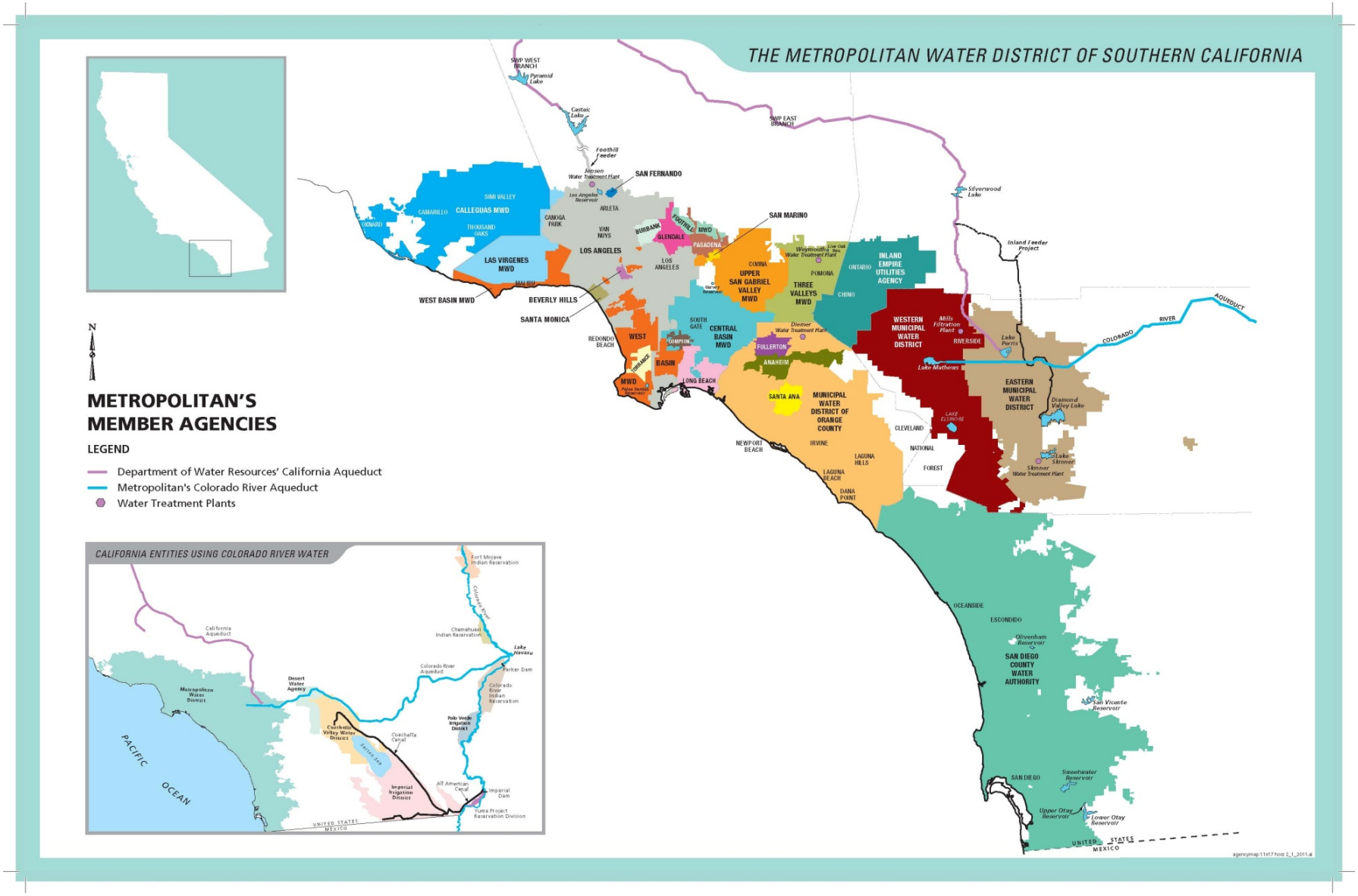


Figure 2-5. MWD Service Area

Figure 2-6. SDCWA Service Area

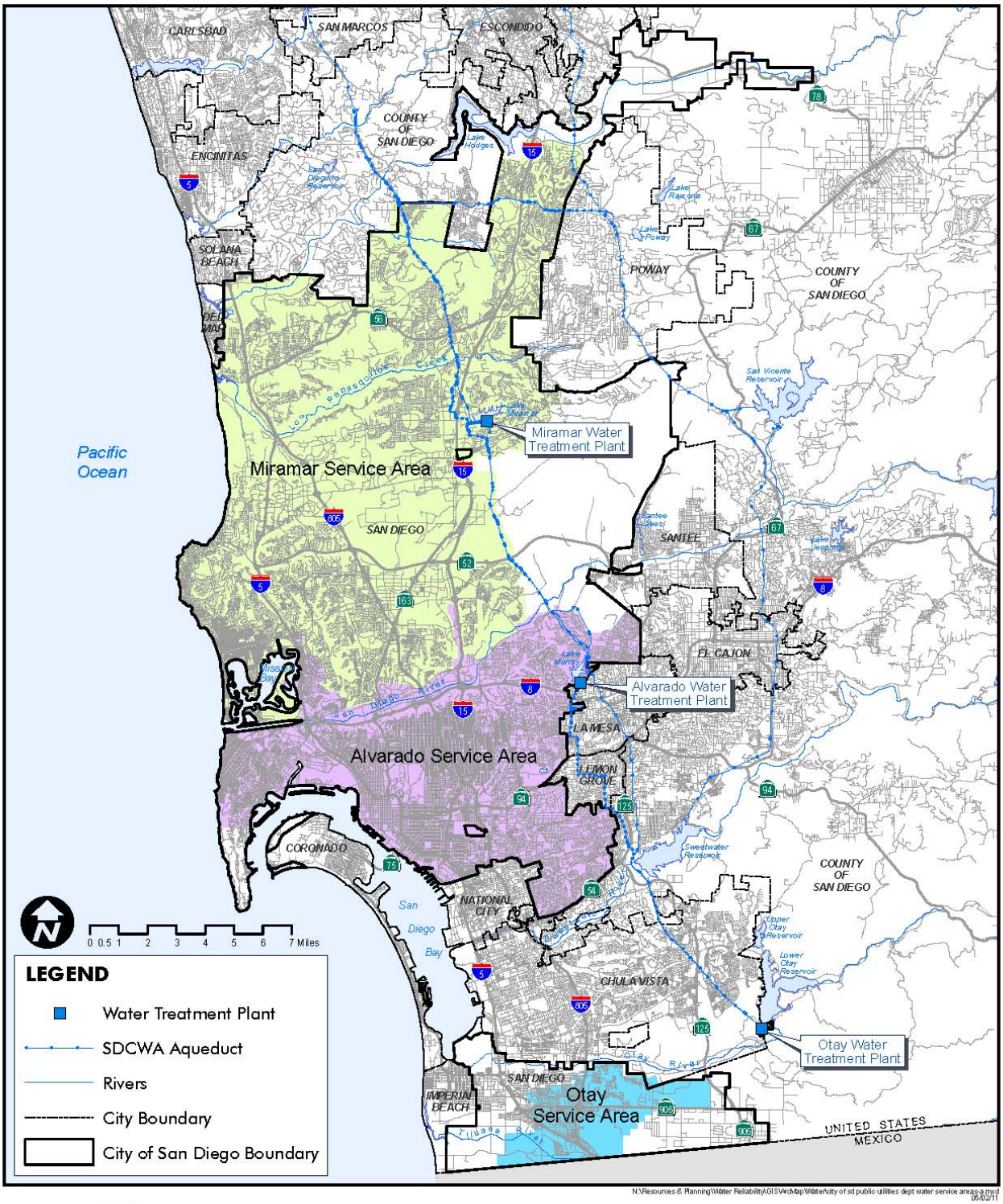


Figure 2-7. City Water Treatment Plants

Section 3

Historical and Projected Water Use

Water demand projections provide the basis for evaluating the adequacy of future water supplies. This section presents the population and water needs projections for the City.

3.1 Population

Demographic factors such as population, housing, and employment are taken into account when associating water use within the City. With more than 1.3 million people, San Diego is the eighth largest city in the United States and the second largest in California. More than 100 languages are spoken by San Diego residents who have come from all parts of the world to live here. San Diego also has a young population, with approximately 70 percent of its residents under 45 years old.

The City's population is expected to increase from its current 1.3 million to over 1.7 million in 2035. This represents a 27 percent increase in 25 years. The City's population presented in Table 3-1 is from SANDAG's latest projections developed for the Series 12: 2050 Regional Growth Forecast.

Table 3-1. City of San Diego Population Current and Projected

	2010	2015	2020	2025	2030	2035
City of San Diego population	1,376,173	1,459,351	1,542,528	1,615,891	1,689,254	1,756,621
City population not served by the water system [(a)]	51,868	53,811	58,542	61,105	63,501	68,667
Service area population	1,324,305	1,405,540	1,483,986	1,554,786	1,625,753	1,687,954

DWR Table 2
Source: SANDAG Series 12: 2050 Regional Growth Forecast, City of San Diego, February 2010, and City of San Diego Public Utilities Update of Long-term Water Demand Forecast, June 2010.

Notes:

[(a)] Some City of San Diego residents in the South Bay and in the northern part of the City are served by other water agencies.

3.2 Water Use

Water use consists of potable and recycled water used by the City, water sold to others, and additional water uses and losses. Tables 3-2 to 3-6 present the past and projected water sales to City customers and number of connections by customer sector. The information is based on the calendar year, unless noted as fiscal year (FY).

The City utilizes an econometric model to develop its long-range demand forecasts. This computer model is based on the U.S. Army Corps of Engineers Municipal and Industrial Needs (MAIN) model, which has over a quarter of a century of practical application and is used by many cities and water agencies throughout the United States. The City uses a version of the model known as CWA-MAIN. The CWA-MAIN model relates historic water demand patterns to variables such as household income, consumer response to the price of water, and weather, to predict future water demands. The water demand projections were developed using CWA-MAIN.

As can be seen in Tables 3-2 and 3-3, the City's actual water use has experienced a decline that is due to a combination of circumstances, including poor economic conditions, response to the mandatory water use restrictions associated with the Level 2 Drought Alert, increased retail water costs, and conversion of potable water system customers to the recycled water system.

The decrease in the number of industrial accounts from 2005 to 2010 is because the City will be eliminating the industrial meter classification as part of the change to a new customer information and billing system, projected to be implemented by the end of July, 2011. Accounts that are classified as industrial in the current system will be included in a combined commercial/industrial classification under the new system. Although the system is not yet in place, many industrial accounts have already been reclassified to commercial/industrial and are included under the commercial sector in 2010.

Table 3-7 presents the projected lower income household water demands as required by SB 1087. The projected lower income household water demands were developed based on the projected number of households with less than 80 percent of the median income in proportion to the total number of households. The new legislation known as SBX7-7 requiring establishing per capita water demand targets is described in Section 3.3. The City's demand projections presented in this section are consistent with the City's gallons per capita per day (gpcd) demand target.

Table 3-2. Water Deliveries, Actual 2005

Water Use Sector	2005				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	217,983	77,864	0	0	77,864
Multi-family	28,443	39,220	0	0	39,220
Commercial	14,468	33,099	0	0	33,099
Industrial	253	4,276	0	0	4,276
Institutional/Governmental	2,341	16,842	0	0	16,842
Landscape Irrigation	7,245	27,877	0	0	27,877
Total	270,733	199,178	0	0	199,178

DWR Table 3
Source: City of San Diego Public Utilities Report U02-P10715.

Table 3-3. Water Deliveries, Actual 2010

Water Use Sector	2010				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	220,862	62,367	0	0	62,367
Multi-family	28,361	36,324	0	0	36,324
Commercial	14,542	27,244	0	0	27,244
Industrial	186	2,325	0	0	2,325
Institutional/Governmental	2,321	13,774	0	0	13,774
Landscape Irrigation	7,327	20,257	0	0	20,257
Total	273,599	162,291	0	0	162,291

DWR Table 4
Source: City of San Diego Public Utilities Report U02-P100715.

Table 3-4. Water Deliveries, Projected 2015					
Water Use Sector	2015				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	231,346	75,922	0	0	75,922
Multi-family	32,082	47,266	0	0	47,266
Commercial	14,376	31,617	0	0	31,617
Industrial	186	2,071	0	0	2,071
Institutional/Governmental	2,302	13,359	0	0	13,359
Landscape Irrigation	7,583	25,452	0	0	25,452
Total	287,587	195,688	0	0	195,688

DWR Table 5

Table 3-5. Water Deliveries, Projected 2020					
Water Use Sector	2020				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	236,639	79,992	0	0	79,992
Multi-family	37,330	56,700	0	0	56,700
Commercial	14,783	33,541	0	0	33,541
Industrial	186	2157	0	0	2157
Institutional/Governmental	2,302	13,772	0	0	13,772
Landscape Irrigation	7,869	27,247	0	0	27,247
Total	298,582	213,409	0	0	213,409

DWR Table 6

Table 3-6. Water Deliveries, Projected 2025, 2030, and 2035						
Water Use Sector	2025		2030		2035	
	Metered		Metered		Metered	
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)
Single family	241,491	83,370	244,138	85,633	245,682	86,471
Multi-family	42,662	66,070	47,910	75,328	52,420	82,781
Commercial	14,681	34,012	14,100	33,116	13,853	32,740
Industrial	176	2,077	166	1,995	166	1,967
Institutional/Governmental	2,247	13,639	2,172	13,399	2,154	13,329
Landscape irrigation	8,192	28,893	8,162	29,301	8,543	30,698
Total	308,505	228,061	315,534	238,772	321,337	247,986

DWR Table 7

Table 3-7. Projected Low Income Water Demands					
Water Use Sector	Low Income Water Demands (AFY)				
	2015	2020	2025	2030	2035
Single family	28,774	30,319	31,514	32,284	32,600
Multi-family	17,914	21,491	24,974	28,399	31,208
Total	46,688	51,810	56,488	60,684	63,808

DWR Table 8
Note: Based on projected number of households with less than 80% of median household income per SANDAG 2050 Regional Growth Forecast, February 2010.

The City, through past agreements, sells treated water to the Cal-Am which provides water service to the cities of Coronado and Imperial Beach, City of Del Mar, and Naval Air Station North Island. The population of Naval Station North Island is located within the City of Coronado, whereas the other military bases that the City serves are within the City. The City also sells untreated water to Santa Fe Irrigation District and San Dieguito Water District. Table 3-8 presents the water sales to other agencies.

Per the agreement between the City and Cal-Am, only local surface water is sold to Cal-Am to provide water to supply Cal-Am customers. A portion of City residents in the South Bay area are also served by Cal-Am. Per the agreement between the City and the City of Del Mar, the City takes deliveries of water, which the City of Del Mar purchases from the SDCWA, through the Second Aqueduct Connection at Miramar. This water is then treated at the City's Miramar WTP and transported to the City of Del Mar through several interconnections.

The City has agreements to provide surplus treated water to Otay Water District and untreated exchange water to Ramona Municipal Water District. These water deliveries occur infrequently and for short periods of time, and are therefore not shown in Table 3-8.

Table 3-8. Sales to Other Water Agencies (AFY)							
Water Distributed	2005	2010	2015	2020	2025	2030	2035
California American Water Company	13,311	11,462	13,153	13,395	13,452	13,757	13,988
Santa Fe Irrigation District and San Dieguito Water District [(a)]	2,012	7,227	7,596	7,983	8,391	8,819	9,268
City of Del Mar [(b)]	1,324	1,058	1,112	1,168	1,228	1,290	1,356
Naval Air Station North Island	1,204	1,568	1,568	1,568	1,568	1,568	1,568
Total	14,515	13,030	14,721	14,963	15,020	15,325	15,556

DWR Table 9
Source: 2005-2035 values from "Sales to other Agencies" spreadsheet provided by David Glanville on August 17, 2010, with Cal-Am values modified in email dated March 2, 2011.
Notes:
[(a)] Through a joint agreement, the City supplies raw water from local surface water supplies to Santa Fe Irrigation District/San Dieguito Water District, and treated water to the other agencies. This water supply is not included in total since the supply is not included in the local surface water supply values in Section 4, Tables 4-14, 4-16, and 4-17.
[(b)] City of Del Mar not included in total as the City is treating water for Del Mar that is provided by SDCWA.

3.2.1 Non-Revenue Water

Traditionally, the term "unaccounted-for-water" has been used to describe the difference between water produced into the system (input) and water delivered (output) to the users or metered consumption by users. However, this term has a variety of definitions and meanings. The International Water Association (IWA) has proposed the term "non-revenue water" (NRW) with a clear definition, as shown in the lower right-hand portion of Figure 3-1. The IWA terminology has also been adopted by the American Water Works Association (AWWA).

<table>
<tr><td rowspan="6">Own water</td><td rowspan="9">System input</td><td>Exported water</td><td rowspan="3">Authorized consumption</td><td rowspan="2">Billed consumption</td><td rowspan="2">Revenue water</td><td>Billed water exported</td></tr>
<tr><td rowspan="8">Water supplied</td><td>Billed metered consumption</td></tr>
<tr><td>Billed unmetered consumption</td></tr>
<tr><td rowspan="2">Unbilled consumption</td><td rowspan="7">Non-revenue water (NRW)</td><td>Unbilled metered consumption</td></tr>
<tr><td>Unbilled unmetered consumption</td></tr>
<tr><td rowspan="4">Water losses</td><td rowspan="2">Apparent losses</td><td>Unauthorized consumption</td></tr>
<tr><td>Meter inaccuracies and data errors</td></tr>
<tr><td rowspan="3">Imported water</td><td rowspan="3">Real losses</td><td>Leakage on mains</td></tr>
<tr><td>Leakage and overflow at storage</td></tr>
<tr><td>Leakage on service connections</td></tr>
</table>

Source: Alegre H. et al. IWA 2000.

Figure 3-1. IWA Water Audit Format

One issue with the term "unaccounted-for water" which the IWA format clarifies is the differentiation of real water loss and unbilled consumption. As shown in Figure 3-1, apparent water loss includes revenue loss due to leaks, breaks and storage overflows. Water use for firefighting, line flushing and other authorized, but unbilled, use is classified as neither real nor apparent loss, but is included in the computation of NRW as unbilled consumption.

Using metered demand and total City delivered values, NRW was computed as 9.0 percent in 2008. City staff deemed it reasonable to assume this percent system loss could be maintained in future years given the City's aggressive program of leak detection and repair. The City is going forward with an automated meter reading system that could improve billing accuracy, better quantify real versus apparent losses and identify customer leaks. Thus, NRW is held constant in the projections at 9.0 percent for forecast years. Table 3-9 presents the City's additional water uses (recycled water) and losses.

Table 3-9. Additional Water Uses and Losses (AFY)							
Water Use	2005	2010	2015	2020	2025	2030	2035
Recycled water	4,294	7,656	9,253	9,253	9,253	9,253	9,253
Non-revenue water	10,404	21,909	20,810	22,586	24,041	25,131	26,065
Total	14,698	29,565	30,063	31,839	33,294	34,384	35,318

DWR Table 10

Notes:

1. *Source for recycled water: 2005 from Table 2-8 of the City's 2005 Urban Water Management Plan. 2010 from NCWRP and SBWRP beneficial reuse summary tables with wholesale deliveries excluded provided by the City on March 2, 2011. 2015 and later from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.*
2. *Recycled water is City use only and excludes recycled water sold to other agencies.*
3. *Source for non-revenue water: For 2005, Table 2-8 of the City's 2005 Urban Water Management Plan with 4.3% assumption. For 2010 to 2035, City of San Diego Public Utilities, Update of Long-Term Water Demand Forecast, Table 6-5, Water Demand Forecast with Normal Weather, June 2010.*

The total amount of water used in 2005 and 2010 and projected to be used by the City in the future is presented in Table 3-10.

Table 3-10. Total Water Use							
Water Distributed	Total Water Use (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries (from Tables 3-3 through 3-6)	199,178	162,291	195,688	213,409	228,061	238,772	247,986
Sales to Other Water Agencies (from Table 3-8)	14,515	13,030	14,721	14,963	15,020	15,325	15,556
Additional Water Uses and Losses (from Table 3-9)	14,698	29,565	30,063	31,839	33,294	34,384	35,318
Total	228,391	204,886	240,472	260,211	276,375	288,481	298,860

DWR Table 11

3.3 Per Capita Water Use Targets

The Water Conservation Act of 2009 was signed into law in November 2009 as part of a comprehensive water legislation package. Known as SBX7-7, the legislation sets a goal of achieving a 20 percent reduction in urban per capita water use statewide by 2020. DWR developed technical methodologies to guide the consistent development by urban water suppliers of their baseline per capita water use and targets.

SBX7-7 requires urban water suppliers to establish per capita water use targets by using one of four methods:

- Method 1: Eighty percent of the urban retail water supplier's baseline per capita daily water use using a 10-year average starting no earlier than 1995. Tables 3-11 to 3-13 present the base period population, gross water use, and per capita water use information for this method. The resulting per capita demand target is 133 gpcd;
- Method 2: The per capita daily water use that is estimated using the sum of several defined performance standards. This method requires quantifying the landscaped area and the baseline commercial, industrial, and institutional use;
- Method 3: Ninety-five percent of the applicable state hydrologic region target, as set forth in the DWR Guidebook (DWR, 2011). The City, located in DWR's South Coast Hydrologic Region Number 4 as shown on Figure 3-2, has a year 2020 target of 95 percent of 149 gpcd, which is 142 gpcd; and
- Method 4: A provisional method that was released by DWR in February 2011 that develops the target based on indoor residential, commercial, industrial, institutional, outdoor, and water loss components.

Table 3-11. Base Period Ranges

Base	Base Period Ranges		
	Parameter	Value	Units
10- to 15-year Base Period	FY 2008 total water deliveries	226,150	AFY
	FY 2008 total volume of delivered recycled water (City use only)	10,489	AFY
	2008 recycled water as a percent of total deliveries	4.6	percent
	Number of years in base period	10	years
	Year beginning base period range	1996	
	Year ending base period range	2005	
5-year Base Period	Number of years in base period	5	years
	Year beginning base period range	2004	
	Year ending base period range	2008	

DWR Table 13

Table 3-12. Base Daily per Capita Water Use - 10- to 15-year Range				
Base Period Year		Distribution System Population[a]	Daily System Gross Water Use (AFY)[b]	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Fiscal Year Ending June 30			
Year 1	1996	1,099,989	216,066	175
Year 2	1997	1,111,440	222,977	179
Year 3	1998	1,128,491	206,495	163
Year 4	1999	1,151,642	215,400	167
Year 5	2000	1,173,293	230,973	176
Year 6	2001	1,191,357	216,312	162
Year 7	2002	1,206,026	219,610	163
Year 8	2003	1,228,055	211,059	153
Year 9	2004	1,243,152	229,162	165
Year 10	2005	1,244,554	217,780	156
Year 11	2006	1,253,497	224,197	160
Year 12	2007	1,265,120	229,940	162
Year 13	2008	1,285,692	226,150	157
Year 14	2009	1,302,470	213,258	146
Year 15	2010	1,324,226	188,981	127
Base Daily Per Capita Water Use				1996-2005: 166
Target				0.8*166=133

DWR Table 14
Notes:
[a] Population consists of population served by the Public Utilities Department.
[b] Gross water use consists of water produced by the Public Utilities Department and purchased SDCWA treated water minus water sold to other agencies, and includes system losses.

Table 3-13. Base Daily per Capita Water Use - 5-year Range				
Base Period Year		Distribution System Population	Daily System Gross Water Use (AFY)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Fiscal Year Ending June 30			
Year 1	2004	1,243,152	229,162	165
Year 2	2005	1,244,554	217,780	156
Year 3	2006	1,253,497	224,197	160
Year 4	2007	1,265,120	229,940	162
Year 5	2008	1,285,692	226,150	157
Base Daily Per Capita Water Use				160
Target				0.95*160=152

DWR Table 15

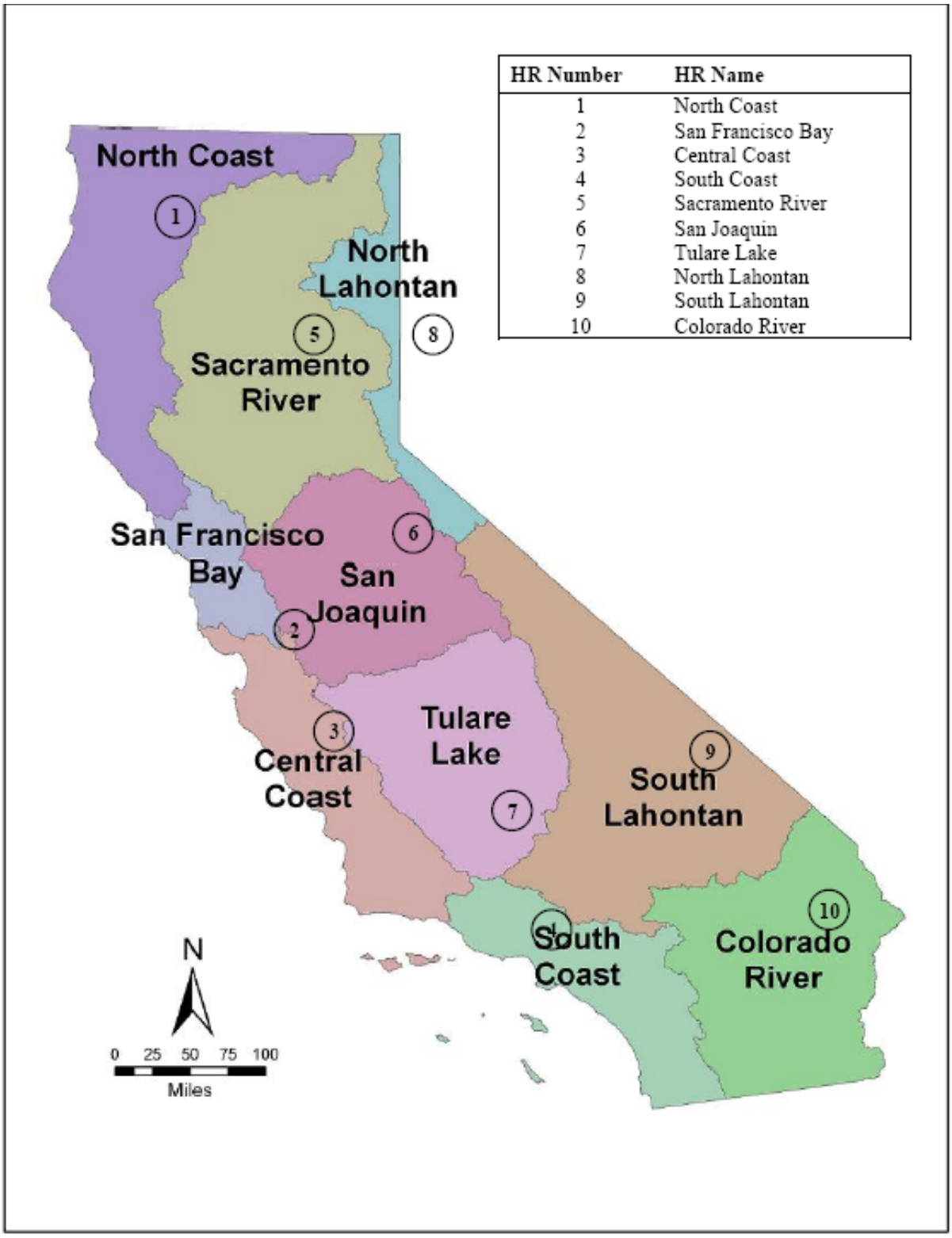


Figure 3-2. California Hydrologic Regions

An urban water supplier must select one of the methods to set their per capita water use target. Water suppliers may choose to change the selected method until 2015. The City has selected Method 3 for establishing the 2020 per capita water use target of 142 gpcd. Based on an evaluation of the four methods, the City has determined that Method 3 provides the best target.

Since 2007, the City's per capita water use has been experiencing a decline. As shown in Table 3-12, the City's per capita water use in 2010 was already below the 2020 target. However, this 2010 level of water use is likely to be somewhat temporary due to the water use impacts of the recent poor economic conditions and the Level 2 Drought Alert with mandatory restrictions that have been in effect since June 2009. A partial rebound to prior per capita water use levels may occur.

The City's approach to meeting the 2020 per capita water use target has several elements consisting of increased saturation into the customer base of low flow plumbing devices and fixtures, continued implementation of demand management measures, the water use reductions that occur with the increased costs of water and the increased use of recycled water. Recycled water is excluded from gross water use in determining per capita water use according to the DWR guidance. The City's water conservation efforts are described in Section 5.

Section 4
Water Supply

In 1997, the City developed the Strategic Plan for Water Supply. This plan focused mainly on engaging the City in the planning and development of its own water supply in order to become less reliant on imported water. Subsequently, over a two-year period beginning in 2000, the City's Water Department worked closely to develop a long-range water supply plan with a twelve member Citizen's Advisory Board (CAB). The CAB members, representing a variety of community interests and groups, were an integral part of the planning process. The result of this effort was the creation of the Long-Range Water Resources Plan (LRWRP) that was unanimously adopted by the City Council on December 9, 2002.

The LRWRP identified water conservation, water recycling, groundwater desalination, groundwater storage, ocean desalination, marine transport, water transfers, and imported supply from SDCWA and MWD as potential near-term and long-term supplies. Based on the recommendations of the LRWRP, the City has been increasing conservation and recycled water use and exploring new alternative sources of water, including groundwater. The City recently initiated an update of the LRWRP that is expected to be completed in 2012.

The City currently uses imported water, local surface water, recycled water, and a small amount of groundwater as its supply sources. This section describes the water supplies and their quantities, reliability, and water quality.

4.1 Imported Water

The City currently purchases most of its water from the SDCWA. The City has been receiving water from the SDCWA since 1947 and during the last 20 years the City has purchased between 100,000 and 228,000 AF of water per year. This section presents the City's amounts needed from imported water, the wholesaler planned sources of water, supply reliability, and factors resulting in inconsistency of the imported supply.

In order to help the SDCWA plan for their customers' future demands, the Act requires that each agency who receives wholesale water provide their demand projections to the wholesaler. Therefore, demand projections for imported water for the City are presented in Table 4-1.

Table 4-1. Retail Agency Demand Projection Provided to Wholesaler (AFY)

Wholesaler	Contracted Volume	2015	2020	2025	2030	2035
San Diego County Water Authority	[a]	201,719	221,458	237,622	249,728	260,107

DWR Table 12

[a] *The SDCWA does not define contract volumes.*

The SDCWA's water supplies consist of a variety of supply sources. This water resources mix allows the SDCWA to provide supply reliability to its customers. The SDCWA's supply sources consist of the following components:

1. The supply allocation from MWD;

2. The water obtained by the adoption of the Quantification Settlement Agreement with IID and other parties to transfer water;
3. The water obtained from the agreement between SDCWA, IID, and other parties to line the All-American Canal (AAC) and the Coachella Canal (CC), and
4. The commencement of the SDCWA's Seawater Desalination Program.

The SDCWA's water supply estimates are presented in Table 4-2. A more detailed discussion regarding the water supplies can be found in the SDCWA's 2010 Urban Water Management Plan.

Table 4-2. Wholesale Supplies-Existing and Planned Sources of Water (AFY)

Wholesaler sources	Contracted Volume	2015	2020	2025	2030	2035
San Diego County Water Authority	[a]	201,719	221,458	237,622	249,728	260,107
Total		201,719	221,458	237,622	249,728	260,107

DWR Table 17

[a] *The SDCWA does not define contract volumes.*

4.2 Local Surface Water

The City's local surface water is collected as runoff from local watersheds in the City's reservoirs. Use of local surface water by the City to meet water demand is affected by availability (rainfall) and water resource management policies. The City operates its reservoir system to maximize use of local water supplies in conjunction with imported water programs.

The City also operates the reservoirs to store emergency water, which increases emergency supply reliability by maintaining a sufficient amount of water in accessible storage should earthquakes or other events interrupt the supply of imported water. The management of reservoirs is guided by San Diego City Council Policy 400-04, which outlines the City's Emergency Storage Policy. The policy mandates that the City store sufficient water in active, available storage to meet the City's upcoming six-tenths of the annual (7.2 months) normal water demands. The emergency storage requirement changes from month to month and thus results in seasonally fluctuating emergency storage requirements, generally peaking in April and reaching its minimum in October. In FY 2011, the emergency storage requirement ranged from 134,000 AF to 168,500 AF. Emergency storage is accounted for at Lake Skinner (a MWD reservoir) and several City reservoirs (San Vicente, El Capitan, Lower Otay, Murray, and Miramar). In addition, the City has made substantial investments in the SDCWA's Emergency Storage Project (152,000 AF including carry over with 90,000 AF for the City), Olivenhain Reservoir, and MWD's Diamond Valley Reservoir (800,000 AF) through water rates and charges paid by the City to those agencies.

4.3 Groundwater

According to the LRWRP, groundwater resources present a promising local supply opportunity, and the City is exploring the potential for groundwater to be a future water supply source. The City overlies and is in the vicinity of several groundwater basins. The groundwater basins in the vicinity of the City with their DWR designated basin number from Bulletin 118 (DWR, 2003) are listed in Table 4-3. None of the groundwater basins are adjudicated or have been declared to be in overdraft, but the California Supreme Court has ruled that the City has Pueblo Water Rights in the San Diego River Valley Basin.

Groundwater is addressed in the recent water legislation SBX7-6 that requires monitoring of groundwater levels with specific reporting requirements.

The groundwater basins are characterized by generally stable groundwater levels. The groundwater quality is often brackish, with total dissolved solids (TDS), chloride, and sodium impairing its use for potable supply, unless treatment is provided.

The City currently pumps a small amount of water from the San Diego River Valley Basin as shown in Table 4-4.

Table 4-3. DWR Groundwater Basins in the Vicinity of the City of San Diego

Basin name	DWR basin number
San Pasqual Valley	9-10
San Dieguito Creek	9-12
Poway Valley	9-13
Mission Valley Basin	9-14
Santee/El Monte [(a)]	9-15
El Cajon Valley	9-16
Sweetwater Valley	9-17
Otay Valley	9-18
Tijuana Basin	9-19
Pamo Valley Basin	9-24

Note:

[(a)] Identified as the San Diego River Valley Basin in DWR Bulletin 118

Table 4-4. Groundwater-Volume Pumped (AFY)

Basin name (DWR basin number)	Metered or Unmetered	2006	2007	2008	2009	2010
Santee/El Monte Basin (9-15) [(a)]	0	0	0	500	500	500
Groundwater as Percent of Total Water Supply	0	0	0	0.2	0.2	0.2

DWR Table 18

Note:

[(a)] Identified as the San Diego River Valley Basin in DWR Bulletin 118

Table 4-5. Groundwater-Volume Projected to be Pumped (AFY)

Basin name	2015	2020	2025	2030	2035
Santee/El Monte Basin (9-15) [(a)]	500	500	500	500	500
Percent of Total Water Supply	0.2	0.2	0.2	0.2	0.2

DWR Table 19

Note:

[(a)] Identified as the San Diego River Valley Basin in DWR Bulletin 118

The City is currently investigating several of the local groundwater basins to determine their feasibility as a source of supply. The City sees these basins as a local asset and a possible way to improve its water supply reliability. There are two types of water supply that these groundwater basins could provide:

(1) safe yield production, providing a yearly supply; and

(2) storage (conjunctive use) of imported and/or reclaimed water, providing a dry year supply.

The City is moving ahead with field studies through drilling exploratory monitoring and pilot production wells that will be used to determine safe yield (inflow and outflows), water quality, and other basin characteristics. In late 2011 the City will be entering into a multi-year, multi-million dollar agreement with a consulting firm to assist with investigating, evaluating and developing the City's groundwater assets. Some elements of this agreement will include: groundwater management planning, project management and construction of groundwater monitoring and production wells, preparation of aquifer storage and recovery plans, seawater intrusion and control plans, nutrient /salinity management plans, and groundwater specific designs, specifications and construction services Figure 4-1 presents the locations of these groundwater investigations for the following basins.

San Pasqual

The San Pasqual Basin is located in the northern part of the City approximately 25 miles northeast of downtown San Diego. The majority of the San Pasqual Basin is owned and managed by the City. A designated agricultural preserve, the San Pasqual Valley is sparsely populated and includes row crop, orchard, nursery and dairy operations. In November 2007, the City Council adopted the San Pasqual Groundwater Management Plan (GMP) that defines an adaptive management approach for the basin (http://www.sandiego.gov/water/gen-info/watersupply.shtml). The City has been actively managing and implementing the GMP basin recommendations in cooperation with the local community/agricultural groups.

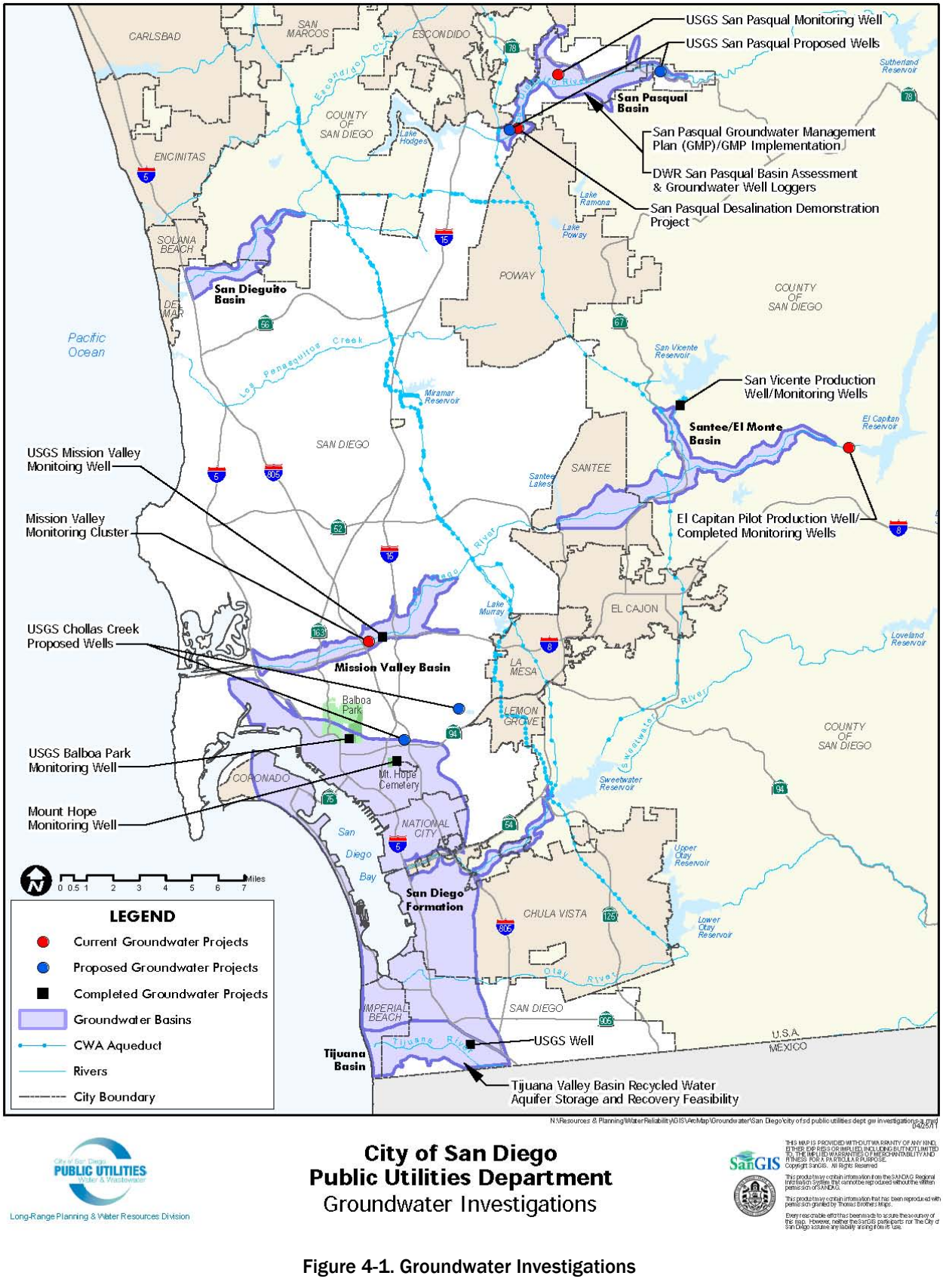
Several studies have already been completed for this basin, and include:

1. Piloting a brackish groundwater desalination process to evaluate water treatment processes for the groundwater present in the basin.
2. Utilization of the basin for groundwater conjunctive use.
3. Installation of a USGS multi-depth monitoring well
4. Salinity study

Future work will involve more USGS monitoring wells, collaboration with the California Department of Water Resources (DWR) on a groundwater monitoring plan, exploration of basin recharge alternatives and further implementation of the goals in the GMP. The continued work in this basin is with the intent of developing an integrated, comprehensive understanding of the geology and hydrology of the San Pasqual, and to use this understanding to manage the basin in a sustainable and environmentally sound manner.

Santee/El Monte

The Santee/El Monte Basin (identified as the San Diego River Valley Basin in DWR Bulletin 118) is located in the eastern portion of the San Diego River watershed near the cities of Santee, La Mesa, El Cajon, and Lemon Grove and extends up into the Julian Mountains. The City has an existing municipal supply well along San Vicente Creek downstream of the San Vicente Reservoir. The City will upgrade that exiting well to bring it online with the City's Supervisory Control and Data Acquisition (SCADA) system for remote management and control. In March 2010, the City drilled a pilot production, municipal supply well about a quarter mile downstream of its El Capitan Reservoir. This pilot production well is anticipated to be connected to the City's raw water supply system in FY 2012.



City of San Diego
PUBLIC UTILITIES
Water & Wastewater
Long-Range Planning & Water Resources Division

City of San Diego
Public Utilities Department
Groundwater Investigations

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Figure 4-1. Groundwater Investigations

To prepare for eventual use of the groundwater from these sites, the City has installed a network of monitoring wells, obtaining groundwater levels and has been collecting biological data in the groundwater basin to establish baseline environmental conditions. This baseline data will help determine if groundwater pumping is impacting the natural system and how groundwater pumping can be adaptively managed to mitigate such impact.

Mission Valley

The Mission Valley Basin, located in the central region of San Diego, is a basin of interest. This basin is being studied to determine the feasibility of pumping and desalinating the groundwater using reverse osmosis. The water quality in this basin has been negatively impacted due to petroleum products having been discharged by an adjacent storage facility since 1986. In 1992, a clean-up order was issued by the Regional Water Quality Control Board. The City has conceptual plans to develop groundwater in the most favorable part of the basin, however, it is in the most favorable part of the basin that the contamination has occurred and remediation is ongoing. The most prudent course of action for the City is to let the discharger complete the remediation before any development occurs in this portion of the basin. The City has identified another location adjacent to the monitoring well where it has installed a monitoring well cluster and is performing aquifer testing.

San Diego Formation (Sweetwater Basin and Otay Basin)

The San Diego Formation is a large groundwater basin that underlies the coastal plain of southern San Diego County. The City of San Diego is engaged in investigations to gain a better understanding of the San Diego Formation. Monitoring wells were drilled in 2007 and 2008, and future monitoring and pilot production wells will help characterize the water quality, quantity, and sustainability of the formation. The City is working with the United States Geological Survey (USGS) and other entities to develop an integrated, comprehensive understanding of the geology and hydrology of the formation, and to use this understanding to evaluate a sustainable, environmentally sound use of the formation for groundwater recharge and extraction. The City recently entered into a cooperative, joint funded agreement with the USGS to install highly sophisticated, monitoring wells to help identify the path of recharge to the San Diego Formation. These wells will not only aid in the immediate research of the formation, but will also be a part of a monitoring network to assure sustainability for future installations of municipal supply wells.

The City is currently looking to install a test well at a site within the City overlying the San Diego Formation. If groundwater well testing is successful, the City will move forward with performing a Drinking Water Source Assessment, environmental analysis and ultimately the installation of a municipal supply well or wells.

Tijuana River Basin

The Tijuana Basin located in the southwest corner of San Diego County, underlies the Tijuana River along the California-Mexico Border. The basin extends along the Tijuana River approximately 6 miles from the International Boarder to the Pacific Ocean and has historically experienced problems with seawater intrusion. With large storage capabilities, this basin offers significant opportunities for implementing water resource management strategies. The City is examining the feasibility of using the Tijuana Valley alluvial aquifer as a potential aquifer storage and recovery system to seasonally store recycled water from the South Bay Water Reclamation Plant to meet maximum day demands during the dry season.

The City will be looking into updating the groundwater management plan originally developed by the Tia Juana Valley County Water District in addition to other work building and improving our understanding of the basin groundwater elevation cycles and the corresponding water quality impacts for sea water intrusion. As with the other groundwater basins, the City will be performing this work to determine the nature and characteristics of this basin for its use as a water storage and/or supply source.

4.4 Desalination

Ocean desalination is a process where salt and other impurities are removed from seawater. Desalinated seawater, used as a potable water supply in many areas of the world where fresh water is deficient, is sometimes described as a solution to the San Diego region's reliance on the Colorado River and northern California water supplies.

The City has no current plans to develop an ocean desalination project. The City supports the SDCWA in its efforts to promote ocean desalination as a viable technology in San Diego County. The SDCWA's 2010 Plan should be consulted for details regarding the SDCWA's plans for implementing ocean desalination. Table 4-6 summarizes the opportunities for desalinated water.

Table 4-6. Opportunities for Desalinated Water

Sources of water	Opportunities
Ocean water	Nearby ocean supply. Permitting challenges. Never implemented in San Diego County. SDCWA to evaluate and implement.
Brackish ocean water	
Brackish groundwater	City is pursuing brackish groundwater sources.

4.5 Transfer and Exchange Opportunities

Water transfers are agreements in which water supplies are transferred from the original point of origin or control to a new place of use. Water transfers are defined as voluntary, market-based exchanges of water from willing sellers to willing buyers. Transfers can offer flexibility and help ensure that the state's water resources are used effectively, but there are a myriad of rules surrounding transfers in California. The City supports the SDCWA in its efforts to identify water transfer opportunities, and has no current plans to use water transfers as a supply resource to meet projected demands.

In 2003, the IID, Coachella Valley Water District, and other parties formally agreed to sell conserved water to the SDCWA. The Colorado River Quantification Settlement Agreement (QSA) will provide up to 200,000 AFY of water by 2021 to the SDCWA and its member agencies through water conservation measures in Imperial Valley. The QSA also allows for the transfer of water conserved from the concrete lining of portions of the previously earthen AAC and CC from the IID. The canal lining projects reduce the loss of water that occurs through seepage. The SDCWA has been receiving 77,700 AF of this conserved water per year since 2010. Additionally, MWD has established a formal water transfer agreement with the Palo Verde Irrigation District (PVID) to transfer varying amounts of Colorado River water to MWD as part of a voluntary fallowing program offered to PVID customers. MWD also has pioneered various spot market water transfers with farmers in California's Central Valley during dry years. The SDCWA may also pursue spot market water transfers during dry years independently of MWD, however, doing so may require paying wheeling costs to MWD. The cost may be justified by the increased reliability that would be attained. MWD's and the SDCWA's 2010 Urban Water Management Plans should be consulted for details on their transfer and exchange opportunities.

A summary of the water supply transfer and exchange opportunities available to the City's wholesale suppliers is provided in Table 4-7.

Table 4-7. Transfer and Exchange Opportunities (AFY)			
Transfer agency	Transfer or exchange	Short term or Long Term	Proposed Volume, AFY
MWD	Transfer of Colorado River water from PVID from fallowing. Miscellaneous spot transfers from Central Valley agriculture.	See MWD's 2010 Regional Urban Water Management Plan.	See MWD's 2010 Regional Urban Water Management Plan.
SDCWA	Transfer of conserved water from IID. Miscellaneous spot transfers from Central Valley suppliers.	See SDCWA's 2010 Urban Water Management Plan.	See SDCWA's 2010 Urban Water Management Plan.

DWR Table 20

4.6 Recycled Water

Water recycling, a component of the City's local water supply portfolio, is the treatment of municipal wastewater for beneficial reuse purposes, thereby reducing demands for potable water. "Recycled water" is defined in the California Water Code as "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur." CDPH sets the water quality criteria for specific uses of recycled water in Title 22 of the California Code of Regulations. The City's recycled water is treated to a Title 22 disinfected tertiary level quality suitable for irrigation, industrial processes including cooling water, construction uses, ornamental fountains, flushing toilets and urinals and groundwater recharge.

This section provides information on the amount of generated wastewater, existing disposal of wastewater, the existing and projected uses of recycled water as well as the quantity of recycled water potentially available.

4.6.1 Agency Participation

The City has agreements with a number of local agencies that define the terms of the City providing recycled water supply. Table 4-8 identifies the agencies with whom the City coordinates with to supply recycled water.

Table 4-8. Recycled Water Coordination	
Agencies	Role in Plan Development
Otay Water District	Wholesale recycled water customer
City of Poway	Wholesale recycled water customer
Olivenhain Municipal Water District	Wholesale recycled water customer

4.6.2 Wastewater Quantity and Disposal

This section provides information on the wastewater collected and treated within the City's service area. The City collects and treats wastewater from the City and surrounding municipalities and sewer districts. The City is responsible for transporting the San Diego region's wastewater to the Point Loma Wastewater Treatment Plant (PLWTP) or one of the two water reclamation plants. The City treats approximately 180 MGD of wastewater, generated in a 450 square mile area by more than 2.2 million residents within the City and 15 other cities and districts (called Participating Agencies). The Participating Agencies are the Cites of Chula Vista, Coronado, Del Mar, El Cajon, Imperial Beach, La Mesa, National City, and Poway,

Lemon Grove Sanitation District, Otay Water District, Padre Dam Municipal Water District, and Lakeside/Alpine, Spring Valley, Wintergardens, and East Otay Mesa located in the unincorporated portions of County of San Diego.

The City's collection system consists of 61,717 sewer manholes, over 3,000 miles of sewer mains, 83 sewer pump stations, and 54 storm water interceptor stations, with approximately 10 percent of the sewer lines located in canyons and open space. The sewer main diameters range from 4 inches to 114 inches.

The wastewater is treated at the PLWTP, the North City Water Reclamation Plant (NCWRP), and the South Bay Water Reclamation Plant (SBWRP). The current and projected volume of collected wastewater and the amount that meets recycled water standards from the City's service area is presented in Table 4-9. The current and projected annual volume of disposed wastewater is presented in Table 4-10.

Table 4-9. Recycled Water-Wastewater Collection And Treatment (AFY)

Type of Wastewater	2010	2015	2020	2025	2030	2035
Wastewater collected and treated in service area[a]	120,080[b]	121,205	124,188	127,313	131,450	136,192
Volume that meets recycled water standard [c]	8,906[b]	16,950	16,950	16,950	16,950	16,950

DWR Table 21

Source: Email from D. Glanville, Feb. 2, 2011.

Notes:

[a] The SANDAG Series 12 Forecast was used to project City's sewage flow within the City's Water Service Areas. The projected annual flow volume includes the wet weather component contributed by the 2-year storm. The flow projection based on this return period represents the median value.

[b] Actual flow.

[c] Includes City's recycled water supply and recycled water sold to other agencies.

Table 4-10. Recycled Water-Non-Recycled Wastewater Disposal (AFY)

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Point Loma Ocean Outfall	Advanced Primary or better	108,952[a]	102,744	106,497	109,622	113,759	118,500
South Bay Ocean Outfall[b]	Secondary or better	2,222[a]	1,481	741	741	741	741
Total		111,174[a]	104,255	107,238	110,363	114,500	119,242

DWR Table 22

Notes:

[a] Actual ocean discharge flow.

[b] South Bay currently discharges about 3 MGD to the ocean. Assumes that it will discharge 2 MGD in 2015 and 1 MGD in other years. The City's flow is approximately 66% of the Metro flow.

The PLWTP is located on a 40 acre site on the bluffs of Point Loma; the plant has a treatment capacity of 240 MGD. In compliance with federal and state laws, the PLWTP processes wastewater at an advanced primary treatment level. After a final screening, the treated wastewater, called "effluent," is discharged to the ocean through the 4.5 mile long ocean outfall.

The NCWRP currently treats an average wastewater inflow of 23.0 MGD, which is 77 percent of its capacity. Of this amount, approximately 6.7 MGD of tertiary-treated recycled water was produced and beneficially reused in 2010. The remaining flow is treated to a secondary level and returned to the sewer system where it mixes with untreated wastewater as it is conveyed to the PLWTP for treatment.

The 15 MGD SBWRP became operational in the summer of 2002. It currently produces 6.5 MGD of tertiary-treated wastewater, of which 4.2 MGD was beneficially reused in 2010 with the remaining disposed of via an ocean outfall. Certification of the tertiary treatment facilities by the RWQCB was granted in 2004.

4.6.3 Recycled Water Use

This section describes existing recycled water use in the City. Non-potable reuse typically uses disinfected tertiary treated recycled water that meets California water quality standards for uses that are not associated with drinking water, such as irrigation, industrial and construction purposes, ornamental fountains and toilet and urinal flushing. Non-potable applications have been proven safe, reliable and effective at reducing the need for potable water, particularly during peak summer months. The City produces recycled water that is primarily used for irrigation and industrial processes. The City owns and operates a recycled water system that supplies water to more than 500 retail customers as well as several wholesale customers. The wholesale customers include the City of Poway, Olivenhain Municipal Water District, and the Otay Water District.

The City's recycled water system is divided into two service areas. The Northern Service Area is supplied with recycled water from the NCWRP and consists of 83 miles of recycled water pipeline, two storage tanks and two pump stations. The Southern Service Area is supplied with recycled water by the SBWRP and consists of 3,000 feet of recycled water pipeline, one storage tank, and one pump station. The recycled water service areas are depicted on Figure 4-2.

Table 4-11 shows actual recycled water use by the City in 2010, compared to the 2010 projection made in the City's 2005 Plan.

Table 4-11. Recycled Water-2005 UWMP Use Projection Compared with 2010 Actual (AFY)

Use Type	2010 Actual Use [a]	2005 Projection for 2010 [b]
Landscape irrigation	4,702	5,441
Industrial reuse	2,954	2,984
Other (wholesale to other agencies)	3,660	3,409
Total	11,316	11,934

DWR Table 24

Note:

[a] 2010 actual use from table entitled Recycle Water Demand Projections, dated March 8, 2011.

[b] Projection from Tables 2-7 and 2-8 of the City's 2005 Plan.

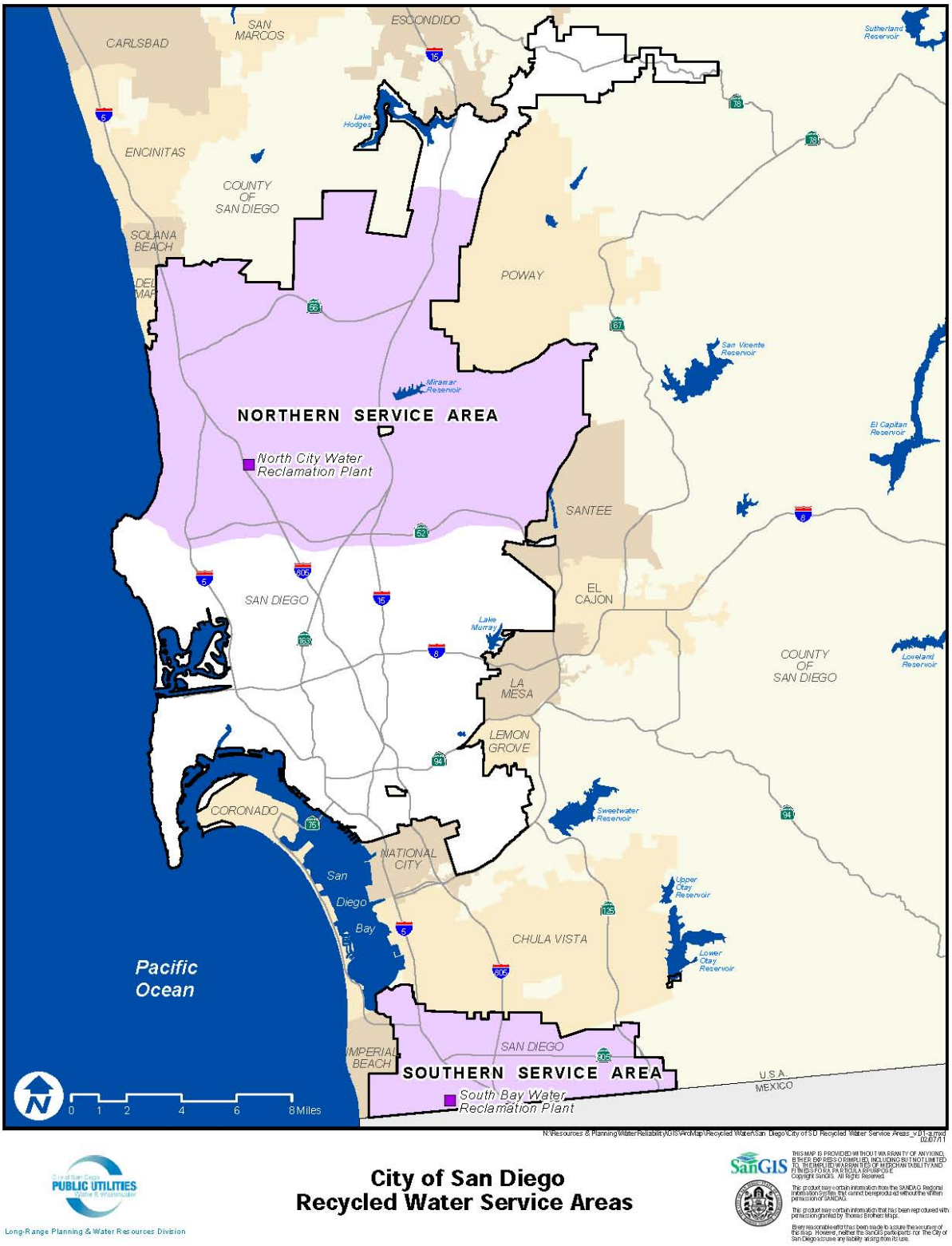

Figure 4-2. Recycled Water Service Areas

4.6.4 Potential and Projected Recycled Water Use

The City is currently conducting a Recycled Water Study (RWS) that is focusing on identifying opportunities to increase the usage of recycled water for potable and non-potable uses and the potential costs of implementing such opportunities. The RWS will evaluate the potential amount of wastewater that can be treated for potable reuse through reservoir augmentation (RA). The RWS will also evaluate the facilities required to treat and deliver more recycled water to potential non-potable reuse customers. The analysis includes the feasibility of expanding the distribution system and/or building new satellite treatment facilities.

In addition to the RWS, the City is also updating its Recycled Water Master Plan (Master Plan). Updated every five years, the 2010 Master Plan update is a component of the RWS, and will include information about potential areas to expand the City's existing non-potable reuse system. A major function of the Master Plan is to forecast reasonable recycled water demands. The Master Plan will include a general assessment of costs and benefits of each proposed project. The next update will be made available to the public in Fall 2011.

The City has limited local water sources and relies on importing approximately 85 to 90 percent of its water supply. In the past, importing water from the Colorado River and Northern California has been a low-cost, reliable option, but drought, environmental stresses and court-ordered pumping restrictions have continued to reduce the amount of water that can be delivered to San Diego. These circumstances and the threat of further limitations on our water supplies have intensified the need for new sources of water. As part of the City's effort to provide a local and sustainable water supply, the Water Purification Demonstration Project (WPDP) is examining the use of advanced water purification technology to provide safe and reliable water for San Diego's future.

The WPDP is the second phase of a three phase process evaluating ways for the City to increase its use of recycled water. The first phase was the City's 2005 Water Reuse Study that identified reservoir augmentation (RA) as the preferred option for developing recycled water sources. The WPDP will determine if RA is a feasible option for San Diego.

Reservoir augmentation is a multi-step process that includes:

- Using advanced water purification technology on tertiary-treated water.
- Sending the purified water to be stored in a surface water reservoir to blend with existing water supplies which consists of imported and local surface water.
- Treating the blended water again at a WTP and then distributing as drinking water.

The Demonstration Project is underway and will conclude in 2012. During this time, the Advanced Water Treatment Plant (AWTP) will operate for approximately one year and will produce 1 MGD of purified water. A study of the San Vicente Reservoir is being conducted to test the key functions of RA and to determine the viability of a full-scale project. During the demonstration phase, no purified water will be sent to the reservoir. Instead the purified water will supply water to the non-potable recycled water distribution system.

Project research is being conducted to determine (1) if the purification system satisfies all water quality, safety, and regulatory requirements of the CDPH and RWQCB, and (2) the behavior of the reservoir and what will happen if the purified water is added. An independent advisory panel of experts is providing oversight for the research. A summary report detailing the results of the WPDP will be provided to the Mayor and San Diego City Council. If deemed technically feasible and following Mayoral and City Council authorization, a full-scale RA project would be implemented.

The potential benefits of implementing RA in San Diego include:

- Provide a local and sustainable supply of high-quality drinking water for San Diego.

- Increase utilization of recycled water.
- Decrease dependence on imported water.
- Provide a supply of water that uses less energy than imported water.
- Improve the quality of water in the San Vicente Reservoir.
- Have a positive impact on the environment by producing less discharge into the ocean and working toward lower carbon emissions that would otherwise occur from pumping imported water supplies.

In an effort to keep San Diego citizens informed about this project, the public outreach program will provide tours of the AWTP (following its completion in 2011), and project presentations are being made to community groups and other stakeholders for the duration of the project.

The elements of the three phases of the process are presented below:

Phase 1: Water Reuse Study

- A comprehensive evaluation of all viable options to maximize the use of recycled water produced at reclamation plants.
- Analyzed and researched the health effects of reuse options, followed by a public participation process.
- Stakeholders identified RA at the City's San Vicente Reservoir to be their preferred strategy.
- In October 2007, the City Council accepted the study report and recognized the North City-3 strategy as their preferred alternative. The North City-3 strategy is a water reuse strategy that would maximize the available North City water supply through indirect potable reuse, have less dependence on imported water, have a locally controlled drought proof supply and offset discharge of wastewater into the ocean. It provides the lowest overall unit cost and greatest geographic area of utilization.

Phase 2: Water Purification Demonstration Project

- Design, construct, operate, and test a demonstration-scale AWTP at the NCWRP.
- Conduct a limnology study of San Vicente Reservoir.
- Define the state's regulatory requirements.

Phase 3: Reservoir Augmentation Project

- If deemed technically and economically feasible, and after City Council and Mayoral approval, a full-scale AWTP could produce approximately 15,000 AFY of high quality advanced treated recycled water.
- The full-scale AWTP would be located adjacent to the NCWRP and use tertiary treated recycled water as its source.
- Construction of a 23-mile pipeline would be necessary to transport treated water to San Vicente Reservoir.
- The treated water would be blended with local runoff and imported water and would reside in the reservoir prior to being sent to a water treatment plant for additional treatment and distribution as potable water.

The projected volume of recycled water use by the City, excluding recycled water sold to other agencies, is shown in Table 4-12 (potable reuse is not included in Table 4-12 because the WPDP is underway but is not complete, so the outcome for a full-scale plant is not known). The projected amount of recycled water to be sold to Poway, Olivenhain, and Otay for 2015 and later is 7,697 AFY.

Table 4-12. Recycled Water-Potential Future Use (AFY)							
User Type	Description	Feasibility	2015	2020	2025	2030	2035
Landscape irrigation	To offset potable water use.	Yes, being evaluated in Master Plan.	5,644	5,644	5,644	5,644	5,644
Industrial reuse	See Master Plan.	Yes, being evaluated in Master Plan.	3,609	3,609	3,609	3,609	3,609
Potable reuse	See text.	Being investigated. See text.	0	0	0	0	0
Total			9,253	9,253	9,253	9,253	9,253

DWR Table 23

Source: From table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.

Notes:

1. Recycled water is City use only and excludes recycled water sold to other agencies.

The actions that the City uses to encourage recycled water use are water supply reliability, financial incentives, and public outreach. Some customers select to receive recycled water to avoid water use restrictions. The price of recycled water is currently lower than the price of potable water because the full cost of supplying recycled water is not reflected in the price. The City may increase the price of recycled water in the future to more accurately reflect its true cost.

Outreach methods used by the City to encourage recycled water use includes focusing on increasing connections to in-fill customers and those customers located along the existing distribution system by:

1. Meeting with potential customers and conducting site visits to give them an idea of what they need to do to retrofit their property.
2. Giving presentations to organizations (e.g., Association of Golf Superintendents, Landscape Architects, homeowners associations, etc.).
3. Updating recycled water web site with timely information on how to connect to the recycled water system.
4. Contacting existing recycled water irrigation customers who could increase their potable water use efficiency by switching their cooling towers systems over to recycled water.

The 2010 Master Plan will evaluate actions based upon the recommendations for system or customer base expansion. The Master Plan will also define the potential annual recycled water use if those strategies are adopted.

4.7 Potential Water Supplies

Tables 4-13 and 4-14 present possible future water supply projects that the City is currently investigating. Table 4-15 summarizes the current and projected water supplies.

Table 4-13. Future Recycled Water Projects

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Normal-year supply, AF	Single-dry year supply, AF	Multiple-Dry-Year first year supply, AF	Multiple-Dry-Year second year supply, AF	Multiple-Dry-Year third year supply, AF
Reservoir Augmentation Project[a]	[a]	[a]	Requires City Council and Mayoral approval.	15,000	15,000	15,000	15,000	15,000
Northern Service Area Recycled Water Expansion	2013	2016	Requires final permits and approvals.	2,740	2,740	2,740	2,740	2,740

DWR Table 26

[a] The schedule and supplies for this potential water supply project will not be known until ongoing studies are completed and necessary City approvals are obtained.

Table 4-14. Groundwater Feasibility Studies and Project Concepts

Project Type	Groundwater Basin or Location	Groundwater Conceptual for New Production (AFY)					
		2010	2015	2020	2025	2030	2035
Brackish GW Recovery and Treatment	San Pasqual Basin	0	560	1,120	2,240	3,360	4,480
Brackish Groundwater Recovery and Treatment	Mission Valley Basin (Alluvial Aquifer / San Diego River)	0	-	1,760	1,760	1,760	1,760
Groundwater Recovery	San Diego Formation Pilot Production Well	0	-	650	1,300	1,300	1,300
Groundwater Recovery	San Diego Formation Southeastern Pilot Production Well		800	1,600	1,600	1,600	1,600
Groundwater Recovery	Santee-El Monte Basin (San Vicente & El Capitan)	0	700	1,400	1,400	1,400	1,400

Table 4-15. Water Supplies-Current and Projected (AF)						
Water Supply Sources	Wholesaler Supplied Volume (yes/no)	2015	2020	2025	2030	2035
San Diego County Water Authority	**Yes**	**201,719**	**221,458**	**237,622**	**249,728**	**260,107**
Supplier produced surface water [a]		**29,000**	**29,000**	**29,000**	**29,000**	**29,000**
Supplier produced groundwater		**500**	**500**	**500**	**500**	**500**
Transfers In		**0**	**0**	**0**	**0**	**0**
Exchanges In		**0**	**0**	**0**	**0**	**0**
Recycled Water [b]		**9,253**	**9,253**	**9,253**	**9,253**	**9,253**
Desalinated Water		**0**	**0**	**0**	**0**	**0**
Other		**0**	**0**	**0**	**0**	**0**
Total		**240,472**	**260,211**	**276,375**	**288,481**	**298,860**

DWR Table 16

Notes:

[a] Local surface water estimates provided by City, 2011.

[b] Recycled water excludes recycled water sold to other agencies and is from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.

Table 4-15 shows a decrease in the recycled water projections versus the 2005 Plan. In the 2005 Plan, the projected recycled water use was based on the expansion of the non-potable system, which did not proceed as planned, but is moving forward in 2011.

However, the RWS will provide recommendations for future water reuse projects, and will likely include a blend of indirect potable reuse (IPR) and non-potable reuse projects. Until the WPDP is complete in 2012, the City's ability to implement IPR projects will not be known. Also, the 2010 Master Plan will include information about potential areas to expand the City's existing recycled water system. As the implementation of future non-potable reuse beyond already planned system expansions through 2015 are pending the findings of the WPDP, the 2010 Plan recycled water projections are held constant.

4.8 Water Supply Reliability

Providing reliable and sufficient water supplies upon demand has been a constant challenge for the City. The City has addressed the water supply challenge with a variety of strategies including:

- Conservation and peak management programs
- Storage
- Water transfers
- Local surface water
- Recycled water

The City presently relies upon imported water to supply a majority of its annual water supply (higher during times of drought). Each of the imported and local water supply sources that the City depends on to meet water demands could be vulnerable to legal, environmental, water quality, or climatic uncertainties (inconsistency of supply).

In order to improve water supply reliability, the City continues to pursue water recycling and conservation programs. Furthermore, the City relies upon SDCWA and MWD to develop additional sources of water and storage for increased reliability.

As required by the Act, the City has developed a water shortage contingency plan that is presented in Appendix B. The plan presents actions the City would take to address short-term interruption in water supply.

Table 4-16 presents the basis for water year data that is used to project future local surface water supplies for various water year types. As defined by the DWR Guidebook, the single-dry year is generally considered to be the lowest annual runoff for a watershed. The multiple-dry year period is considered to be the lowest average runoff for a consecutive multiple-year period (4 years) for a watershed.

Table 4-16. Basis of Water Year Data

Water Year Type	Base Year(s)
Average Water Year	1978
Single-Dry Water Year	1964
Multiple-Dry Water Years	1961-1965

DWR Table 27

Source: Email from David Glanville and Rosalva Morales, City, June 19, 2009.

Tables 4-17 and 4-18 present the City's historical and current water supplies for normal and single and multiple-dry years based on 2015 projections. The wholesale water supplies from SDCWA are assumed to increase to meet the difference between the City's increased dry year water demands and reduced dry year local water supplies.

Table 4-17. Supply Reliability – Historic Conditions (AFY)

	Average/ Normal Water Year	Single Dry Water Year	Multiple Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
San Diego County Water Authority	201,719	240,787	240,334	249,470	265,813	267,213
Local surface water [(a)]	29,000	4,500	7,500	8,100	5,900	4,500
Groundwater	500	500	500	500	500	500
Recycled water[(b)]	9,253	9,253	9,253	9,253	9,253	9,253
Total	240,472	255,040	257,587	267,323	281,466	281,466
Percent of Average/Normal Year	100	106	107	111	117	117

DWR Table 28

Note:

[(a)] Local surface water dry year cutbacks based on 2005 Plan.

[(b)] Recycled water excludes recycled water sold to other agencies and is for 2011 from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.

Table 4-18. Supply Reliability – Current Water Sources (AFY)				
Water Supply Sources	Average Year	Multiple Dry Water Year Supply		
		Year 1	Year 2	Year 3
San Diego County Water Authority	201,719	240,334	249,470	265,813
Local surface water	29,000	7,500	8,100	5,900
Groundwater	500	500	500	500
Recycled water	9,253	9,253	9,253	9,253
Total	240,472	257,587	267,323	281,466
Percent of Average/Normal Year	100	107	111	117

DWR Table 31

Note: Local surface water dry year cutbacks based on 2005 Plan. Recycled water excludes recycled water sold to other agencies and is from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.

4.9 Factors Resulting in Inconsistency of Supply

Factors resulting in inconsistency of supply are summarized in Table 4-19. Alternatives to replace inconsistent sources may potentially include the use of groundwater, purchase of imported water, use of recycled water, implementation of aquifer storage and recovery, and increased conservation. The City may not rely on any one source, but a combination of sources and would increase these sources to meet any shortfall caused by inconsistency in supply.

Water quality issues are not anticipated to have a significant impact on water supply reliability. Water quality issues would be mitigated by using the existing water treatment facilities to treat water supplies to meet drinking water standards.

Table 4-19. Factors Resulting in Inconsistency of Supply							
Water supply sources	Specific source name	Limitation quantification	Legal	Environmental	Water Quality	Climatic	Additional information
San Diego County Water Authority [(a)]	Delta and Colorado River	See Section 4.	Current supply from Delta is occasionally inconsistent due to legal and environmental decisions. Future supply may not be consistent due to delays in construction, legal rulings, or environmental decisions. Legal decisions regarding the Quantification Settlement Agreement could reduce supplies from the Colorado River.		None	Drought and climate change could result in reductions of imported water supply. Colorado River supply may be reduced due to extended drought period.	
Local surface water	Local watersheds. See Section 2.	See Section 4.	None	None	None	Drought and climate change could result in reductions of local surface water supply.	
Recycled water			None	None	None	None	

DWR Table 29

Note:

[(a)] See SDCWA's 2010 Plan for details.

The impacts that climate change will have on the City's water supply are not well known. However, some general predictions can be made, as described below. These impacts are projected to develop over the next 100 years, with major changes noticeable by 2030, and some changes already noticeable today.

- Change in central and northern California and Rocky Mountain precipitation from snow to rain. Climate changes will decrease the precipitation in the form of snow and increase the precipitation in rain. This change would result in water runoff in a shorter time frame. Having reservoirs of sufficient capacity to capture the runoff is an issue. If reservoir capacity is not sufficient, water will be lost to spilling. The magnitude of runoff velocity and volume will increase, but over a shorter period of time. Increased erosion is expected, resulting in higher turbidities and solids. DWR has noted that the peak runoff period in the Sacramento River watershed is already trending earlier in the runoff season. The annual runoff from the Colorado River has noticeably reduced during the last 10 years.
- The timing of when precipitation falls may shift due to climate change. Operators of the Colorado River and central and northern California water systems and reservoirs will have to change storage and pumping practices to accommodate the timing of the precipitation.
- If the climate becomes warmer, increased water demand for agriculture, landscape, and cooling will be encountered.
- Changes in water quality due to climate change may include increased solids, turbidity, and taste and odor issues. These changes should not decrease the supply of water. Water quality changes would be treated using the City's existing water treatment facilities and may result in increasing the cost of treatment.
- The number and frequency of drought years may increase due to climate change. Storage capacity is critical to addressing the drought years.
- The total amount of precipitation may decrease.
- Extended droughts may require additional releases of water to the Delta for environmental concerns, thereby limiting Delta exports.
- Environmental concerns for maintaining a healthy ecosystem will influence pumping and water releases.
- Legal challenges on water rights and quality have been ongoing and will continue. The legal issues will result in unknown consequences.
- Increased population and environmental issues will result in additional energy usage. With the state wanting to decrease its green house gas emissions to 1990 levels by 2020 as stated in Assembly Bill 32, increased energy usage to supply and deliver water may have to be mitigated.

4.10 Water Quality Impacts on Future Water Supply

The Act requires that the 2010 Plan include information, to the extent practicable, on the quality of existing supply sources and the manner in which water quality affects water supply reliability. This section summarizes water quality issues associated with supplies serving the City.

4.10.1 Colorado River

High salinity levels and perchlorate contamination represent two areas of concern regarding the quality of Colorado River supplies. Agricultural development and water diversions over the past 50 years have increased the already high naturally occurring levels of TDS. Water imported via the Colorado River has a TDS averaging around 650 milligrams per liter (mg/L) during normal water years. To reduce the affects of high TDS levels, MWD approved a Salinity Management Policy in April 1999. One of the policy goals is to blend Colorado River supplies with lower-salinity water from the SWP to achieve delivered water salinity levels less than 500 mg/l of TDS.

Perchlorate has been detected at low levels in MWD's Colorado River Aqueduct water supply. Because of the growing concerns over perchlorate levels in drinking water, in 2002 MWD adopted a Perchlorate Action Plan. Objectives include expanded monitoring and reporting programs and continued tracking of remediation efforts in the Las Vegas Wash. MWD has been conducting monthly monitoring of Colorado River supplies.

4.10.2 State Water Project

The quality of SWP water as a drinking water source is affected by a number of factors, most notably 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 (SDWA). Wastewater discharges from cities and towns surrounding the Delta also add salts and pathogens to Delta water, and they reduce its suitability for drinking and recycling. The City treats all water to meet stringent state and federal drinking water standards before delivering it to customers.

4.10.3 Local Surface Water

The local surface water supplies are treated to meet drinking water standards before being delivered to the City's customers. Water quality can vary with imported water inflows and surface water quality degradation. The City's local surface water quality is influenced by a variety of factors depending on its source. The City's surface water supplies are primarily vulnerable to increasing urbanization in the watershed, agriculture, recreational uses, wildlife, and fires. Currently, the most significant water quality issue that affects the public is algae blooms, which can create taste and odor problems. The effect of urban runoff on receiving water quality is a recently recognized problem. Considerable quantities of contaminants, nutrients in particular, may enter the receiving waters through urban runoff.

Source water protection is considered a key element in ensuring high quality local water supplies. The City is working to improve watershed awareness and management.

The City, SDCWA, and the County of San Diego have formed a Regional Water Management Group to coordinate development of an IRWM Plan for the San Diego region. An important element in the IRWM Plan is to protect and enhance the region's local surface water quality. As part of this process, projects have been identified and are being implemented to assist in watershed protection, and thereby, protect the quality of surface water supplies.

4.10.4 Overview

The quality of the City's treated water deliveries is regulated by the CDPH, which requires regular collection and testing of water samples to ensure that the quality meets federal and state regulatory standards by not exceeding maximum contaminant levels (MCL). Both the City and the SDCWA perform water quality monitoring, which has consistently yielded results within the acceptable regulatory limits.

The quality of treated surface water provided to the City's customers over the next 25 years is expected to continue to meet drinking water standards. Surface water will continue to be treated to drinking water standards and no impacts to water supplies due to water quality deficiencies are foreseen to occur in the next 25 years. Table 4-20 summarizes the current and projected water supply changes due to water quality.

Table 4-20. Water Quality – Current and Projected Water Supply Impacts (AFY)							
Water Supply Sources	Description of condition	2010	2015	2020	2025	2035	2035
San Diego County Water Authority	Treated by City to meet standards	0	0	0	0	0	0
Local surface water	Treated by City to meet standards	0	0	0	0	0	0
Recycled water	Treated by City to meet standards	0	0	0	0	0	0
Total		0	0	0	0	0	0

DWR Table 30

Section 5

Water Conservation Best Management Practices

Water conservation is an available method to reduce water demands, thereby reducing water supply needs for the City. The unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by the DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban Best Management Practices (BMPs), or also known as demand management measures (DMMs), for conserving water. This consensus-building effort resulted in a Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), which formalizes an agreement to implement these BMPs and makes a cooperative effort to reduce the consumption of California's water resources. The MOU is administered by the California Urban Water Conservation Council (CUWCC). The City was an original signatory of the MOU on September 23, 1991. Table 5-1 presents the water conservation BMPs as recently revised by the CUWCC. Foundational BMPs are required of all MOU signatories. Programmatic BMPs are optional depending on the selected implementation track. Appendix C contains the City's 2009 to 2010 BMP reports.

Table 5-1. Water Conservation Demand Management Measures Listed in MOU

CUWCC BMP Category

Category	BMP No.	BMP Name
Foundational BMPs	BMP 1	Utility Operations
	BMP 1.1	Operations Practices
	BMP 1.1.1	Conservation Coordinator
	BMP 1.1.2	Water Waste Prevention
	BMP 1.1.3	Wholesale Agency Assistance
	BMP 1.2	Water Loss Control
	BMP 1.3	Metering with Commodity Rates
	BMP 1.4	Retail Conservation Pricing
	BMP 2	Educational
	BMP 2.1	Public Information
	BMP 2.2	School Education
Programmatic BMPs	BMP 3	Residential
	BMP 3.1	Residential Assistance
	BMP 3.2	Landscape Water Survey
	BMP 3.3	High-Efficiency Clothes Washers
	BMP 3.4	Water Sense Standard (WSS) Toilets
	BMP 3.5	Water Sense Standard (WSS) for New Residential Development
	BMP 4	Commercial Industrial Institutional (CII)
	BMP 5	Landscape

5.1 Drought

The spring of 2009 started with the City and the State of California in a drought condition. Governor Arnold Schwarzenegger had proclaimed a statewide drought and issued an Executive Order, which required immediate action to address water shortage conditions where numerous California communities were being forced to mandate water conservation or rationing. On May 5, 2009, Mayor Sanders and the City Council approved moving from a Level 1 Drought Watch Condition to a Level 2 Drought Alert Condition starting on June 1, 2009, as shown in Figure 5-1.

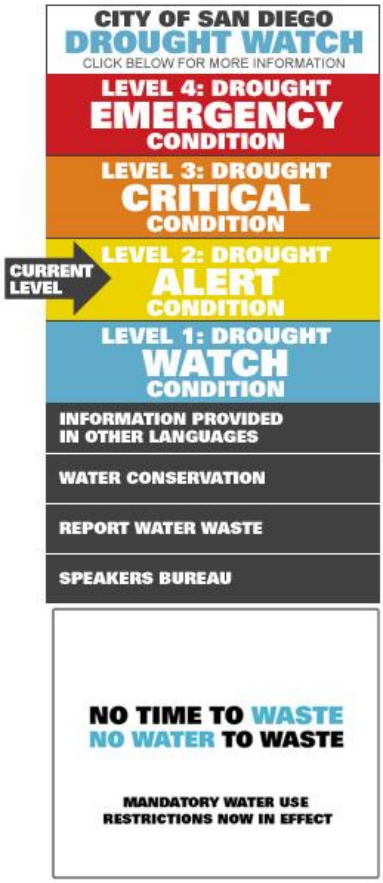

Figure 5-1. Drought Levels

Level 2 Drought Alert means mandatory conservation is required from every water customer. Mandatory conservation requires residents of the City to change the way they think about and use water. Under a Level 2 Drought Alert:

- Landscape irrigation will be limited to specific days of the week and specific times for residential and commercial landscapes, including golf courses.
- Car washing is also limited to specific times and requires a hand-held container or a hose with a positive shut-off nozzle. There are no limits on commercial car washes that recycle water.
- Ornamental fountains that shoot water into the air can no longer be operated, except for maintenance purposes.
- Water cannot drain onto adjacent properties, streets or gutters due to excessive irrigation or uncorrected leaks.
- Leaks must be stopped or repaired.

These actions came after years of below-average rainfall, limited snowmelt runoff and the largest court-ordered water transfer restrictions in state history. Additional consequences of drought conditions included extreme fire danger due to dry conditions, economic harm to urban and rural communities, loss of crops and the potential degradation of water quality.

On March 30, 2011, Governor Brown declared the drought over after plentiful rain and snow pack filled State reservoirs and improved the overall supply conditions. On April 29, 2011, Mayor Jerry Sanders discussed his proposal to end the city's mandatory water restrictions. He was joined by Councilmember Sherri Lightner and board members of the San Diego County Water Authority at the press conference.

Regardless, the good news is that San Diegans continue to save water, totaling approximately 34,000 AF in 2010. Additionally, the City's Water Conservation Section continues to focus on developing long-term water savings through hardware replacement while making strides towards educating customers about exterior irrigation efficiency.

5.2 Drought Response "No Time to Waste, No Water to Waste"

The Water Conservation Section demonstrated exceptional commitment and capability in communicating water issues to the public by developing the *No Time To Waste, No Water To Waste* public outreach and education campaign. With the drought alert raised to Level 2, the campaign and theme shown in Figure 5-2 was developed to boost local public awareness about the new, mandatory water use restrictions and to reduce water usage by 8% from SDCWA projections.

The main communication objectives of the campaign were to inform all customers of the Department that mandatory water use restrictions went into effect June 1, 2009, and to teach them how to abide by them. Through this ongoing campaign, the City reinforces San Diego's commitment to the wise use of water in a manner consistent with its long-term goals of water management. While an increase of conservation may have been caused by this sense of urgency, the community's positive response to this situation is a foundation for creating and maintaining a San Diegan lifestyle that exhibits environmental stewardship to protect and maintain vital natural resources.

Figure 5-2. Drought Response Theme

5.2.1 Basic Methods

Using existing resources to inform customers, the City employed these basic methods to spread the word about mandatory water use restrictions to their customers.

- Customers were provided with water bill inserts about the mandatory water use restrictions with their monthly water bill.
- An announcement was included in the United States Environmental Protection Agency (EPA) mandated Annual Drinking Water Quality Report, which was mailed to every water customer by July 1, 2010.
- Campaign posters were placed at all City office counters in 2010.
- May 2010 and 2011 "Water Awareness Month" Activities took place at Home Depot, Borders, Barnes and Nobles, and City libraries.
- Speaker's Bureau presentations were made to community, professional, civic, and business groups.
- Press releases included the campaign slogan and website reference.
- Department employees from both the Public Utilities Department and Park & Recreation Department were trained on water waste procedures and water use restrictions.

5.2.2 Traditional and Specific Methods

Additionally, the City purchased strategic advertising media buys to target single-family homeowners, adults over 35 years old, and people with an interest in landscaping and home improvements and make them aware of mandatory water use restrictions.

- Print advertising in the San Diego Union Tribune and La Prensa.
- Internet advertising on City, KFMB, and the San Diego Union Tribune's websites.
- Public service announcements on City TV, Cox Media's 16 cable channels, and KFMB.

5.2.3 Unique Methods

To conduct public communication outreach to the general public, the City purchased unique advertising with high visibility at key community locations in San Diego in both 2010 and 2011.

- Partnering with the Metropolitan Transit System, the City coordinated one trolley wrap that is still in use, as shown in Figure 5-3. With the ability to alternate months, the advertising is running on the Orange, Blue and Green lines, taking advantage of high visibility at large community events, such as: the American Water Works Association convention, Comic-Con, Padres and Charger games.

Figure 5-3. Trolley Wrap for Communicating Drought Response Theme

- In addition to the trolley wrap, eight buses were fitted with advertising wraps that ran in each of the eight city council districts for six months.
- Eight billboards were posted throughout different council districts in San Diego for one month.
- Twenty posters were posted for two months at five Westfield malls in the San Diego area: Horton Plaza, Mission Valley, North County, Plaza Bonita, and University Towne Center.
- Starting on the Fourth of July weekend in 2010, and for each weekend throughout July 2010, an airplane banner flew over San Diego beaches and large community areas such as San Diego State University, Mission Valley, Fashion Valley, Del Mar Fairgrounds, Rancho Santa Fe Polo Fields and the Convention Center.

Statistics show the campaign's effectiveness. Through the end of FY2010, ending June 30, 2010, water billing was reduced by 11.6% (25,470 AF) Citywide from the previous Fiscal Year. The campaign was recognized with the following national awards:

- "Public Communications Achievement Award" from the American Water Works Association (AWWA)
- "Merit Award for Public Involvement/Education Programs" from the Association of Environmental Professionals
- "Public Education Award" from the Water Environment Federation

5.3 Background on the Water Conservation Section

In 1985, the San Diego City Council officially established the City's Water Conservation Section to reduce San Diego's dependency upon imported water. Today, the Water Conservation Section directly accounts for over 30 million gallons per day (mgd) of potable water savings. This savings has been achieved by creating a water conservation ethic, adopting programs, policies and ordinances designed to promote water conservation practices, and implementing comprehensive public information and education campaigns.

San Diego is located in a semi-arid coastal environment that averages 10 inches of rainfall annually, and imports most of its water by purchasing it from the SDCWA. Only 10-20 percent of San Diego's water is of local origin, collected as runoff in the City's nine reservoirs.

In 2005, the City completed its *2005 Urban Water Management Plan* (2005 UWMP). The 2005 UWMP built upon the previously approved *City of San Diego Long-Range Water Resources Plan (2002 – 2030)*

and the *Strategic Plan for Water Supply (1997 – 2015)*. These documents set water savings goals of 32,000 AF by 2010; 36,000 AF by 2020 and 46,000 AF by 2030. The 2010 goal was achieved. Senate Bill x7-7, enacted in November of 2009, requires a statewide 20% reduction in urban per capita water use by 2020. Based on this new requirement, water savings goals must be updated to 40,400 AF saved by 2020. One AF of water equals 325,851 gallons, or enough water to cover an area of land about the size of a football field one foot deep. Depending on use, one AF of water can supply two average California homes with a year's worth of water for all indoor and outdoor needs.

5.4 Ongoing Conservation Programs and Initiatives

To meet established goals, the Water Conservation Section continues to integrate existing programs while developing new programs, all focused on achieving the additional AF savings. The following outlines ongoing programs and initiatives.

5.4.1 Residential Interior/Exterior Water Surveys

This program offers residential customers an interior and exterior water use survey of their home. To date, over 45,000 surveys have been completed. San Diego's residential survey program is one of the largest water survey programs in the nation. Figure 5-4 depicts a water survey being conducted.

Figure 5-4. Water Surveys are a Key Part of the City's Conservation Program

The Water Conservation Section first implemented the Residential Water Survey Program in July 1992. During a scheduled survey appointment, a trained water surveyor meets with a residential customer for approximately one hour, reviews how to read the meter and use the leak detector, measures the flows of all interior water use appliances, identifies leaks and provides conservation tips. The surveyor then performs a landscape evaluation including identification of up to 26 potential problems or sources of water waste, and provides an irrigation schedule specific to the soil type, plant material and micro-climate zone where the customer lives. A typical participating household can reduce water consumption by a range of 13 to 28 percent or approximately 60 gallons per day (gpd).

This program is well received by residents who appreciate the complimentary service and assistance. From July 1, 2010 through March 31, 2011, the Water Conservation Section completed 805 surveys at single family residences and 142 at multi-living units.

5.4.2 Commercial Landscape Survey Program

The City's Commercial Landscape Survey Program (CLSP) has proven to be a major source of water savings based on activities conducted this year. Commercial properties can receive a free audit of their irrigation system, water-saving recommendations and a water-use budget. In FY2011, through March 31, 2011, staff performed: 8 CLSP surveys, 9 CLSP mini-audits, and 24 large multi-family audits.

5.4.3 Water Conserving Municipal Code – Retrofit Upon Resale

The concept of an ordinance that would require the retrofitting of properties upon change of property ownership or bathroom alteration was first discussed by the City Manager's Water Conservation Advisory Committee in the spring of 1990. By March 14, 1991, San Diego had an ordinance which required the installation of ultra-low flush toilets (ULFTs) in all new construction. In addition, the City Council requested that the then City Manager develop a separate ordinance requiring the replacement of existing toilets with ULFTs when remodeling a bathroom or upon change of property ownership. Over 124,500 certificates of compliance with San Diego Municipal Code (SDMC) 147.04 have been filed since its inception, with 2,601 certificates submitted in FY2011 through March 31st.

5.4.4 SoCal Water$mart Rebates for Single Family Dwellings

The MWD and its member agencies, including the City, offer a limited number of rebates each year on clothes washers, smart controllers, sprinkler nozzles and synthetic turf. Funds for these rebates are limited. Figure 5-5 depicts MWD's web site and theme.

Figure 5-5. MWD's Be Water Wise Theme

In FY 2011, through March 31, 2011, City of San Diego customers received incentives for: 285 high efficiency toilets, 4,609 high efficiency clothes washers, 1,865 rotating sprinkler nozzles (which use 20% less than conventional spray heads), 394 square feet of synthetic turf, and 22 Weather Based Irrigation Controllers (WBICs). Water savings from efficient toilets, which were initially incentivized in the early 90s, is over 10 mgd.

5.4.5 Save A Buck Rebates for Commercial, Industrial and Institutional and Multi-Family Properties

MWD continues to operate its Save A Buck program for Commercial, Industrial and Institutional and Multi-Family properties. Save A Buck offers cash rebates on a wide variety of water-saving technologies including high efficiency toilets and urinals, commercial high efficiency clothes washers, WBICs for outdoor landscaping as well as many industry specific water conserving devices. This program was another activity that faced financial challenges during FY2010, as funds were exhausted.

In FY2011, through March 31, 2011, incentives were provided for: 117 Commercial, Industrial and Institutional toilets/urinals, 61 WBICs, 5,141 rotating nozzles, and seven cooling tower conductivity controllers.

5.4.6 Water Conservation Film Contest

In FY2010, the Water Conservation Section hosted its 2nd Water Conservation Film Contest, titled "No Time to Waste, No Water to Waste." This film contest produced an opportunity to engage high school and college students directly about the importance of conserving water, while allowing the creativity of the students to inspire the rest of our community to use water more efficiently.

Contest entrants were recognized, and one winner was selected at a special Public Film Screening Event on Wednesday, April 14, 2010, at 5:30 p.m. at the IMAX Theater at the Rueben H. Fleet Science Center in Balboa Park, as shown in Figure 5-6. The winning film was featured at the Fashion Valley 18, Mira Mesa 18 and Mission Valley 20 theatres with a total of 15,328 showings over the nine week campaign over the summer of 2010.

The 2011 event will take place on Wednesday, May 18 at 5:30 p.m. at the IMAX Theater. The winning film will be featured in select movie theaters the summer of 2011.

Figure 5-6. Water Conservation Film Contest Event

5.4.7 Water Conservation Poster Contest

The Mayor and City Council celebrated the creative efforts of the winners of the Eleventh Annual Water Conservation Poster Contest in the City Council Chambers on May 3, 2011. The ceremony honored the 19 outstanding student artists (First through Sixth Grade) who won this year's contest and included their proud teachers and family members.

Held each year by the Department, the poster contest provides a focal point for teachers to talk with their students about the importance of using water wisely. This year's "San Diegans Waste No Water" theme gave thousands of students the opportunity to artistically illustrate meaningful water conservation messages by creating original artwork. All students who enter the contest receive a certificate of participation. Nineteen winners will receive prizes and have their artwork featured in a calendar and displayed at various public venues including art galleries, building lobbies, banks, libraries supermarkets and coffee houses.

Figure 5-7. Water Conservation Poster Contest

The Department will then make another splash with the child artists and the San Diego Watercolor Society. The winning posters from the 2011 Children's Water Conservation Poster Contest will be on exhibit alongside original watercolor paintings reflecting the "Shortfall" theme at the Watercolor Society's Gallery in NTC Promenade at Point Loma's Liberty Station. To kick off the month-long exhibit, a special reception will be held on Friday, June 3, 2011, at the Watercolor Society's Showcase Gallery. The event will again honor the 19 winners out of the thousands of students who submitted posters to the 2011 contest. During the reception, student artists and member artists will be recognized during an awards ceremony, as shown in Figure 5-7. Awards and prizes will be given out by the Watercolor Society and the Department.

5.4.8 Water Conservation Garden on the Campus of Cuyamaca College

The Water Conservation Garden is a state-of-the-art demonstration garden that operates as an educational center for San Diego County residents. The Garden hosts events, classes, plant sales and festivals. The Garden offers a beautiful collection of California-Friendly landscaping and other water wise gardening techniques.

Figure 5-8. Water Conservation Garden's Spring Garden Festival

The four-and-a-half acre site includes multiple educational exhibits, a 350 seat amphitheatre, over 360 trees, and 100,000 square feet of water wise landscaping. Encouraging homeowners, developers, and landscape professionals to use California-Friendly landscaping, efficient irrigation design, and appropriate maintenance can drastically reduce the outdoor water use by 30 - 70 percent.

The Garden is a not-for-profit corporation focusing on education, and supported by earned income and contributions of six member agencies, including the City. The Water Conservation Garden's Spring Garden Festival "Conservation in Bloom" was held on Saturday, April 24, 2010, and had over 6,400 attendees, including members of the aforementioned San Diego Water Color Society, as shown in Figure 5-8, who held their monthly "paint out" in the garden led by accomplished watercolorist Chuck McPherson. The festival was held again more recently on April 9, 2011. Approximately one-third of the Garden's visitors and participants are residents of the City.

The Department contributes to the Garden through an annual assessment and participates in the Garden Board, Marketing and Facilities Committees. At major Garden events, the Department staffs an information table and assists with promoting and facilitating the event.

5.4.9 California-Friendly Landscape Contest

The Department participated in the regional 2011 *Water Agency California-Friendly Landscape Contest*. Submittals were due on April 8, 2011. At press time, a winner had yet to be selected. An award ceremony will be held on May 21, 2011, hosted by Garden Executive Director Marty Eberhardt. Figure 5-9 depicts the winning landscape from the previous year.

Figure 5-9. Award Winning California-Friendly Landscape Contest Winner

5.4.10 Public Education, Information and Community Outreach

Water Conservation staff members actively participate in community fairs or events, or as individual speakers to community groups, providing informational brochures on the various programs and promoting both simple and highly technical conservation measures. To date in FY2011, Water Conservation staff attended 61 community outreach events. An example of one such event is EarthFair at Balboa Park. The Water Conservation has participated in this annual event for more than 20 years. Typical attendance at EarthFair is upwards of 60,000.

Figure 5-10. Water Conservation Educational Display

The Water Conservation Section continues to maintain its interactive educational display at the Reuben H. Fleet Science Center in Balboa Park, as shown in Figure 5-10. The exhibit, entitled *"San Diego's Water, from Source to Tap,"* details the long journey our water makes to reach our faucets and the technology involved in providing water to the City. The exhibit is part of the Science Center's TechnoVation collection, showcasing local technological achievements. The exhibit reaches an annual audience of 2.1 million people. The project was created in partnership with the CWA and made possible through a grant from the Hans and Margaret Doe Charitable Trust.

5.4.11 California Irrigation Management Information System (CIMIS) Stations

One of the keys to effectively managing irrigation for commercial nurseries and agricultural customers is accurate weather information. Weather patterns (solar radiation, wind, rain, relative humidity) have a direct impact on the watering needs for turf, trees, shrubs and other plants. The City partners with the DWR to calibrate and maintain four CIMIS weather stations located in the City of San Diego. CIMIS stations are passive data loggers that gather accurate weather data to create and track evapotranspiration (ET) values. ET provides information on when and how much to water plants. Real-time weather data can be used to determine appropriate watering schedules for central control irrigation systems and conventional controllers. The advantage of CIMIS is that it is a recognized standard and the equipment calibration is performed regularly. City staff, working in conjunction with DWR, provides local support for the four CIMIS stations located in the maritime, coastal, central and inland weather bands of San Diego. The data from these stations is used to develop water budgets used in the Commercial Landscape Survey Program. Data from the University of California, Berkeley, shows water reduction of 13 percent when CIMIS data is used, which equals 75,000 gpd for the City's agricultural customers and commercial nurseries.

5.4.12 Water Waste Investigations

Water Conservation Section staff respond to water waste complaints generated by citizens throughout the Department's service area. Staff contacts the property owner or manager and work to resolve a variety of water waste issues and their associated hazards. Water waste complaints can vary drastically. A typical example would be a broken sprinkler head which is wasting 1 - 20 gpm and flooding adjacent properties and streets, as shown in Figure 5-11. Since June 2009, over 7,600 water waste complaints were resolved.

Figure 5-11. The City Actively Corrects Water Waste Issues

5.4.13 Water2Save Program

Water2Save, sponsored by San Diego Gas & Electric (SDG&E) and the SDCWA, recently conducted a Managed Landscape Pilot program on nine selected sites with 43 irrigation-only meters located in the City. Water2Save analyzed historical consumption rates, installed monitoring and control equipment on the irrigation systems, calculated potential savings on each of these accounts and created reports regarding water and dollars savings for each of these accounts at no cost or obligation to the owners. Water consumption histories for each account are being provided by the Department on an ongoing basis throughout the twelve month period to assist Water2Save with their monitoring of these accounts.

5.4.14 Junior Lifeguards

The City's Junior Lifeguard program provides a fun and safe aquatic education to the youth of San Diego with an emphasis on developing confidence, mental and physical fitness along with respect for others and the coastal environment. In cooperation with "Think Blue San Diego," the Water Conservation Section participates annually in two, one-day events that are dedicated to promoting environmental awareness, as shown in Figure 5-12. Over 550 Junior Guards cycle through seven booths each day and participate in educational activities regarding recycling, watershed/water pollution awareness and water conservation. At the end of the session, each participant receives a backpack containing additional information supporting the important messages delivered throughout the day.

Figure 5-12. Junior Lifeguard Events Promote Environmental Awareness

5.4.15 WaterSmart

Through a program sponsored by the SDCWA and the Grossmont-Cuyamaca Community College District, the City has been assigned a Landscape Auditor Intern to support various water conservation activities. Typical duties performed by the interns can include such tasks as measuring landscaped areas on the ground or via GIS tools, home surveys, assisting with large landscape surveys, preparing reports and water budgets, inspecting and assisting customers with weather based irrigation controllers, inspecting new developments for installation of high efficiency toilets and California Friendly landscaping and assisting at community events. A main focus of the work performed at the City has been the use of the web-based program, WaterSmart Target, developed by the SDCWA that measures landscapes using aerial measurements and infrared imagery. Water budgets are created specifically based on the location of that landscape and its plant material. The program is capable of comparing actual and projected consumption and a three year average consumption to the water budget for these irrigation-only accounts. To date, over 650 irrigation–only accounts have had water budgets created in this program by the intern.

5.4.16 Storm Water Pollution Prevention

Water conservation contributes more than just local water savings. Proper water conservation techniques assist the City's Storm Water Pollution Prevention Program. When excess irrigation water flows out of landscapes, it flows directly into storm drains. Everything that flows down into a storm drain goes untreated directly into canyons, creeks, bays, lagoons and ultimately the ocean. Irrigation runoff water carries pesticides, fertilizers, motor oil, pet waste and silt. The Clean Water Act prohibits disposal of wastes and pollutants into creeks, bays, lakes and oceans. Such pollutants have harmful effects on recreational areas, waterways and wildlife. Proper irrigation scheduling either through the Section's various survey programs help reduce storm water pollution.

5.4.17 New Grant Funded Outdoor Water Conservation Rebates Program

A water-efficient landscape and irrigation system can reduce outdoor water use and minimize the amount of polluted dry weather runoff that enters the storm drain system. The City of San Diego is working to help customers conserve water by providing incentives to upgrade existing irrigation systems and install climate appropriate landscapes. Thanks to an award of grant funds from the State of California Integrated Regional Water Management Program, the Public Utilities Department can offer its commercial, multi-family and residential customers these rebates on a first come, first served basis when installing 'smart irrigation controllers,' converting overhead sprinklers to micro-irrigation distribution systems and/or replacing thirsty turf grass with water-wise plant material. Through March 31, 2011, City of San Diego residential customers have been approved for rebates for: 20 WBICs, 42 drip systems and 66 turf replacements; commercial customers have been approved for: 3 WBICs, 4 drip systems and 9 turf replacements.

Figure 5-13. Outdoor Water Conservation Rebates Flyer

5.5 Conclusion

The Water Conservation Section is currently focused on helping citizens save water in response to California's drought. Table 5-2 outlines actual estimated water savings and how each program contributes to water savings. The programs outlined undergo periodic reevaluation to ensure the realization of forecasted savings. Additionally, changes in water conservation technologies require reassessment of long-range plans. Because of these changes, the Water Conservation Section reviews and revises its reports at the end of each fiscal year to provide an ongoing assessment and status update, redirecting efforts as necessary.

Table 5-2. Water Conservation Implementation Plan by Fiscal Year

Program Title	2005 Actual	2006 Actual	2007 Actual	2008 Actual	2009 Actual	2010 Actual
Retired Water Conservation Programs	10,056,926	10,056,926	10,056,926	10,056,926	10,056,926	10,056,926
SDMC 147.04 (w/o City incentives	2,903,332	3,051,480	3,153,408	3,224,496	3,274,080	3,316,224
ULFTs/HETs (gpd)	9,383,409	9,569,955	9,881,787	9,990,819	10,045,723	10,214,671
CII Incentives (gpd)	578,473	670,117	902,645	1,064,560	1,172,875	1,177,763
Residential Water Survey Program (gpd)	1,245,217	1,252,409	1,326,809	1,398,869	1,484,669	1,561,049
CIMIS Station Program (gpd)	70,000	75,000	85,000	90,000	90,000	90,000
Residential HEW Washers (gpd)	265,289	319,119	405,423	584,103	668,895	731,039
CLSP & WRLD Water Budgets (gpd)	1,409,729	1,749,389	1,947,427	2,023,229	2,108,501	2,262,436
Water Waste Investigations (gpd)	93,478	100,552	115,492	137,932	207,892	515,512
Enhanced Public Education (gpd)	250,000	250,000	250,000	250,000	300,000	300,000
CLIP/Irrigation Controllers (gpd)	0	0	0	2,480	59,337	290,686
Synthetic Turf Incentive (gpd)					42,501	50,572
Rotating Nozzles (gpd)					11,191	23,936
Total Gallons Savings Per Day	26,255,853	27,094,947	28,124,917	28,823,414	29,522,590	30,635,814
Total Gallons Savings Per Year	9,583,386,345	9,889,655,655	10,265,594,705	10,520,546,110	10,775,745,350	11,182,072,180
Total AF Savings Per Year	29,410	30,350	31,504	32,286	33,070	34,317

Section 6

Water Supply to Demand Comparison

This section provides a comparison of the projected water supply and demand for the City from 2010 through 2035. Water supply to demand comparisons are also provided for single-dry year and multiple-dry year scenarios. The water demands are developed in Section 3 and water supplies are defined in Section 4 of this report.

6.1 Normal Water Supply to Demand Comparison

The analysis compares the projected normal water supply and customer demands from 2010 to 2035, in five-year increments. The projected available normal climate year water supply and demands are presented in Tables 6-1.

The comparison of projected water supply and demand is presented in Table 6-1.

Table 6-1. Supply and Demand Comparison-Normal Year (AFY)

	2015	2020	2025	2030	2035
Supply totals	240,472	260,211	276,375	288,481	298,860
Demand totals	240,472	260,211	276,375	288,481	298,860
Difference (supply minus demand)	0	0	0	0	0
Difference as a percent of supply	0	0	0	0	0
Difference as a percent of demand	0	0	0	0	0

DWR Table 32

6.2 Single Dry Year Water Supply to Demand Comparison

Table 6-2 provides a comparison of a single dry year water supply with projected total water use over the next 25 years, in five-year increments. The City's demands in single dry years are projected to be higher similar in proportion to the increase in regional water demands projected in SDCWA's 2010 Plan. It is assumed that recycled water demands would not increase in single dry years. The City's local water supplies (groundwater, local surface water, and recycled water) in single dry years would be as shown in Table 4-17. The wholesale water supplies from SDCWA are assumed to increase to meet the difference between the City's increased water demands and local single dry year water supplies.

Table 6-2. Supply and Demand Comparison-Single Dry Year (AFY)

	2015	2020	2025	2030	2035
Supply totals	255,040	276,526	293,895	307,230	318,586
Demand totals	255,040	276,526	293,895	307,230	318,586
Difference (supply minus demand)	0	0	0	0	0
Difference as a percent of supply	0	0	0	0	0
Difference as a percent of demand	0	0	0	0	0

DWR Table 33

6.3 Multiple Dry Year to Supply Comparison

Table 6-3 compares the total water supply available in multiple dry water years with projected total water use over the next 25 years. The City's demands in mutiple dry years are projected to be higher similar in proportion to the increase in regional water demands projected in SDCWA's 2010 Plan. It is assumed that recycled water demands would not increase in multiple dry years. The City's local water supplies (groundwater, local surface water, and recycled water) in mutiple dry years would be as shown in Table 4-17. The wholesale water supplies from SDCWA are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies.

Table 6-3. Supply and Demand Comparison -Multiple Dry Year Events (AFY)

		Supply and Demand Comparison – Multiple Dry Year Events				
		2015	2020	2025	2030	2035
Multiple-dry year First year supply	Supply totals	257,587	278,451	296,319	309,230	320,382
	Demand totals	257,587	278,451	296,319	309,230	320,382
	Difference	0	0	0	0	0
	Difference as percent of supply	0	0	0	0	0
	Difference as percent of demand	0	0	0	0	0
Multiple-dry year Second year supply	Supply totals	267,323	288,723	306,726	320,467	332,038
	Demand totals	267,323	288,723	306,726	320,467	332,038
	Difference	0	0	0	0	0
	Difference as percent of supply	0	0	0	0	0
	Difference as percent of demand	0	0	0	0	0
Multiple-dry year Third year supply	Supply totals	281,466	303,004	322,166	334,720	346,823
	Demand totals	281,466	303,004	322,166	334,720	346,823
	Difference	0	0	0	0	0
	Difference as percent of supply	0	0	0	0	0
	Difference as percent of demand	0	0	0	0	0

DWR Table 34

References

California Department of Water Resources. 2003. California's Groundwater Bulletin 118 Update 2003. October.

California Department of Water Resources. 2011. Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan. March.

CDM. 2002 City of San Diego Long-Range Water Resources Plan (2002-2030).

The City of San Diego Water Department. 2005. 2005 Urban Water Management Plan.

Regional Advisory Committee. 2007. 2007 San Diego Integrated Regional Water Management Plan. October.

San Diego County Water Authority, 2011. 2010 Urban Water Management Plan.

Appendix A: Public Hearing and Resolution (To Be Included After Adoption)

Appendix B: Water Shortage Contingency Plan

Section 1
Water Shortage Contingency Plan

The Act requires water agencies to incorporate a water shortage contingency analysis, focusing on the allocation of water supplies and the management of water consumption during periods of shortage due to extended drought or a water emergency. This section describes the City of San Diego's (City) policies and ordinances to deal with water shortages. The City imports the majority of its water supply from Metropolitan Water District (MWD) via the San Diego County Water Authority (SDCWA), while continuing efforts to diversify its supply.

The City's water shortage contingency plan illustrates specific water supply conditions that trigger the activation of voluntary and mandatory rationing efforts. It explains what the ability is to meet projected short-term demands during extended dry periods and emphasizes some of the significant proactive measures that enhance the City's ability to respond to interruptions in water supply should a natural or man-made disaster occur. The contingency plan outlines the planned response to failures in the infrastructure of the water system in the event of an earthquake, extensive power outage, or other catastrophic event. Finally, this section provides details about the prohibitions and penalties against specific water uses during water shortages, and evaluates potential impacts to the Water Enterprise Fund should water sales decrease as a result of supply shortages.

1.1 Levels of Action

- San Diego does not receive enough annual local precipitation to meet water demands. Because of this, the City is committed in the promotion of water conservation among its citizens all year long. Customers are encouraged to participate in numerous conservation programs that are consistent with the California Urban Water Conservation Council's (CUWCC) Best Management Practices. With a continuous focus on widespread voluntary conservation, even during years of normal and above-average precipitation, the City's Public Utilities Department (Department) believes it is in the best position to manage mandatory water-rationing efforts in the event that local and imported supplies are negatively impacted by extended drought or a catastrophic event. By focusing on wise water use practices, the City is increasing awareness among its consumers about the need to conserve water at all times.
- The City's Municipal Code includes Emergency Water Regulations (67.38), which authorize the City to determine and declare water shortages and water shortage emergencies in any and/or all parts of the City. A water shortage exists when a general water supply shortage occurs as the result of: (1) an increased demand or limited supply; (2) the distribution or storage facilities of MWD, the SDCWA, and/or the City are inadequate; and (3) a disruption occurs in supply, storage, or distribution facilities of MWD, the SDCWA, or the City. The applicable section of the City's Municipal Code is included as Attachment 1.
- The Emergency Water Regulations list restrictions to water use that are in effect at all times. These are described in detail in Section 67.3803(j)(6). In addition, the four levels of drought response conditions that trigger activation of progressively higher stages of water use restrictions are explained. Water conservation measures called for in Drought Level 1 (Water Watch) are voluntary. Levels 2, 3, and 4 each call for mandatory water use restrictions. While these regulations do not explicitly correlate a predetermined percentage reduction in water supply to each of the four levels of action, Table 1-1 presents the estimated percentage reduction in water supply that triggers each level of action. Shortage conditions that trigger the activation of Level 4 (Water Emergency) set the most extreme water rationing measures into effect, and are in response to a major failure of or interruption

to any MWD, SDCWA, or City water supply or distribution facility resulting in mandatory reductions in excess of 40 percent.

Table 1-1. Water Supply Shortage Levels and Conditions			
Level	Compliance	Water Supply Conditions	Consumer Demand Reduction (%)
Level 1: Drought Watch Condition	Voluntary	Applies during periods when there is a reasonable probability that, due to drought, there will be a supply shortage and a consumer demand.	Up to 10
Level 2: Alert Condition	Mandatory	Applies during periods when the probability exists that the Water Department will not be able to meet all water demands of its customers.	Up to 20
Level 3: Drought Critical Condition	Mandatory	Applies during periods when the Water Department will not be able to meet all water demands of its customers.	Up to 40
Level 4: Drought Emergency Condition	Mandatory	Applies when a major failure of any supply or distribution facility, whether temporary or permanent, occurs in MWD, SDCWA, or City water distribution system and facilities.	Over 40

DWR Table 35

1.1.1 Water Supply Challenges and Update

The San Diego Region has been experiencing a water supply crisis. There is increasing competition for water in the Colorado River basin, reduced snow pack and runoff in northern California and the Colorado River watershed, and a reduction in water deliveries due to court-ordered pumping restrictions on the State Water Project.

The region's water supplies have been impacted by extremely dry conditions around California and in the Colorado River watershed. These conditions have significantly reduced storage in key reservoirs, although the wetter 2011 water year has improved reservoir storage levels.

In addition to hydrological water shortages, court-ordered pumping restrictions on the State Water Project, designed to protect threatened fish species, went into effect in December 2007, cutting water supplies from the Bay-Delta to 25 million Californians who live from the Bay Area to San Diego. At this point, it is not clear how long these restrictions will be in place; but it is expected that the timing and amount of pumping will continue to restrict Southern California water supplies for the next several years.

In 2009, San Diego's water wholesalers announced a reduction in water deliveries to the region. With San Diego's 85 to 90 percent dependence on imported water, these conditions added to the stress on supplies.

On March 30, 2011, Governor Jerry Brown declared California's three-year drought over. Significant rainfall and snowpack has dramatically improved water supply conditions, and the State's reservoirs are all at above average levels. As of March 29, 2011 Lake Oroville was at 104% of average, Lake Shasta was at 111 percent of average and snowpack in the Sierras was 165 percent of average.

Locally, as of March 29, 2011 San Diego has received almost 12 inches of rain, compared to the annual average of 10.77 inches and MWD reports that Diamond Valley Lake is almost full, using abundant rain conditions to replenish the reservoir almost completely.

Because of the improved State supply conditions, on April 12, 2011 the MWD Board of Directors terminated water allocations imposed by Drought Level 2. This action means that MWD will not require continued water use reductions from its member agencies for FY 2012. The SDCWA Board lifted its allocation requirements on April 28, 2011, and rescinded its Drought Level 2 Water Alert. It is anticipated that the San Diego City Council will take similar action on its Level 2 Drought Alert.

1.1.2 City's Emergency Water Regulations

In response to the supply situation, in July 2008, the Mayor recommended and Council approved the Declaration of Water Emergency under the City's Emergency Water Regulations. In addition, a Level 1 - Water Watch - Voluntary Conservation measure was also enacted to formally request customers voluntarily modify their behaviors to conserve water. San Diego declared a Level 2 Drought alert, effective June 1, 2009. Level 2 enforced mandatory water use restrictions, including enforcement of voluntary Level 1 conservation practices. The Department has continued to monitor and report on the status of conservation levels being attained. Improved water supply conditions in 2011 allowed the Governor to declare the drought over and wholesalers to end water allocations.

The City updated its Emergency Water Regulations in December 2008, and again in December 2010, to mitigate impacts, plan for a future of more water supply variability, reflect improved analysis of water demand sensitivities, clarify demand target levels based upon supply availability, improve communication, and improve the City's overall demand response program going forward. The updated section of the City's Municipal Code is included as Attachment 1.

1.2 Estimate of Minimum Supply for Next Three Years

As required by the Urban Water Management Act, Table 1-2 provides an estimate of the water supply available during the next 3 years (e.g., 2011 to 2014) based on the driest 3-year historic sequence.

This analysis is applicable to San Diego where the region has relied heavily on imported water from northern California and the Colorado River. The SDCWA and City have been focused on diversifying supplies. The City is diversifying local supply sources by increasing its use of recycled water, promoting conservation, and working to develop groundwater sources. The SDCWA is diversifying imported supply sources, as is seen with the 2003 Imperial Irrigation District (IID) Transfer Agreement. The region is also pursuing seawater desalination and anticipates that a seawater desalination plant will be constructed in the City of Carlsbad, producing potable water for the region. This plant will provide as much as 56,000 acre-feet per year (AFY) of potable water.

Table 1-2. Three-Year Estimated Minimum Water Supply – ac-ft/yr

Source	Normal	Year 1	Year 2	Year 3
San Diego County Water Authority	201,719	240,334	249,470	265,813
Local surface water	29,000	7,500	8,100	5,900
Groundwater	500	500	500	500
Recycled water	9,253	9,253	9,253	9,253
Total	240,472	257,587	267,323	281,466
Percent of Average/Normal Year	100	107	111	117

DWR Table 31

1.3 Catastrophic Supply Interruption Plan

An occurrence where there is an insufficient amount of available water to meet the region's needs because of a disaster is considered a catastrophic water shortage. The Act requires urban water agencies to provide a catastrophic supply interruption plan. This section takes into account the potential impacts from non drought-related emergencies such as a regional power outage, an earthquake, or other disaster. SDCWA's Emergency Response Plan (ERP) and the Emergency Storage Project (ESP) were each developed to protect SDCWA's member agencies' public health and safety and to prevent or limit economic damage that could occur from a severe shortage of water supplies.

In addition to long-range plans and projects, the City maintains several emergency connections to and from neighboring water agencies to provide mutual aid during times of temporary water supply interruptions, including the Santa Fe Irrigation District, the Poway Municipal Water District, Otay Water District, the California American Water Company, and the Sweetwater Authority.

1.3.1 Emergency Storage of Water: City Policy Number 400-4

The City's major supply of water is through the aqueducts, canals, and pumping plants of MWD and the SDCWA. While such facilities have an excellent record of service, it is entirely possible for service to be interrupted by floods, earthquakes, or sabotage. Prior to 1963, the Department operated under an unofficial policy of providing approximately one year of storage as an emergency supply. An evaluation of the hazards and possible interruptions balanced against the costs of emergency storage caused the City to re-evaluate this requirement. The current Policy 400-4 dated December 27, 1973, is included as Attachment 2.

This policy details the requirement for the City to provide a minimum quantity of stored, untreated water to provide for emergencies such as aqueduct failure or aqueduct pump station outages. The Department shall have 0.6 of the annual requirement of the City and its contractees as active, available storage at the following reservoirs: Lake Skinner, San Vicente, El Capitan, Lower Otay, Murray, and Miramar. The active, available storage shall include any water in the San Vicente Reservoir stored to the account of the SDCWA or the MWD but shall not include any water stored at El Capitan Reservoir by the Helix Irrigation District. The active, available storage shall also include 60 percent of the active, available storage in the MWD Lake Skinner Reservoir. Active, available storage shall be that portion of the water that is above the lowest usable outlet of each reservoir.

1.3.2 SDCWA Emergency Response Plan

The SDCWA's 2010 Urban Water Management Plan includes detail about its ERP. The ERP is a document outlining how staff can respond to an emergency that causes severe damage to the SDCWA's water distribution system or hinders its ability to provide reliable water service to its member agencies, including the City. In addition to providing direction and strategies for responding to a crisis, it also outlines the triggers that would activate the ERP and/or the Emergency Operations Center (EOC).

SDCWA'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 SDCWA, its member agencies, and MWD 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 that outline the terms and conditions under which mutual aid assistance will be provided

- Pre-emergency planning and emergency operations procedures

The SDCWA's ERP Manual provides a step-by-step approach with procedural tools as action checklists, resource and information lists, personnel rosters, and listings of established policies and procedures. This plan parallels many of the same plan components within the Unified San Diego County Emergency Services Organization's "Operational Area Emergency Plan" (OAEP). This means that the OAEP serves to support and supplement SDCWA's ERP.

1.3.3 SDCWA Emergency Storage Project

Based on the SDCWA's Urban Water Management Plan, the ESP is a system of reservoirs, pipelines, and other facilities that are in place to work together to store and transport water around the county in the event of a natural disaster. The ESP is a $1.5 billion project designed to provide up to six months of emergency storage in the region. The locations of these facilities are throughout San Diego County and are being constructed in phases. The initial phase included the 318-foot-high Olivenhain Dam and 24,789 acre-feet (AF) Olivenhain Reservoir. The ESP will provide 90,100 AF of stored water for emergency purposes, meeting the County's needs through at least 2030 when complete. The size of the ESP was based on the SDCWA's assumption of an assumed 75 percent level of service to all member agencies during an outage and full implementation of the water conservation best management practices (BMPs). The Board of Directors has the ability to authorize that supplies from the ESP be used in a prolonged drought situation where imported water and local supplies do not meet 75 percent of the SDCWA's member agencies Municipal and Industrial (M&I) demands.

The SDCWA's August 2002 Emergency Water Delivery Plans include the following list of steps that show the methodology for calculating the allocation of ESP supplies to member agencies in a prolonged outage situation without imported supplies.

1. Estimate the duration of the emergency (i.e., time needed to repair damaged pipelines)
2. Determine each member agency's net demand during the emergency period by adding municipal and industrial (M&I) water demands and agricultural water demands and then subtracting recycled water supplies
3. Determine each member agency's useable local supplies during the emergency period (local supplies include surface water and groundwater)
4. Determine each member agency's level of service based on usable local supplies and net demand
5. Adjust the allocation of ESP supplies based on a member agency's participation in the Interim Agriculture Water Program (IAWP). IAWP customers will be required to take a reduction in deliveries during a water shortage due to an emergency at double the systemwide reduction up to a maximum of 90 percent. Water not delivered to IAWP customers will be redistributed to member agencies based on the "system-wide" level of service targets
6. Determine the amount of local supplies that can be transferred between member agencies with transfers occurring only after a member agency has a level of service greater than 75 percent based on its usable local supplies
7. Allocate delivery of useable ESP storage supplies and MWD supplies to member agencies with the goal of equalizing the level of service among the member agencies

1.3.4 ESP Agreement – City access to Olivenhain Reservoir

The San Vicente and Lake Hodges Projects are part of the SDCWA's Emergency Storage Project, a system of reservoirs, interconnected pipelines, and pumping stations designed to make water available to the San Diego region in the event of an interruption in imported water deliveries.

The Lake Hodges Projects will connect the City's Hodges Reservoir, also called Lake Hodges, to Olivenhain Reservoir, which is owned by SDCWA and Olivenhain Municipal Water District. The connection provides the City the ability to access 20,000 AF of water in Hodges Reservoir that it has not had access to. The connection will also allow water to be pumped back and forth between Hodges Reservoir and Olivenhain Reservoir. From Olivenhain Reservoir, water can be distributed throughout the region by SDCWA's delivery system.

The Lake Hodges Projects will also help keep Hodges Reservoir at a more constant level during dry seasons, capture runoff during rainy seasons, and prevent spills over Hodges Dam.

The Lake Hodges Projects construction has four components:

- **Pipeline Tunnel** – a 10-foot-diameter underground pipeline, contained in a 1.25-mile-long tunnel, connecting the two reservoirs
- **Pump Station** – a pump station to move water back and forth between the two reservoirs and generate electricity
- **Electrical Switchyard** – an electrical switchyard providing electricity to the pump station and sending electricity from the pump station to a local transmission system; San Diego Gas and Electric (SDG&E) will build one substation and SDCWA will build adjacent equipment
- **Inlet-Outlet Structure** – an inlet-outlet structure below the water surface that draws and discharges water between the Hodges Reservoir and the pump station

Work began in 2005 and is expected to be completed in 2011.

The San Vicente projects include pipelines, pumping facilities, and the San Vicente Dam Raise. The pipeline and pump station were completed in early 2011. The 11-mile San Vicente Pipeline is a large-diameter pipeline connecting San Vicente Reservoir in Lakeside to the SDCWA's Second Aqueduct west of Interstate 15. The pipeline was built in a tunnel at a depth ranging from 50 to 550 feet underground and will not pass directly under any homes. Tunneling, rather than cut-and-cover trenching, allows the SDCWA to build the pipeline with fewer impacts to land surfaces and the surrounding communities. During emergencies, the San Vicente Pipeline will operate with other SDCWA facilities to deliver water from San Vicente Reservoir to water agencies in the southern half of the county.

In the event of an interruption in imported water deliveries to the county, the pumping facilities would be used. With the ability for these pumping facilities to move up to 300 million gallons of water per day from San Vicente Reservoir through the 11-mile-long San Vicente Pipeline to the SDCWA's water delivery system, nearly half of the San Diego region's average daily water use can be met.

From the pump station, water will be pumped through pipelines up to the surge control facility at the top of the hill near the dam. The 3-million-gallon surge tank was built in a basin so that only the top 20 feet are visible. The surge control facility will protect the San Vicente Pipeline and other pipelines from extreme pressure fluctuations in the case of sudden pump or valve failures in the system. From the surge control facility, water will flow by gravity through the San Vicente Pipeline to the SDCWA's Second Aqueduct.

The last portion of the San Vicente projects, as well as the overall ESP, is the San Vicente Dam Raise Project. The existing height of the San Vicente Dam stands at 220 feet and can store up to 90,000 AF of water. The dam raise project will increase the height of the dam by 117 feet, the tallest dam raise in the United States and the tallest of its type in the world. The raised dam will store an additional 152,000 AF of water, more than doubling the capacity of the reservoir. The San Vicente dam raise has multiple phases as follows:

- Foundation preparatory work: summer 2009 – summer 2010
- Dam raise: spring 2010 – early 2013

- Bypass pipeline: summer 2014-summer 2015
- New marina construction: summer 2013 – summer 2014
- Post construction site restoration: summer 2014 – summer 2015

Included in the ESP Agreements are provisions to minimize supply impacts to the City during construction at San Vicente Reservoir. As described earlier, the last phase of the ESP is the San Vicente Dam Raise Project. While this project was being constructed, the water level of San Vicente was dropped, impacting the City's ability to store and use water from the reservoir. During this period, the City was allocated 20,000 AF of temporary storage in the SDCWA's Olivenhain Reservoir. The City no longer has the temporary storage with the completion of the pipeline. The completion of the Lake Hodges projects in 2011 and the allocation of storage in Olivenhain Reservoir will give the City access to 40,000 AF of storage in the north part of its delivery system.

1.4 Prohibitions, Consumption Reduction Methods, and Penalties

This section presents mandatory prohibitions, consumption reduction methods and penalties that would be implemented during water shortages.

1.4.1 Mandatory Prohibitions

This section outlines the mandatory prohibitions against specific water use practices during water shortages as well as those restrictions that are in effect at all times. The City's Emergency Water Regulations specify that Department customers shall not make, cause, use, or permit the use of water from the City for any purpose in a manner contrary to the provisions made in the Code's Emergency Water Regulations section, or in an amount that exceeds that which is permitted within each of the activated conservation stages shown in Table 1-3.

Unreasonable uses of water include, but are not limited to, the following practices:

1. Allowing water to leave the customer's property by drainage onto adjacent properties, roads, or streets due to too much irrigation or leaks
2. Failure to repair a leak
3. Use of water to wash down sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas, except to alleviate immediate safety or sanitation hazards

As described in Section 67.3803 of the revised City Water Use and Drought Ordinance, Attachment 1, there are restrictions on water use that will be in effect at all times. These are listed in Table 1-3.

Table 1-3. Mandatory Prohibitions	
Mandatory Prohibitions	Stage When Prohibition Becomes Mandatory
A customer shall not allow water to leave the customer's property by drainage onto adjacent properties or public or private roadways or streets or gutters due to excessive irrigation and/or uncorrected leaks.	All Times - Mandatory
A customer will not fail to repair or stop a water leak.	All Times - Mandatory
A customer will not use a running hose to wash down sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas, except to alleviate immediate safety or sanitation hazards, unless connected to a water-efficient device such as a commercial water broom.	All Times - Mandatory
A customer will not overfill swimming pools and spas.	All Times - Mandatory
A customer will not use nonrecirculating decorative water fountains.	All Times - Mandatory
Vehicle washing can only be done in a commercial car wash or using a hose with an automatic shutoff nozzle or hand-held container.	All Times - Mandatory
Single pass-through cooling systems as part of new water service connections will be prohibited. Nonrecirculating systems in all new conveyer car wash and commercial laundry systems will also be prohibited.	All Times - Mandatory
Restaurants and other food establishments will only serve and refill water upon request.	All Times - Mandatory
Guests in hotels, motels, and other commercial lodging establishments will be provided the option of not laundering towels and linens daily.	All Times - Mandatory

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1.4.2 Consumption Reduction Methods

As described in Section 1.1, Levels of Action, the City describes current drought status by four distinct levels, varying from Drought Watch to Drought Emergency. Levels 3 and 4 outline the reductions enforced to significantly reduce water consumption during times of extreme water shortage.

A list of the consumption reduction methods the City will use to reduce water use is described in the following section and shown in Table 1-4. The City has not projected the reduction in water use that would occur from each of the reduction methods. As specific levels are implemented, the City would closely monitor projected supply availability and demand. Depending on these projections, the methods presented in Table 1-4 would be enacted and enforced to achieve the desired reductions in water use.

1.4.2.1 Drought Level 1

This section is the first response level within the new Water Use and Drought Ordinance. Similar in nature to the existing "Level 1 - Water Watch," behavioral restrictions specified at this level are voluntary. However, a key distinction at this, and all drought response levels, is the triggering language for the declaration of this level.

A Drought Response Level 1 would occur when there is a reasonable probability that, due to drought, there will be a supply shortage and that a consumer demand of up to 10 percent reduction is required to ensure that sufficient supplies will be available to meet anticipated demands. This language provides a much clearer nexus between a Drought Response Level 1 and the percentage demand reduction necessary, something which was absent in the existing municipal code.

Changes in previous behavioral restrictions imposed at this level include those associated with the timing of landscape watering and the hand washing of mobile equipment (before 10:00 a.m. and after 6:00 p.m.). Also clarified is the requirement to repair all leaks upon discovery or within 5 days of notification by the City.

1.4.2.2 Drought Level 2

Level 2 includes many mandatory water restrictions. In addition, all voluntary Level 1 conservation practices become mandatory.

1.4.2.3 Drought Level 3

A Level 3 drought response is triggered when a consumer demand reduction of up to 40 percent is required. This language triggering a Level 3 response parallels that of Levels 1 and 2. Level 3 use restrictions will not apply to commercial nurseries or growers, or to golf course greens.

Significantly, at Level 3, no new potable water service will be provided, nor temporary or permanent meters issued, except under the following circumstances:

1. A valid building permit has been issued
2. The project is necessary to protect the public's health, safety, or welfare
3. For fire hydrant meters, only upon the return of an old fire hydrant meter
4. The applicant for a new meter provides an enforceable commitment that the new water demands for the project will be offset prior to the provision of new water meter(s)

The water allocation enabling language as part of Level 2 response is duplicated in Level 3.

1.4.2.4 Drought Level 4

A drought response Level 4 is triggered upon declaration by the Mayor, and resolution of the City Council, that a water shortage emergency exists pursuant to California Water Code Section 350, and upon a declaration that a demand reduction of greater than 40 percent is required to have maximum supplies available to meet demands.

At a Level 4 response, all landscape irrigation is stopped except for hand-held watering of trees and shrubs 2 days a week, the maintenance of landscaping necessary for fire protection and erosion control, the watering of livestock, water for public works projects and actively irrigated environmental mitigation projects, and irrigation necessary for the maintenance of plant materials that are rare or essential to the well being of rare animals. The maintenance of parks and playing fields and golf course greens is also allowed under a 2-day-a-week schedule, as previously provided in Level 3.

Table 1-4. Consumption Reduction Methods

Consumption Reduction Method	Stage When Method Take Effect	Projected Reduction, %[(a)]
Customers shall not allow water to leave their property due to drainage onto adjacent properties or public or private roadways or streets or gutters due to excessive irrigation and/or uncorrected leaks.	Level 1 – Voluntary Level 2 - Mandatory	
Customers cannot use a running hose to wash down sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas, except to alleviate immediate safety or sanitation hazards, unless that hose is connected to a water-efficient device such as a commercial water broom.	Level 1 – Voluntary Level 2 - Mandatory	
Overfilling of swimming pools and spas is strictly prohibited.	Level 1 – Voluntary Level 2 - Mandatory	
All decorative water fountains must use a recirculating pump.	Level 1 – Voluntary Level 2 - Mandatory	
Vehicles may only be washed at a commercial car wash or by using a hose with an automatic shut-off nozzle or with a hand-held water container.	Level 1 – Voluntary Level 2 - Mandatory	
The City will not provide new water service connections for customers using single pass-through cooling systems.	Level 1 – Voluntary Level 2 - Mandatory	

Table 1-4. Consumption Reduction Methods		
Consumption Reduction Method	Stage When Method Take Effect	Projected Reduction, %[a]
All new conveyer car wash and commercial laundry system connections will be required to employ a recirculating water system.	Level 1 – Voluntary Level 2 - Mandatory	
Restaurants and other food establishments shall only serve and refill water for patrons upon request.	Level 1 – Voluntary Level 2 - Mandatory	
Guests in hotels, motels, and other commercial lodging establishments will be provided the option of not laundering towels and linens daily.	Level 1 – Voluntary Level 2 - Mandatory	
Landscape irrigation is limited to no more than three assigned days per week from June 1 to Oct. 31. Those days are: Homes with odd-numbered addresses can water: Sunday, Tuesday, and Thursday Homes with even-numbered addresses can water: Saturday, Monday, and Wednesday Apartments, Condos, and Businesses can water: Monday, Wednesday, and Friday	Level 2	
On your watering day, you may only water before 10:00 a.m. or after 6:00 p.m.	Level 2	
Landscape irrigation using sprinklers is limited to no more than 10 minutes maximum per watering station per assigned day (does not apply to drip, micro-irrigation, stream rotor, rotary heads, hose end sprinklers with timers, or valves operated by a weather-based irrigation controller).	Level 2	
Trees and shrubs not irrigated by a landscape irrigation system may be watered no more than three assigned days per week by using a hand-held container, hand-held hose with positive shut-off nozzle, or low-volume soaker hose.	Level 2	
Irrigation of nursery and commercial growers' products is permitted in the hours between 6:00 p.m. and 10:00 a.m. or at any time when using a hand-held hose with a positive shut-off nozzle, hand-held container, or drip, micro-irrigation.	Level 2	
Irrigation of nursery propagation beds is permitted at any time.	Level 2	
Vehicle washing is permitted only in the hours between 6:00 p.m. and 10:00 a.m. with a hand-held container or a hand-held hose with a positive shut-off nozzle for quick rinses, or at any time on the immediate premises of a commercial car wash. Vehicle washing required for public health and safety is exempt.	Level 2	
Water use by commercial car washes that do not use partially recirculated water will be reduced in volume by an amount determined by the City Council.	Level 2	
All leaks must be stopped or repaired upon discovery or within 72 hours of notification by the City of San Diego.	Level 2	
Bird baths, koi ponds, and any ornamental water feature using a recirculating pump and that does not shoot water into the air are allowed under Level 2. Water fountains that discharge into the air a jet or stream of water are banned under Level 2 restrictions. However, these fountains may be operated for maintenance purposes. Any water feature that does not recirculate water is banned.	Level 2	
Use of recycled or nonpotable water is required for construction purposes when available.	Level 2	
Water use from fire hydrants is limited to fire fighting, City meter installation as part of the Fire Hydrant Meter Program, and for public health and safety reasons.	Level 2	
Construction operations will not use water obtained by a fire hydrant meter for uses other than normal construction activity.	Level 2	
Landscape irrigation is reduced to two assigned days per week June through October and one assigned day November through May	Level 3	
The filling of ornamental lakes and ponds is prohibited, except to sustain aquatic life of significant value.	Level 3	
Repairs of leaks shall be done within 48 hours.	Level 3	

Table 1-4. Consumption Reduction Methods		
Consumption Reduction Method	Stage When Method Take Effect	Projected Reduction, %[a]
Car washing is prohibited except at car washes using recirculated water.	Level 3	
All landscape irrigation is stopped except for hand-held watering of trees and shrubs 2 days a week, the maintenance of landscaping necessary for fire protection and erosion control, the watering of livestock, water for public works projects and actively irrigated environmental mitigation projects, and irrigation necessary for the maintenance of plant materials that are rare or essential to the well being of rare animals.	Level 4	

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[a] *Reduction not projected. See text.*

1.5 Penalties and Charges

All water waste is prohibited in Section 67.3803 of the San Diego Municipal Code. Wasting water is illegal at all times, even when no Drought Response Levels are in effect. Any violations of the water use restrictions associated with Drought Response Levels 1-4 (SDMC Sections 67.3805-67.3808 are also treated as water waste. The City may penalize those who continue to waste water with an escalating series of penalties up to and including shutting off water service. When customers continue to waste water after being contacted by the Department's Conservation staff, the City's Code Enforcement Section can step in.

Should a customer refuse to stop over-watering, fail to repair a leak, or continue other water waste, the Code Enforcement Officer or Water Waste Investigator will fashion an appropriate response.

As with any violation of the San Diego Municipal Code, Code Enforcement Officers have a variety of remedies to help ensure compliance. These remedies always begin with education regarding the restrictions and information about resources available from the City to assist in complying with regulations. The remedies also include an escalating series of remedies, including:

- Warning letter
- Administrative Citations ($100, $250, $500, $750, and $1,000)
- Notice of Violation (Civil Penalties up to $2,500 per day per violation)
- Referral to the City Attorney for Civil or Criminal prosecution
- Shut off water service

The decision to terminate Water Service is not taken lightly and will occur when other enforcement measures have not been effective. The City will consider all of the following as part of its decision regarding appropriate remedies to employ:

- Drought Response Level in effect
- Prior enforcement remedies applied
- Public health and safety
- Amount of water being used in violation
- Impact of the violation

Table 1-5. Penalties and Charges	
Examples of Penalties and Charges	Stage When Penalty Takes Effect
Warning letter	All stages
Administrative citations ($100, $250, $500, $750, and $1,000)	All stages
Notice of Violation (up to $2,500 per day)	All stages
Referral to City Attorney for prosecution	All stages
Service of water discontinued	All stages
Installation of flow-restricting devices	All stages

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1.6 Analysis of Revenue Impacts of Reduced Sales during Shortages

This section outlines how planned consumption reduction methods, penalties, and prohibitions are likely to impact revenues and expenditures. In the case of a prolonged water shortage when a reduction in water consumption is planned, or in an emergency when it is unplanned, Department revenues and expenditures would be impacted by the reduction in water sales. Furthermore, any interruption or reduction in imported or local water supply would impact the volume of water available for sale. In turn, revenues to the Water Enterprise Fund would also be impacted. Any reduction in revenues would likely require rate increases or a significant reduction in planned expenditures to operate the water system and to maintain the minimum debt coverage ratio required by covenants related to outstanding debt. It is anticipated that any rate increase would take the form of a percentage increase on the commodity charge and/or base fee, which would impact all customers. Rate increases require the approval of the City Council.

To mitigate the financial impacts of a water shortage, the City would evaluate its operation and maintenance (O&M) and capital program budgets for possible deferrals, the use of emergency storage water, and the use of one or more of the available reserve funds. Reallocation of capital project funding to meet short-term emergency needs would be restricted by bond covenants require bond proceeds to be used exclusively for capital projects.

There are currently three reserve funds that could be utilized in the event of a water shortage.

1. The first is the Secondary Purchase Reserve, which is intended to be equal to six percent of the annual water purchase budget. This is intended to be an emergency reserve for the purchase of water in the event of drought or other emergency that suddenly disrupts the normal supply of water.
2. The second is a 45-day Operating Reserve in Enterprise Funds such as Water and Wastewater, which is intended to be used in the event of a catastrophe that prevents the utility from operating in its normal course of business. Use of the funds is restricted to emergency situations resulting from loss of revenue and must be replenished no later than the subsequent fiscal year. The Chief Operating Officer and/or Chief Financial Officer would have the authority to approve spending.
3. The third is the Rate Stabilization Fund, which is intended to provide a source of funds to mitigate future rate increases. Deposits into this fund are at the discretion of the City and are made from current system revenues.

Without the use of these reserves or emergency storage water, it could be necessary to increase rates during periods of significant reductions in delivered water. The use of the reserves would require rate increases because the reserves would need to be replenished, but the increases could be spread over more than one year. The timing and the amount of the reserves used would be evaluated based on the

significance of the rate increases, the ability to reduce variable O&M costs and defer capital projects, the availability of emergency storage water, the timing of additional debt issuances, and the possibility of a debt rating downgrade.

DWR's Urban Water Management Plan Guidelines ask urban water utilities to specify the measures that could be taken to help the utility overcome revenue and expenditure impacts resulting from a planned reduction in water consumption during supply shortages and water rationing. Table 1-6 summarizes those measures and associated effects.

Table 1-6. Overcoming Revenue and Expenditure Impact from Planned Consumption Reduction During Shortages

Name of Measure	Summary of Effects
Use of emergency storage water during times of shortage	Make water available to avoid revenue reduction from decreased sales and expenditure increases to purchase imported water
Use of Secondary Purchase Reserve	Allow the purchase of water during drought or other disruption of normal supply
Use of 45-Day Operating Reserve	Provide for unanticipated needs when normal water supply is disrupted by a catastrophic event
Use of Rate Stabilization Fund	Provide a source of funds to mitigate future rate increases
Council-approved rate increase	Provide additional revenues when water sales decline or expenditures increase Replenish reserve funds
Reductions in expenditures through possible deferrals	Reduce current operational expenditures to compensate for reduction in water sales revenue or increased expenditures Delay in O&M and capital improvements
Use of emergency storage water and other local water sources	Provide protection against potential higher cost or surcharge on imported water during shortages
Use of federal and state disaster loans	Mitigate the impact of increased expenditures resulting from staff and public education outreach efforts and potential increase in cost of water during shortage

1.7 Emergency Water Regulations and Implementation

The City's Emergency Water Regulations are a part of the Municipal Code, listed under Division 38 of Chapter 6: Public Works and Property; Public Improvement and Assessment Proceedings, Article 7: Water System, Division 38, Sections 67.3801-67.3811.

During periods of emergency or drought when implementation of the mandatory conservation phases are enacted, Section 67.3809 of the Emergency Water Regulations requires the Department to monitor the projected supply and demand for water by its customers on a daily basis, and will recommend to the *Mayor* the extent of the conservation required through implementation or termination of the conservation stages to drought-level restrictions to prudently plan and supply water to its customers.

Based on the updated San Diego Municipal Code, the following procedures for determination and notification of Drought Response Level are as follows:

1. The existence of a **Drought Response Level 1** condition may be declared upon recommendation by the *Mayor* and resolution of the City Council, upon a written determination of the existence of the facts and circumstances supporting the determination. A copy of the written determination will be filed with the City Clerk. The *Mayor* will publish a notice of the determination of existence of **Drought Response Level 1** condition in the City's official newspaper. The City may also post notice of the condition on its website.

2. The Department will monitor the projected supply and demand for water during periods of emergency or drought and will recommend to the *Mayor* the extent of the conservation required. The *Mayor* will recommend to the City Council the implementation or termination of the appropriate level of water conservation in accordance with this Division.
3. The existence of **Drought Response Level 2 or Level 3** conditions may be declared upon recommendation by the *Mayor* and resolution of the City Council. The mandatory conservation measures applicable to **Drought Response Level 2 or Level 3** conditions will take effect on the 10th day after the date the response level is declared. Within 5 days following the declaration of the response level, the *Mayor* will publish a notice giving the extent, terms, and conditions respecting the use and consumption of water a minimum of one time for 3 consecutive days in the City's official newspaper. If the City Council adopts a water allocation, the *Mayor* will publish notice of this adoption in the City's official newspaper. Water allocation will be effective on the 5th day following the date of publication or at such later date as specified in the notice.
4. The existence of a **Drought Response Level 4** condition may be declared upon recommendation by the *Mayor* and resolution of the City Council and in accordance with the procedures specified in *California Water Code Sections 351 and 352*. The mandatory conservation measures applicable to **Drought Response Level 4** conditions will take effect on the 10th day after the date the response level is declared. Within 5 days following the declaration of the response level, the *Mayor* will publish a notice giving the extent, terms, and conditions respecting the use and consumption of water in the City's official newspaper. If the City Council adopts a water allocation, the *Mayor* will publish notice of the allocation in the City's official newspaper. Water allocation will be effective on the 5th day following the date of publication or at such later date as specified in the notice.
5. The City may declare an end to **Drought Response Levels 1, 2, 3 and 4** upon recommendation of the *Mayor* and resolution by the City Council at any regular or special meeting of the City Council.

Attachment 1: Emergency Water Regulations

Article 7: Water System

Division 38: Emergency Water Regulations

("Emergency Water Regulations" added 10-19-1998 by O-18596 N.S.)

§67.3801 Declaration of Necessity and Intent

(a) This Division establishes water management requirements necessary to conserve water, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, prevent unreasonable use of water, prevent unreasonable method of use of water within the City of San Diego Water Department service area in order to assure adequate supplies of water to meet the needs of the public, and further the public health, safety, and welfare, recognizing that water is a scarce natural resource that requires careful management not only in times of drought, but at all times.

(b) In addition to the general provisions of Section 67.3803, this Division establishes regulations to be implemented during times of declared water shortages, or declared water shortage emergencies. It establishes four levels of drought response actions to be implemented in times of shortage, with increasing restrictions on water use in response to worsening drought conditions and decreasing available water supplies.

(c) Drought Response Level 1 measures are voluntary and will be reinforced through local and regional public education and awareness measures. Drought Response condition Levels 2 or higher become increasingly restrictive in order to attain escalating conservation goals.

(d) During a Drought Response Level 2 condition or higher, the water conservation measures and water use restrictions established by this Division are mandatory and violations are subject to criminal, civil, and administrative penalties and remedies as provided in Chapter 1 of this Code.

(Renumbered from Sec. 67.38 and retitled to "Declaration of Emergency" on 10-19-1998 by O-18596 N.S.)
(Former Section 67.3801 repealed and added "Declaration of Necessity and Intent" 12-15-08 by O-19812 N.S; effective 1-14-2009.)

§67.3802 Definitions

The following words and phrases whenever used in this Division will have the meaning defined in this section:

Customer means any person, corporation, public or private entity, public or private association, public or private agency, government agency or institution, school district, college, university, or any other user of water provided by the City of San Diego.

Days are defined as calendar days, unless otherwise indicated.

Disaster means a catastrophic, naturally occurring or man-made event, including earthquake, flood, fire, riot, or storm, for which a state of emergency has been declared by the President of the United States, the Governor of California, or the executive officer or legislative body of the City or County of San Diego.

Drought means any shortage in water supply based upon expected demands that are caused by hydrological, environmental, legislative, judicial actions, or by infrastructure failure.

Grower means a *customer* engaged in the growing or raising, in conformity with recognized practices of husbandry, for the purpose of commerce, trade, or industry, or for use by public educational or correctional institutions, of agricultural, horticultural or floricultural products, and produced: (1) for human consumption or for the market, or (2) for the feeding of fowl or livestock produced for human consumption or for the market, or (3) for the feeding of fowl or livestock for the purpose of obtaining their products for human consumption or for the market. Grower does not refer to customers who purchase water subject to the Metropolitan Interim Agricultural Water Program or the San Diego County Water Authority Special Agricultural Rate Programs.

Metropolitan means the Metropolitan Water District of Southern California.

Potted Plant means any plant or group of plants contained in a pot or other receptacle that can be moved, including plants on boards, bark, driftwood or airplants (epiphytes).

Water Authority means the San Diego County Water Authority.

Water Conservation means the efficient management of water resources for beneficial uses, preventing waste, or accomplishing additional benefits with the same amount of water.

(Renumbered from Sec. 67.38.1 and retitled to "Comprehensive Water Conservation Plan" on 10-19-1998 by O-18596 N.S.)
(Former Section 67.3802 repealed and added "Definitions"12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 10-28-2009 by O-19904 N.S; effective 11-27-2009.)

§67.3803 Water Waste Prohibitions

The following restrictions will be in effect at all times:

(a) A *customer* shall not allow water to leave the *customer's* property by drainage onto adjacent properties or public or private roadways or streets or gutters due to excessive irrigation and/or uncorrected leaks.

(b) A *customer* will not fail to repair or stop a water leak.

(c) A *customer* will not use a running hose to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate safety or sanitation hazards, unless connected to a water efficient device such as a commercial water broom.

(d) A *customer* will not overfill swimming pools and spas.

(e) A *customer* will not use non-recirculating decorative water fountains.

(f) Vehicle washing can only be done in a commercial car wash or using a hose with an automatic shutoff nozzle or hand held container.

(g) Single pass-through cooling systems as part of new water service connections will be prohibited. Non-recirculating systems in all new conveyer car wash and commercial laundry systems will also be prohibited.

(h) Restaurants and other food establishments will only serve and refill water upon request.

(i) Guests in hotels, motels, and other commercial lodging establishments will be provided the option of not laundering towels and linens daily.

(j) A *customer* may only irrigate *potted plants*, non-commercial vegetable gardens and fruit trees, residential and commercial landscapes, including golf courses, parks, school grounds and recreation fields, before 10:00 a.m. and after 6:00 p.m. during the months of June through October and before 10:00 a.m. and after 4:00 p.m. during the months of November through May. A *customer* may irrigate at any time the following:

(1) as required by a landscape permit;

(2) for erosion control;

(3) for establishment, repair, or renovation of public use fields for schools and parks;

(4) for landscape establishment following a *disaster*. Such irrigation is permitted for a period of up to two months, after which a hardship variance is required in accordance with Section 67.3810;

(5) for renovation or repair of an irrigation system with an operator present; or

(6) for nursery and commercial *growers* using a hand-held hose equipped with a positive shut-off nozzle, a hand held container, or when a drip or micro-irrigation system or equipment is used. Irrigation of nursery propagation beds is permitted at any time.

(Renumbered from Sec. 67.38.2 and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3803 repealed and added "Water Waste Prohibitions" 12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 12-7-2010 by O-20008 N.S.; effective 1-6-2011.)

§67.3804 Application

(a) This Division applies to any *customer* in the use of any water provided by the City of San Diego.

(b) This Division is intended solely to further the conservation of water. It is not intended to implement or replace any provision of federal, state, or local statutes, ordinances, or regulations relating to protection of water quality or control of drainage or runoff.

(c) Nothing in this Division is intended to affect or limit the ability of the City Manager to declare and respond to an unforeseeable disaster or water emergency such as an earthquake, aqueduct break, or other major disruption in the water supply, pursuant to the City Charter or other provisions of this Code.

(d) This Division does not apply to use of water from private wells or to reclaimed water, or the use of fully permitted grey water systems.

(e) This Division does not apply to use of water that is subject to a special supply program, such as the *Metropolita*n Interim Agricultural Water Program or the *Water Authority* Special Agricultural Rate Programs. Violations of the conditions of special supply programs are subject to the penalties established under the applicable program. A *customer* using both water subject to a special supply program and other water provided by the City of San Diego is subject to this Division in the use of water provided by the City of San Diego.

(f) The use of potable water for industrial manufacturing, processing, or research and development is exempt from the water use restrictions during Drought Response Levels 1 and 2, if all of the following conditions are met as certified by the City Manager: 1) the business is one of the types of businesses described in categories 2000 through 3999, 7390, and 8730 of the Standard Industrial Classification Code [Editor's note. A copy is on file with the Office of the City Clerk as Document No. 00-18596-1]; 2) the business is located in an area where reclaimed water is available; 3) the business uses reclaimed water on its premises to the fullest extent possible; and 4) the business participates in all applicable City water conservation programs that are considered Best Management Practices by the California Urban Water Conservation Council. [Editor's note. A list of the City's water conservation programs that are Best Management Practices is on file with the Office of the City Clerk as Document No. 00-18596-2.]

(Renumbered from Sec. 67.38.3, retitled to "Authority to Implement Water Conservation Stages" and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3804 repealed and added "Application " 12-15-08 by O-19812 N.S; effective 1-14-2009.)

§67.3805 Drought Response Level 1 – Drought Watch Condition

(a) A Drought Response Level 1 condition is also referred to as a "Drought Watch" condition. The City Manager may recommend, and upon resolution of the City Council, declare a Drought Response Level 1 when there is a reasonable probability, due to *drought*, that there will be a supply shortage and that a consumer demand reduction of up to 10 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon such declaration, the City Manager shall take action to implement the voluntary Level 1 conservation practices identified in this Division.

(b) During a Level 1 Drought Watch condition, City of San Diego will increase its public education and outreach efforts to increase public awareness of the need to implement the following *water conservation* practices.

(1) Limit all landscape irrigation to no more than three assigned *days* per week on a schedule established and posted by the City Manager. This provision does not apply to commercial *growers* or nurseries, nor to the irrigation of golf course greens and tees.

(2) Use a hand-held hose equipped with a positive shut-off nozzle or hand held container or a garden hose sprinkler system on a timer to water landscaped areas, including trees and shrubs located on residential and commercial properties that are not irrigated by a landscape irrigation system.

(3) The washing of automobiles, trucks, trailers, airplanes and other types of mobile equipment is permitted only before 10:00 a.m. or after 6:00 p.m. during the months of June through October and only before 10:00 a.m. and after 4:00 p.m. during the months of November through May, with a hand-held container or a hand-held hose equipped with a positive shut-off nozzle for quick rinses. Boats and boat engines are permitted to be washed down after use. Washing is permitted at any time on the immediate premises of a commercial car wash. The use of water by all types of commercial car washes which do not use partially recirculated water will be reduced in volume by an amount determined by resolution of the City Council. Mobile equipment washings are exempt from these regulations where the health, safety and welfare of the public are contingent upon frequent vehicle cleanings, such as garbage trucks and vehicles to transport food products, livestock and perishables.

(4) *Customers* shall repair or stop all water leaks upon discovery or within five days of notification by the City of San Diego.

(5) Use recycled or non-potable water for construction purposes when available.

(6) Use of water from fire hydrants will be limited to fire fighting, meter installation by the Water Department as part of its Fire Hydrant Meter Program, and related activities or other activities necessary to maintain the health, safety and welfare of the citizens of San Diego.

(7) Construction operations receiving water from a fire hydrant meter or water truck will not use water beyond normal construction activities, consistent with Section 67.3803 and that required by regulatory agencies. Construction projects requiring watering for new landscaping materials shall adhere to the designated irrigation hours of only before 10:00 a.m. and after 6:00 p.m. during the months of June through October and only before 10:00 a.m. and after 4:00 p.m. during the months of November through May.

(8) Irrigation is not permitted during a rain event.

(Renumbered from Sec. 67.38.4 and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3805 repealed and added "Drought Response Level 1 – Drought Watch Condition " 12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 10-28-2009 by O-19904 N.S; effective 11-27-2009.)
(Amended 12-7-2010 by O-20008 N.S.; effective 1-6-2011.)

§67.3806 Drought Response Level 2 – Drought Alert Condition

(a) A Drought Response Level 2 condition is also referred to as a "Drought Alert" condition. The City Manager may recommend and, upon resolution of the City Council, declare a Drought Response Level 2 when, due to *drought*, a consumer demand reduction of up to 20 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon declaration of Drought Response Level 2, the City Manager shall take action to implement the mandatory Level 2 conservation practices identified in this Division.

(b) All City of San Diego water *customers* shall comply with all Level 1 Drought Watch *water conservation* practices during a Level 2 Drought Alert, and shall also comply with the following conservation measures:

(1) Limit lawn watering and landscape irrigation using sprinklers to no more than ten minutes maximum per watering station per assigned *Day* during the months of June through October and no more than seven minutes maximum per watering station per assigned *Day* during the months of November through May. This provision does not apply to landscape irrigation systems using water efficient devices, including drip/micro-irrigation systems and stream rotor sprinklers.

(2) Landscaped areas, including trees and shrubs not irrigated by a landscape irrigation system governed by Section 67.3806(b)(2) shall be watered no more than three assigned days per week by using a hand held container, hand-held hose with positive shut-off nozzle, or low volume non-spray irrigation (soaker hose.)

(3) Repair or stop all leaks upon discovery or within seventy-two hours of notification by the City of San Diego.

(4) Stop operating ornamental fountains except to the extent needed for maintenance.

(5) *Potted plants*, non-commercial vegetable gardens and fruit trees may be irrigated on any *day*, but must be irrigated only before 10:00 a.m. or after 6:00 p.m. during the months of June through October and only before 10:00 a.m. and after 4:00 p.m. during the months of November through May.

(6) Irrigation is permitted any *day* at any time, as follows:

(A) as required by a landscape permit;

(B) for erosion control;

(C) for establishment, repair or renovation of public use fields for schools and parks; or

(D) for landscape establishment following a *disaster*. Such irrigation is permitted for a period of up to two months, after which a hardship variance is required in accordance with Section 67.3810.

(c) The City Manager may recommend and, upon resolution of the City Council, implement a water allocation per *customer* account served by the City of San Diego, and a schedule of surcharges or penalties for exceeding the water allocation. If the City Council adopts or modifies water allocations, the City Manager will post notice of the water allocation prior to the effective date(s). Following the effective date(s) of the water allocation as established by the City Council, any *customer* that uses water in excess of the allocation will be subject to a surcharge or penalty for each billing unit of water in excess of the allocation. The surcharge or penalty for excess water usage will be in addition to any other remedy or penalty that may be imposed for violation of this Division. The *water conservation* measures required under Level 1 Drought Watch and Level 2 Drought Alert conditions, shall be suspended during the period a water allocation is in effect.

(Renumbered from Sec. 67.38.5 and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3806 repealed and added "Drought Response Level 2 – Drought Alert Condition" 12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 10-28-2009 by O-19904 N.S; effective 11-27-2009.)
(Amended 12-7-2010 by O-20008 N.S.; effective 1-6-2011.)

§67.3807 Drought Response Level 3 – Drought Critical Condition

(a) A Drought Response Level 3 condition is also referred to as a "Drought Critical" condition. The City Manager may recommend and, upon resolution of the City Council, declare a Drought Response Level 3 when, due to *drought*, there will be a supply shortage and that a consumer demand reduction of up to 40 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon declaration of Drought Response Level 3, the City Manager shall take action to implement the mandatory Level 3 conservation practices identified in this Division.

(b) All City of San Diego water *customers* shall comply with all Level 1 Drought Watch and Level 2 Drought Alert *water conservation* practices during a Level 3 Drought Critical condition and shall also comply with the following additional mandatory conservation measures:

(1) Limit all landscape irrigation to no more than two assigned days per week on a schedule established and posted by the City Manager. During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established and posted by the City Manager. This provision will not apply to commercial *growers* or nurseries, nor to the irrigation of golf course greens.

(2) Stop filling or re-filling ornamental lakes or ponds, except to the extent needed to sustain plants or animals that have been actively managed within the water feature prior to declaration of a *drought* response level under this Division.

(3) *Customers* shall repair or stop all water leaks upon discovery or within forty-eight hours of notification by the City of San Diego, with the exception of rental properties, which shall be given seventy-two hours to repair interior unit leaks, in order to comply with state requirements of giving prior notice before accessing rental units.

(4) Stop washing vehicles except at commercial carwashes that re-circulate water, or by high pressure/low volume wash systems.

(c) Upon the declaration of a Drought Response Level 3 condition requiring a 30 percent or greater demand reduction, new potable water services, temporary or permanent water meters, and statements of immediate ability to serve or provide potable water service (such as, will serve letters, certificates, or letters of availability) will be allowed only under the circumstances listed below. This provision does not preclude the resetting or turn-on of meters to provide continuation of water service or to restore service that has been interrupted.

(1) A valid building permit has been issued for the project; or

(2) The project is necessary to protect the public's health, safety, and welfare; or

(3) The number of new fire hydrant meters will not exceed the existing number of currently authorized fire hydrant meters. A new fire hydrant meter will be issued only when an old meter is returned; or

(4) The applicant provides substantial evidence satisfactory to the City Manager of an enforceable commitment that the new water demands for the project will be offset prior to the provision of new water meter(s). Such offset shall be in the form of additional *water conservation* measures, the provision of recycled water use in place of existing potable water demands, or other such offsets developed and approved by the City Manager. These offsets shall be reflected in a reduced capacity fee from the project's initially calculated demand (for example, an offset of 75 equivalent dwelling units ("edu") is provided so that the project's 200 edu demand is reduced to 125 edus and fees are paid on 125 edus but the service and meter will be sized at 200 edus).

Development projects with approved tentative maps and related entitlements shall have their maps and related entitlement's expiration dates tolled for the period of time that the Drought Response Level 3 condition is in place but not to exceed 5 years, unless the development project applicant chooses to proceed with development under subsections (c)(1) through (c)(4) above.

(d) Upon the declaration of a Drought Response Level 3 condition, the City Manager will suspend consideration of annexations to its service area.

(e) The City Manager may recommend and, upon resolution of the City Council, implement a water allocation per *customer* served by the City of San Diego, and a schedule of surcharges or penalties for exceeding the water allocation. If the City Council adopts or modifies a water allocation, the City Manager will post notice of the allocation prior to the effective date(s). Following the effective date(s) of the water allocation as established by the City Council, any *customer* that uses water in excess of the allocation will be subject to a surcharge or penalty for each billing unit of water in excess of the allocation. The surcharge or penalty for excess water usage will be in addition to any other remedy or penalty that may be imposed for violation of this Division. The *water conservation* measures required under Level 1 Drought Watch, Level 2 Drought Alert, and Level 3 Drought Critical conditions shall be suspended during the period a water allocation is in effect.

(Renumbered from Sec. 67.38.6 and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3807 repealed and added "Drought Response Level 3 – Drought Critical Condition" 12-15-08 by O-19812 N.S; effective 1-14-2009.)

§67.3808 Drought Response Level 4 – Drought Emergency

(a) A Drought Response Level 4 condition is also referred to as a "Drought Emergency" condition. The City Manager may recommend and, upon resolution of the City Council, declare a water shortage emergency pursuant to California Water Code section 350 and declare a Drought Response Level 4 when there is a reasonable probability that there will be a supply shortage and that a consumer demand reduction of more than 40 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon declaration of a Drought Response Level 4, the City Manager shall take action to implement the mandatory Level 4 conservation practices identified in this Division and on the grounds provided in California Water Code section 350.

(b) All City of San Diego water *customers* shall comply with all *water conservation* measures required during Level 1 Drought Watch, Level 2 Drought Alert, and Level 3 Drought Critical conditions and shall also comply with the following additional mandatory conservation measures:

(1) Stop all landscape irrigation, except crops and landscape products of commercial *growers* and nurseries. This restriction does not apply to:

(A) Maintenance of trees and shrubs that are watered no more than two assigned days per week on a schedule established and posted by the City Manager, and by using a hand held container, hand-held hose with an automatic shut-off nozzle, or low-volume non-spray irrigation;

(B) Maintenance of existing landscaping necessary for fire protection;

(C) Maintenance of existing landscaping for erosion control;

(D) Maintenance of plant materials identified to be rare, protected by City Council Policy or essential to the well being of rare animals;

(E) Maintenance of landscaping within active public parks and playing fields, day care centers, school grounds, cemeteries, and golf course greens, provided that such irrigation does not exceed two days per week according to the schedule established under Section 67.3807(b)(1);

(F) Watering of livestock; and

(G) Public works projects and actively irrigated environmental mitigation projects.

(2) *Customers* shall repair or stop all water leaks upon discovery or within twenty-four hours of notification by the City of San Diego, with the exception of rental properties, which shall be given seventy-two hours to repair interior unit leaks, in order to comply with state requirements of giving prior notice before accessing rental units..

(3) Stop filling or refilling residential pools and spas.

(4) No new commitments or agreements will be entered into to provide water to *customers* or agencies located outside of the City of San Diego.

(Renumbered from Sec. 67.38.7 and amended 10-19-1998 by O-18596 N.S.) (Former Section 67.3808 repealed and added "Drought Response Level 4 – Drought Emergency" 12-15-08 by O-19812 N.S; effective 1-14-2009.)

§67.3809 Procedures for Determination and Notification of Drought Response Level

(a) The existence of a Drought Response Level 1 condition may be declared upon recommendation by the City Manager and resolution of the City Council, upon a written determination of the existence of the facts and circumstances supporting the determination. A copy of the written determination will be filed with the City Clerk. The City Manager will publish a notice of the determination of existence of Drought Response Level 1 condition in the City's official newspaper. The City of San Diego may also post notice of the condition on its website.

The Water Department will monitor the projected supply and demand for water during periods of emergency or *drought* and will recommend to the City Manager the extent of the conservation required. The City Manager will recommend to the City Council the implementation or termination of the appropriate level of *water conservation* in accordance with this Division.

(b) The existence of Drought Response Level 2 or Level 3 conditions may be declared upon recommendation by the City Manager and resolution of the City Council. The mandatory conservation measures applicable to Drought Response Level 2 or Level 3 conditions will take effect on the tenth day after the date the response level is declared. Within five days following the declaration of the response level, the City Manager will publish a notice giving the extent, terms and conditions respecting the use and consumption of water a minimum of one time for three consecutive days in the City's official newspaper. If the City Council adopts a water allocation, the City Manager will publish notice of this adoption in the City's official newspaper. Water allocation will be effective on the fifth day following the date of publication or at such later date as specified in the notice.

(c) The existence of a Drought Response Level 4 condition may be declared upon recommendation by the City Manager and resolution of the City Council and in accordance with the procedures specified in California Water Code Sections 351 and 352. The mandatory conservation measures applicable to Drought Response Level 4 conditions will take effect on the tenth day after the date the response level is declared. Within five days following the declaration of the response level, the City Manager will publish a notice giving the extent, terms and conditions respecting the use and consumption of water in the City's official newspaper. If the City Council adopts a water allocation, the City Manager will publish notice of the allocation in the City's official newspaper. Water allocation will be effective on the fifth day following the date of publication or at such later date as specified in the notice.

(d) The City of San Diego may declare an end to Drought Response Levels 1, 2, 3 and 4 upon recommendation of the City Manager and resolution by the City Council at any regular or special meeting of the City Council.

(Renumbered from Sec. 67.38.8 and amended 10-19-1998 by O-18596 N.S.) (Former Section 67.3809 repealed and added "Procedures for Determination and Notification of Drought Response Level" 12-15-08 by O-19812 N.S; effective 1-14-2009.)

§67.3810 Hardship Variance

(a) If, due to unique circumstances, a specific requirement of this Division would result in undue hardship to a *customer* using City of San Diego water or to property upon which City of San Diego water is used, that is disproportionate to the impacts to City of San Diego water users generally or to similar property or classes of water uses, then the *customer* may apply for a variance to the requirements as provided in this Section.

(b) The variance may be granted or conditionally granted, only upon a written finding of the existence of facts demonstrating an undue hardship to a *customer* using City of San Diego water or to property upon which City of San Diego water is used, that is disproportionate to the impacts to City of San Diego water users generally or to similar property or classes of water user due to specific and unique circumstances of the user or the user's property.

(1) Application.

Application for a variance will be in written form prescribed by the City Manager and will be accompanied by a non-refundable processing fee in an amount set by resolution of the City Council.

(2) Supporting Documentation.

The written application will be accompanied by photographs, maps, drawings, or other pertinent information as applicable, including a written statement of the applicant.

(3) Approval Authority.

The City Manager will exercise approval authority and act upon any completed application after submittal and may approve, conditionally approve, or deny the variance. The applicant requesting the variance will be promptly notified in writing of any action taken. The decision of the City Manager is final. Unless specified otherwise at the time a variance is approved, the variance applies to the subject property during the term of the mandatory *drought* response.

(4) Required Findings for Variance.

(A) Except as set forth in Section 67.3810(B), an application for a variance will be denied unless the approving authority finds, based on the information provided in the application, supporting documents, or such additional information as may be requested, and on water use information for the property as shown by the records of the City of San Diego, all of the following:

(i) that the variance does not constitute a grant of special privilege inconsistent with the limitations upon other City of San Diego *customers*; and

(ii) that because of special circumstances applicable to the property or its use, the strict application of this Division would have a disproportionate impact on the property or use that exceeds the impacts to *customers* generally; and

(iii) that the authorizing of such variance will not be of substantial detriment to adjacent properties, and will not materially affect the ability of the City of San Diego to effectuate the purpose of this Division and will not be detrimental to the public interest; and

(iv) that the condition or situation of the subject property or the intended use of the property for which the variance is sought is not common, recurrent or general in nature.

(B) An application for a variance will be denied unless the approving authority finds, based on the information provided in the application, supporting documents, or such additional information as may be requested, and on water use information for the property as shown by the records of the City of San Diego, either of the following:

(i) that the property has been adversely impacted by a *disaster*; or

(ii) that proposed alternative water use restrictions for the property would result in greater water savings than the existing water use restrictions.

(5) No relief will be granted to any *customer* for any reason in the absence of a showing by the *customer* that the *customer* has achieved the maximum practical reduction in water consumption in the *customer's* residential, commercial, industrial, institutional, agricultural or governmental water consumption.

(Renumbered from Sec. 67.38.9 on 10-19-1998 by O-18596 N.S.)
(Former Section 67.3810 repealed and added "Hardship Variance" 12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 10-28-2009 by O-19904 N.S; effective 11-27-2009.)

§67.3811 Violations and Penalties

It is unlawful for any *customer* to violate the mandatory provisions of this Division. Violations are subject to criminal, civil, and administrative penalties and remedies as provided in Chapter 1 of this Code. In addition, service of water may be discontinued or appropriately limited through the installation of flow-restricting devices to any *customer* who willfully uses water in violation of this Division.

(Renumbered from Sec. 67.39 and retitled to "Publication of Terms of Water Use" on 10-19-1998 by O-18596 N.S.)
(Former Section 67.3811 repealed and added "Violations and Penalties" 12-15-08 by O-19812 N.S; effective 1-14-2009.)

Attachment 2: Emergency Storage of Water Policy 400-04

CITY OF SAN DIEGO, CALIFORNIA

COUNCIL POLICY

CURRENT

SUBJECT: EMERGENCY STORAGE OF WATER
POLICY NO.: 400-04
EFFECTIVE DATE: December 27, 1973

BACKGROUND:

The City of San Diego's major supply of water is through the aqueducts, canals, and pumping plants of the Metropolitan Water District and the San Diego County Water Authority. While such facilities have an excellent record of service, it is entirely possible for service to be interrupted by floods, earthquakes, or sabotage. Prior to 1963 the Water Utilities Department operated under an unofficial policy of providing approximately one year's storage as an emergency supply. An evaluation of the hazard and possible interruptions balanced against the costs of emergency storage caused us to reevaluate this requirement.

PURPOSE:

To provide a minimum quantity of stored, untreated water to provide for emergencies such as aqueduct failure or aqueduct pump stations outage.

POLICY:

The Water Utilities Department shall have six-tenths of the annual requirement of the City of San Diego and its contractees as active, available storage at the following reservoirs: Lake Skinner, San Vicente, El Capitan, Lower Otay, Murray, and Miramar. The active, available storage shall include any water in the San Vicente Reservoir stored to the account of the San Diego County Water Authority or the Metropolitan Water District of Southern California but shall not include any water stored at El Capitan Reservoir by the Helix Irrigation District. The active, available storage shall also include 60% of the active, available storage in the Metropolitan Water District Lake Skinner Reservoir. Active, available storage shall be that portion of the water which is above the lowest usable outlet of each reservoir.

HISTORY:

Adopted by Resolution R-176832 08/13/1963
Amended by Resolution R-200189 07/02/1970
Amended by Resolution R-209553 12/27/1973

Appendix C: Best Management Practices (To Be Provided Once Completed)

Base Year Data, BMP Activity History, Coverage Reports, and Report Filing

Appendix D: Urban Water Management Plan Checklist

Table D-1. Urban Water Management Plan checklist, organized by legislation number

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		Section 3.3
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	Section 1.6
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	Not applicable
4	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.	10620(d)(2)	Plan Preparation		Section 1.5
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply Reliability . . .		Section 1.3
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	Plan Preparation		Section 1.6
7	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).	10621(c)	Plan Preparation		Section 1.6
8	Describe the service area of the supplier	10631(a)	System Description		Section 2.1

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
9	(Describe the service area) climate	10631(a)	System Description		Section 2.2
10	(Describe the service area) current and projected population . . . 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 . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in “Baseline Daily Per Capita Water Use.” See Section M.	Section 3.1
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 3.1
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Section 3.2
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	System Supplies	The ‘existing’ water sources should be for the same year as the “current population” in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 4.1 – imported water Section 4.3 – groundwater Section 4.2 – surface water Section 4.6 – recycled water
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4.3

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		Section 4.3
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Section 4.3
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		Section 4.3 (not adjudicated)
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		Not applicable (not adjudicated)
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	System Supplies		Section 4.3
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	System Supplies		Section 4.3
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	Section 4.3

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
22	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: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability . . .		Section 4.8 Section 4.9
23	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 supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Water Supply Reliability . . .		Section 4.9
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Section 4.5
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), 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.	10631(e)(1)	System Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
26	(Describe and provide a schedule of implementation for) 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) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 5 Appendix C (2009/2010 BMP reports)
27	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.	10631(f)(3)	DMMs		Appendix C (2009/2010 BMP reports)
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		Appendix C (2009/2010 BMP reports) Per item no. 32 in this table, since the City is a signer of the MOU and submits the annual reports, they are deemed compliant with no. 28 and 29 in this table.

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
29	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, that 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.	10631(g)	DMMs	See 10631(g) for additional wording.	Appendix C (2009/2010 BMP reports) Per item no. 32 in this table, since the City is a signer of the MOU and submits the annual reports, they are deemed compliant with no. 28 and 29 in this table.
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	System Supplies		Section 4.7
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		Section 4.4

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Appendix C (2009/2010 BMP reports)
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 4.1
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		Section 3.2
35	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.	10632(a)	Water Supply Reliability . . .		Appendix B
36	Provide 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.	10632(b)	Water Supply Reliability . . .		Appendix B
37	(Identify) 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.	10632(c)	Water Supply Reliability . . .		Appendix B

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
38	(Identify) 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.	10632(d)	Water Supply Reliability . . .		Appendix B
39	(Specify) 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.	10632(e)	Water Supply Reliability . . .		Appendix B
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability . . .		Appendix B
41	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.	10632(g)	Water Supply Reliability . . .		Appendix B
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability . . .		Appendix B
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability . . .		Appendix B
44	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. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	System Supplies		Section 4.6
45	(Describe) 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.	10633(a)	System Supplies		Section 4.6.2
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		Section 4.6.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		Section 4.6.3
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		Section 4.6.4
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	System Supplies		Section 4.7
50	(Describe the) 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.	10633(f)	System Supplies		Section 4.6.4
51	(Provide 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, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	System Supplies		Section 4.6.4
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply Reliability . . .	For years 2010, 2015, 2020, 2025, and 2030	Section 4.10

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
53	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 state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Water Supply Reliability . . .		Section 4.8
54	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 no later than 60 days after the submission of its urban water management plan.	10635(b)	Plan Preparation		Section 1.6
55	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.	10642	Plan Preparation		Section 1.6
56	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. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	Plan Preparation		Section 1.6
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		Section 1.6
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		Section 1.6

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	Plan Preparation		Section 1.6
60	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.	10645	Plan Preparation		Section 1.6

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Appendix E: Staff Participants

City of San Diego 2010 Urban Water Management Plan Participants				
For questions pertaining to the 2010 Urban Water Management Plan, please contact Dave Glanville, Project Manager at (619) 533-4222 Dglanville@sandiego.gov				
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