2015

City of San Diego

URBAN WATER MANAGEMENT PLAN

Final | June 2016

SD Public Utilities

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SECTION 1

Introduction

1.1 Purpose of 2015 Urban Water Management Plan

The City of San Diego (City) presents this 2015 Urban Water Management Plan (UWMP) to meet the State of California's requirements under the California Water Code and comply with the California Urban Water Management Planning Act (Act) as administered by the California Department of Water Resources (DWR).

The City has developed this 2015 UWMP not only to meet regulatory requirements of the Act, but also to serve as an overarching water resources planning document for the City's residents, businesses, interest groups, and public officials. This plan provides information on the City's current and future water demands and supplies, discusses the water resources challenges that the City faces, and summarizes the major water resources initiatives that the City has proactively taken to ensure a safe, reliable water supply for its water customers.

Specifically, this 2015 UWMP details the City's water system, water demands, sources of water supplies, water conservation efforts, climate change impacts, energy intensity, water shortage contingency planning, and projected water supply reliability during normal, dry, and multi-year drought conditions.

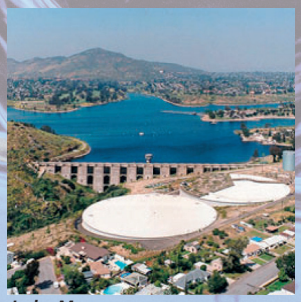
1.2 Overview of the City and its Water System

The City is a major metropolis with a diverse community that consistently ranks as one of the world's most desirable cities to live and work. As of the 2010 US Census, the City ranked as the eighth largest city in the United States and second largest city in California, with an estimated population of 1.38 million. The City is located in the most southwestern corner of the United States and State of California. It is bound on the west by the Pacific Ocean and lies just north of the international border with Mexico. The City's close proximity to Mexico and its rich history have molded the City into an international community. The City's partnerships with Tijuana, Mexico, on multiple economic projects and issues have benefited the entire region culturally and economically. The City's main industries of tourism, cutting edge technology, international trade, and defense attract businesses and employees to the area, leading to a high quality of life for its residents.

The City's climate is semiarid with cycles of multi-year droughts. Average rainfall does not provide adequate local water supplies for the City and is supplemented with water imported from outside the region. At approximately 340 square miles, the City has varying topography ranging from coastal shores to inland mountain

INSIDE

San Diego Waterfront



Lake Murray

Point Loma Wastewater Treatment Plant

areas, each with its own distinct microclimate. This varied geography and semiarid climate require sophisticated and innovative water and wastewater systems.

The City has continually and proactively invested in its water supply system to maintain a reliable water supply for residents and businesses for over 100 years. The City's water and wastewater systems are maintained and operated by the City's Public Utilities Department. The water system extends over 404 square miles, with average water deliveries on the order of 200 million gallons per day (mgd), or 224,000 acre-feet per year (AFY). The City's extensive raw water system includes nine reservoirs, which capture local runoff from rainfall and store purchased imported water that is sent to the City's three water treatment plants for treatment and distribution.

The City collects, treats and disposes of nearly 180 mgd of sewage from the City's wastewater customers, as well as from 12 cities/agencies in a 450-square-mile area with a service area population of over 2.2 million. The City also has a separate recycled water system that currently extends over 90 miles. The City's two water reclamation plants currently provide recycled water to meet non-potable water demands. In Fiscal Year 2015, the City provided 8,195 AFY of non-potable recycled water within the City and 4,232 AFY to three wholesale customers.

1.3 Changes Since the 2010 Urban Water Management Plan

UWMPs have been required by DWR since 1985 (and every five years after) to promote long-term water resource planning and assure that adequate supplies are available to meet future demands in the State. For each cycle of UWMPs, the California Legislature has amended the original Act to include additional requirements and considerations. For the 2010 UWMP cycle, the California Water Code was amended to include mandated compliance to reduce per capita water demands by 20 percent by 2020 (20x2020), with an interim reduction target in 2015. One unique aspect of this 2015 UWMP is that this will be the first report in which the per capita water use targets are assessed. In addition, for the 2015 UWMP, DWR has added voluntary reporting in multiple areas. The City is providing voluntary reporting of climate change impacts and energy intensity.

Since completion of the 2010 UWMP, the City has continued to take steps to ensure that its customers have a reliable, cost-effective, and environmentally sensitive water supply. Without a reliable water supply, public health is in jeopardy, businesses relocate to other cities, tourism suffers, and the overall quality of life for the City's residents declines. The steps the City has taken since it completed its 2010 UWMP include:

- Development and participation in strategic water resources plans that guide future investments in local water resources, such as:
  - City's Long-Range Water Resources Plan.
  - City's Recycled Water Study.
  - Participation in San Diego Integrated Regional Water Management Program.
- Developing local water resources to increase the reliability of its water system, which include:
  - The Water Purification Demonstration Project, which was constructed and operated to determine the feasibility of blending imported water with purified wastewater in the San Vicente Reservoir, then treating the water again at an existing drinking water treatment plant. This effort, which had a substantial public education and outreach component, has led to the advancement of San Diego's Pure Water Program (Pure Water).
  - Two groundwater projects: (1) Joint Partnership with Sweetwater Authority-Expansion of the Richard A. Reynolds Brackish Groundwater Desalination Facility; and (2) San Vicente and El Capitan Municipal Supply Wells/San Vicente and El Capitan

Seepage Recovery, which are currently under evaluation and development.

- Continuing to implement water conservation measures to reduce the City's dependence on imported water. The City has achieved substantial water savings by developing innovative, customer-oriented water conservation programs; creating policies and ordinances designed to promote water conservation; and implementing comprehensive public information and education campaigns that foster a water conservation ethic in San Diegans.
- Responding to the current, very severe drought conditions that have stressed state, regional, and local water supplies.
- Support of new regional water supply projects, such as the newly commissioned Carlsbad (Seawater) Desalination Facility.
- Approving water rate increases, beginning in January 2016 and extending through June 2020, primarily to account for ever-increasing imported water costs, local water reliability improvements, and improvements to the City's aging water infrastructure.

1.4 Summary of Water Resources Plans and Studies

The City currently depends heavily on purchased water from the San Diego County Water Authority (SDCWA), which is predominantly imported water from Northern California and the Colorado River. During the past five years, from 2011 to 2015, imported water represented 87 percent of the City's overall water supply (including recycled water, but excluding savings from water conservation).

Because of this heavy reliance on imported water, the convergence of critical water supply issues has far-reaching implications for the City that requires long-range and proactive planning. Critical water supply issues facing the City include: (1) reliability of imported water during droughts, restrictions resulting from environmental regulations, and state mandated water conservation; (2) quality of imported water that impacts local water recycling, groundwater, and water customers; (3) climate change impacts on local water demands, local water supply, and imported water; and (4) increasing cost of imported water.

As part of the City's proactive planning, the City completed a Long-Range Water Resources Plan (LRWRP) in 2012. The LRWRP represents the strategic vision for water supply, and identifies a number of short-term and long-term actions to reduce reliance on imported water and improve supply reliability for the City. The City also completed a Recycled Water Study (RWS) in 2012 and a Water Purification Demonstration Project Report in 2013. Finally, the City continues to investigate and study the expanded use of local groundwater, and continues to participate in the San Diego Integrated Regional Water Management (SDIRWM) Program.

1.4.1 Long-Range Water Resources Plan

Integrated water resources planning is a process by which demand-side and supply-side options are viewed together in order to meet multiple objectives, such as reliability, cost, water quality, environmental protection, and implementation risks. This process also addresses uncertainties such as droughts, climate change, and regulatory change. The City used an integrated water resources planning approach in developing its LRWRP.

Stakeholder collaboration, through an open and participatory process, was essential to the success of the LRWRP's development. At the start of the LRWRP process, the City formed a Stakeholder Committee that represented a wide range of interests and backgrounds to help guide the development of the plan. Members of the Stakeholder Committee included individuals from the following groups: San Diego Taxpayers Association, Independent Rates Oversight Committee (IROC), San Diego Regional

Chamber of Commerce, Building Industry Association of San Diego, San Diego Coastkeeper, American Society of Landscape Architects, San Diego Section of the American Planning Association, and the City representative to the SDCWA Board.

The 2012 LRWRP recommendations include:

- Move forward with Stakeholder Committee-recommended implementation strategies, which include:
  - Additional water conservation.
  - Potable reuse (Pure Water).
  - Groundwater supply development.
  - Rainwater harvesting.
- Use an adaptive management process to assess the progress made on implementation of options, and reassess risk triggers concurrent with the City's UWMP schedule (2020, 2025, 2030, 2035, and so on).
- Update the 2012 LRWRP in 2020 (and every 10 years thereafter) to identify new trends, imported water reliability, and local supply development.

The 2012 LRWRP and the recommended strategies were unanimously adopted by the City Council on December 10, 2013, with Resolution Number R-308636.

LRWRP Implications for the City's 2015 UWMP

Implementation of the LRWRP will have numerous benefits for the City and its residents. These include:

- Greater water supply reliability and reduced dependence on imported water.
- Greater resilience against climate change and disasters.
- Greater local control over how water investments are made, helping to manage costs and maximize City assets.
- Improved quality of water delivered to the City's water customers, improved water quality in local groundwater basins, and improved effluent water quality discharged to the natural environment as stormwater and wastewater.

Assuming ongoing drought conditions and climate change impacts through year 2035, if the City's status quo of heavy dependence on imported water were continued without implementation of the 2012 LRWRP, then reliance on imported water supplies would be approximately 83 percent and potential shortages would approach approximately 32 percent of projected water demands. With the implementation of the LRWRP strategy, reliance on imported water would be reduced to 50 percent under drought and climate change conditions, and there would be no anticipated water shortages, as illustrated in Figure 1-1.

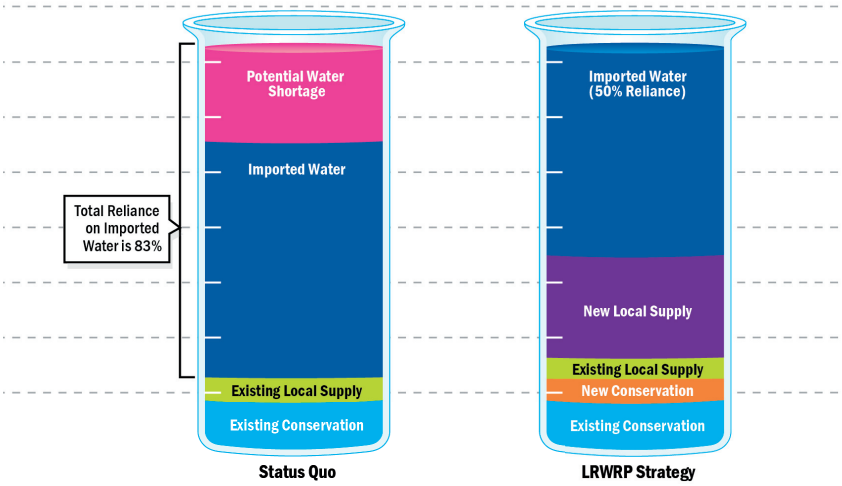


Figure 1-1 Comparison of Water Supply Mix in Year 2035 Under Drought and Climate Change
Source: City of San Diego 2012 Long-Range Water Resources Plan

1.4.2 Recycled Water Study

The City's RWS was initiated in 2009 to further evaluate and develop water reuse in the San Diego region. The RWS was intended to provide guidance to assist policy leaders in making decisions regarding water reuse and the City's water and wastewater infrastructure.

Installing purple pipes for non-potable reuse

Through the RWS, the City conducted an extensive evaluation of ways to increase water reuse, reduce discharges of treated wastewater into the ocean, and minimize loads on the Point Loma Wastewater Treatment Plant (PLWTP). Water reuse targets for the RWS were based on previously established water reuse goals, stakeholder input, and findings from technical analyses. A reuse target of 100 mgd was ultimately established.

To achieve the target offloading from PLWTP, the RWS developed five integrated reuse alternatives that would build upon non-potable and potable reuse efforts previously studied. The alternatives were strategically selected by considering the location of available wastewater, existing facilities, and delivery points. Each alternative includes 83 mgd of new potable reuse and 3 mgd of new non-potable recycled wastewater, in addition to 4 mgd of already planned non-potable reuse.

In conjunction with the RWS, the City conducted the Water Purification Demonstration Project to determine the feasibility of reservoir augmentation. The Water Purification Demonstration Project was designed to determine whether advanced water purification technology could provide a local and safe drinking water supply for the City. The project evaluated the feasibility of blending imported water with purified water produced from wastewater in the San Vicente Reservoir, and then treating the water again in an existing water treatment plant. A 1-mgd demonstration-scale advanced water treatment plant was constructed at the North City Water Reclamation Plant (NCWRP) and began operating in June 2011.

The Water Purification Demonstration Project studied and modeled the reservoir augmentation process, but did not actually put any purified water into San Vicente Reservoir. Several reports prepared to analyze the feasibility of this demonstration project include the Advanced Water Purification Facility Study Report, Limnology and Reservoir Detention Study of San Vicente Reservoir, and Water Purification Demonstration Project-Testing and Monitoring. The viability and safety of the purification process confirmed through this one-year demonstration project led to the unanimous approval of the program, now known as Pure Water, by the City Council for advancement on November 18, 2014.

RWS Implications for the City's 2015 UWMP

By increasing water reuse, the City recognizes multiple benefits including:

- Increased water supply reliability and local control.
- Enhanced sustainability by reducing imported water from Northern California and the Colorado River.
- Safe and affordable water for existing and future generations.
- Water quality benefits that result from reducing regional salinity and ocean discharges.

1.4.3 San Diego Integrated Regional Water Management Program

Water resources within the San Diego County region are complex and government agencies are subject to a myriad of regulations. The westward draining portion of San Diego County consists of eleven coastal watersheds extending from the Mexican border north to the border with Orange County, as shown in Figure 1-2. The runoff captured within these watersheds meets approximately 15 percent of the region's overall water demands. Habitat areas range from the coastal wetlands to inland mountains, and

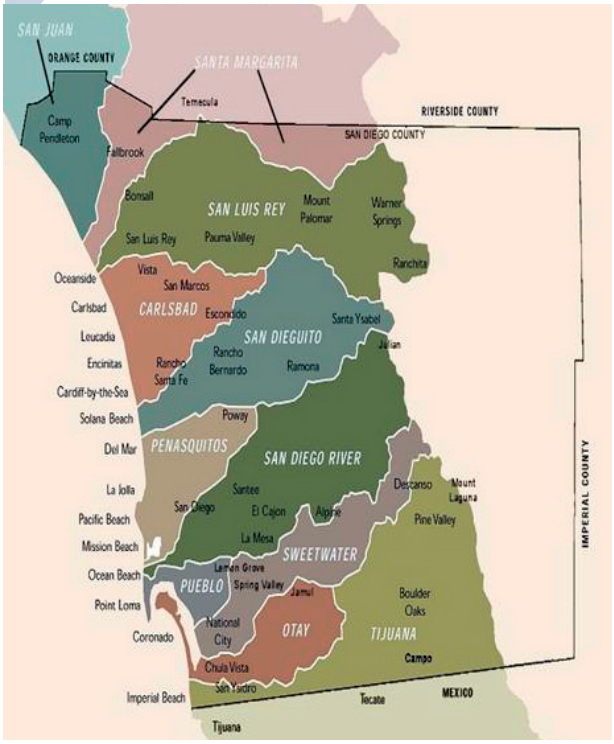


Figure 1-2 Watersheds within the SDIRWM Program

support more threatened and endangered species than any other comparable land area in the country. Currently the region's population is approximately 3.1 million concentrated mainly in coastal areas. The water resource challenges for this region include water supply, water quality, watershed health, endangered species, and climate change.

Previously, projects addressing these water resources challenges were designed to appease single-focused visions, and organizations operating independently devised solutions. The SDIRWM process constituted a different approach, in which the region's stakeholders came together to develop an integrated and regional plan that would comprehensively address water resources issues. The first SDIRWM Plan was completed in 2007 after a multi-year effort led by a Regional Water Management Group (RWMG). RWMG members consist of the City, County of San Diego, and SDCWA. The 2007 SDIRWM Plan established regional priorities to protect, manage, and increase reliability and sustainability of water resources. In 2013, the 2007 SDIRWM Plan was revised to comply with new requirements, update content, and maintain eligibility for funding.

The governing bodies of the three RWMG agencies approved the 2013 SDIRWM Plan in the fall of 2013. The 2013 SDIRWM Plan allowed stakeholders to revisit goals and objectives established in the original plan to reflect updated conditions. The mission statement explains the purpose of the SDIRWM Plan as:

> *To develop and implement an integrated strategy to guide the 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.*

Four goals were developed for the region:

- Improve the reliability and sustainability of regional water supplies.
- Protect and enhance water quality.
- Protect and enhance our watersheds and natural resources.
- Promote and support sustainable integrated water resource management.

SDIRWM Plan Implications for the City's 2015 UWMP

Starting with development of the first SDIRWM Plan in 2007, 162 projects designed to improve watershed health and water supply were collected and integrated for inclusion in the plan. Projects were scored and ranked by a Project Selection Workgroup, using objectives and criteria outlined in the 2013 SDIRWM Plan Update and specific grant funding criteria. To date, 58 projects identified in the SDIRWM Plan have received a total of $89.5 million in funding through DWR's Integrated Regional Water Management Grant Program. This funding has been provided through California voter-approved Propositions 50 and 84 that are administered by the DWR. In the future, additional funding will be available under California's Proposition 1. The City has served as the lead project sponsor for 16 projects, which have received approximately $25.4 million in grants.

Funding received through the SDIRWM process assists the City in increasing local water supply reliability, reducing imported water demands, improving water quality and protecting the watershed.

1.5 California Drought

California is currently in the midst of a very severe, multi-year drought. In 2014, over 90 percent of the State experienced extreme to exceptional drought conditions. Although the drought conditions subsided slightly in 2015, the State's water supply remains perilously low. The warmest year on record occurred in 2013, and the lowest snowpack in the Sierra Nevada mountain range occurred in 2014. This has resulted in record low water allocations for California's State Water Project (SWP) and federal Central Valley Project contractors. In addition, during the 2013-2015 period, the City's reservoirs were also at record low water storage levels due to lower-than-average rainfall.

1.5.1 State Water Resources Control Board Mandated Conservation

In January 2014, California Governor Edmund G. Brown Jr. issued a proclamation of a state of emergency under the California Emergency Services Act based on these drought conditions. In April 2014, the Governor issued a proclamation of continued state of emergency, based on continued drought conditions. In July 2014, California's State Water Resources Control Board (SWRCB) voted to impose voluntary water use restrictions statewide that averaged 20 percent. On November 1, 2014, the City Council, at the Mayor's direction, activated the Emergency Water Regulation's Drought Alert status to respond locally to the years of drought. The Drought Alert Status invoked mandatory water use restrictions, including limiting landscape irrigation to no more than three assigned days per week.

In March 2015, as the drought extended to its fourth year, the SWRCB adopted and expanded the emergency regulations first adopted in July 2014. On April 1, 2015, following the lowest snowpack ever recorded in the Sierra Nevada mountains, and with no end to the drought in sight, Governor Brown issued the first ever statewide mandatory water reductions through Executive Order B-29-15. The Executive Order directed the SWRCB to impose restrictions on water suppliers to achieve a 25 percent reduction in potable urban water use between June 2015 and February 2016 based on 2013 water use. On November 15, 2015, Governor Brown issued Executive Order B-36-15 to extend the restrictions on water suppliers through October 31, 2016, if needed. Under the regulation, the City's specific conservation goal was set at 16 percent (reflecting the City's past investments in conservation and recycled water). In February 2016, the SWRCB revised the City's conservation target down to 8 percent, reflecting actual population growth and implementation of alternative water supplies. The SWRCB's new target for the City until October 31, 2016, is a reduction of 8 percent of its 2013 water use. The SWRCB is anticipated to issue revised rules based on the Governor's mandate that would apply through January 2017. The SWRCB is scheduled to consider these revised rules on May 18, 2016.

1.5.2 Summary of the City's Response to Drought

The City's permanent water use restrictions, in place since 2009, already met elements of the State-mandated requirements. To emphasize the importance of continued water conservation, the City Council enacted the Drought Watch status of the Emergency Water Regulations. To promulgate the requirements of the Executive Order and the SWRCB, the City amended these Emergency Water Regulations. Key changes included limiting landscape irrigation to two assigned days per week, and prohibiting irrigation for at least 48 hours after a rain event.

As of February 2016, the City has met and exceeded the initial 16 percent conservation goal, despite historically high summer temperatures. Current conservation programs, combined with long-range planning, have allowed the City to maintain a reliable water supply during the current drought.

1.6 Plan Organization

San Diego's 2015 UWMP is divided into eleven sections. Sections are generally organized as presented in DWR's UWMP Guidelines and briefly described below:

- Section 1 – Introduction, provides the purpose of the plan, and an overview of the City, water resources issues, and major water resources initiatives.
- Section 2 – Plan Requirements and Preparation, summarizes the UWMP requirements, and plan's preparation and coordination with other agencies.
- Section 3 – Description of Existing Water System, provides detailed description of the service area, water system, recycled water system and wastewater system.
- Section 4 – Historical and Projected Water Use, describes historical and projected water use.
- Section 5 – Conservation Baselines and Targets, provides calculated baseline daily per capita water use and per capita water use targets for 2015 and 2020.
- Section 6 – Water Supplies, provides current and projected water supplies for surface water, groundwater, recycled water, imported water; and discusses potential water supplies.
- Section 7 – Demand Management Measures, summarizes water conservation efforts including drought response; describes conservation programs and incentives, and an overview of the sub-metering ordinance requirements.
- Section 8 – Water Supply Reliability Assessment, analyzes the reliability of the water supplies in comparison to demands under different hydrologic conditions.
- Section 9 – Climate Change Impacts, analyzes potential impacts of climate change on water service reliability (this was a voluntary UWMP requirement that the City determined to be valuable).
- Section 10 – Energy Intensity, provides an overview of water delivery and energy requirements of various components of the City's water system and presents the City's carbon footprint (this was a voluntary UWMP requirement that the City determined to be valuable).
- Section 11 – References.

In addition, there are 13 appendices in this 2015 UWMP that document the plan's public involvement/review, provide an UWMP checklist for DWR use, provide DWR compliance tables, document the California Urban Water Conservation Council Biennial Report, document the City's Water Shortage Contingency Plan and emergency policies, and provide other useful information.

SECTION 2

Plan Requirements and Preparation

The State of California requires urban water providers serving more than 3,000 AFY of water or 3,000 urban connections to prepare a UWMP every five years (in years ending with "0" and "5"). The plans must comply with the Act's requirements, which initially became effective on January 1, 1984 (Water Code, Sections §10608–10656). Compliant plans are then submitted to DWR for staff review. A summary of the completed plans is then submitted to the California Legislature by DWR.

For an urban water supplier to be eligible for any water management grant or loan administered by DWR, the agency must have a current UWMP on file that has been determined by DWR to be compliant. A current UWMP must also be maintained by the water supplier throughout the term of any grant or loan administered by DWR. A UWMP may also be required to be eligible for other State funding, depending on the conditions specified in the funding guidelines.

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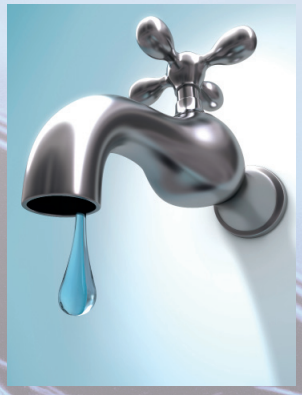

2.1 Plan Requirements

Since the original Act became effective in 1984, there have been several amendments. Some of the recent amendments include:

- Extension of the submittal date from December 31, 2015, to July 1, 2016 (Assembly Bill (AB) 2067).
- A narrative description of water demand measures implemented over the past five years and future measures planned for implementation to meet 20x2020 demand reduction targets (AB 2067).
- Standard methodology for calculating distribution system water loss (Senate Bill 1420).
- Mandatory electronic filing of UWMPs (SB 1420).
- Voluntary reporting of passive conservation savings (SB 1420).
- Voluntary reporting of energy intensity (SB 1036).
- More thorough accounting for wastewater generation as part of recycled water documentation.
- Voluntary reporting of climate change impacts.
- Voluntary reporting of decreased reliance on imported Bay-Delta water.

At a minimum, each UWMP must have the following components: (1) process for the plan preparation; (2) water system overview; (3) water use history and projections; (4) baselines and targets for achieving mandated water

conservation; (5) current and potential water supplies; (6) water supply reliability; (7) water demand management measures; and (8) water shortage contingency planning. DWR also recommends that a checklist be prepared to show how the UWMP is addressing the requirements. A copy of the Act is provided in Appendix B. A checklist cross-referencing Act requirements to applicable pages in this UWMP is provided in Appendix C.

Several laws have been implemented that strengthen the importance of the numbers reported in UWMPs, these being Water Supply Assessments (SB 610), Written Verifications of Water Supply (SB 221), and California Water Act of 2009 (SBX7-7).

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

Following the passage of SB 610 and SB 221 in 2001, UWMPs took on even more importance. SB 610 and SB 221 require counties and cities to consider the availability of adequate water supplies for certain new large developments as defined in the Water Code Section 10910, and to have written verification of sufficient water supply to serve them. SB 610 requires completion of a water supply assessment for certain new large developments as defined in the Water Code, during the preparation of environmental documents for compliance with the California Environmental Quality Act (CEQA). The water supply assessment demonstrates the water supplier has sufficient water supplies to meet the projected water demands of the project for the next 20 years.

SB 221 requires completion of a water supply verification for certain new large developments, exceeding the thresholds defined in the Water Code, prior to approval of a tentative map associated with a subdivision. UWMPs are identified as key source documents for these verifications. To comply with these statutes, the City prepares individual water supply assessments and water supply verifications for such new large developments.

2.1.2 California Water Act of 2009

The Water Conservation Act of 2009 (SBX7-7) requires water agencies to reduce baseline per capita water use by 20 percent by 2020 (known as 20x2020). Water agencies were required to set an interim target for 2015 and a final target for 2020 in their 2010 UWMP using one of four methodologies to calculate per capita water use. Failure to meet adopted targets will result in the ineligibility of a water supplier to receive state grants or loans.

2.2 Plan Coordination

Preparation of this 2015 UWMP was coordinated with multiple local and regional agencies, and the general public, as shown in Table 2-1. As part of this coordination, the City provided its 2015 UWMP to the wholesale water provider, SDCWA. Availability of imported water and regional water demands and conservation were also coordinated with SDCWA. Wastewater and recycled water use data were coordinated with the Wastewater Branch of the City's Public Utilities Department. As the City's wastewater system is used to treat wastewater for 12 participating agencies outside the City via a joint powers agreement, coordination with these agencies also took place. To prepare the City's water demand forecast, coordination with the San Diego Association of Governments (SANDAG) was necessary to obtain the most recent demographic projections for the City (2050 Regional Growth Forecast Update Series 13, released in September 2013). A 60-day

Table 2-1 UWMP Coordination

Agency	Coordination
San Diego County Water Authority	Imported water availability, regional water demands and conservation
San Diego Association of Governments	Demographic data
City Public Utilities Department, Wastewater Branch	Wastewater flows, treatment and recycled water use
Wholesale Cities	Public meeting announcement
Cities/Agencies Served by San Diego's Wastewater System	Wastewater flows, treatment, and recycled water use
California Department of Water Resources	UWMP requirements

notice of the public hearing for the 2015 UWMP was sent to the County of San Diego, City of Del Mar, City of Poway, and all other cities in San Diego County on January 11, 2016. On April 7, 2016, the draft report was available for public comment and a 30-day notice of the public hearing was sent to the agencies listed above. A copy of these notices of the public hearing and a list of local agency recipients is provided in Appendix A. Additionally, the City participated in webinars, meetings, and workshops hosted by DWR that discussed the 2015 UWMP Guidelines and Act requirements.

2.3 Public Participation and Plan Adoption

Prior to adoption of this 2015 UWMP, the public was invited to comment and provide input in the drafting of this document. The City issued a press release on April 7, 2016, describing the 2015 UWMP and inviting the public to comment on the 2015 UWMP between April 7, 2016, and May 5, 2016. The press release also listed locations where the public could read the Draft 2015 UWMP, and the date and location of the public hearing to adopt the 2015 UWMP. A copy of this press release is included in Appendix A. Copies of the 2015 UWMP were available for inspection on the City's website, and the City of San Diego Public Utilities Department office at 525 B Street, Suite 700, San Diego, CA 92101. A legal notice of public hearing was published in The Daily Transcript on the following dates: June 6, 2016, and June 14, 2016.

Multiple public meetings were also held prior to the adoption of the 2015 UWMP. The 2015 UWMP was presented to the City's IROC on May 16, 2016, and the City Council's Environment Committee on May 26, 2016. These public meetings involved a discussion of the 2015 UWMP components, including a summary of how well the City is achieving its per capita water demand targets.

The 2015 UWMP was presented and adopted at a public hearing of the San Diego City Council at one of its regularly scheduled public hearings on June 20, 2016. A copy of the Resolution of Adoption is provided in Appendix A. The 2015 UWMP was submitted to DWR, the California State Library, and County of San Diego County within 30 days of adoption and was made available to the public on the City's website.

Outside of the 2015 UWMP preparation process, the City also provides multiple opportunities for the public to comment and give input on water supply issues. The City's Public Utilities Department proactively reaches out to the public by conducting public presentations, and by setting up informational tables at community events. The Public Utilities Department also continually updates the City's website related to water use, and constantly works with media outlets to garner accurate and complete coverage of Department's water programs.

2.4 Data Assumptions

The 2015 UWMP Guidebook allows cities/agencies to select units of measurements and reporting year types. Units are required to remain consistent throughout the UWMP. Reporting years are recommended to remain consistent throughout the 2015 UWMP.

For this UWMP the unit of measurement is AFY for all compliance tables showing water demands, conservation, and supplies. When reporting water treatment and wastewater treatment flows, and capacities of treatment, the unit of measurement is mgd.

Reporting years in this UWMP are fiscal years, unless otherwise noted in text or tables. The City's fiscal year begins on July 1 and ends on June 30.

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SECTION 3

Description of Existing Water System

In 1901, the City purchased its initial water system from the San Diego Water and Telephone Company. Between 1913 and 1943 the City developed eight additional reservoirs to capture local runoff from rainfall to meet growing water demands. Prior to 1944, all of the water supply provided by the City was from impounded local runoff from rainfall and some limited groundwater sources. As the City grew, it became clear that new sources of water were needed. In 1944, SDCWA was formed as a countywide wholesale water agency to transport imported water from the Colorado River to the City and other communities in the County. The SDCWA joined the Metropolitan Water District of Southern California (MWD) in that same year. MWD is Southern California's regional wholesale water provider and owns and operates the Colorado River Aqueduct (CRA), which was constructed in the 1930s. In 1947, Colorado River water from MWD's CRA, via San Diego County water conveyance facilities, was delivered to the City.

As the population and economy of California grew, MWD and some 30 other public water agencies signed a contract to develop the State Water Project (SWP). This ambitious project, initiated in the early 1960s, was the largest civil works project in the nation. The massive undertaking involved the construction of a series of reservoirs, large conveyance pipelines and canals, and massive pump stations to bring water from the Bay-Delta to central and southern regions of California. MWD is the largest of the State Water Contractors and receives approximately 50 percent of the SWP's water deliveries. In 1978, SWP water from Northern California was delivered to the City, blending with Colorado River water.

The City's residents and businesses are served by its Public Utilities Department, which provides water, recycled water, and wastewater services. The water and wastewater systems managed by the Public Utilities Department are among the largest and most complex in the nation. The Public Utilities Department has independent review via the Independent Rates Oversight Committee (IROC), which serves as an official advisory body to the Mayor and City Council on water and wastewater policies, operations, and financial matters.

The Metropolitan Wastewater Joint Powers Authority (JPA) is composed of representatives from the 12 agencies for which the Public Utilities Department collects, treats, and discharges the wastewater. This Commission serves as an advisory body to the City Council on the operation of the Metropolitan Sewerage System.

INSIDE

Barrett Dam (built in 1922)

California Aqueduct (part of SWP system)

City's Alvarado Water Treatment Plant

3.1 Service Area Overview

3.1.1 Geography

The City is located within the southwest portion of San Diego County and extends over 340 square miles (see Figure 3-1). The City is bound by the Pacific Ocean to the west and mountains to the east. Topography in the City varies dramatically over short geographical distances, creating diverse microclimates. General topography consists of coastal areas and mesas, cut by canyons, with general elevations ranging from sea level to over 1,000 feet above sea level. The highest point is Cowles Mountain at nearly 1,600 feet elevation. The City's water system is split into three major service areas: (1) Miramar, which includes the entire northern area of the City; (2) Alvarado, which includes the Mission Bay area, Mission Valley area, and the areas extending south to the boundary of National City; and (3) Otay, which serves the southernmost part of the City's service area, adjacent to the US-Mexico border.

Figure 3-1 Location of San Diego County and City

3.1.2 Demographics

In 2015, the City's population was estimated to be 1.38 million residents, making it the second largest city in California and the eighth largest in the nation. Demographic data for the City is provided by SANDAG, based on its latest projections made for the Series 13: 2050 Regional Growth Forecast, which used a 2013 population and housing estimate produced by the California Department of Finance. SANDAG's demographic forecast incorporates regional projections and local inputs gathered from the region's 18 incorporated cities and the County. SANDAG works closely with each jurisdiction to incorporate accurate land use data. Data collected from cities and the County include existing and planned land uses, development constraints apparent in existing land uses, zoning, remaining housing capacity, current adopted general and community plans, and guidance on likely development patterns by 2050. Table 3-1 summarizes these demographics projections for the City's water service area.

Population

Approximately 1.33 million people reside in the City's water service area, which is slightly smaller than the City's jurisdictional boundary of 1.38 million. Approximately 49,000 residents of the City are served by other water agencies. The City's water service area population is expected to increase at a rate of about 1 percent annually over the next 25 years.

Housing

Within the City's water service area there are approximately 490,000 homes, of which 54 percent are multifamily and 46 percent are single-family. It is projected that housing will increase at rates above 1 percent annually, with multifamily housing expected to grow faster than single-family housing. It is also expected that overall housing density per acre will increase in the future and that average family size (persons per home) will decrease slightly into the future.

Table 3-1 Demographic Projections for San Diego Water Service Area

Demographic	2015	2020	2025	2030	2035	2040
Population						
City of San Diego[1]	1,377,884	1,454,150	1,524,328	1,594,506	1,664,684	1,698,689
City Not Served By SDPUD	48,673	49,618	51,621	53,625	55,628	56,031
SDPUD Service Area[2]	1,329,211	1,404,532	1,472,707	1,540,881	1,609,056	1,642,658
Service Area Housing[2]						
Single-Family Units[3]	227,203	231,873	231,980	232,183	232,478	230,292
Multi-Family Units	263,056	291,283	317,269	347,565	382,868	400,295
Total Housing	490,259	523,156	549,249	579,748	615,346	630,587
Employment[2]						
Commercial	666,155	714,958	735,426	755,893	776,360	796,726
Government	162,133	175,441	179,694	183,947	188,200	192,688
Industrial	47,783	49,389	48,955	48,521	48,087	47,151

[1] SANDAG Series 13, 2050 Regional Growth Forecast

[2] City of San Diego Public Utilities Department, Update of Long-Term Water Demand Forecast, July 2015.

[3] Single-family units are single-family accounts.

Employment

Government and commercial employment in the service area is expected to increase by 0.8 percent annually from 2015 to 2040. In 2014, the three largest employers in the City of San Diego were the US Navy, University of California San Diego, and Sharp Healthcare. During the 25-year forecast period, industrial employment growth is expected to slightly increase, reaching a peak in 2020 and then gradually declining by 2040. Industrial growth is expected to decrease at approximately 0.2 percent annually between 2020 and 2040.

3.1.3 Climate

San Diego has a Mediterranean to semiarid climate, according to the Koppen climate classification system, which is characterized by warm, dry summers and mild winters with limited rainfall. May to October is typically dry, while the bulk of the rainfall (90 percent) falls from November to April. Table 3-2 provides a summary of average monthly maximum temperature, precipitation and evapotranspiration (ETo) for the coastal region of the City, as recorded by the San Diego Airport weather station from 1914-2015.

The City's average monthly maximum temperature is 70 degrees Fahrenheit. Total precipitation averages 10 inches per year. Figure 3-2 (on the following page) plots the average monthly maximum temperature, precipitation and reference ETo, which is important because it impacts how much supplemental irrigation the area's vegetation (turf, trees, and shrubs) requires. The higher the ETo, the more irrigation water is needed to sustain the vegetation. Because of the City's geography and terrain, precipitation, and temperature can vary across the service area. Coastal areas tend to have less precipitation and lower temperatures, while higher inland elevations can receive more than 30 inches of precipitation per year and have higher temperatures.

Table 3-2 Average Climate Data for San Diego

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average / Total
Average Maximum Monthly Temperature (ºF)[1]	65	65	66	68	69	71	75	76	76	73	70	66	[average] 70
Average Precipitation (inches)[1]	1.95	1.94	1.61	0.76	0.23	0.05	0.03	0.06	0.16	0.50	0.97	1.79	[total] 10.05
Average ETo (inches)[2]	2.30	2.69	3.80	4.44	5.00	4.87	5.25	5.21	4.49	3.31	2.34	1.93	[total] 45.63

[1] 1914-2015, San Diego Weather Station Office Airport Station, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7740.

[2] 2002-2015 average, San Diego (Station ID. 184), CIMIS database, http://wwwcimis.water.ca.gov

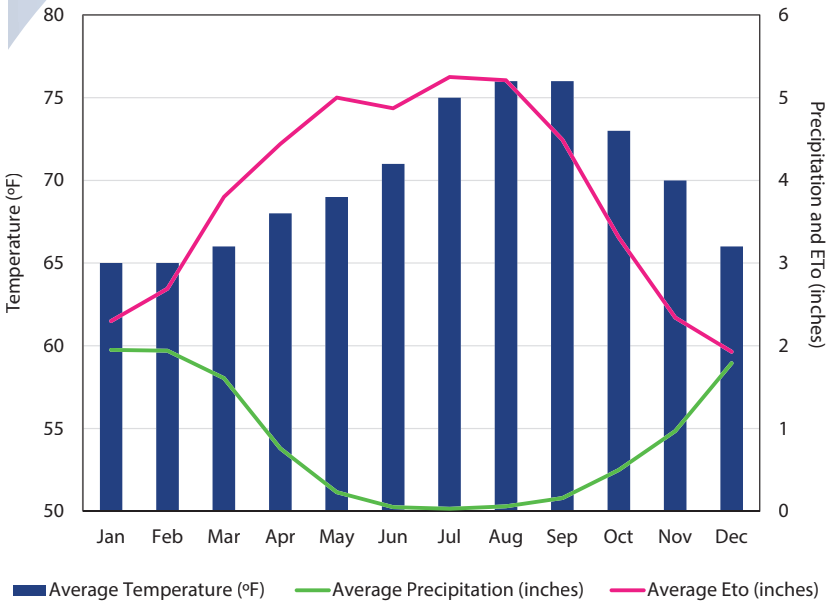


Figure 3-2 Average Climate for City of San Diego Coastal Area (1914-2015)

3.2 Water Supply Facilities

The City's water system is one of the most complex in California, spanning three major water treatment service areas, with three water treatment plants, nine reservoirs, and two water reclamation plants. The service area also overlays several groundwater basins. There are 128 main pressure zones in the City's retail system, reflecting the varied topography of the water service area. In addition to local runoff from rainfall that is captured in the City's reservoirs and the use of recycled water for non-potable water demands from the City's water reclamation plants, imported water is purchased from the SDCWA to meet the majority of water demands in the City. Imported water is conveyed to the City using pipeline connections to SDCWA's aqueducts. The majority of imported water is stored in several of the City's reservoirs and treated at the City's water treatment facilities. Some treated imported water is also purchased from the SDCWA.

3.2.1 MWD System

MWD, Southern California's regional water wholesaler, operates the largest water system in the nation. MWD imports water from two main supply sources: (1) the CRA, which it owns and operates and which brings water from the Colorado River into Southern California; and (2) the SWP, which it contracts with to bring water from the Bay-Delta. The SWP and CRA are part of an extensive water supply system that includes State, federal and local conveyance of water (see Figure 3-3).

MWD provides both untreated and treated imported water to its 26 public member agencies (14 cities, 11 municipal water districts, and SDCWA), which in turn deliver water to over 19 million people in Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. MWD owns and operates nine surface reservoirs, 16 hydroelectric plants, 819 miles of large pipelines, and five large regional water treatment plants with a combined water treatment capacity of 2.6 billion gallons per day. MWD also participates in a number of groundwater banking and water transfer programs outside its region's service area. These programs supplement water from the Colorado River and SWP when dry weather years and droughts reduce imported water.

Colorado River Aqueduct

The Colorado River is the largest river in the western United States. The Colorado River Basin covers about 246,000 square miles, including parts of the seven "basin States" of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, and also flows into Mexico. The river provides water to more than 30 million people, irrigates nearly 4 million acres of cropland in the United States and Mexico, and supplies hydropower plants that generate more than 10 billion kilowatt-hours annually. Water from the river also provides recreational opportunities and an array of environmental benefits, supporting a wide diversity of fish and wildlife and their habitats, and

Figure 3-3 Major Water Conveyance Facilities in California

preserving flow and water-dependent ecological systems. The US Secretary of the Interior is vested with the responsibility to manage the mainstream waters of the Colorado River pursuant to applicable federal law. The Colorado River Board of California is the State agency given authority to protect the interests and rights of the State and its residents in matters pertaining to the Colorado River.

In 2003, a Quantification Settlement Agreement (QSA) was completed as a way to ensure that California stays within its 4.4 million acre-foot (MAF) annual apportionment of Colorado River water. The QSA provides the means to implement water transfers and supply programs between water agencies that use Colorado River water in California. The MWD has a basic apportionment of the Colorado River of 550,000 AFY. To date, no shortages have been declared on the Colorado River supplies and MWD has reliably received its 550,000 AFY apportionment every year. In addition, MWD has developed a number of water transfers, irrigation conservation measures, and storage programs with irrigation water districts that have more senior water rights to Colorado River water within California. Through these and other programs, MWD's goal is to keep its CRA nearly full at its capacity of 1.2 million acre-feet (MAF).

State Water Project

The SWP is a water storage and delivery system that provides water to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California—delivering water to two-thirds of the population of California and 750,000 acres of farmland. The project is owned by the State of California and operated and maintained by DWR. The SWP system consists of 701 miles of aqueduct, 34 reservoirs totaling 5.8 MAF of storage, five hydroelectric plants, 17 pumping plants, and three pump stations. SWP water originates in Northern California at Lake Oroville on the Feather River, goes downstream to its confluence with the Sacramento River, and then travels into the Bay-Delta region. Water is pumped from the Bay-Delta to State Water Contractors. SWP deliveries consist solely of untreated water. In addition to delivering water to its contractors, the SWP is operated to improve water quality in the Bay-Delta, control floodwaters, and provide recreation, power generation, and environmental enhancement. MWD contracted with the SWP in 1960 for almost half of its supplies. The California Aqueduct was completed in 1972 to deliver water to MWD's service area. As the largest of 29 contractors for water from the SWP, the MWD holds a contract

for 1.912 MAF per year, or 46 percent of the total SWP contract. DWR determines annual allocations of SWP contract amounts based on hydrologic and regulatory conditions. Since 1995, annual SWP allocations have ranged from 5 to 90 percent.

3.2.2 San Diego County Water Authority System

SDCWA is the countywide water wholesaler and is made up of 24 public member agencies (Figure 3-4). The SDCWA owns and operates five large-diameter pipelines to deliver imported water to its member agencies. These pipelines are divided into two alignments known as the First Aqueduct and the Second Aqueduct. The First Aqueduct includes Pipelines 1 and 2, which extend from MWD's CRA near San Jacinto to San Vicente Reservoir. The Second Aqueduct includes Pipelines 3, 4, and 5. Pipeline 3 extends from the CRA near Hemet, in Riverside County, to Lower Otay Reservoir. Pipeline 4 terminates at the Alvarado Water Treatment Plant (WTP) near Lake Murray.

In 2010, a pipeline connecting San Vicente Reservoir to the Second Aqueduct was completed as part of the SDCWA's program for emergency storage. Figure 3-5 shows the City's water system connections to the SDCWA.

In order to be more resilient and reliable in case of unplanned disruptions in imported water facilities, the SDCWA embarked on a multi-year, $1.5 billion dollar Emergency Storage Project (ESP). The goal of

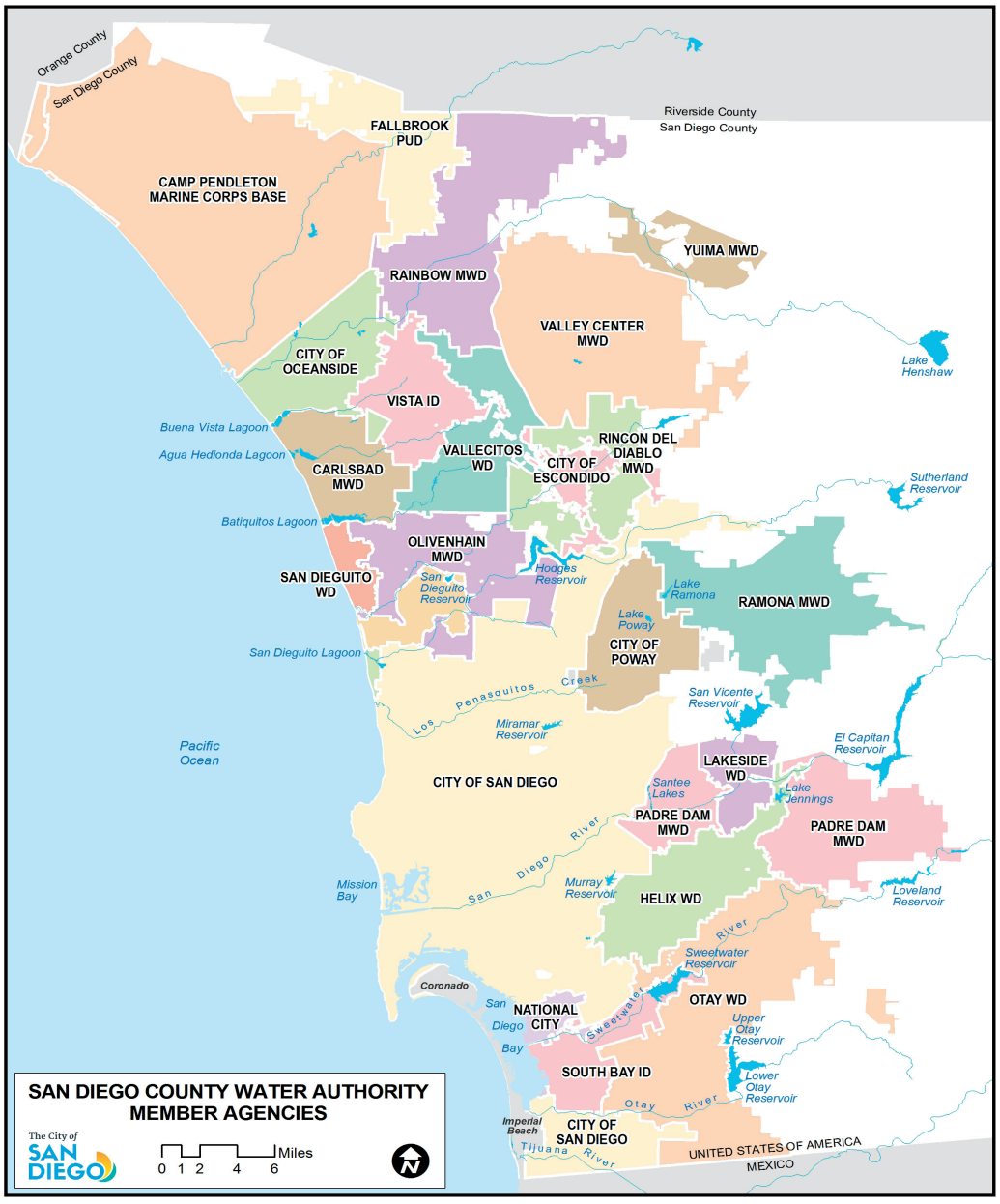


Figure 3-4 SDCWA Member Agencies

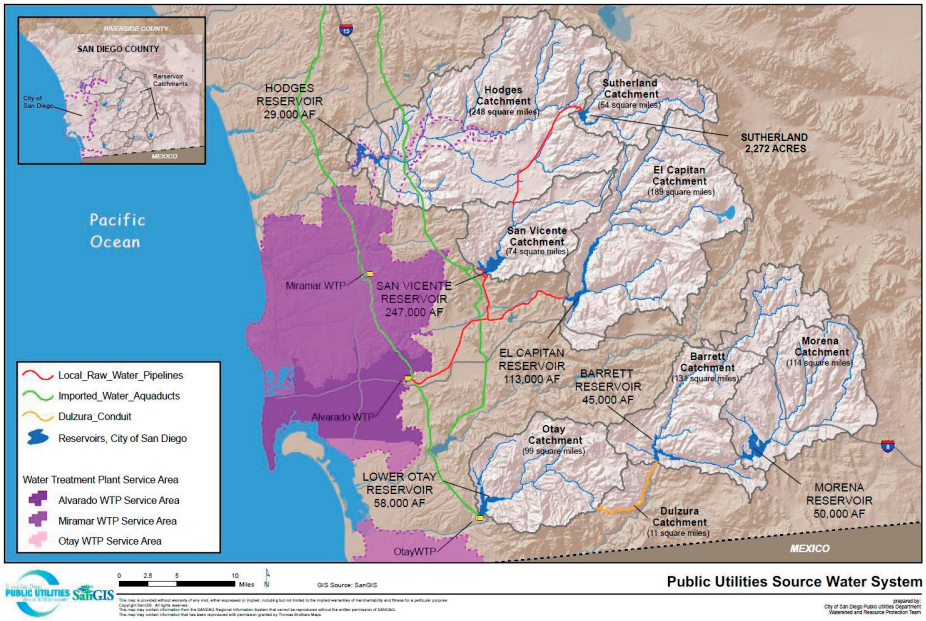


Figure 3-5 Imported Water Facilities that are Connected to the City of San Diego's Infrastructure

3.2.3 City's Water Facilities

The City's water system is made up of nine reservoirs that capture runoff from rainfall within local watersheds, three water treatment plants, and a small use from local groundwater. To offset potable water demands, the City owns and operates two water reclamation plants and a recycled water distribution system that delivers recycled water for non-potable water uses.

ESP is to provide up to six months of emergency water supplies in the event of a system failure of imported water from MWD. The ESP represents a system of reservoir enhancements, interconnected pipelines, and pumping stations. When fully completed, the ESP will add 90,100 AF of new water storage capacity for emergency use. As part of the ESP, the SDCWA raised the San Vicente Dam to increase the storage capacity of San Vicente Reservoir. Under the same project, a pipeline connection was established between the City's Hodges Reservoir and the SDCWA's Olivenhain Reservoir. The connection allows water to be transferred to the City in the event of an interruption in imported water deliveries. It also allows water to be delivered to all City treatment plants.

In addition to water purchased from MWD, the SDCWA has a QSA portion of the Colorado River Water supplies, developed a water transfer program with Imperial Irrigation District (IID), and developed a regional desalination facility in Carlsbad. These supplies are described in more detail in Section 6 – System Water Supplies.

Surface Water Reservoirs

The City's reservoirs capture the majority of runoff from rainfall in nine watersheds covering more than 900 square miles. Figure 3-6 shows the watershed capture areas, reservoir locations, and the distribution of average rainfall in the area. The dotted purple line shows the City's water supply service area. Rainfall along coastal areas averages 10 inches per year, but rainfall amounts in areas east of the City, where the City's large reservoirs are located, can range from 15 to 30 inches per year.

The City's nine local surface water reservoirs have a combined capacity of 569,021 acre-feet. The native water captured in these reservoirs provides approximately 19 percent of the City's total supply (based on average data from 2011 to 2015). These reservoirs not only capture local supply, but many of them are connected to the regional imported water system, providing the City with reliability during seismic and other system emergencies. Management of the reservoirs is guided by the City of San Diego Council Policy 400-04 (see Appendix H), which outlines the City's Emergency Storage Policy. Table 3-3 provides the storage capacity for the City's reservoirs.

Table 3-3 City's Reservoirs

Reservoir	Capacity (AF)
Barrett	34,806
El Capitan	112,807
Hodges	30,633
Lower Otay	49,849
Miramar	6,682
Morena	50,694
Murray	4,684
San Vicente	249,348
Sutherland	29,508
Total Capacity	**569,021**

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

Barrett Reservoir

Barrett Reservoir was created in 1922 with the completion of Barrett Dam. Barrett Reservoir is in a remote area approximately 35 miles east of San Diego, at the confluence of Cottonwood and Pine Valley creeks. Barrett Reservoir impounds runoff from the surrounding watershed, water transferred from Morena Reservoir via Cottonwood Creek, and the water stored in the reservoir is transferred to Otay Reservoir to be treated at the Otay WTP.

El Capitan Reservoir

El Capitan Reservoir was created with the construction of El Capitan Dam in 1935. In the same year, the reservoir was connected to the City of San Diego's water system via the El Capitan Pipeline. The reservoir is located approximately 30 miles northeast of downtown San Diego. This reservoir also serves as emergency storage to meet demands during a system outage. The reservoir impounds water transferred from Cuyamaca Reservoir via Boulder Creek and imported water from the SDCWA Aqueduct System.

Hodges Reservoir

Hodges Reservoir was formed in 1918 with the completion of its dam on San Dieguito Creek. The reservoir was purchased by the City of San Diego in 1925. In 2012, as part of the Emergency Storage Project, Hodges Reservoir was connected to Olivenhain Reservoir. This connection provides the ability to store water for emergency use and allows water to be transferred between Hodges Reservoir and the SDCWA Aqueduct System.

Lower Otay Reservoir

Lower Otay Reservoir was created in 1897 with the completion of the Lower Otay Dam. In 1906, the reservoir was connected to the City of San Diego's water system through the Bonita Pipeline. Lower Otay Reservoir serves as a primary emergency reservoir to serve the Otay WTP. The reservoir impounds runoff from the surrounding watershed, water transferred from Morena and Barrett Reservoirs, and imported water from the SDCWA Aqueduct System.

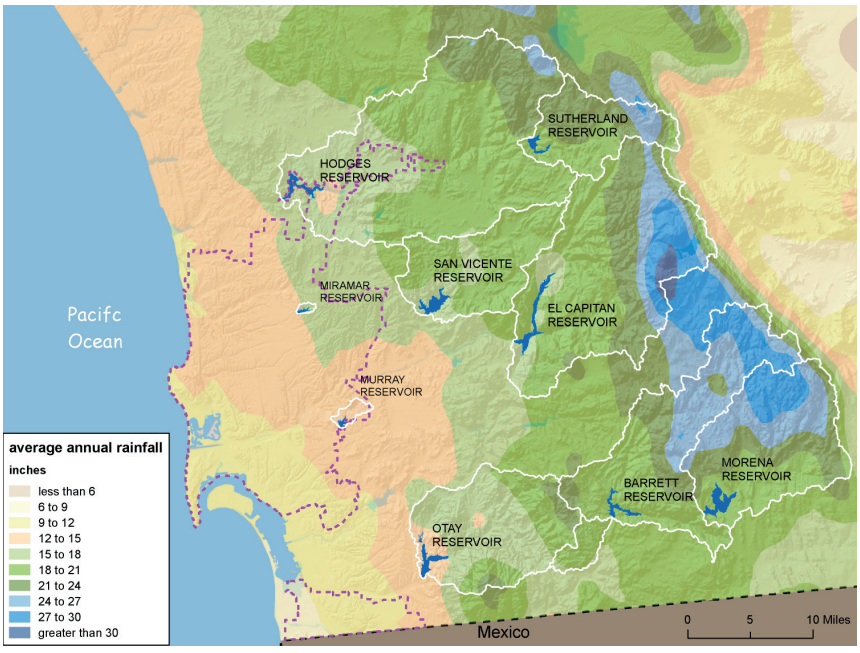


Figure 3-6 Reservoir Locations and Rainfall Catchment Areas

Miramar Reservoir

Miramar Reservoir and its dam were completed in 1960 as part of the second San Diego Aqueduct project. The reservoir is located in the Scripps Ranch community and has a water storage capacity of 6,682.4 acre-feet. Miramar Reservoir serves as emergency storage for the Miramar WTP. It impounds runoff and imported water from the SDCWA Aqueduct System.

Morena Reservoir

The construction of Morena Dam began in 1897 on Cottonwood Creek and was completed in 1912. Located at 3,000 feet above sea level, Morena is the highest and most remote of the City's reservoirs. Morena Reservoir transfers water to Barrett Reservoir, provided that storage capacity is available.

Murray Reservoir

Murray Reservoir was previously owned by Helix Irrigation District. However, in 1960 the City purchased the reservoir after 10 years of operating it. Murray Reservoir functions as an emergency and operational storage reservoir to mainly meet Alvarado WTP needs. The reservoir impounds water transferred from San Vicente, El Capitan, and Sutherland Reservoirs via El Monte Pipeline, and imported water from the SDCWA Aqueduct System.

San Vicente Reservoir

San Vicente Reservoir is located on San Vicente Creek, approximately 25 miles northeast of San Diego. Construction to raise the dam 117 feet, which more than doubled the reservoir's capacity, was completed in 2014. The San Vicente Dam Raise increased storage by 152,000 acre-feet. The San Vicente Dam Raise is part of the 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.

Sutherland Reservoir

The construction of Sutherland Dam began in 1927 and was completed in 1954. Sutherland Reservoir is located approximately 45 miles northeast of San Diego. Water stored in Sutherland Reservoir is transferred to San Vicente Reservoir if sufficient storage capacity is available.

Groundwater Facilities and Systems

There are several groundwater basins in the San Diego region to which the City has rights, concerns, and jurisdiction, along with an interest in developing for municipal supply or other beneficial use. These basins are:

- San Pasqual Basin.
- Mission Valley Basin.
- Santee/El Monte.
- Tijuana Basin.
- San Diego Formation (includes both the Sweetwater Valley and Otay Valley basins).

The groundwater quality in these basins is predominantly brackish. Improved technologies make it now possible to consider available water sources, such as brackish groundwater, that were not affordable a few decades ago. Groundwater is a viable water resource and is part of the City's planning efforts. Local water supply projects, particularly groundwater exploration, benefit City ratepayers, offer drought protection, and are locally controlled.

Currently, the Public Utilities Department is producing approximately 500 AFY of groundwater from the Santee/El Monte Basin via the San Vicente Production Well. The water produced from this well is sent to the San Vicente Reservoir, and from there to the Alvarado WTP for distribution.

Groundwater basins under investigation by the City include:

- San Pasqual: The City has researched the possibility of groundwater and recycled water conjunctive use, as well as brackish groundwater desalination in this basin.
- Mission Valley: A plan to desalinate groundwater using reverse osmosis is on hold due to the

unauthorized release of gasoline from a petroleum tank farm and related litigation.

- Santee/El Monte: The City is evaluating the expansion of groundwater facilities near the San Vicente Production Well, in addition to a well downstream of El Capitan Reservoir.
- San Diego Formation: The City has been able to characterize the water quality and quantity in the San Diego Formation through aquifer testing and monitoring well installation that have occurred since 2007. In addition, the City has been working with the US Geological Survey (USGS) to develop an integrated and comprehensive understanding of the geology and hydrology of the San Diego Formation, and to use this understanding to evaluate a sustainable, long-term and environmentally sound use of the formation for municipal supply.

Potential projects and projected yields are further discussed in Section 6 – Water Supplies.

Water Treatment Plants and Distribution System

The City's three water treatment plants Alvarado, Miramar, and Otay, provide safe and reliable drinking water and have a combined total rated capacity of 378 mgd. In addition, the City's two water reclamation plants provide non-potable recycled water to City customers and wholesale agencies. Figure 3-7 shows the location of the City's water treatment and water reclamation plants.

Table 3-4 describes the date of construction, current capacity, projected capacity, and challenges to implement additional capacity. The Alvarado WTP does not include a future capacity since it was recently improved and upgraded in 2011. The initial capacity rating of the plant was 120 mgd in 1951, but recent hydraulic improvements and upgrades have increased the capacity to 200 mgd. The Alvarado WTP serves the geographical area from National City to the San Diego River. The Miramar WTP is expected to increase from its initial capacity of 144 mgd to 215 mgd after two old clearwells are replaced in 2016. The Miramar WTP generally serves the geographical area north of the San Diego River. The Otay WTP can be expanded from its current capacity of 34 mgd to 40 mgd, after approval by the SWRCB's Division of Drinking Water. The Otay WTP generally serves the geographical area bordering Mexico (south San Diego) and parts of the southeastern portion of central San Diego.

The geographic areas served by the three WTPs are flexible so that some areas of the City can be supplied by more than one of the treatment plants, as indicated in Figure 3-7 (on the following page). To distribute potable water produced at these water treatment plants, the Public Utilities Department maintains and operates 50 water pump stations, 128 pressure zones (within the City's retail service area), and 32 treated water storage facilities with more than 200 million gallons of potable water capacity. The water distribution system consists of more than 3,293 miles of pipeline, including large transmission lines.

Water Reclamation Facilities and Systems

The City recognized early on the need to offset potable demands with non-potable water supplies to reduce reliance on imported water and increase reliability. As discussed in 2012, the City adopted a RWS, followed by the 2012 LRWRP in 2013. Both of these planning documents emphasize expansion of the existing recycled water systems as a means to reduce imported water demands. Recycled water is wastewater that

Table 3-4 Water Treatment Plant Existing and Planned Capacities

Water Treatment Plant	Original Construction	Current Capacity	Maximum or Future Capacity	Challenges to Implement Future Capacity
Miramar Water Treatment Plant	1962	144 mgd	215 mgd	Requires replacement of two old clearwells
Alvarado Water Treatment Plant	1951	200 mgd	No expansion planned	Not applicable
Otay Water Treatment Plant	1940	34.4 mgd	40 mgd	Requires approval from SWRCB's Division of Drinking Water

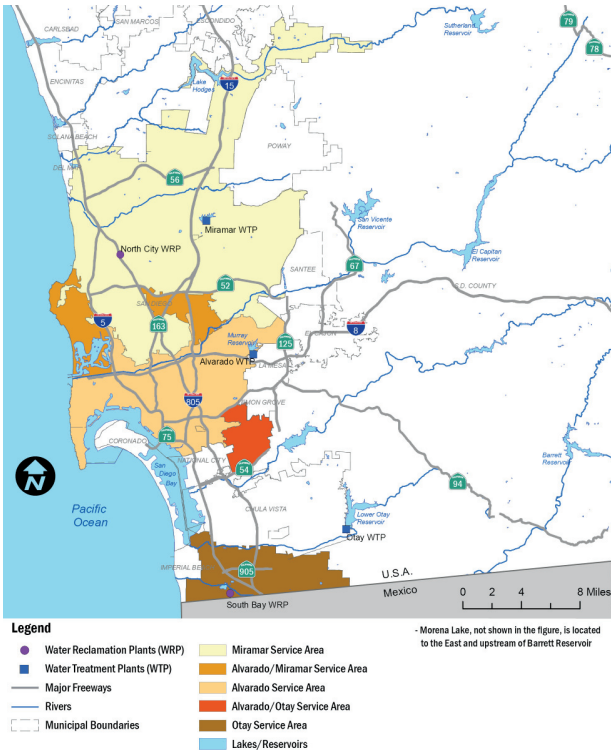


Figure 3-7 City's Water Treatment and Water Reclamation Plants

has undergone additional treatment to make it suitable for a range of beneficial uses. Tertiary recycled water, also known as Title 22 water as defined by the California Title 22 Standards (Title 22, Division 4, Chapter 3 of the California Code of Regulations), is regulated by the SWRCB's Division of Drinking Water.

Recycled water that has undergone tertiary treatment is safely used for many non-potable applications, including landscape irrigation, industrial cooling towers, toilet flushing, fountains, and wetlands restoration. Recycled water has been used in the City for almost 20 years. The majority of recycled water is used for irrigation and there are a limited number of industrial connections where the water is used in cooling towers. Recycled water for non-potable uses is delivered to customers in purple pipes that are kept separate from potable water pipes, to prevent cross-connections between the two delivery systems.

Recycled water is produced by two water reclamation plants, the North City Water Reclamation Plant (NCWRP) and South Bay Water Reclamation Plant (SBWRP). The treated water produced at these plants is distributed through over 90 miles of pipelines. These reclamation plants are discussed in Section 3.3. Potential expansion of the recycled water system is discussed in Section 6 – Water Supplies.

3.3 Wastewater Treatment and Water Reclamation System

The City collects and treats approximately 160 mgd of wastewater that is generated in a 450-square-mile area made up of the City's boundaries, as well as 12 other agencies that form the Metro Wastewater JPA (see Table 3-5). Collectively, the wastewater collection and treatment system is known as the Metro System. Besides distributing recycled water within its own service area, the City's Public Utilities Department sells recycled water to three local water agencies: Otay Water District, the City of Poway, and Olivenhain Municipal Water District.

Wastewater is treated at three treatments plants: NCWRP, SBWRP, and PLWTP. All three plants are located in the City. Recycled water is produced at both NCWRP

Table 3-5 Metro Wastewater JPA Agencies

Agencies	Role
City of San Diego	Collects and treats wastewater, produces and distributes recycled water
City of Chula Vista	Wastewater generator
City of Coronado	Wastewater generator
City of Del Mar	Wastewater generator
City of El Cajon	Wastewater generator
City of Imperial Beach	Wastewater generator
City of La Mesa	Wastewater generator
Lemon Grove Sanitation District	Wastewater generator
National City	Wastewater generator
Otay Water District	Wastewater generator and wholesale recycled water customer
Padre Dam Municipal Water District	Wastewater generator
City of Poway	Wastewater generator and wholesale recycled water customer
San Diego County	Wastewater generator (certain unincorporated communities)

Table 3-6 Wastewater Collected in 2015 by Treatment Plant

Water Treatment Plant	Operator of Wastewater Treatment Plan	WTP Located in City's Water Service Area?	Volume Estimated or Measured?	2015 Volume of Wastewater Collected from Wastewater Service Area (AFY)[1]
PLWTP	City's Public Utilities	Yes	Measured	152,564
NCWRP	City's Public Utilities	Yes	Measured	28,340
SBWRP	City's Public Utilities	Yes	Measured	9,409
			Total	**190,313**

[1] Includes wastewater generated outside of water service area since wastewater service area is larger than the water service area.

and SBWRP. Two additional water recycling facilities are located outside the Metro Wastewater System: (1) the Ralph W. Chapman Water Recycling Facility in Otay; and (2) the Padre Dam Water Recycling Facility in the Padre Dam Municipal Water District. These plants relieve wastewater flows that would have historically flowed into the Metro Wastewater System for treatment at PLWTP. Both facilities send treated solids into the Metro system for further treatment at PLWTP.

The wastewater collection system covers 100 percent of the water service area (although only 81 percent of the wastewater service area is served by the water system). The entire population served by the water system is served by the wastewater system, while 64 percent of the population served by the wastewater system obtains its water from the City. The collection system consists of 61,717 sewer manholes, more than 3,000 miles of sewer mains, 83 sewer pump stations, and 54 stormwater interceptor stations, with approximately 10 percent of the sewer lines located in canyons and open space. Figure 3-8 shows the location of the treatment plants in relation to the wastewater service area. Total measured wastewater collected from the wastewater service area in 2015 was 190,313 AF, as indicated in Table 3-6.

Table 3-7 summarizes the volume of wastewater treated, discharged, and recycled in 2015. The total volume of wastewater treated in 2015 was 179,620 AF. Inflow to each plant undergoes primary treatment; sludge from the primary treatment process at both SBWRP and NCWRP is sent to the PLWTP. Primary treated effluent is filtered in secondary treatment, then undergoes final disinfection. The wastewater from these two processes is directed to the PLWTP (in the

Table 3-7 Wastewater Treated in 2015 by Treatment Plant

Wastewater Treatment Plant	Discharge Location	Method of Disposal	Treatment Level	2015 (AFY)				
				Wastewater Treated[1]	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area Within Another UWMP	Recycled Outside of Service Area, Not in Another UWMP
PLWTP	Pacific Ocean via outfall	Outfall	Chemically Enhanced Primary	152,564	152,564	0	0	0
NCWRP	Sewer	Conveyed to PLWTP	Tertiary for recycled water; Secondary for non-recycled water	18,094	8,946	7,029	1,006	0
SBWRP	Pacific Ocean via outfall	Outfall	Tertiary for recycled water; Secondary for non-recycled water	8,962	3,542	1,166	3,226	0
			Total	**179,620**	**165,052**	**8,195**	**4,232**	**0**

[1] Includes wastewater generated outside of water service area since wastewater service area is larger than the water service area.

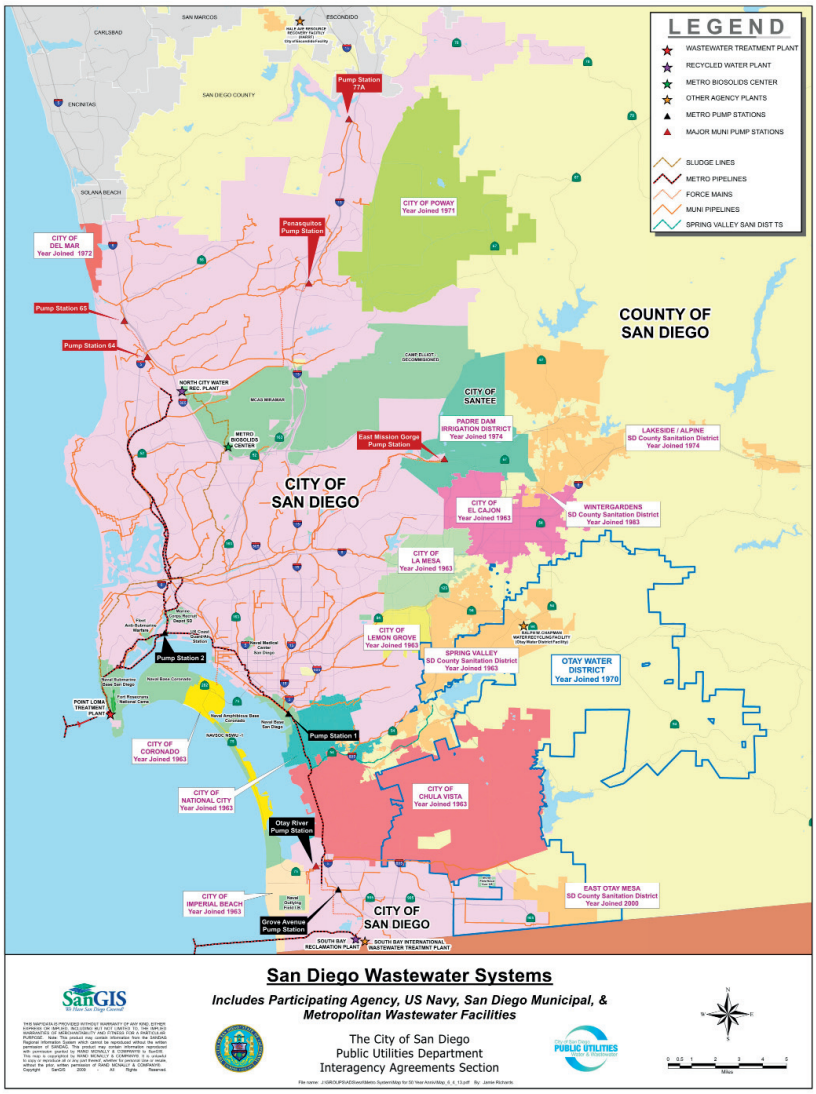


Figure 3-8 Wastewater Service Area and Wastewater Treatment Facilities

3.3.1 Point Loma Wastewater Treatment Plant

The PLWTP has a treatment capacity of 240 mgd and a peak wet weather capacity of 432 mgd. Chemically enhanced primary treated water is discharged, in compliance with federal and State laws, to the Pacific Ocean via a 4.5-mile outfall. The facility opened in 1963 and is located on the bluffs at Point Loma. NCWRP and SBWRP alleviate loads on the PLWTP by diverting wastewater flows for recycling and distribution to the Northern Recycled Water Service area and the Southern Recycled Water Service area, respectively. In 2015 the measured wastewater collected was 152,564 AF (136.2 mgd), with all advanced primary treated wastewater discharged to the Pacific Ocean.

3.3.2 North City Water Reclamation Plant

The NCWRP was the first large-scale water reclamation plant in San Diego. Operations commenced at the facility in 1997. The plant serves the northern San Diego region, including the cities of Del Mar and Poway and the City's neighborhoods of Mira Mesa, Rancho Penasquitos, Scripps Ranch, and Rancho Bernardo. The NCWRP has a tertiary treatment capacity of 27,000 AFY (24 mgd), out of a total treatment capacity of 34,000 AFY (30 mgd).

In 2015 NCWRP collected an average daily wastewater inflow of 16.15 mgd and treated 15.22 mgd to a secondary treatment level, which is 56 percent of its 30 mgd capacity. In 2015 the measured wastewater flows treated were 18,094 AF, with 8,109 AF of secondary treated wastewater discharged to the sewer system and 8,946 AF recycled to a tertiary

case of NCWRP), or the ocean outfall (in the case of SBWRP). Reclaimed water is generated after the final disinfection step. This water is either sent out of the plant for recycling or reused at the plant.

The discharged treated wastewater volumes for the NCWRP and SBWRP do not represent any sludge volume sent to PLWTP; as a result there is a discrepancy in wastewater collected (Table 3-6) and wastewater treated (Table 3-7) at the plants.

level. Secondary treated water that is not recycled is discharged to the sewer system, where it is mixed with untreated flows and conveyed to PLWTP for treatment and discharge. Solids are conveyed to the City's Metropolitan Biosolids Center for further treatment. Approximately 90 percent of the 2015 recycled water produced, or 7,251 AF, was used within the water service area. The remainder of the recycled water was sold to other agencies.

Note for both the NCWRP and the SBWRP the difference in flow between the influent and secondary effluent is due to solids removal in primary and secondary treatment. The secondary effluent flow that goes to the sewer system is secondary effluent flow minus the tertiary influent flow.

3.3.3 South Bay Water Reclamation Plant

The SBWRP began operation in 2002 and is the City's most recently constructed water reclamation plant. The plant is located in the Tijuana River Valley near the international border and primarily serves areas close to the SBWRP and the Otay Water District. The SBWRP has a tertiary treatment capacity of 15,000 AFY (13.5 mgd), out of a total treatment capacity of 17,000 AFY (15 mgd).

In 2015 the SBWRP collected an average daily wastewater inflow of 7.8 mgd and treated 6.95 mgd to a secondary treatment level, which is approximately 52 percent of its 15 mgd capacity. In 2015 the measured wastewater flows treated were 8,962 AF, with 1,919 AF of secondary treated wastewater discharged to the 3.5-mile South Bay Ocean Outfall. Solids are conveyed to the PLWTP for treatment. Approximately 27 percent of the 2015 recycled water produced, or 1,166 AF, is used within the water service area. The remainder of the recycled water was sold to other agencies.

SECTION 4

Historical and Projected Water Use

Planning for future water supply requires an understanding of past water use and the factors that influence future water use over time. This section presents historical and projected water use for the City's water service area. The water service area is comprised of retail water sales that are provided to water customers in the City proper area, as well as wholesale water deliveries made to other communities outside the City proper area.

The City forecasts its retail service area water demands by using an econometric approach that is based on several factors, including weather, socioeconomics (income, price of water, economy), demographics (population, housing, employment), and water conservation. Although future conditions cannot be known with certainty, reasonable estimates of such future conditions allow for credible and defensible estimates of future water demands. The demand forecast model estimates water demands for 128 individual pressure zones in the City's retail service area. Separate projections of wholesale water demands are then added to the retail demand forecast in order to get total projected water demands for the entire City water system.

4.1 Historic Water Use by Sector

The City's potable water use is broken down into the following retail sectors: (1) single-family residential; (2) multifamily residential; (3) commercial/institutional/industrial (CII); (4) irrigation (for large landscaped areas); and (5) other. Others include metered sales for construction and other temporary uses of water. In addition, the City has a wholesale water category for sales of water made outside of the City proper boundary. Table 4-1 presents the historical water use by retail sector and for wholesale deliveries for 2010 and 2015. Figure 4-1 shows the breakdown in retail water use (excluding wholesale deliveries) for 2015. Not included in Table 4-1 or Figure 4-1 is recycled water for non-potable uses, as this is presented later in this section.

Wholesale treated water is sold to California American Water Company (Cal-Am), which provides water to the cities of Coronado, Imperial Beach, and to the Naval Air Station North Island. Residents of Naval Air Station North Island reside within the City of Coronado. Residents of other military bases that the City serves are located within the City. The City sells only local surface water to Cal-Am for its customers, in accord with an agreement between the City and Cal-Am. A small portion of residents within South Bay are also served by Cal-Am.

INSIDE

Hodges Reservoir

Recycled Water

Groundwater Well Installation

Table 4-1 Historical Potable Water Use for City's Water Service Area

Sector	Type of Use	Treatment Level	2010		2015	
			Meters	Use (AF)	Meters	Use (AF)
Single-Family Residential	Indoor and outdoor uses	Drinking Water	219,555	67,267	224,162	60,573
Multifamily Residential	Indoor and outdoor uses	Drinking Water	28,992	40,124	30,471	37,799
CII	Indoor and outdoor uses	Drinking Water	15,539	46,350	17,064	46,072
Irrigation	Landscape irrigation	Drinking Water	7,359	23,538	7,679	22,668
Other	Dust mitigation, cleaning	Drinking Water	214	89	464	0
Subtotal of Retail Area			**271,659**	**177,368**	**279,840**	**167,112**
Wholesale Water Sales	Domestic	Raw and Drinking Water	N/A	11,493	N/A	10,229
Total City Service Area			**271,659**	**188,860**	**279,840**	**177,341**

In addition, the agreement between the City and Del Mar permits the City to take delivery of water that Del Mar purchases from the SDCWA at the Second Aqueduct Connection at Miramar. The raw water is then treated by the City at the Miramar WTP and distributed to Del Mar through multiple system interconnections. Untreated wholesale water is sold to the Santa Fe Irrigation District and San Dieguito Water District. Additionally, the City has an agreement to sell surplus water to the Otay Water District, and transfer water to Ramona Municipal Water District. This occurs infrequently and for short durations.

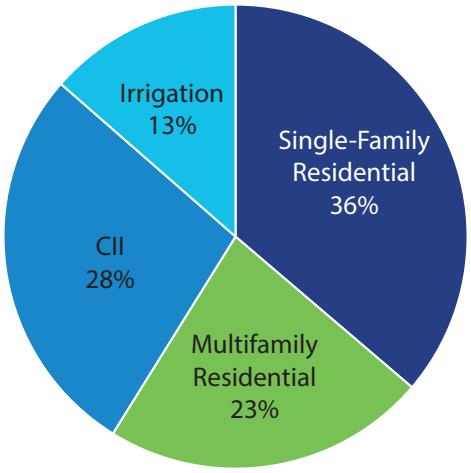


Figure 4-1 2015 Historical Potable Water Use for City's Retail Water Service Area (Excluding Wholesale)

Total retail area water demands decreased by 6 percent from 2010 to 2015, reflecting the City's conservation efforts. It should be noted that 2010 was a cool/wet weather year, while 2015 was a relatively warm/dry weather year. Single-family residential water use makes up the largest sector of demand within the City's retail service area (excluding wholesale deliveries), representing about 36 percent of the total use in 2015. In 2015, multifamily residential, CII, and irrigation accounted for 23 percent, 28 percent, and 13 percent of total retail water use, respectively.

A comparison of recycled water use in the City's service area for FY 2010 and 2015 is provided in Table 4-2. The City also sells recycled water to three wholesale customers: the City of Poway, Olivenhain Municipal Water District, and Otay Water District. These wholesale recycled water deliveries are not included in Table 4-2, but are summarized in Section 6 – System Water Supplies. The majority of recycled water sales is used to meet irrigation demands.

Between 2010 and 2015, recycled water use increased by approximately 3 percent, and meters increased by 38 percent. The City's Public Utilities Department and Park and Recreation Department have collaborated to aggressively pursue retrofitting City parkland, street landscaping, and open space to use recycled water

Table 4-2 Historic Recycled Water Use for City's Water Service Area

Sector	Type of Use	Treatment Level	2010		2015	
			Meters	Use (AF)	Meters	Use (AF)
Recycled Water	Irrigation/Industrial	Title 22 (Tertiary)	456	7,951	628	8,195

for irrigation. Sites that are close to existing recycled water distribution pipelines were targeted. In 2007, only 23 recycled meters were serving City parkland, street landscaping and open space; whereas of June 30, 2015, that number increased to 101 meters.

4.2 Historic Non-Revenue Water

System water use must also account for non-revenue water, which is defined as the difference between the potable water supplied to the system (also known as potable water production) and the potable water sold to customers (also known as metered water deliveries). Non-revenue water typically includes legitimate uses that are not metered, such as street cleaning, hydrant flushing and fire suppression; as well as unaccounted for water such as meter errors and system leaks.

Typically, non-revenue water is presented as a percentage of total potable water production. Historically, the City reported 4.3 percent of non-revenue water in the 2005 UWMP and 9.0 percent of non-revenue water in the 2010 UWMP. Non-revenue water for 2015 was determined to be 7.4 percent, based on the American Water Works Association's (AWWA) Water Audit Software, as required by the 2015 UWMP Guidebook. Non-revenue water was estimated at 13,421 AFY in 2015. The AWWA Water Audit is provided in Appendix I.

4.3 Projected Potable Water Demands

In July 2015, the City developed its Update of Long-Term Water Demand Forecast, which is used for water supply planning and development of the City's water capital improvement program. The long-term water demand forecast is derived from econometric models of residential and non-residential water use that account for explanatory factors such as weather, income, price of water, economy, drought, and passive (or code/ordinance based) conservation. Water use coefficients are produced by this model and multiplied by projected demographics (housing and employment) in order to estimate future water demands by sector. Demographic data is provided by SANDAG (using the 2050 Regional Growth Forecast Update, Series 13) for 128 retail water pressure zones within the City. What is produced from this effort is considered a "baseline" water demand forecast that does not include future water conservation attributed to active intervention by the City's Public Utilities Department (i.e., incentives and rebate programs to encourage customers to install water conserving devices).

Recently water demands for the City have been greatly suppressed due to mandatory water use restrictions and public education that were put in place by the City as a result of the current statewide mandate for conservation in response to emergency drought conditions. Because of these suppressed demands, the City had to develop near-term water use projections for its Cost of Service Study (developed in 2015). These short-term water use projections are used for setting water rates to year 2020 and were much lower than the new long-term water demand forecast.

Thus, a method was developed to bridge the gap between the short-term water use projections and long-term water demand forecast. This method assumes that once mandatory water use restrictions are lifted, water demands would return to pre-drought (2008) levels within 15 years. In past droughts, it only took 5 to 7 years for water demands to return to pre-drought levels; but because of the severity of this drought it was assumed to take longer for the bounce back in water demands to occur.

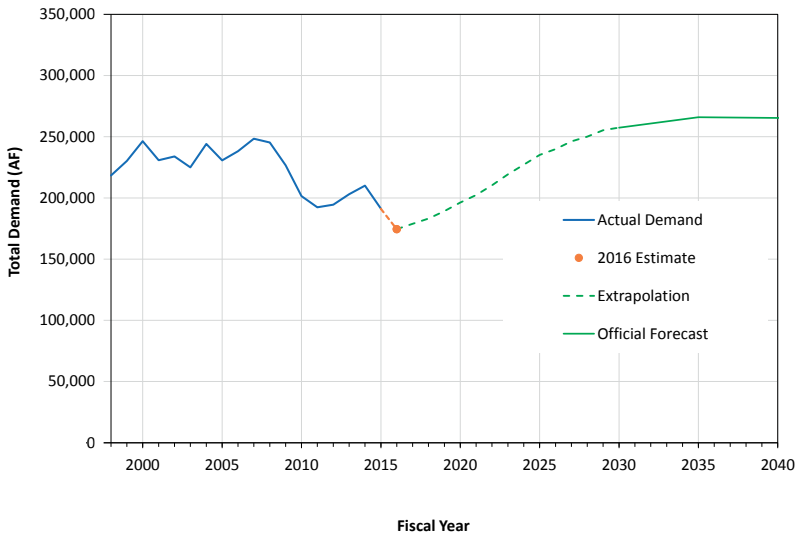


Figure 4-2 City's Total Baseline Potable Water Demand Forecast (City Retail, City Wholesale, Non-Revenue)

Table 4-3 presents baseline potable water use projections by retail billing water sector through 2040, under normal weather conditions. These demand projections include passive conservation and estimates of water savings from changes in the price of water. Passive conservation represent gains in water use efficiency from plumbing codes and landscape ordinances. The billing categories shown in Table 4-3 do not include the irrigation category that was shown in Table 4-1, as that water use was distributed among the multifamily (to account for irrigation of common home association property) and CII sectors. Cumulative sector demands are forecasted to increase by 37 percent over the projection period of 2020 to 2040. Single-family residential water use is expected to peak in 2035 and begin to decline during the period 2035 to 2040. Overall single-family residential water use is projected to increase by 39 percent over the projection period of 2020 to 2040. Multifamily residential water use is forecasted to experience the greatest increase at 69 percent over the projection period of 2020 to 2040, but, similar to single family use, is projected to experience a slight decline between 2035 and 2040. The declines in residential water use from 2035 to 2040 are attributed to a peak in single-family water use in 2035 and then a gradual decline in single-family housing thereafter.

Wholesale water demand projections are also shown in Table 4-3 (see Figure 4-2 for total retail and wholesale demands and non-revenue water which is discussed in Section 4.3.2). These projections were based on water demand trends for the Cal-Am, Del Mar, and Otay service areas.

4.3.1 Projected Low-Income Residential Water Demands

The requirements for the 2015 UWMP call for projections of water demands for low-income residential customers. This requirement was first enacted during the 2010 UWMP cycle, as required by Senate Bill (SB) 1087. Table 4-4 presents the projected water demands for low-income households.

Table 4-3 City's Baseline Potable Water Demand Forecast for Billed Water

Sector	Water Use (AFY)				
	2020	2025	2030	2035	2040
Single-family Residential	62,638	80,762	86,340	87,932	87,180
Multifamily Residential	56,766	73,191	90,080	95,841	95,786
CII	48,936	48,238	47,542	47,755	48,014
Sub-Total (Retail Area)	**168,340**	**202,191**	**223,962**	**231,528**	**230,980**
Wholesale Water Sales	12,200	14,106	15,453	15,759	15,821
Total (Retail plus Wholesale)	**180,540**	**216,297**	**239,415**	**247,287**	**246,801**

Source: 2020 to 2030 is extrapolation from 2015 Cost of Service Study; 2030 and after is from City's Update of Long-Term Water Demand Forecast, July 2015

Table 4-4 City's Current and Projected Low-Income Residential Demands

Sector	Low-Income Water Demands (AFY)					
	2015	2020	2025	2030	2035	2040
Single-family Residential	20,872	21,584	27,821	29,733	30,266	29,898
Multifamily Residential	16,987	25,511	33,373	41,221	43,985	44,047
Total	**37,859**	**47,094**	**61,194**	**70,954**	**74,251**	**73,945**

These demands are included in the residential demands shown in Table 4-3. Projected low-income household water demands were developed based on the projected number of households with less than 80 percent of the median household income in proportion to the total number of households. Low-income demand was calculated using the model implemented in the demand forecast for 80 percent of the San Diego County area median income (AMI) of $72,700, which is $58,160. The number of households classified as low income were determined using the SANDAG Series 13 data. SANDAG Series 13 data lists the service area households by income brackets for each zone, and has a bracket with a high income of $59,999. The number of households in and below this bracket are used to estimate the current and projected number of low-income single-family and multifamily units in each pressure zone. Comparing these calculated low-income demands with previously projected demands indicates that low-income housing in 2040 accounts for approximately 34 percent of single-family demand, and 46 percent of multifamily demand.

4.3.2 Projected Non-Revenue and Recycled Water

Beginning in Fiscal Year 2013, the City has estimated non-revenue water utilizing the AWWA Water Audit software. Over the past two fiscal years, the City has averaged 7.9 percent for non-revenue water (2014 at 8.3 percent and 2015 at 7.4 percent). An estimate of 8 percent has been used for projecting non-revenue water in the official water demand forecast from 2020 to 2025. For 2030 and beyond, non-revenue water projections are from the July 2015 Update of Long-Term Water Demand Forecast. Using these values, the City has forecast its non-revenue and total water use until 2040.

Recycled water demands for non-potable water use are estimated by the City's Public Utilities Department. These recycled water demands for non-potable use are expected to increase from the current 8,195 AFY to 13,650 AFY by 2020 and remain constant throughout the planning period. Table 4-5 presents the City's historical and projected non-revenue water and recycled water.

Table 4-5 City's Historical and Projected Non-Revenue Water and Recycled Water Demands

Use	Water Use (AFY)						
	2010	2015	2020	2025	2030	2035	2040
Non-Revenue Water	12,593	13,421	15,700	18,809	18,020	18,613	18,576
Recycled Water[1]	7,951	8,195	13,650	13,650	13,650	13,650	13,650

[1] Excludes wholesale recycled water that City provides outside of its service area.

Table 4-6 City's Historical and Projected Total Water Demand

Use	Water Demand (AFY)						
	2010	2015	2020	2025	2030	2035	2040
Retail Potable Water Sales	177,368	167,112	168,340	202,191	223,962	231,528	230,980
Wholesale Potable Water Sales	11,493	10,229	12,200	14,106	15,453	15,759	15,821
Non-Revenue Water	12,593	13,421	15,700	18,809	18,020	18,613	18,576
Sub-Total (Potable)	**201,454**	**190,762**	**196,240**	**235,106**	**257,435**	**265,900**	**265,377**
Recycled Water (Non-Potable)	7,951	8,195	13,650	13,650	13,650	13,650	13,650
Total Demand	**209,405**	**198,957**	**209,890**	**248,756**	**271,085**	**279,550**	**279,027**

4.3.3 Total Water Demand Forecast

Table 4-6 presents the City's total water demand forecast, aggregating the data from Tables 4-1, 4-2, and 4-5.

Future active water conservation was estimated by the SDCWA for its member agencies, using the Alliance for Water Efficiency (AWE) conservation tool. The projected active conservation savings are based on the continuation of conservation incentive and rebate programs, which is summarized in detail in Section 7 – Demand Management Measures. Table 4-7 shows the impact of this future active conservation on the overall demand forecast for the City.

Table 4-7 Impact of Future Active Water Conservation on City's Water Demand Forecast

Use	Water Demand (AFY)					
	2015	2020	2025	2030	2035	2040
Total Baseline Water Demand[1]	198,957	209,890	248,756	271,085	279,550	279,027
Less Future Active Water Conservation[2]		8,906	6,718	6,245	5,802	5,619
Net Water Demand[3]		**200,984**	**242,038**	**264,840**	**273,748**	**273,408**

[1] Includes retail water sales, wholesale water sales, non-revenue water, and recycled water demands from Table 4-6.

[2] Estimated by SDCWA for its member agencies.

[3] Represents difference between total baseline water demand and future active water conservation.

ACCELERATED FORECASTED GROWTH DEMAND

SDCWA's 2015 UWMP long-range water demand forecast incorporates a small demand increment associated with potential accelerated forecasted growth (AFG). This demand increment is intended to account for land-use development included in SANDAG's growth forecast and projected to occur beyond year 2040, but not yet accounted for in local jurisdictions' general land use plans.

The AFG demand increment was included in the SDCWA's 2015 UWMP to assist member agencies with general plan amendments that rely on the SDCWA's demand forecast to comply with laws linking water availability and land-use approvals, and intended to ensure SDCWA is adequately planning supplies for potential growth within the service area during the 2015 UWMP planning horizon. As a member agency of SDCWA, the City has access to SDCWA's regional supply associated with AFG, in conjunction with supplies identified in the City's 2015 UWMP, to document the availability of water supplies to serve proposed projects when preparing a Water Supply Assessment (Water Code Section 10912 (a). Additionally, SDCWA will track demands associated with member agency projects requesting a portion of the AFG demand increment, to demonstrate that adequate supplies exist for each new development.

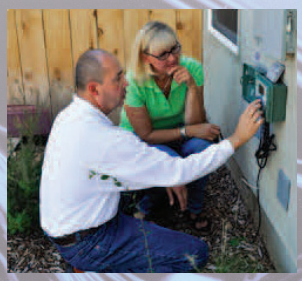
SECTION 5

Per Capita Water Use Baselines and Targets

The California Water Conservation Act of 2009, SB X7-7, requires water agencies to reduce per capita water use by 20 percent by the year 2020 (20x2020). In the 2010 UWMP, the City was required to develop a baseline per capita water use and set a per capita water use target for 2015 and 2020. For the 2015 UWMP, the City is required to adjust the baseline and target per capita water use, and compare 2015 per capita water use with set targets. Detailed calculations in compliance with DWR requirements are provided in Appendix J. Water use is typically discussed based on per capita use and is presented in gallons per capita daily (GPCD).

INSIDE

Landscape conservation



Irrigation timer

5.1 Baseline Daily Per Capita Water Use

In the 2010 UWMP, the City was required to develop a baseline per capita water use. Per DWR requirements, the City estimated a 10-year (1996 to 2005) and a 5-year (2004 to 2008) baseline per capita water use. The baseline per capita water use estimates in the 2010 UWMP were based on preliminary 2010 Census population data. For the 2015 UWMP, DWR requires that the baseline estimates be recalculated with the formal 2010 Census population data, by using the DWR Population Tool developed in 2015. Table 5-1 presents the adjusted populations and recalculated per capita water use.

Table 5-1 Baseline and Compliance Year Daily Per Capita Water Use

Fiscal Year	Distribution System Population	Daily System Gross Water Use (AFY)	Annual Daily Per Capita Water Use (GPCD)
1996	881,119	216,066	219
1997	1,122,784	222,977	177
1998	1,143,362	206,495	161
1999	1,157,759	215,400	166
2000	1,169,843	230,973	176
2001	1,179,015	216,312	164
2002	1,192,637	219,610	164
2003	1,207,261	211,059	156
2004	1,217,481	229,162	168
2005	1,227,114	217,780	158
2006	1,236,521	224,197	162
2007	1,243,005	229,940	165
2008	1,247,563	226,150	162
2015	1,304,114	180,177	123

Note: Population data and per capita water use were adjusted from the 2010 UWMP using updated 2010 Census population data in accordance with DWR requirements.

Table 5-2 Wastewater Baseline Periods in 2015 by Treatment Plant

Baseline Periods	Parameter	Value	Unit
10-Year Baseline Period	FY 2008 total water deliveries	226,150	AFY
	FY 2008 total volume of recycled water (City use only)	10,489	AFY
	2008 recycled water as a percent of total deliveries	4.64	Percent
	Number of years in base period	10	Years
	Year beginning base period range	1996	
	Year ending base period range	2005	
	Per capita water use	171	GPCD
5-year Baseline Period	Number of years in base period	5	Years
	Year beginning base period range	2004	
	Year ending base period range	2008	
	Per capita water use	163	GPCD

Note: Baseline per capita water use was adjusted from the 2010 UWMP using updated 2010 Census population data in accordance with DWR requirements

Table 5-2 presents the adjusted baseline per capita water using the adjusted 2010 Census population data. The adjusted 10-year and 5-year baseline per capita water use figures were estimated at 171 GPCD and 163 GPCD, respectively. For reference purposes, the 2010 UWMP presented the 10-year and 5-year baseline per capita water use as 168 GPCD and 166 GPCD, respectively.

5.2 Per Capita Water Use Targets

DWR developed four different technical methods to determine how the 2020 Urban Water Use Target can be set. These technical methods give water suppliers flexibility in establishing per capita water use targets.

SB X7-7 requires urban water suppliers to determine per capita water use targets for comparison against actual per capita water use to demonstrate compliance. The targets must be established using one of four different methods.

- Method 1: Estimate per capita water use targets by calculating 80 percent of the urban retail water supplier's baseline, using a 10- to 15-year average.
- Method 2: Estimate per capita daily water using a sum of defined performance standards. This method requires the sum of water use in indoor residential and landscaped areas as well as the 10 percent reduction in commercial, industrial, and institutional water use.
- Method 3: Calculate 95 percent of the applicable hydrologic regional target as presented in the DWR Guidebook (DWR, 2009). The City is located in DWR's South Coast Hydrologic Region Number 4 (see Figure 5-1).

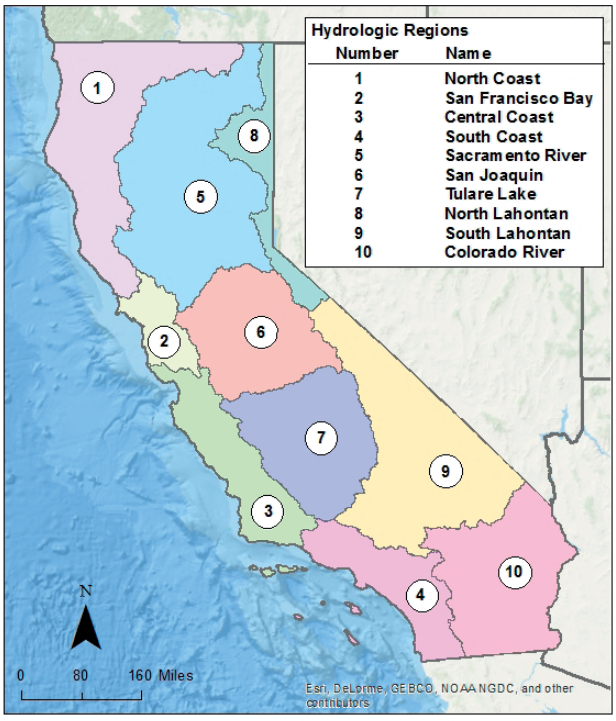


Figure 5-1 Hydrologic Regions for DWR Planning

Table 5-3 Baselines and Targets Summary Retail Agency

Baseline Period	Start Years From SB x7-7 Table 1	End Years From SB x7-7 Table 1	Average GPCD	2015 Interim Target	Confirmed 2020 Target
10-year	1996	2005	171	157	142
5-year	2004	2008	163		

Source: Appendix J Required DWR Compliance Table

- Method 4: Estimate water savings obtained through identified practices and subtract them from the baseline annual daily per capita water use. Agencies that use this method must use the prescribed procedures identified by DWR and utilize the Method 4 Calculator.

The City has selected Method 3 to establish its 2020 per capita water use target. Under Method 3, the South Coast Hydrological Region has a year 2020 target of 95 percent of 149 GPCD, which is 142 GPCD. The 2015 target is set at 157 GPCD, which is half of the 2020 target based on the 10-year baseline. Table 5-3 summarizes the City's estimated baseline and target per capita water use.

5.2.1 2015 Interim Target Compliance

A new requirement in the Act is that retail water suppliers must meet their 2015 interim urban water target by December 31, 2015, to be eligible for funding opportunities with DWR. DWR and the City use different methodologies to calculate GPCD. The City's 2015 average per capita water use, based on DWR's methodology was 123 GPCD, which is below the 2015 Interim Target of 157 GPCD. The City's internal methodology results in a GPCD of 122. Table 5-4 shows the City's compliance with the 2015 interim target.

Table 5-4 2015 Compliance Retail Agency or Regional Alliance Only

2015 Interim Target	2015 Actual[1]	Adjustments	Actual as Percentage of Target	In Compliance? Y/N
157 GPCD	123 GPCD	None	78%	Y

[1] Note: DWR and the City use different methodologies to calculate per capita water use. As part of the 2015 UWMP Guidelines, DWR developed a specific methodology to calculate interim target compliance (see Appendix J, Department of Water Resources SB X7-7) to ensure consistency between all reporting water providers. This methodology utilizes a population tool developed by DWR. The City uses an internally developed methodology that is more conservative which results in a GPCD of 122.

5.2.2 2020 Target

The City is on track with the 2020 target of 142 GPCD. However, the prolonged drought and mandatory water use restrictions imposed by the City have clearly contributed to major reductions in per capita water use. If the drought eases and water use restrictions are lifted, there is the potential for water use trends to rebound. The City will remain vigilant in reviewing per capita water use in the interim period before 2020, to ensure it remains on track to achieve compliance in 2020.

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SECTION 6

System Water Supplies

This section summarizes the City's current and planned future water supplies, and identifies potential, conceptual future water supplies that the City may implement in the coming years. Supply reliability is presented in Section 8 – Water Supply Reliability Assessment.

The City's current water supplies consist of: (1) capture of local runoff from rainfall within seven of its nine surface reservoirs; (2) recycled water for non-potable water use; (3) limited local groundwater; and (4) water purchased from SDCWA. The SDCWA currently receives the majority of its water supplies from MWD, Southern California's regional wholesale water provider. Purchased water from SDCWA is the largest portion of the City's overall water supply, accounting for about 86 percent on average from 2011-2015. In FY 2015, a significant drought year, purchased water from SDCWA accounted for 93 percent of the City's total water supply as the availability of local surface water was lower than normal (see Figure 6-1).

A twelve-year drought along the Colorado River has reduced Lake Mead (the primary storage reservoir for California withdrawals from the river) to its lowest level since the reservoir started to fill in 1935. Meanwhile, SWP water deliveries were reduced due to the recent prolonged California drought and regulatory restrictions that protect fisheries in the Bay-Delta. MWD Table A deliveries, the allocated contract supply from the SWP, decreased from 32 percent of MWD's previous average amount to 3 percent in 2014.

Because of these constraints on imported water supplies, as well as anticipated climate change impacts, the City has continued to develop additional local water supplies to reduce its reliance on imported water and improve overall reliability. The City conducted two studies to address improving supply reliability through a diversified water supply approach: (1) the 2012 LRWRP, a water supply plan that developed a preferred long-term strategy of local and imported water sources; and (2) the 2012 RWS, which comprehensively evaluated non-potable and potable water reuse projects. These studies are described in detail in Section 1 – Introduction.

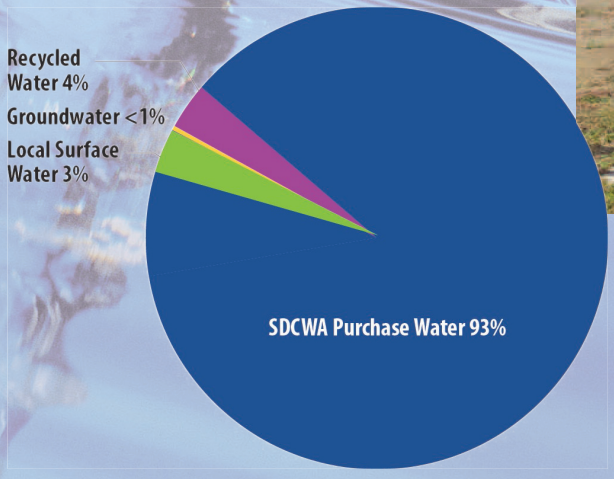

Figure 6-1 City's Current Water Supplies for FY 2015

INSIDE

Otay Reservoir

Groundwater Monitoring Well

6.1 SDCWA Purchased Water

The City has been purchasing imported water from SDCWA since 1947. The City determines its water supply needs from SDCWA by subtracting its local water supplies from its total water demands. As required by the Act, the City's water demand projections, local supplies, and needs for supplemental water are provided to SDCWA. Table 6-1 shows the total City water demands and planned local supplies under average weather and hydrological conditions, with the difference between the two representing the need for purchased water from SDCWA. Over the forecasted period, the City's average demands on SDCWA are projected to increase by approximately 43 percent, reaching a maximum of 234,398 AFY in 2035, and then slightly declining in 2040.

6.1.1 MWD Water Supply Diversification Strategy

To augment its imported water from the Colorado River and Bay-Delta, MWD has developed water banking programs, agricultural efficiency and land fallowing programs, and water transfers. These supplemental supplies are used mainly during dry years and droughts, and are located in Riverside County, Imperial County, and the Central Valley region of the state. MWD has also developed groundwater storage programs with water agencies in its service area. Finally, MWD provides financial incentives for local water agencies in its service area to implement projects for recycled water, groundwater recovery and seawater desalination.

To plan for future water supply reliability, MWD has developed a regional Integrated Resources Plan (IRP). The IRP is used by MWD to establish targets for its imported water, water banking and transfers, and local project incentives. MWD's Board of Directors approved the first IRP in 1996. This was followed by several updates in 2004, 2010, and 2015. The water targets and recommendations from MWD's 2015 IRP Update include:

Maintain Colorado River Aqueduct Supplies

The 2015 IRP Update goal for CRA supplies is to maintain current levels of water supplies from existing programs, while also developing flexibility through dry-year programs and storage. In order to accomplish this goal, the 2015 IRP Update targets development of sufficient base supply programs to ensure that a minimum of 900,000 AF of diversions are available when needed and to ensure access to a total of 1.2 MAF of supplies in dry years.

Stabilize State Water Project Supplies

The 2015 IRP Update goal for SWP supplies is to adaptively manage flow and export regulations in the near term and to achieve a long-term Bay-Delta solution that addresses ecosystem and water reliability challenges. Achieving this goal will require continued participation and a successful outcome in the California WaterFix and the California EcoRestore efforts. The California WaterFix is the successor program to the Bay-Delta Conservation Plan (BDCP). This new approach will provide MWD with an average of 980,000 AFY of SWP supplies in the near term and 1.2 MAF annually on average starting in 2030, when a long-term Bay-Delta solution is in

Table 6-1 City's Future Need for Purchased Water from SDCWA

Category	Projected Water Demands and Supplies (AFY)				
	2020	2025	2030	2035	2040
City Water Demands Retail & Wholesale[1]	200,984	242,038	264,840	273,748	273,408
Less City Verifiable Local Water Supplies[2]	39,650	39,550	39,450	39,350	39,250
Purchased Water from SDCWA[3]	**161,334**	**202,488**	**225,390**	**234,398**	**234,158**

[1] Represents net future water demands, after future active water conservation is subtracted (see Table 4-7).

[2] Includes existing and planned verifiable supplies (surface water, groundwater and recycled water).

[3] Represents difference between City water demands and planned local water supplies.

place. By improving average-year water deliveries from the SWP, more water can be stored in MWD's reservoirs, groundwater banks and other storage programs for use during dry years and droughts.

Achieve Additional Regional Water Conservation Savings

Conservation is crucial to the 2015 IRP Update strategy. While MWD and its member agencies continue to work toward achieving water savings consistent with 20x2020 goals, the 2015 IRP Update seeks further savings through increased emphasis on outdoor water use efficiency, largely through enhanced regional compliance with the state's Model Water Efficient Landscape Ordinance. MWD is working with its member agencies to develop a combination of incentive, education/outreach, and other programs in support of this approach. The 2015 IRP Update target for conservation would result in approximately 485,000 AFY of new water savings by 2040.

Develop Additional Local Water Supplies

Local supplies are a key to providing regional water supply reliability for the MWD service area. Over half of the water supplies in the MWD service area come from locally developed sources. The 2015 IRP Update goal for local water supplies is primarily to maintain existing and under-construction supply sources. The 2015 IRP Update target for local supplies totals 2.2 MAF in 2016; this target grows to 2.4 MAF by 2040. In comparison, local supplies produced about 1.94 MAF in calendar year 2014. Over the next 25 years, up to 460,000 AF of additional local supplies are anticipated to be developed.

Continue With the Adaptive Management Approach

The 2015 IRP Update reliability targets are based on a wide range of potential future conditions. Beyond that range, the 2015 IRP Update process identified additional foreseeable challenges and risk scenarios. To address these risks, the 2015 IRP Update approach explicitly recognizes that there are remaining policy discussions that will be essential to ensuring the maintenance and timely development of local supplies and conservation. The 2010 IRP Update established a planning framework that included Foundational Actions, which are low-cost, low-risk preparatory actions intended to accelerate additional development as needed. The 2015 IRP Update continues to integrate these actions, now described as Future Supply Actions, in its adaptive management strategy to help prepare the region for long-term changes to the climate, demographics, the economy, water quality, and regulations. Future Supply Actions aim to improve the viability of potential contingency resources and position the region to effectively implement these resources in a timely manner should they be needed. These resources include recycled water, seawater desalination, storm water capture, and groundwater recovery.

Figure 6-2 presents (on the following page) MWD's 2015 IRP Update water supply portfolios for today and 2040. MWD's expected future reliance on SWP supplies will decrease from 28 percent today to 20 percent by 2040, reflecting increases in regional local supplies of its member agencies.

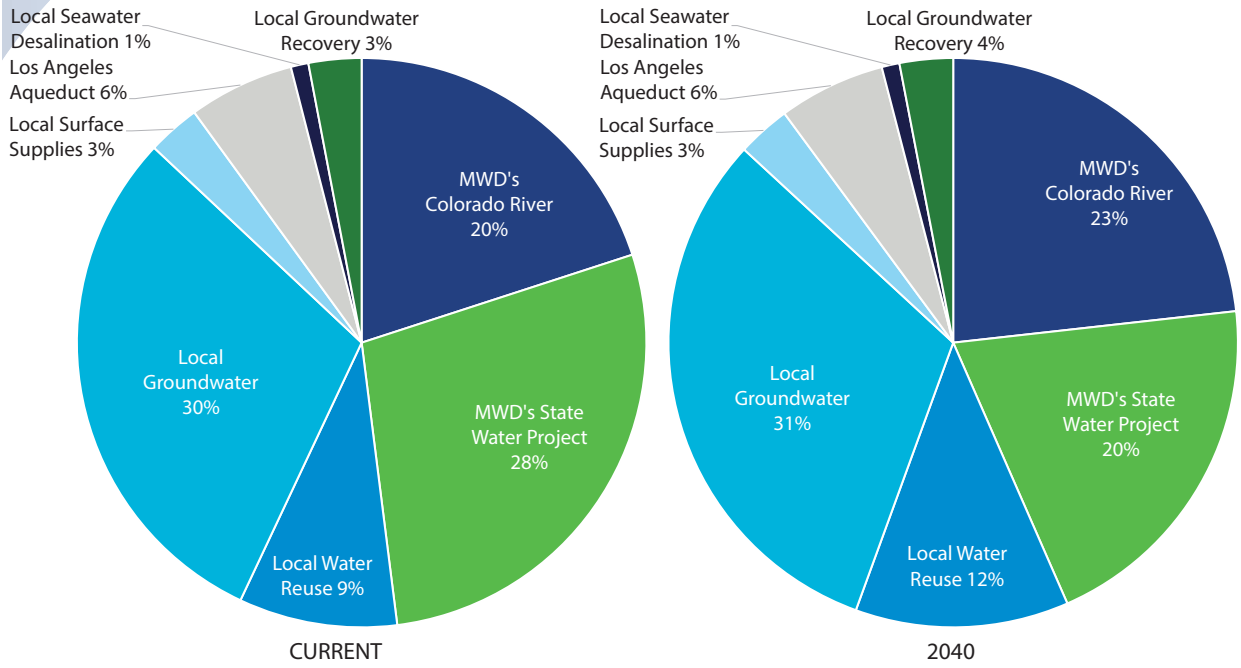

Figure 6-2 MWD 2015 IRP Water Portfolios (Current and Future)

6.1.2 SDCWA Water Supply Diversification Strategy

As a result of the 1991 drought that forced MWD to cut deliveries to the San Diego region, SDCWA executed a long-term strategy to diversify its water sources. In 1991, SDCWA relied on MWD for 95 percent of its member agency demands. Since then, SDCWA has invested heavily in the San Diego region's water delivery and storage system to improve efficiencies. The SDCWA and its member agencies are working to develop local resources such as groundwater, recycled water, seawater desalination, and water conservation. As of 2015, the strategy has reduced SDCWA's dependence on MWD supplies to 57 percent. The SDCWA currently has three main regional water supply sources:

Coachella and All-American Canal Lining

The SDCWA has a 110-year agreement to receive 80,000 AFY of Colorado River as a result of lining portions of the Coachella and All-American canals in Riverside and Imperial counties. Parties to this agreement include: SDCWA, Coachella Valley Water District (CVWD), Imperial Irrigation District (IID), US Bureau of Reclamation (USBR), and MWD [for wheeling arrangement].

IID Water Transfer

The SDCWA secured new imported water supplies through a 45- to 75-year water conservation-and-transfer agreement with IID. The deal, reached in 2003, provided approximately 70,000 AFY of highly reliable Colorado River water in 2010 and 100,000 AFY in 2015. This supply increases to 200,000 AFY by 2021. Under the "Law of the River," the IID water supplies have a Priority 3a status, which is higher than MWD's Priority 4 status, thereby offering greater water supply reliability. Parties to this agreement include: SDCWA, IID, USBR, and MWD [for wheeling arrangement].

Carlsbad Desalination Plant

In 2015, SDCWA received its first water deliveries from the Claude "Bud" Lewis Carlsbad Desalination Plant, a public-private partnership between Poseidon Water and SDCWA. Now fully operational, the plant produces approximately 50,000 AFY of desalinated ocean water,

which accounts for approximately one-third of San Diego County's local supply. Desalinated seawater is not dependent on the weather and as such, offers greater levels of reliability than other supplies.

In addition to these regional supplies, SDCWA works with its member agencies to expand their local supplies, including recycled water, groundwater, and desalination.

The SDCWA's 2015 UWMP summarizes the regional water demands, local water supplies, regional water supplies, and MWD water purchases. Table 6-2 presents the regional demands and supplies under normal weather conditions for verifiable projects, while Table 6-3 presents the same information for a single-dry year.

Table 6-2 SDCWA Demand and Supply Mix Under Normal Weather[1]

Water Demands and Supplies (AF/YR)	2020	2025	2030	2035	2040
Water Authority Supplies					
IID Water Transfer	190,000	200,000	200,000	200,000	200,000
ACC and CC Lining Projects	80,200	80,200	80,200	80,200	80,200
Lewis Carlsbad Desalination Plant	50,000	50,000	50,000	50,000	50,000
Sub-Total	**320,200**	**330,200**	**330,200**	**330,200**	**330,200**
Member Agency Supplies					
Surface Water	51,580	51,480	51,380	51,280	51,180
Water Recycling	41,166	44,381	46,465	46,825	47,565
Seawater Desalination	6,000	6,000	6,000	6,000	6,000
Potable Reuse	3,300	3,300	3,300	3,300	3,300
Brackish GW Recovery	12,100	12,507	12,507	12,507	12,507
Groundwater	17,940	19,130	20,170	20,170	20,170
Sub-Total	**132,086**	**136,798**	**139,822**	**140,082**	**140,722**
Metropolitan Water District Supplies	130,897	164,855	183,578	202,042	226,713
Total Projected Supplies	**583,183**	**631,853**	**653,600**	**672,324**	**697,635**
Total Demands w/ Water Efficiency Savings	**583,183**	**631,853**	**653,600**	**672,324**	**697,635**

[1] Normal water year demands based on 1960-2013 hydrology

Table 6-3 SDCWA Demand and Supply Mix Under a Single Dry-Year

Water Demands and Supplies (AF/YR)	2020	2025	2030	2035	2040
Water Authority Supplies					
IID Water Transfer	190,000	200,000	200,000	200,000	200,000
ACC and CC Lining Projects	80,200	80,200	80,200	80,200	80,200
Lewis Carlsbad Desalination Plant	50,000	50,000	50,000	50,000	50,000
Sub-Total	**320,200**	**330,200**	**330,200**	**330,200**	**330,200**
Member Agency Supplies					
Surface Water	6,004	6,004	6,004	6,004	6,004
Water Recycling	41,166	44,381	46,465	46,825	47,565
Seawater Desalination	6,000	6,000	6,000	6,000	6,000
Potable Reuse	3,300	3,300	3,300	3,300	3,300
Brackish GW Recovery	12,100	12,507	12,507	12,507	12,507
Groundwater	15,281	15,281	15,281	15,281	15,281
Sub-Total	**83,851**	**87,473**	**89,557**	**89,917**	**90,657**
Metropolitan Water District Supplies	263,340	264,740	263,340	260,680	258,720
Total Projected Supplies w/o Storage Takes	**667,391**	**682,413**	**683,097**	**680,797**	**679,577**
Total Demands w/ Water Efficiency Savings	**624,523**	**676,872**	**700,459**	**720,531**	**759,852**
Potential Supply (Shortage) or Surplus	42,868	5,541	(17,362)	(39,734)	(80,275)
Utilization Carryover Supplies	0	0	17,362	39,734	40,000
Total Projected Core Supplies w/ utilization of Carryover Storage Supplies	**667,391**	**682,413**	**700,459**	**720,531**	**719,577**
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	42,868	5,541	0	0	(40,275)

Table 6-4 Current and Projected Local Surface Water

Reservoirs Providing Local Supply	Water Supply (AFY)					
	2015*	2020	2025	2030	2035	2040
Barrett, El Capitan, Hodges, Lower Otay, Morena, San Vicente, Sutherland[1]	6,279	22,900	22,800	22,700	22,600	22,500

* 2015 represents actual supplies under very dry hydrologic conditions—resulting in very low surface water supplies
Note: Cal-AM water is already subtracted off these data.

[1] Does not include emergency storage reservoirs Miramar and Murray.

6.2 City Local Surface Water

Local runoff from rainfall is collected in the City's extensive surface reservoir system. To ensure water supply reliability, the City began to expand the City's water supply system with the acquisition of existing reservoir systems and dams, including Lower and Upper Otay in 1913, and Morena Dam in 1912. The City then purchased Hodges Reservoir 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.

The City currently owns nine reservoirs with a total capacity of 561,281 AF as described in Section 3 – Description of Existing Water System. Seven of these reservoirs, as listed in Table 6-4, provide a local water supply to the City, while the other two reservoirs are for emergency storage only.

The median reservoir yields from 2020-2040 shown in Table 6-4 decrease slightly over time to account for increases in Cal-Am water demands on the City's local supplies.

The City operates its surface water reservoir system to maximize the use of local supplies in the form of runoff from local watersheds, while also storing imported water as described in Section 3. The reservoirs not only provide water supply benefits, but also support recreation and flood control needs.

6.3 Local Groundwater Basins

A number of separate and distinct groundwater basins underlie the City's service area. The City currently produces limited groundwater from the Santee-El Monte Basin, and is investigating additional production to reduce reliance on imported water. The City manages or co-manages five of these groundwater basins, presented in Table 6-5. It should be noted that for purposes of this analysis, the San

Table 6-5 Groundwater Basins in the Vicinity of the City's Service Area

Basin Name	DWR Basin Number	Basin Management
San Pasqual Valley	9-10	SDCWA, the City
San Dieguito Creek	9-12	
Poway Valley	9-13	SDCWA, City of Poway
Mission Valley	9-14	SDCWA, the City
Santee-El Monte[1]	9-15	SDCWA, the City
El Cajon Valley	9-16	SDCWA, Padre Dam Municipal Water District
Sweetwater Valley (overlies San Diego Formation)	9-17	SDCWA, the City, Sweetwater Authority, National City, South Bay Irrigation District
Otay Valley (overlies San Diego Formation)	9-18	SDCWA, the City
Tijuana Basin	9-19	SDCWA, the City, Cal-Am
Pamo Valley Basin	9-24	

[1] Identified as the San Diego River Valley Basin in DWR Bulletin 118

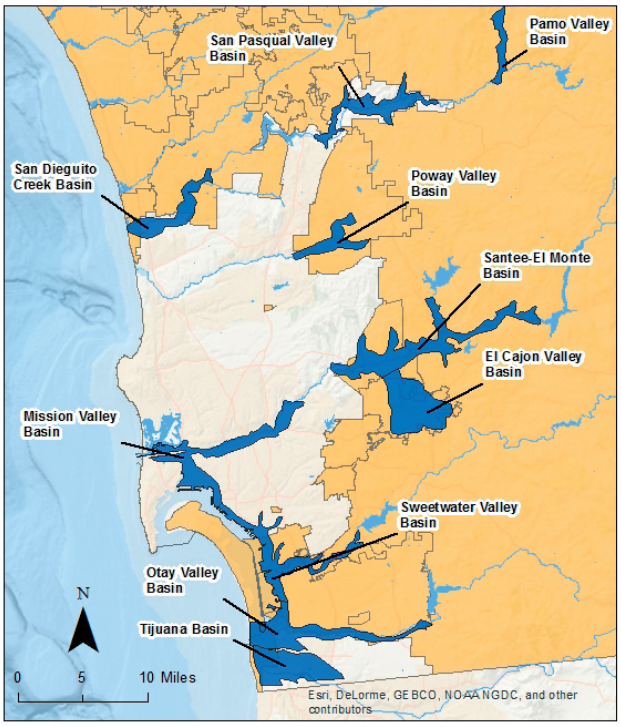

Figure 6-3 Location of Groundwater Basins in the Vicinity of City's Service Area

Diego Formation includes the Sweetwater Valley, Otay Valley, and Tijuana Basins.

None of the groundwater basins listed in Table 6-5 are adjudicated, meaning managed by the courts to ensure that water rights are protected and safe yields are adhered to. The California Supreme Court decreed in 1930 that the City has Pueblo water rights to all of the water (surface and underground) of the San Diego River. The City is committed to protecting its groundwater resources and preserving its established Pueblo water. This right includes the use of all surface water and groundwater of the streams that flowed through the original pueblo, including their tributaries, from their source to their mouth. The location of the groundwater basins are shown in Figure 6-3.

The Sustainable Groundwater Management Act of 2014 (SGMA) is new legislation that provides a framework for sustainable management of groundwater supplies by local authorities. Local agencies involved in the implementation must form local groundwater sustainability agencies within two years. For agencies in basins deemed high or medium priority, groundwater sustainability plans must be adopted within five to seven years. By 2040, groundwater sustainability agencies in critically overdrafted basins should achieve sustainable groundwater management to avoid undesirable impacts, such as seawater intrusion, chronic depletion of groundwater, reduction of groundwater storage, degradation of water quality, depletion of surface water, or land subsidence.

The DWR, tasked with implementing SGMA, has not declared any of the ten basins listed in Table 6-3 to be in conditions of critical overdraft. However, groundwater elevations are monitored by the City in accordance with the DWR California Statewide Groundwater Elevation Monitoring program (CASGEM), and the basins are designated a prioritization value. In 2017, DWR plans to revise the ranking of all basins using updated data they have collected since 2014. The prioritization ranks the basins based on Equation 6-1, and assigns priorities of very low, low, medium, and high. A summary of local basin rankings is shown in Table 6-6.

Equation 6-1:

$$\begin{aligned}&\text{Population} +\\ &\text{Population Growth} +\\ &\text{Public Supply Wells} +\\ &(0.75 \times \text{total wells}) +\\ &\text{Irrigated Acreage} +\\ &((\text{Groundwater Use} +\\ &\%\ \text{of Total Supply})/2) +\\ &\text{Impacts} +\\ &\text{Other information}\\ &= \text{Overall Basin Ranking}\end{aligned}$$

Table 6-6 Basin Priority Rankings by DWR

Basin Name	Ranking Priority
San Pasqual Valley	Medium
Mission Valley	Low
Santee-El Monte	Medium
Sweetwater Valley (overlies San Diego Formation)	Very Low
Otay Valley (overlies San Diego Formation)	Very Low
Tijuana	Very Low

In general, the groundwater basins in the San Diego area are characterized by stable groundwater levels. Groundwater quality is often brackish, with total dissolved solids (TDS), chloride, and sodium impairing its use as a potable supply, unless the water is treated. This section describes the groundwater basins' location, geography, climate, water quality concerns, and usage.

San Pasqual Valley Basin

The San Pasqual Valley Basin is located in the northern part of the City, approximately 25 miles northeast of downtown San Diego and within the San Pasqual Valley, which is a designated City-owned and managed agricultural preserve. The San Pasqual Valley is sparsely populated and includes row crop, orchard, nursery, and dairy operations. The basin is cited as having high nitrate and high TDS issues in many locations, but particularly toward the west. Potential sources of nitrate contamination are traced to agricultural use of fertilizers, urban and industrial runoff, wastewater discharges, septic systems, and sewage spills. The basin is pumped extensively to supply agricultural demands, experiencing water declines of up to 20 feet per year in dry years.

The basin is classified as a medium priority basin on DWR's Basin Priority List. Under the CASGEM program, the City is the approved Monitoring Entity for the basin and provides seasonal groundwater elevation data to the program twice a year. An approved San Pasqual Valley Basin elevation monitoring plan and Monitoring Designation (August 2015) for the basin is on record with DWR.

In November 2007, the City Council adopted the San Pasqual Groundwater Management Plan[1], which defines an adaptive management plan for the basin. Included in the plan are five management objectives including:

1. Protect and enhance water quality.
2. Sustain a safe, reliable local groundwater supply.
3. Reduce dependence on imported water.
4. Improve understanding of groundwater elevation, basin yield and hydrogeology.
5. Partner with the agricultural and residential communities to continue to improve implementation of best management practices.

Five additional plan components include:

1. Stakeholder involvement.
2. A monitoring program.
3. Groundwater resources protection.
4. Groundwater sustainability.
5. Planning integration.

The City has been actively managing and implementing the San Pasqual Groundwater Management Plan Basin recommendations in cooperation with the local community and agricultural groups.

In May 2014, the City, in compliance with the State Water Resources Control Board, completed a Salinity and Nutrient Management Plan for the San Pasqual Valley Basin, which identified excessive levels of salts and nutrients in areas of the basin. Proposed management strategies for protecting and improving groundwater quality for agriculture, potable water supply, and for other beneficial groundwater uses are categorized by nutrient management, salinity management, and groundwater protection. Basin-wide stakeholder involvement will be enlisted to implement the strategies.

Mission Valley Basin

The Mission Valley Basin is a historic groundwater basin that served as an original water supply for the City of San Diego. However, in 1986, a large unauthorized release of gasoline from an owner-operator of a petroleum tank farm was discovered in the basin, preventing groundwater pumping. The San Diego Regional Water Quality Control Board (SD RWQCB) in 1992 issued a cleanup and abatement order to the party responsible for the leak. In 2007,

[1] Available at https://www.sandiego.gov/sites/default/files/legacy/water/pdf/supply/spgmpreport.pdf

the City sued the responsible party over the loss of this water and the damage to the Mission Valley Basin. Remediation activities have been ongoing for over 20 years, preventing the City from using the basin.

The Mission Valley Basin is located in the central region of the City of San Diego and underlies an east-west trending valley, which is drained by the San Diego River. The City, working with the USGS, installed a monitoring well in this basin in 2004. Following this installation, the City installed several additional monitoring wells in 2011 to gather hydrogeologic and water quality data. The basin is classified as a low priority on DWR's Basin Priority List.

Santee-El Monte Basin

The Santee/El Monte Basin (identified as the San Diego River Valley Basin in DWR Bulletin 118) is located outside the City's municipal boundary but within San Diego County. The basin includes two dams (San Vicente and El Capitan) owned and operated by the City. It is situated in the eastern portion of the San Diego River watershed near the cities of Santee, La Mesa, El Cajon, and the unincorporated community of Lakeside. The basin is classified as a medium priority basin on DWR's Basin Priority List due to its high nitrate levels and treatment requirements for iron and manganese. Groundwater from the western area of Santee/El Monte Basin has high TDS as a result of several possible contributing causes, including natural mineralization and surface runoff from Eocene marine rocks, and would require demineralization prior to use.

Under the CASGEM program the City is the approved Monitoring Entity for the basin. In July 2015, a Memorandum of Understanding establishing a Voluntary Cooperative Groundwater Monitoring Association was executed with Padre Dam Municipal Water District, Lakeside Water District, and Helix Water District. On file with DWR is an approved Santee/El Monte Basin monitoring plan, Monitoring Designation (August 2015), and Memorandum of Understanding (July 2015). As a requirement of the CASGEM program, the City provides seasonal groundwater elevation data to the program twice a year for this basin.

The City will be working with the overlying water agencies (Padre Dam Municipal Water District, Helix Water District, and Lakeside Water District) in moving forward to develop the Santee/ El Monte Basin in compliance with SGMA.

San Diego Formation Basin

The San Diego Formation is a coastal plain, groundwater basin in southern San Diego County. The San Diego Formation is a confined aquifer that underlies a portion of the Otay Valley, Tijuana, and Sweetwater Valley groundwater basins, as identified by DWR in Bulletin 118.

The Otay Valley and Sweetwater Valley portions of the San Diego Formation are classified as very low priority on DWR's Basin Priority List. The Otay Valley is considered marginal to inferior for potable water production as a result of high TDS levels in the coastal plain. Groundwater in the eastern portion of the basin could be suitable for potable production water but would likely require treatment. It is marginal to inferior for irrigation due to high chloride concentrations. Groundwater in the Sweetwater Basin generally exceeds the recommended drinking water limits for TDS, chloride, and sodium content.

Table 6-7 Historical Groundwater Production for City

Wastewater Treatment Plant	Historic Supply (AFY)				
	2011	2012	2013	2014	2015
Santee/El Monte: San Vicente GW Production Well	500	500	500	500	500
Percent of Total City Water Supply	0.25%	0.25%	0.24%	0.23%	0.25%

6.3.1 Historical Groundwater Basin Use

The Santee/El Monte Basin has two dams owned and operated by the City, on the San Vicente and El Capitan Reservoirs. The City installed the San Vicente Production Well in 2004 with a maximum capacity of 600 gallons per minute (gpm). Water from the well flows to the City's raw water line downstream of San Vicente Reservoir, and from there it is conveyed to the Alvarado WTP. Table 6-7 summarizes groundwater pumped by the City over the past five years.

6.3.2 Future Groundwater Projects

Table 6-8 presents the City's projected groundwater supplies available under normal climate conditions. Existing production from the Santee-El Monte groundwater well will continue at 500 AFY out to 2040. The Richard A. Reynolds (Reynolds) Desalination Facility Expansion, in which the City is partnered with the Sweetwater Authority to implement, is a planned, verifiable project in the San Diego Formation that could produce up to produce 2,600 AFY, starting in year 2020. Additional conceptual projects are included in Table 6-8 that have not yet been verified as supplies.

Verifiable Projects

Santee-El Monte Basin Development

The City has an existing municipal supply well along San Vicente Creek downstream of the San Vicente Reservoir. In March 2010, the City drilled a pilot production and municipal supply well about a quarter mile downstream of its El Capitan Reservoir. Both wells are being evaluated for long-term production and the possible benefits of constructing a larger well field downstream of San Vicente Dam.

San Diego Formation Basin Development

The City has worked with hydrogeological consultants and the USGS since 2007 to install several groundwater monitoring wells in the San Diego Formation to help characterize water quality, quantity, and sustainability. The sources of natural recharge to the basin have not yet been clearly identified or quantified and are the subject of extensive research. The City's interest in developing the San Diego Formation

Table 6-8 Existing and Future Groundwater Supply

Basin	Groundwater Supply (AFY)					
	2015	2020	2025	2030	2035	2040
Verifiable Projects (Existing and Planned)						
Santee-El Monte: San Vicente Groundwater Well	500	500	500	500	500	500
San Diego Formation: Reynolds Desalination Facility Expansion - Sweetwater Authority Partnership	0	2,600	2,600	2,600	2,600	2,600
Total Verifiable	**500**	**3,100**	**3,100**	**3,100**	**3,100**	**3,100**
Conceptual Projects						
Mission Valley: Brackish Groundwater Recovery Project	0	0	840	1,680	1,680	1,680
San Diego Formation	0	0	800	1,600	1,600	1,600
San Pasqual Basin: Brackish Groundwater Recovery Project	0	0	1,235	1,427	1,539	1,619
Total Conceptual	**0**	**0**	**2,875**	**4,707**	**4,819**	**4,899**
Total Verifiable and Conceptual	**500**	**3,100**	**5,975**	**7,807**	**7,919**	**7,999**

Basin is complicated by other parties' existing and planned use of the basin for municipal supply.

In 2013, Sweetwater Authority and the City reached an agreement to share potable water generated by the Richard A. Reynolds Desalination Facility (upon its expansion) and jointly fund the project. The proposed project is designed to increase the capacity of the desalination facility from an existing 3,600 AFY to 8,800 AFY. Under the terms of the agreement, the City shall receive 50 percent of any water produced in excess of 3,600 AFY at the desalination facility; this volume is projected to be 2,600 AFY starting in 2020. The Sweetwater Authority will construct, own, and operate the desalination facility.

Conceptual Projects

Mission Valley Basin Development

The Mission Valley Brackish Groundwater Recovery Project is planned to provide the City with a locally controlled supply of water by extracting and desalinating native groundwater using reverse osmosis. A conceptual plan intends to treat, disinfect, and convey desalinated water to the potable water distribution system at approximately 1,700 AFY. The unauthorized release of gasoline from the petroleum tank farm and related litigation have put the brackish desalination project and basin investigation on hold.

San Diego Formation Basin Development

In 2011, the City installed a deep monitoring well near Chollas Creek that will provide valuable information for a proposed San Diego Formation Groundwater Production Project. This project at the Diamond Business Improvement District (BID) Well Field and Disinfection Facility will extract fresh water from a confined aquifer system within the San Diego Formation. For this conceptual project, the extracted groundwater could be conveyed to Mount Hope Cemetery for non-potable irrigation, and the remainder will be disinfected and delivered to the potable distribution system. The facilities could be operational by 2025 with delivery of 800 AFY and ramping up production to 1,600 AFY by 2030.

San Pasqual Valley Basin Development

The City has researched the possibility of groundwater and recycled water conjunctive use, as well as brackish groundwater desalination, in the San Pasqual Valley Basin. Conjunctive use studies were completed by CDM Smith (2010 and 2012) and explored direct surface water delivery from the First and Second San Diego Aqueducts to agricultural users, as opposed to groundwater pumping. The San Pasqual Brackish Groundwater Desalination Demonstration Project was another project studied by RBF Consulting (2011). Contributing studies for this project included brine minimization and disposal (Trussell Technologies, Inc.), and the reliability and economic viability of potable water production through the temporary operation of a desalination demonstration facility for 26 weeks (Reiss Engineering). The City also completed work with DWR to establish a monitoring well system with groundwater level data loggers installed and a basin evaluation to determine its storage capacity and safe yield (2015).

Both the conjunctive use and brackish groundwater desalination projects provide valuable information on storage, recovery, and desalination of groundwater in the basin. The groundwater modeling completed by CH2M showed that flows are constrictive through the west end of the basin and that agricultural irrigation consumes much of the sustainable yield in the basin. Therefore, there is a need for supplemental basin recharge if groundwater is to be extracted for additional uses. The City is currently collaborating with water districts surrounding the San Pasqual Valley Basin to pursue regional water opportunities for groundwater recharge or potable or recycled water reuse in the basin. Initial efforts for a regional water study are under way. The study will provide a comprehensive assessment of existing or planned water, wastewater, and recycled water facilities for use to meet water supplies and needs of the region.

6.3.3 Other Groundwater Basins

Tijuana Groundwater Basin Development

Along with the proposed basin development described throughout Section 6.2, the Tijuana Basin is another source located in San Diego County. The Tijuana Basin is located in the southwest corner of San Diego County and underlies the Tijuana River along the California-Mexico Border. It is managed by SDCWA and Cal-Am, a private company. The basin extends along the Tijuana River approximately six miles from the international border to the Pacific Ocean and has historically experienced problems with seawater intrusion. Additionally, the basin is classified as a very low priority on DWR's Basin Priority List and has been cited as exceeding maximum contaminant levels (MCLS) in some wells for chloride, sulfate, and TDS, as well as for aluminum, barium, lead, selenium, and silver. Due to shifting priorities, the City was unable to complete a feasibility study for using the Tijuana Basin as a potential aquifer storage and recovery system for recycled water. The Tijuana Basin is also currently compromised by sewage and untreated industrial discharges at the international border. As a result, the City currently has no construction projects planned for this basin.

6.4 Recycled Water

The City has taken multiple actions in recent years to investigate and expand its recycled water system. Recycled water contributed an average of 3 percent of the City's supply portfolio from 2005 to 2010, and reached 4 percent in 2015. Recycled water helps to reduce demands for potable water by substituting imported potable supplies with non-potables supplies. Demand for recycled water is driven by multiple factors, including climatic conditions, accessibility, conservation drivers, seasonality, and customer acceptance.

Criteria and guidelines for the production and use of recycled water were established by the SWRCB in the California Code of Regulations, Title 22, Division 4, Chapter 3, commonly referred to as simply Title 22. This regulation was revised in June 2014 from the January 2009 version. Title 22, also known as the Water Recycling Criteria, establishes wastewater treatment standards and recycled water quality standards, based on the end use of the recycled water. Title 22 also establishes recycled water criteria to protect public health. 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." The City's recycled water is treated to a Title 22 disinfected tertiary level quality suitable for irrigation, industrial processes including cooling water, construction purposes, ornamental fountains, flushing toilets, and groundwater recharge.

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

6.4.1 Recycled Water System

Two recycled water distribution systems provide non-potable water to customers, the Northern Service Area and the Southern Service Area. The Northern Service Area receives source water from the NCWRP, and the Southern Service Area receives source water from the SBWRP. The City first began using recycled water on a large scale in 1997, after completing the NCWRP. The SBWRP was completed five years later, in 2002.

Figure 6-4 shows the recycled water service areas in relation to the NCWRP and SBWRP, and illustrates the location of the NCWRP and SBWRP and their respective distribution systems. Distribution systems shown by black lines are operated by other agencies and have connections to the City's system.

The Northern Service Area is the City's largest recycled water distribution system and is served by the NCWRP. This area includes 94 miles of pipelines, two storage tanks, and two pump stations. As of 2015, the Northern Service Area had two wholesale customers:

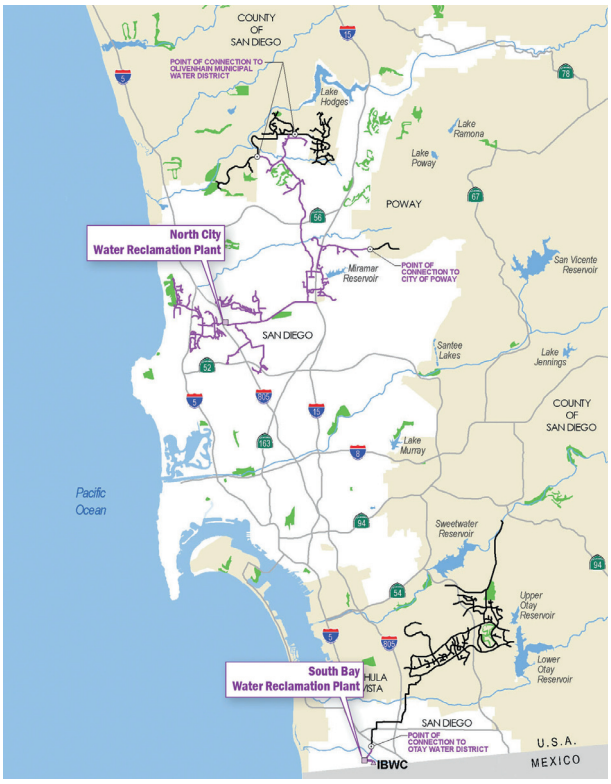

Figure 6-4 City's Non-potable Recycled Water System

the City of Poway and Olivenhain Municipal Water District. Almost all recycled water, approximately 99 percent, is used for irrigation, while the remainder is used for cooling towers, construction, ornamental fountains, and toilet/urinal flushing. Water is treated to a Title 22 disinfected tertiary level and is suitable for all designated Title 22 uses. Annual reclamation plant monitoring reports detail North City WRP operations.

The Southern Service Area is the smaller distribution system of the two reclaimed distribution systems and is served by SBWRP. This area includes a relatively simple distribution system of 3.12 miles of pipelines, one storage tank, one pump station, and a connection to Otay Water District, the only wholesale customer for the service area. Most water produced by the South Bay WRP is sold to Otay Water District, which operates its own extensive recycled water distribution system, as indicated in Figure 6-4. Similar to the NCWRP, an annual monitoring report is published online.

6.4.2 Non-Potable Recycled Water Use

The NCWRP, the SBWRP, and two additional recycling facilities located upstream of the Metro System relieve wastewater flows that would have historically flowed into the Metro System for treatment at the PLWTP. The two additional plants: Ralph W. Chapman Water Recycling Facility in Otay Water District and the Padre Dam Water Recycling Facility in Padre Dam Municipal Water District, are owned by outside agencies and their service areas are not described in this document.

Table 6-9 summarizes the volume of wastewater recycled by the NCWRP and SBWRP in 2015, within their service areas and to wholesale users.

Table 6-9 Wastewater Treated in 2015 by Reclamation Plant

Wastewater Treatment Plant	Discharge Location	Method of Disposal	Treatment Level	2015 (AFY)				
				Wastewater Treated[1]	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area Within Another UWMP	Recycled Outside of Service Area, Not in Another UWMP
North City Water Reclamation Plant	Sewer	Conveyed to PLWTP	Tertiary for recycled water; Secondary for non-recycled water	18,094	8,946	7,029	1,006	0
South Bay Water Reclamation Plant	Pacific Ocean via outfall	Outfall	Tertiary for recycled water; Secondary for non-recycled water	8,962	3,542	1,166	3,226	0
			Total	**27,056**	**12,488**	**8,195**	**4,232**	**0**

[1] Includes wastewater generated outside of water service area since wastewater service area is larger than the water service area.

The City uses several customer outreach services, which place emphasis on water supply reliability and financial incentives, to encourage recycled water use. Outreach focuses on encouraging customers along existing recycled water pipelines to switch to recycled water by:

- Conducting site visits.
- Presenting to organizations.
- Updating its recycled water website.
- Encouraging existing customers to increase their use.

Since publishing the 2010 UWMP, the City has increased recycled water use by approximately 3 percent. Sales to other agencies have remained constant (see Table 6-10).

Table 6-10 Historical Recycled Water Use

Use	Actual Use (AFY)	
	2010	2015
In-City	7,951	8,195
Sales to Other Agencies	4,222	4,232
Total	**12,173**	**12,427**

Actual recycled water use in 2015 is approximately 13 percent less than in was projected in the 2010 UWMP, as noted in Table 6-11. For the 2010 UWMP, the City provided projections of recycled water by type of use, but it no longer categorizes recycled water in this manner.

Table 6-11 Comparison of Actual Retail Recycled Water in 2015 to 2010 UWMP Projection

Use	Actual Use and Projected Use (AFY)	
	2015 Actual Use[1]	2010 Projection for 2015
Landscape Irrigation	N/A	5,644
Industrial Reuse	N/A	3,609
Total	**8,195**	**9,253**

[1] City no longer separates recycled water by use.
This value does not include recycled water sales to other agencies of 4,232 AF in FY 2015.

6.4.3 Future Non-Potable Recycled Water Use

One of the findings from the City's RWS is that the cost of expanding the City's non-potable recycled water system is too high. Table 6-12 shows the projected recycled water for non-potable use that can be achieved utilizing the existing non-potable water system. Of the 13,650 AFY of recycled water supplies projected for the City, 12,500 AFY is expected to come from NCWRP, and 1,150 AFY will be generated at SBWRP. Existing sales to other agencies include approximately 4,600 AFY to Otay Water District, 500 AFY to Olivenhain Municipal Water District, and 750 AFY to the City of Poway. Recycled water projections for the wholesale agencies are based on current agreements.

Table 6-12 Projected Recycled Water for Non-Potable Use

Use	Projected Recycled Water Use (AFY)				
	2020	2025	2030	2035	2040
In City[1,2]	13,650	13,650	13,650	13,650	13,650
Sales to Other Agencies	5,850	5,850	5,850	5,850	5,850
Total	**19,500**	**19,500**	**19,500**	**19,500**	**19,500**

[1] The City does not separate recycled water by use.
[2] Includes plant use.

The RWS investigated future non-potable recycled water opportunities for 11 possible agencies. From the surveys, five agencies were identified for further consideration. Of the five agencies, three agencies, along with their projected demands, are listed in Table 6-13. These demands represent opportunities for the City to increase its non-potable recycled water services to wholesale customers.

Table 6-13 Potential Recycled Water Sales to Outside Agencies

Actions	Description	Expected increase in Demands (AFY)
Additional Sales to Otay Water District	Non-potable reuse	3,363
Additional Sales to City of Poway	Non-potable reuse	1,100
Sales to Santa Fe Irrigation District	Non-potable reuse	850

6.4.4 Maximization of Recycled Water

The City's RWS recommended that maximization of recycled water would be most cost-effectively achieved through potable reuse. Potable reuse uses purified recycled water (through advanced treatment) to replenish a groundwater basin or a surface reservoir. The water extraction from groundwater or surface water is often treated again at a water treatment plant. Unlike the current use of City recycled water for non-potable uses, the purified recycled water can be used for potable uses as well.

Although the advanced water purification process produces water that meets all drinking water standards, passing purified water through environmental buffers, such as a groundwater aquifer or reservoir, will provide an additional barrier for the protection of public health. This strategy has several benefits, including reducing dependence on imported water, providing a locally controlled drought-proof water supply, and reducing the discharge of treated wastewater into the ocean. Additionally, this strategy provides the lowest overall unit cost compared to expansion of the City's non-potable recycled water system.

Water Purification Demonstration Facility Project

City's Water Purification Demonstration Plant

In 2007, the City Council initiated the Water Purification Demonstration Project (Demonstration Project) to determine the feasibility of turning recycled water into purified water that could be sent to a reservoir and later be distributed as drinking water. The project evaluated the feasibility of blending imported water with purified water in the San Vicente Reservoir, and then treating the water in an existing drinking water treatment plant.

A 1-mgd demonstration-scale advanced water treatment plant was constructed at the NCWRP and began operating in June 2011. Approximately 9,000 water quality tests were conducted during the demonstration project and the purified water was monitored daily. As of 2015, more than 28,000 water quality tests have been conducted. In addition, the demonstration plant has been used to educate the public on water purification, and hundreds of public tours of the plant have been given to date.

The Demonstration Project studied and modeled the reservoir augmentation process, but did not actually put any purified water into San Vicente Reservoir. Several reports were prepared to analyze the feasibility of this demonstration project, including the Advanced Water Purification Facility Study Report, Limnology and Reservoir Detention Study of San Vicente Reservoir, and Water Purification Demonstration Project Report. Results reported in the Advanced Water Purification Facility Study Report demonstrate that the membrane filtration system operated at a recovery of 93 to 95 percent, while reverse osmosis was demonstrated to reliably operate at 85 percent recovery. Water quality tests performed before and after the water purification process demonstrate that these two membrane treatment processes, along with UV and advanced oxidation, can produce purified water that meets drinking water quality standards. The results showed that the purified water consistently met all primary federal and state MCLs and numerical secondary drinking water MCLs, and microbial tests in the purified water were all non-detect. In addition, simulation results from the numerical three-dimensional water quality model used in the limnology study showed that blending and retaining purified water in San Vicente Reservoir would be sufficient to meet regulatory requirements.

The 2012 LRWRP provided much of the information used for the energy and economic analysis for the Demonstration Project and notes that the implementation of a full-scale reservoir augmentation project at San Vicente Reservoir will result in avoided wastewater system costs. With these avoided costs, the projected cost of producing and delivering purified water to San Vicente compares favorably

to the projected cost of imported water. Over the course of the Demonstration Project, the City engaged the Independent Advisory Panel (IAP) that was formed to provide expert oversight of the key activities and results of the Demonstration Project. The City also coordinated with DDW (previously known as the California Department of Public Health) and the SD RWQCB as the agencies that would be responsible for establishing the permit requirements for a full-scale reservoir augmentation project. The City received a concept approval letter from the DDW and a letter of regulatory concurrence from the SD RWQCB for a concept providing 15,000 AFY for potable reuse via the San Vicente Reservoir.

A major component of the Demonstration Project was to educate and inform the public about the need for and the benefits of purified water. The City developed a plan to guide public outreach activities, which included speaker's bureau, informational materials, stakeholder interviews, tours of the 1-mgd advanced water purification demonstration facility, community events participation, research surveys, social media, videos, and a dedicated website. Progress of the outreach program was monitored through research studies and polls conducted in 2004, 2011, and 2012, and found a steady increase in City residents favoring the use of recycled water to diversify the City's water supply.

Pure Water San Diego

The viability and safety of the purification process confirmed through the one-year demonstration project led to the advancement of the City's Pure Water San Diego Program (Pure Water), which was unanimously approved by City Council for advancement on November 18, 2014. Potable reuse has three precedents in California, as listed in Table 6-14. In addition, potable reuse is occurring in several cities in Texas and in Singapore.

Pure Water San Diego will provide a reliable drinking water supply that is locally controlled and drought-proof. The program will be implemented in phases, with the final phase to be completed in 2035. The program will use advanced water treatment processes to turn recycled water into water of equal or greater quality than the current imported sources.

The Pure Water program implementation will involve diversion of wastewater from PLWTP to two or three future advanced water purification facilities at NCWRP, a future central area facility, and potentially at the SBWRP. This diversion will significantly reduce flows to PLWTP. The first phase is scheduled to produce up to 15 mgd of water by 2025. A long-term goal of 83 mgd is slated for 2035, and would constitute approximately one-third of San Diego's future drinking water supply. Pure Water is a potential water source and is not included as a firm supply source in this UWMP, or in the reliability analysis presented in Chapter 8, Water Supply Reliability Assessment. Figure 6-5 shows the finalized process of conveying the Pure Water-produced water to either the San Vicente Reservoir or Miramar Reservoir for eventual treatment and reuse in the drinking water system.

To help address issues and concerns with recycled water, the City has taken multiple measures to ensure

Table 6-14 California Potable Reuse Projects

Project	Description	Capacity
Orange County Water District Groundwater Replenishment System	World's largest wastewater purification system for groundwater recharge.	Produces up to 100 mgd of highly purified water.
Montebello Forebay in Los Angeles	In operation since the 1960s to recharge local, imported and recycled water for groundwater replenishment.	Currently recharges 150,000 AF of local, imported, recycled water annually; about 26 percent of the 5.6 million AF recharged since 1960s was recycled water.
West Coast, Dominguez Gap, Alamitos Barriers	Los Angeles and Orange Counties use seawater intrusion barriers to supplement/protect groundwater supplies. Recycled water is injected to prevent high salinity seawater from reaching the groundwater basin.	The Water Replenishment District currently provides 8 mgd (9,000 AFY) of highly purified water for injection into the Alamitos Barrier. The Dominguez Gap and West Coast Barriers receive approximately 6,000 AFY of highly purified water from the West Basin Municipal Water District.

the safety of water reuse projects. For instance, the City has conducted two additional research studies on the demonstration plant after completion of the Water Purification Demonstration Project and has more planned. The City also actively works with regulators before project approval to ensure that regulatory standards are met. In addition, as part of the Pure Water program, the City included an Independent Advisory Panel to work with the study to ensure that all important components were thoroughly covered and reviewed.

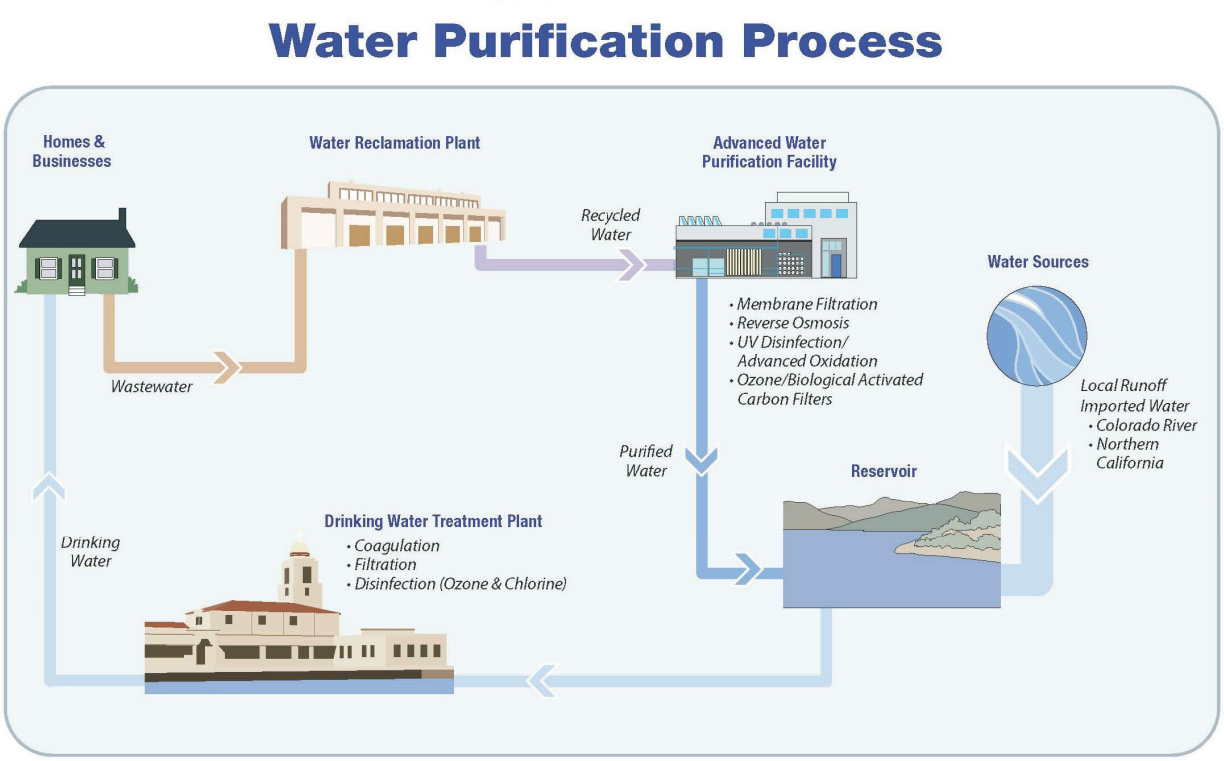

Figure 6-5 Pure Water Program Overview

6.5 Conceptual Alternative Water Supplies

Expected future projects include those that the City is pursuing that are not yet clear enough to be designated as verifiable supplies. These potential projects are outlined in Table 6-15.

6.5.1 Rainwater Harvesting

Large Residential Rain Barrel

Rainwater in urban areas is currently routed to storm drain systems and discharged into streams and flood control channels that lead to the ocean. Generally, this rainwater contains debris, chemicals, bacteria, sediments, or other pollutants that have accumulated on the land or impervious surfaces and could degrade water quality. Capturing rainwater for reuse, instead of allowing it to run off, would improve the quality of receiving waters by reducing the volume of polluted stormwater discharged into streams, rivers, lakes, or coastal waters, while providing a local water supply source.

Cisterns and rain barrels can be installed to capture runoff from rooftops or parking lots, and the water can be applied to non-potable water demands, such as irrigation. Residential properties can install rain barrels at the ends of downspouts, while businesses can install storage tanks above or below ground that capture large volumes or rainwater from rooftops or parking lots. The City has initiated a rainwater harvesting program to raise public awareness of water issues, promote customer responsibility, and reduce imported water use. As part of the City's Water Conservation Program, a rainwater harvesting guide was created to present techniques that can be used to harvest rainwater as well as provide information on the benefits of capturing and reusing rainwater.

As identified in the City's 2012 LRWRP, rainwater harvesting could yield approximately 416 AFY in normal to wet years, assuming that 20 percent of residential and non-residential customers participate. As of December 2015, the City has complied with 661 requests for rain barrels and expects to receive a total of 900 requests for rain barrels with the remaining program funds.

Table 6-15 Conceptual Alternative Water Supplies for The City

Actions	Description	Potential Implementation Year	Potential increase in water supply (AFY)
City of San Diego Pure Water—Phase 1a at NCWRP	Potable reuse	2025	16,800
City of San Diego Pure Water – Phase 1b at NCWRP	Potable reuse	2030	16,800
City of San Diego Pure Water—Phase 2 future site in Central Area	Potable reuse	2035	42,598
City of San Diego Pure Water—Phase 3 at SBWRP	Potable reuse	2035	16,800
Mission Valley Basin	Brackish groundwater recovery	2030	1,680
San Diego Formation	Groundwater production for non-potable irrigation and potable use	2030	1,600
San Pasqual Valley Basin	Brackish groundwater recovery	2040	1,619
Rainwater Harvesting	Harvesting of rainwater via centralized and decentralized options	2035	416
Graywater	Graywater systems installed at 50,000 residential dwellings	2035	2,575
		Total	**100,888**

Note: These supplies are conceptual supplies only and are not included as verifiable supplies at this time.

6.5.2 Graywater

Graywater is wastewater that originates from household fixtures such as bathtubs, showers, washing machines, and bathroom sinks. It excludes wastewater from toilets, kitchen sinks, and dishwashers. Graywater is generated and reused onsite for non-potable

purposes such as landscape irrigation or disposal fields. Although this source of water may contain some contaminants, the safe and effective use of graywater could reduce potable water usage and wastewater flows to sewer systems. Landscape irrigation is a common use of graywater since the phosphorous, potassium, and nitrogen in the water makes it a good source of nutrients for plants. For graywater to be reused, a system must be installed to collect and redirect the water to landscaped areas. The 2012 LRWRP assumes a yield of 2,575 AFY for retrofitting 50,000 homes with a simple graywater system. The City regulates the construction and installation of graywater systems to prevent public and environmental health problems that may arise from improper construction. Written permits must be obtained prior to construction, although permits are not required for clothes washer systems.

6.6 Summary of Existing and Planned Sources of Water Supply

Table 6-16 presents the current and projected water supplies for the City's service area for both verifiable and potential sources, under average weather. SDCWA water purchases make up the difference between total water demands and local supplies. With verifiable local water supplies, SDCWA will continue to meet more than 86 percent of the City's water demands, under average weather by year 2040. Full implementation of potential water supplies could reduce reliance on purchased water from SDCWA to 50 percent by year 2040.

Table 6-16 Existing and Future Water Supply for the City

Basin	Average Year Water Supply (AFY)					
	2015[1]	2020	2025	2030	2035	2040
Verifiable Supply (Existing and Planned)						
Surface Water	6,279	22,900	22,800	22,700	22,600	22,500
Groundwater	500	3,100	3,100	3,100	3,100	3,100
Recycled Water (non-potable)	8,195	13,650	13,650	13,650	13,650	13,650
Total Verifiable Local Water Supplies	**14,974**	**39,650**	**39,550**	**39,450**	**39,350**	**39,250**
SDCWA Water Purchases with Verifiable Regional Water Supplies	**173,754**	**161,334**	**202,488**	**225,390**	**234,398**	**234,158**
Total Verifiable Water Supplies[2]	**198,957**	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Conceptual Supply						
City's Pure Water (all phases)			16,800	33,630	92,998	92,998
Future Groundwater Projects			2,875	4,707	4,819	4,899
Rainwater Harvesting and Greywater			2,991	2,991	2,991	2,991
Total Conceptual Local Water Supplies			**22,666**	**41,328**	**100,808**	**100,888**
Total Verifiable and Conceptual Water Supplies	**14,974**	**39,650**	**62,216**	**80,778**	**140,158**	**140,138**
SDCWA Water Purchases with Verifiable and Conceptual Water Supplies	**173,754**	**161,334**	**180,522**	**184,762**	**134,245**	**133,925**

[1] 2015 represents actual supplies under very dry hydrologic conditions—resulting in very low surface water supplies.

[2] Includes 10,229 AF of surface water deliveries to Cal Am that are not included in the Surface Water or the SDCWA Purchases reported here

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SECTION 7

Demand Management Measures

The City has been a leader in water conservation since the early 1990s. The Public Utilities Department provides public information and education on how to use water efficiently, provides rebates and incentives for water customers to install water-efficient devices and remove turf, and provides further incentives to reduce water use during drought emergencies.

This section presents the demand management (water conservation) measures implemented by the City. To illustrate the importance of the City's demand management measures, this section also presents an overview of California's ongoing drought and the City's response, and the ways that the City's water conservation program meets the requirements of the Water Conservation Act of 2009.

INSIDE

7.1 Constraints of Water Sources

The State of California has faced two droughts in the last ten years. The first drought extended from 2007 to 2009. The current drought has been in effect since 2012 and is the most severe drought on record. In response to the current drought, the SWRCB has enacted mandatory water use restrictions for all urban water providers statewide. Initially, the SWRCB set the City's specific conservation goal at a 16 percent reduction from 2013 levels, and required monthly reporting on water usage, conservation efforts, and enforcement actions taken. In February 2016, the SWRCB revised the City's conservation target down to 8 percent, reflecting actual population growth and implementation of alternative water supplies. In April 2016 it is expected that the SWRCB will vote to either keep these mandatory water use restrictions in place, suspend the restrictions, or increase the conservation targets.

Despite historically high summertime temperatures, San Diegans have met and exceeded the initial 16 percent conservation goal through February 2016. The Public Utilities Department's Water Conservation Section continues to focus on developing long-term water savings through site surveys, hardware replacement, and irrigation and landscape efficiencies. The City continues to make strides in educating customers and encouraging San Diegans to adopt and maintain a strong water conservation ethic, day in and day out.

Permanent water waste prohibitions and drought alert restrictions are discussed in detail in Appendix F - Water Shortage Contingency Plan. Water waste prohibitions are in effect at all times and drought alert restrictions are based on four levels of drought conditions, with progressively higher levels of water use restrictions. On

Drought Alert Restriction limiting outdoor landscaping irrigation

Hand watering landscaping with shutoff nozzle

July 1, 2015, the City declared a Drought Response Level 2 — Drought Alert Condition to comply with the State mandate that the City reduce it's water usage by 16 percent. One of the current Stage 2 drought restrictions limits watering outdoor landscaping to a maximum of two assigned days per week, five minutes per day if using a standard sprinkler system. The City will reassess its drought response levels in light of the reduced mandatory conservation target of 8 percent, as revised by the SWRCB.

7.2 Drought Response

The City has expanded its public outreach and education campaign, rebranding its successful 2007-2011 drought's *No Time to Waste, No Water to Waste* campaign to *San Diegans Waste No Water* in 2012. As the City emerged from the 2007-2009 drought, the Mayor called for an end to mandatory water use restrictions associated with the Drought Alert status in the City's Emergency Water Regulations. With this directive, an adjustment in messaging through the *San Diegans Waste No Water* campaign affirmed two things: (1) that San Diegans were effective in their efforts to reduce water use; and (2) that this was a collective effort, recognizing that San Diegans came together to achieve necessary conservation. This shift allowed for the messaging to focus on a long-term water use ethic to help prolong the savings realized from 2009-2011. In 2015, the *San Diegans Waste No Water* campaign was refocused to increase drought awareness, the severity of the drought, and actions citizens could take to minimize drought impacts. A main objective of the campaign is to educate residents about the State-mandated water use restrictions, the need to reduce water usage by 16 percent between June 1, 2015, and February 2016, and the enforcement actions that the City is taking. The campaign provided guidance on how to comply with the restrictions.

Concurrent with the *San Diegans Waste No Water* messages were complementary drought response messages from the SDCWA's *When In Drought* campaign, and the *State's Californians Don't Waste* campaign. Collectively, all three campaigns communicated the drought message to San Diegans.

The *San Diegans Waste No Water* campaign has demonstrated that the City is committed to promoting the use of water in the most efficient ways possible to meet the near-term and long-term reduction goals. The community's overall response to the message has been positive. The following sections address the basic, traditional, and unique methods employed by the City to increase awareness of the drought, water use restrictions, and water conservation.

7.2.1 Basic Public Education and Outreach Methods

Drought Outreach Message

From 2009-2011 and again beginning July 2015, the City implemented mandatory water use restrictions and employed the following basic methods to spread the word about the restrictions to their customers and engage residents to participate directly in water conservation efforts:

- Customers were provided with water bill inserts that reminded them of the mandatory water use restrictions.
- Campaign posters and materials were placed at all of the City's Public Utilities Department office counters.
- Billboards throughout the City focused on communicating limits on watering days, watering at the right time of the day, and fixing leaks.
- Waste No Water banners were rotated through the City's recreation centers.
- May "Water Awareness Month" was filled with classes, events, and activities such as: plant fairs at local nurseries; water conservation story hours at public libraries and book stores; City-sponsored California Friendly Landscape classes; and exhibits at various street fairs and community events. The month culminated with an awards ceremony held for the winners

of the annual Kids' Water Conservation Poster Contest at Council Chambers. The Mayor and City Council members were present and took part in the recognition and celebration.

Drought banner at recreation center

- The City's Water Conservation team delivered presentations to community, professional, civic, and business groups, and staffed information booths at many community events, including the Del Mar Fair, San Diego Fall and Spring Home and Garden Shows, December nights, Earth Fair, numerous street fairs, and several events held at the Water Conservation Garden at Cuyamaca College.
- Press releases included the campaign slogan and website reference, "wastenowater.org."

7.2.2 Traditional and Specific Public Education and Outreach Methods

To address droughts of the last 10 years, the City mounted an advertising campaign that targeted single-family homeowners, adults over 35 years old, and people with interests in landscaping and home improvements, and highlighted the mandatory water use restrictions. The City purchased advertising and placed it strategically in the following media:

- English-language print ads in The San Diego Union-Tribune and San Diego Magazine, and Spanish-language print ads in El Latino/Enlace and La Prensa.
- Internet advertising on City, KFMB, and The San Diego Union-Tribune websites. Public service announcements on City TV, Cox Media's 16 cable channels, KFMB TV, and local radio stations.

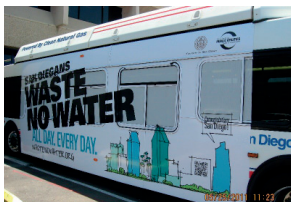
7.2.3 Unique Public Education and Outreach Methods

To reach the general public, the City pursued a variety of unique advertising strategies with high visibility at key community locations in San Diego during the 2007-2009 and current droughts:

- In partnership with the Metropolitan Transit System, the City wrapped trolleys in water conservation messaging. This advertising has run on the trolley system's Orange, Blue, and Green lines, and attracted the attention of daily trolley riders and passers-by, including large crowds attending community events such as the American Water Works Association convention, Comic-Con, and Padres and Charger games.

Water conservation message wrapped trolley

- Bus exteriors were painted with water conservation messaging.



Bus painted with water conservation messaging

- Multiple billboards were posted throughout the City.
- Posters were strategically placed at entrances to major shopping malls in the City.
- The conservation message was promoted through proven community-based social marketing techniques such as social media posts and ads, web videos showing conservation commitments from various local leaders and community groups, a poster and film contest that engaged youth, and a smart phone app that communicates key messages and allows residents to easily report observed water waste.
- The City worked with local large universities and student sustainability clubs to promote the conservation message, place decals in showers

and bathrooms, and convert plumbing fixtures to water efficient models.

- In 2015, the City boosted funding for grass replacement incentives and staffing for the residential survey program to help customers achieve significant water use reductions. The incentive programs experienced record participation as residents tried to do their part to reach water conservation targets.

7.2.4 Metering

The City is fully metered and currently implements an Advanced Metering Infrastructure Program. The City has a sub-metering ordinance for multifamily residences, as discussed in more detail in Section 7.4 Sub-Metering Ordinance.

7.2.5 Conservation Pricing

The City uses a tiered conservation rate structure. The City's pricing structure has four main categories: Single-Family Domestic Customers, Other Domestic Customers, Commercial and Industrial Customers, and Temporary Construction and Irrigation Customers. For each category the bill is based on a monthly meter base fee, plus a fee based on the amount of water used. The Single-Family category is the only category with a tiered rate structure, as described below:

- 0-4 hundred cubic feet (HCF) are billed at $4.240 per HCF.
- 5-12 HCF are billed at $4.754 per HCF.
- 12-18 HCF are billed at $6.797 per HCF.
- Each HCF used above the initial 18 HCF is billed at $9.550 per HCF.

More detailed information regarding the tiered rate structure is provided in Appendix F - Water Shortage Contingency Plan.

7.2.6 Distribution System Real Loss

The City is a member of the California Urban Water Conservation Council and performs annual water audits as required. For detailed information regarding distribution system losses, see Section 4 – System Water Use, or Appendix I – Fiscal Year 2015 AWWA Water Audit.

7.2.7 Water Conservation Program Coordination

The City's Public Utilities Department has a water conservation program coordinator who oversees the water conservation program for the City. Contact information for the water conservation program coordinator is available in the City's 2014 California Urban Water Conservation Council (CUWCC) Report, included in Appendix E.

7.3 Planned Implementation to Achieve Water Use Targets

In 1985, the City officially established the Water Conservation Section to reduce dependence on imported water. Over the past 30 years, the Water Conservation Section has achieved substantial water savings by developing innovative, customer-oriented water conservation programs, creating policies and ordinances designed to promote water conservation, and implementing comprehensive public information and education campaigns that foster a water conservation ethic. The Water Conservation Section has been the primary steward in the City's efforts to comply with its 2015 and 2020 per capita water use targets, as well as the mandatory water use reductions enacted in response to the State-mandated conservation efforts that began in 2015. Compliance with the 20x2020 requirements are discussed in detail in Section 5 - Per Capita Water Use Baselines and Targets. To meet established goals, the following sections describe the efforts of the Water Conservation Section, detailing specifics about ongoing programs, initiatives, and ordinances.

7.3.1 Residential Water Survey Programs

The Residential Water Survey Program offers residential customers a complimentary water use survey of their home, both inside and outside. A water

surveyor visits a customer's home for approximately one hour, reviews how to read the meter and uses a leak detector, measures the flows of sinks, showers, and toilets, identifies leaks, and provides water conservation tips. If the property is landscaped, the surveyor reviews the irrigation system and landscape plant material and recommends ways to reduce usage and increase water use efficiency. It is estimated that a typical household might reduce water consumption by 40 to 60 gallons per day (gpd) by implementing the water use efficiency suggestions made during the residential survey.

7.3.2 Commercial Landscape Survey Programs

The City's Commercial Landscape Survey Program (CLSP) has proven to be an outstanding water conservation program. Commercial properties across San Diego are encouraged to use the program, free of charge. The CLSP survey provides suggestions on ways to increase irrigation system efficiency, and recommends technologies and methods that promote conservation. The customer is issued a final report from the Water Conservation Section that provides water budgets (water use targets) that can be used as a guide for setting landscape watering times at the property.

7.3.3 Water Conservation Rebate Program

For several years the Water Conservation Section has used funding from California Proposition 50 and 84 IRWM grants, as well as CWA, MWD, and the City's Storm Water Pollution Prevention Program to offer cash rebates to water customers for outdoor water conservation projects and devices. This rebate program is run "in-house" by water conservation staff, and offers services including on-site consultation to customers; application and rebate processing; and customer support for landscape projects. The program offers customers rebates for Smart Controllers (weather-based irrigation controllers), micro-irrigation (micro-spray, drip, and in-line emitters), grass replacement, and rain barrels. The goal is to conserve potable water while also reducing pollutant-laden dry weather runoff into sensitive receiving waters.

Residential grass replacement project

7.3.4 Water-Wise Business Survey

A Water-Wise Business Survey is offered free of charge to all commercial, industrial, and institutional customers in the City. The survey provides a customized review of water usage, including an on-site visit to identify areas where water use efficiencies can be achieved. Recommendations can help business customers use water more efficiently and save energy.

7.3.5 Water Waste Investigations

Water Conservation Section staff respond to water waste complaints generated by residents throughout the City. The majority of complaints are due to either irrigation leaving the property or leaks. To resolve water waste issues, City staff contact the property owner or manager and work to eliminate water waste issues and associated hazards. Water waste complaints can vary drastically. A typical example would be a broken sprinkler head, which can waste up to 20 gallons per minute (gpm) and flood adjacent properties and streets. A typical water waste complaint is estimated to save 60 gpd after it is addressed and corrected.

7.3.6 Water Conserving Municipal Codes – Plumbing Retrofit Upon Re-Sale

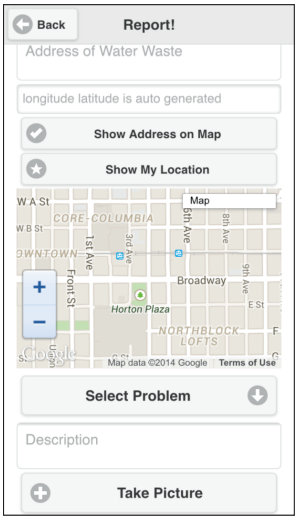
A Memorandum Decision was issued on March 28, 1991, by US District Court Judge Rudi Brewster in concluding a lawsuit filed by the United States Government, the State of California, and the Sierra Club against the City of San Diego (Civil Case #88-1101-B) over violations of the Clean Water Act. The plaintiffs established evidence that the City had been in violation of the Clean Water Act due to insufficient control of pretreatment of sewage by industrial customers, sewage spills, and the absence of secondary treatment at the PLWTP. Judge

Brewster imposed a $3 million penalty against the City, $500,000 of which was to be payable to the US Treasury upon entry of the judgment. The remaining $2.5 million was to be paid to the US Treasury on January 1, 1992, unless the City opted to act on an "optional credit project" to offset $2.5 million of the $3 million fine. The credit project consisted of permanent water conservation codes, including the installation of water conserving plumbing fixtures in new construction, a plumbing retrofit upon re-sale and bathroom alteration code, and a rebate program that offered financial incentives to residential and commercial customers for installing ultra-low-flush toilets (ULFTs), low-flush urinals, low-flow showerheads, and faucet aerators. Funding was set at a level of $500,000 or more per year for five years.

By March 14, 1991, the City had enacted an ordinance that required the installation of ULFTs in all new construction. In addition, the City Council requested that the 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 138,000 certificates of compliance with San Diego Municipal Code (SDMC) 147.04 have been filed since the beginning of the plumbing retrofit program.

7.3.7 Waste No Water App for iPhone® & Android®

The City's Waste No Water App, available for iPhones and Androids, allows users to report water waste by taking a photo of the problem or concern and obtaining the address using the app's GPS. The information goes to the Water Conservation Section for investigation and response. This app allows users to check the status of their complaint, and to request a water survey of their residence or business to help them optimize water use. It also gives them direct access to online information about the City's water use restrictions, rebate programs, and other resources.



Waste No Water App

7.3.8 SoCal Water$mart Rebates

The MWD and its member agencies, which includes the SDCWA, offer a limited number of rebates each year on various devices, including: high-efficiency toilets (HETs), high-efficiency clothes washers (HEWs), smart controllers or weather-based irrigation controllers (WBICs), rotating sprinkler nozzles, air cooled ice machines, cooling tower conductivity controllers, and waterless urinals. Funds for these rebates are limited. SoCal Water$mart also offered turf replacement rebates. Many City customers participated in both the SoCal Water$mart rebate and the City's grass replacement rebate program to combine the incentives for their landscape conversion projects.

7.3.9 Customer Contests

Water Conservation Film Contest

The City's Water Conservation Section promotes an annual water conservation film contest. Open to high school students and college students in the cities of San Diego, Coronado and Imperial Beach, the film contest creates an opportunity to engage students directly in the importance of conserving water. The creativity of the students inspires the rest of our community to use water more efficiently.

Annual Water Conservation Film Contest

Water Conservation Kids' Poster Contest

Held each year by the City, the Kids' Poster Contest provides a focal point for teachers to talk with their

Water Conservation Kids' Poster Contest

students about the importance of using water wisely, and gives thousands of students an opportunity to illustrate meaningful water conservation and recycled water messages by creating original artwork. All students who enter the contest receive a certificate of participation. Nineteen winners receive prizes and their artwork is featured in a calendar and on the City's website, and is displayed at various public venues, including the San Diego County Fair.

California Friendly Landscape Contest

The City participates annually in the regional Water Agency California Friendly Landscape Contest. The Best in District winner (photo below) received a $250 gift certificate to a local nursery at the award ceremony held at the Water Conservation Garden at Cuyamaca College (The Garden).

Student Education

Besides educating students through film and poster contests, the Water Conservation Section applies additional methods to educate students in San Diego, Coronado, and Imperial Beach. In partnership with SDCWA, students have access to the following: a DVD titled "Be Water Smart"; "Water Supply" and "Water Cycle" posters; water quality testing kits for high school classroom use; "Splashlab," a self-contained mobile lab that provides students with a hands-on science experience; and two theater programs, "Waterology" and "H2O, Where Did You Go?"

Another student education program is the City's summertime Junior Lifeguard program, which provides a fun and safe aquatic education course for San Diego youth. The program emphasizes developing confidence and promotes mental and physical fitness, along with respect for others and the coastal environment. In cooperation with "Think Blue San Diego," the Water Conservation Section participated in two, one-day events that were dedicated to promoting environmental awareness. Over 1,000 Junior Guards cycled through seven booths each day and participated in educational activities regarding recycling, watershed/water pollution awareness, and water conservation. At the end of the session, each participant received a backpack containing additional information supporting the important messages delivered throughout the day.

The City also funds school assemblies with Ms. Smarty-Plants™. Ms. Smarty-Plants™ is the student educator at The Garden. She tutors kids about the fascinating

California Friendly Landscape Contest Best in District Winner

Water Conservation Garden on the Campus of Cuyamaca College

adaptations of drought tolerant plants. They also learn that they can make a difference by applying the conservation action steps Ms. Smarty-Plants™ teaches.

Ms. Smarty-Plants™ is just part of the education efforts at The Garden. The Garden is a state-of-the-art demonstration garden that operates as an educational center for San Diego County residents, and hosts events, festivals, plant sales, and classes. The Garden also offers a beautiful collection of California Friendly Landscaping and other water-wise gardening techniques. The four-and-a-half acre site includes multiple educational exhibits, a 350-seat amphitheater, over 360 trees, and 100,000 square feet of water-wise landscaping. The Garden encourages homeowners, developers, and landscape professionals to use California Friendly Landscaping, efficient irrigation design, and appropriate maintenance, which can reduce outdoor water use by 30 to 70 percent. The Garden is a not-for-profit corporation focusing on education, and is supported partially by earned income and contributions of six member agencies, including the City. Approximately 42 percent of The Garden's 45,000 annual visitors and participants who register at the gate are residents of the City. A new attraction at The Garden, the Dorcas E. Utter Butterfly Pavilion, drew record crowds. The City contributes to The Garden through an annual assessment and sends delegates to The Garden Board of Directors' committees.

7.4 Sub-Metering Ordinance

The City enacted an ordinance in June 1, 2010, that requires sub-meters to be installed in every new multi-unit building with at least three units, and to install sub-meters whenever an existing multi-unit building with at least three units replaces its entire interior potable water supply piping.

Metering each unit separately promotes a better understanding of water use, as residents are billed based on their actual consumption, rather than paying a fixed amount or a rate based on square footage. Billing residents individually may provide financial incentives for residents of multi-family buildings to conserve water.

7.5 Summary

Water conservation consists of reducing demands and controlling loss in an effort to meet the 20x2020 demand targets and alleviate the burden resulting from the current drought. Many of the City's conservation programs have achieved desirable water savings and are helping to ensure that residential water usage meets forecast savings. The City is a member of the CUWCC, and has filed its Best Management Practice (BMP) Retail Coverage Report with CUWCC for 2011, 2012, 2013, and 2014 (BMP Report). The 2014 BMP Report contains information on the City's compliance with the Foundational BMPs for Water Efficiency and is available in Appendix E. The 2014 BMP Report has several areas of focus, including Operation Practice, Water Loss Control,

Metering with Commodity, Retail Conservation Pricing, Public Outreach, and School Education Programs. The 2014 BMP Report indicates that the City is on track for foundational BMPs for urban water efficiency. The City's filing of the 2014 BMP Report meets the requirements set forth by the DWR and complies with the Water Conservation Bill of 2009, SB X7-7.

To estimate the water conservation savings attributed to the Water$mart program, SDCWA used a water conservation evaluation tool developed by the Alliance for Water Efficiency to project water savings by demand side management measures for its member agencies, including the City. The water conservation tool first estimates the water savings for measures implemented in 2015. The savings from those measures then ramp down as the programs retire or the life of the measures comes to an end. Then SDCWA assumes that a portion of the 2015 savings continues into the future, assuming that 40 percent of the measures are repeated in subsequent forecast years. Table 7-1 presents a summary of the projected water savings from these measures.

Table 7-1 Projected Active Water Conservation Savings for City

Demand Side Management Measures	Water Conservation Savings (AFY)			
	2015	2020	2030	2040
Single-Family Water Surveys	67	-	-	-
Single-Family ULF Toilet Vouchers, Rebates, Community Based Dist.	2,036	1,354	598	102
Single-Family High Efficiency Toilets	238	194	100	-
Single-Family High Efficiency Clothes Washers	1,305	550	-	-
Single-Family Turf Removal/Replacement	456	387	-	-
Single-Family Landscape Irrigation Control Efficiency	61	5	-	-
Misc. Residential Programs (e.g., SF rain barrels, MF irrigation controls)	132	71	-	-
CII High Efficiency Toilets	29	24	16	-
CII Turf Removal/Replacement	5,196	427	-	-
CII Landscape Efficiency (weather based controllers, sprinkler nozzles)	968	355	-	-
CII Process/Cooling Towers/Other Indoor	3,306	22	17	-
Total Savings from Measures Implemented in 2015	**13,793**	**3,389**	**731**	**102**
Continuation of Measures[1]		**5,517**	**5,517**	**5,517**
Total Future Active Conservation[2]		**8,906**	**6,248**	**5,620**

Source: SDCWA's Alliance for Water Efficiency Conservation Tool.

[1] Assumes that a portion (roughly 40%) of the 2015 savings continue each year into the future.

[2] Represents total savings from programs implemented in 2015, plus continuation of new programs.

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SECTION 8

Water Supply Reliability Assessment

As required by the Act, a water supply reliability assessment must compare future water demands and verifiable water supplies under multiple hydrologic conditions. The water supply reliability assessment is based on historical reservoir inflow, and demand factors as a function of climate, between 1922 and 1998. The reliability analysis assumes any of the historical hydrologic sequences could reoccur in the future. Initial modeling studies for the City conducted for the 2012 LRWRP compiled hydrologic sequences that simulated dry, critically dry, normal, and wet climates. The report defines 1957 to 1982 as a "normal" sequence of years, while 1986 to 1998, followed by 1922 to 1934, constitutes a "critical dry" sequence.

Figure 8-1 shows reservoir runoff factors in a blue line plotted on the left y-axis, and water demand factors in an orange line plotted on the right y-axis. Reservoir runoff factors are multipliers that modify the average inflow over a multi-year time period for specific annual hydrology types. Demand factors alter average period water demands for the specific hydrological year. Demands tend to be higher in dry/hot years (resulting in a factor greater than 1) and lower in wet/cool years (resulting in a factor less than 1).

The 2012 LRWRP uses 1978 to represent normal year hydrology, while 1990 is considered a representative dry year. Based on the historical hydrologic and weather data, the multi-year dry period is represented by 1990-1992. The 2015 MWD Draft UWMP also recognizes a drought period from 1990 to 1992, and this three-year period will be used as consecutive dry years in the following reliability analysis.

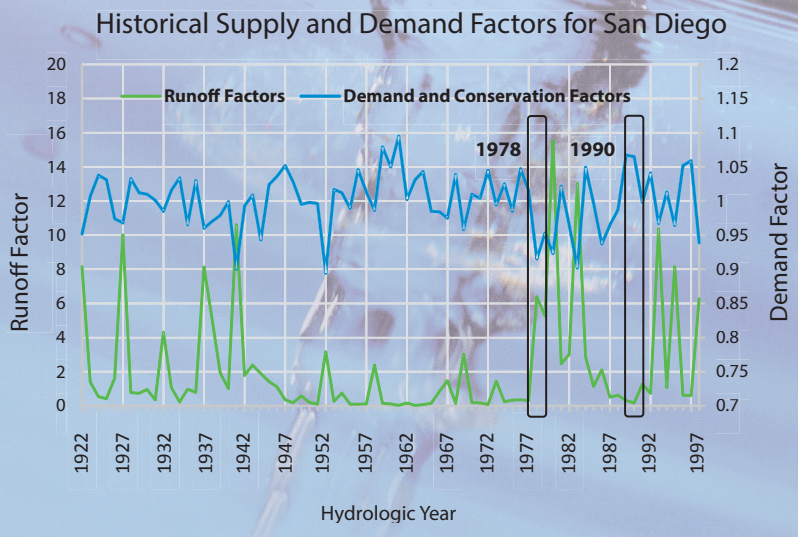

Figure 8-1 Historical Hydrologic Supply and Demand Factors for San Diego

INSIDE

Sacramento Delta

San Vicente Dam Raise Construction

Installing purple pipes for non-potable reuse

8.1 Normal Year Water Demand to Supply Comparison

The normal hydrologic year of 1978 yields a demand factor and a reservoir factor of 1.0, which are applied to average future demands (see Section 4 – Historical and Projected Water Use) and average future local surface water (see Section 6 – System Water Supplies). Groundwater and recycled water supplies are assumed to be independent of hydrology and thus do not vary. Table 8-1 shows the comparison of demands and supplies at five-year increments, out to 2040.

8.2 Single-Dry Year Water Demand to Supply Comparison

The dry hydrologic year 1990 corresponds to a demand factor of 1.065 and a corresponding reservoir factor of 0.73. Recycled and groundwater supplies are assumed to remain constant. It is also assumed by the SDCWA that it will be able to deliver all of the regional supplemental water needed by its member agencies during this single-year drought. Table 8-2 shows the comparison of demands and supplies at five-year increments, out to 2040.

Table 8-1 Normal Year Demand vs Supply for City

Normal Year Demands/Supplies	Demands and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	22,900	22,800	22,700	22,600	22,500
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**39,650**	**39,550**	**39,450**	**39,350**	**39,250**
Water Supply from SDCWA (purchased water)	161,334	202,488	225,390	234,398	234,158
Total City Water Supplies	**200,984**	**242,038**	**264,840**	**273,748**	**273,408**
Estimated Water Shortages	0	0	0	0	0

Table 8-2 Single-Dry Year Demand vs Supply for City

Single-Dry Year (1990) Demands/Supplies	Demands and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,657	16,584	16,512	16,439	16,366
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**33,407**	**33,334**	**33,262**	**33,189**	**33,116**
Water Supply from SDCWA (purchased water)	179,754	223,549	247,906	257,466	257,176
Total City Water Supplies	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Estimated Water Shortages	0	0	0	0	0

For single-dry year and multi-dry year comparisons of demands and supplies, the City's water wholesalers provide differing reliability estimates. The City's analysis concludes that the development of local supply sources will be sufficient to meet San Diego regional demands in all scenarios.

8.3 Multiple Dry Year Water Demand to Supply Comparison

The water demand and reservoir factors for historical hydrologic years 1990 through 1992 (1990 factors: 1.065 demand, 0.73 reservoir; 1991 factors: 0.998 demand, 0.71 reservoir; and 1992 factors: 1.041 demand, 0.83 reservoir) are applied to the multiple dry year analysis. Table 8-3 shows the comparison of demands and supplies at five-year increments, out to 2040.

Table 8-3 Multiple Dry Year SDCWA Shortage

Dry Year 1 (1990) Demands/Supplies	Demand and Supplies (AFY)				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,657	16,584	16,512	16,439	16,366
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**33,407**	**33,334**	**33,262**	**33,189**	**33,116**
Water Supply from SDCWA (purchased water)	179,754	223,549	247,906	257,466	257,176
Total City Water Supplies	**213,161**	**256,883**	**281,167**	**290,654**	**290,292**
Estimated Water Shortages	0	0	0	0	0
Dry Year 2 (1991) Demands/Supplies	**Demand and Supplies (AFY)**				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**200,610**	**241,581**	**264,338**	**273,228**	**272,888**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	16,233	16,162	16,091	16,020	15,949
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**32,983**	**32,912**	**32,841**	**32,770**	**32,699**
Water Supply from SDCWA (purchased water)	167,627	208,669	231,496	240,457	240,189
Total City Water Supplies	**200,610**	**241,581**	**264,338**	**273,228**	**272,888**
Estimated Water Shortages	0	0	0	0	0
Dry Year 3 (1992) Demands/Supplies	**Demand and Supplies (AFY)**				
	2020	2025	2030	2035	2040
Water Demand (with wholesale and conservation)	**208,665**	**251,402**	**275,139**	**284,412**	**284,058**
Local Water Supplies					
Recycled Water (City service area only)	13,650	13,650	13,650	13,650	13,650
Local Surface Supply	18,962	18,879	18,796	18,714	18,631
Groundwater	3,100	3,100	3,100	3,100	3,100
Sub-Total Local Supplies	**35,712**	**35,629**	**35,546**	**35,464**	**35,381**
Water Supply from SDCWA (purchased water)	172,953	215,773	239,592	248,948	248,677
Total City Water Supplies	**208,665**	**251,402**	**275,139**	**284,412**	**284,058**
Estimated Water Shortages	0	0	0	0	0

For single-dry year and multi-dry year comparisons of demands and supplies, the City's water wholesalers provide differing reliability estimates. The City's analysis concludes that the development of local supply sources will be sufficient to meet San Diego regional demands in all scenarios.

8.4 Factors Resulting in Inconsistency in Supply

As required by the Act, a UWMP must summarize the factors that can cause inconsistencies in water supplies. For the City, these factors depend on the supply source and can include hydrologic variability (e.g., prolonged droughts), regulatory issues, legal constraints, water quality, and climate change.

Due to the ongoing drought, MWD instituted its allocation plan to its member agencies, which resulted in an overall cut in its deliveries by 15 percent (starting July 1, 2015). This decision has significant impacts on the City, since MWD provides about half of the region's water supply to the SDCWA. In addition, the SWRCB has instituted statewide mandatory conservation targets as a result of the drought, with the City's target being a reduction of 16 percent of its 2013 water use for Fiscal Year 2016. The SWRCB's new target for the City for the remainder of 2016 is a reduction of 8 percent of its 2013 water use.

8.4.1 Colorado River

The Colorado River Basin supports a unique group of native fish species, many of which are distinct to the river. Since many of these fish species are threatened or endangered, the Colorado River Basin is protected under the Endangered Species Act (ESA), which was established to address the needs of threatened and endangered wildlife. To work toward the recovery of species listed under the ESA, the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) was created to balance conservation of native species with water use in the river. Deliveries from the Colorado River may be influenced by necessary LCR MSCP flows.

Although the QSA assures California up to 75 years of stability in Colorado River water supplies and provides for a large water transfer between the IID and SDCWA, the availability of imported water can be affected by weather patterns in the region. The Colorado River Basin is experiencing the driest conditions in 500 years, and as a result the water supply is becoming less sustainable.

Recent extended droughts have resulted in record lows in Colorado River water levels. Several reservoirs along the Colorado River Basin are below their storage capacity. Based on data collected by the US Bureau of Reclamation (USBR), Lake Mead has experienced significant declines in elevation. The level of Lake Mead dropped to 1,082 feet at the end of October 2010, which is the lowest level since the lake was filled. In recent years, lake levels have not dropped further and remain at near-shortage declaration levels.

8.4.2 State Water Project

Water supply from the SWP has also been significantly reduced as a result of the recent California drought and environmental regulations protecting the Bay-Delta. Political and environmental concerns may also limit imported water supplies from Northern California. In 2007, the SWP pumps were shut down to protect the Delta smelt population. Biological opinions by the US Fish and Wildlife Service and the National Marine Fisheries Services have become increasingly restrictive over the years in the Bay-Delta. SWP exports have decreased since 2005 as the federal biological opinions went into effect, restricting operations. Without a permanent fix in the Bay-Delta, standards that restrict flow and exports are expected to be the status quo. To deal with this situation, federal and state stakeholders developed the Bay-Delta Conservation Plan (BDCP). This comprehensive program sought to accomplish two main objectives: (1) stabilize the environmental impacts by restoring the Bay-Delta; and (2) improve conveyance so that exports of water through the Bay-Delta do not impact fisheries, thereby reducing the need to shut down pumps that send water to Southern California.

Because federal and state environmental agencies could not sign off on the construction of the underground tunnels included in the BDCP, and because environmental groups threatened lawsuits, the BDCP process came to an end. A new process to

stabilize the Bay Delta, called the California WaterFix, was initiated by Governor Brown. This successor program to the BDCP will streamline the permitting process for restoring the Bay Delta and constructing underground tunnels. The project could be online as soon as 2030, at a cost of approximately $15 billion.

8.4.3 Regional SDCWA Supplies

To mitigate the impacts of imported water variability and vulnerability, the SDCWA has made great strides developing alternative water supplies. These supplies are summarized in Section 6 – System Water Supplies. Alternative water supplies include regional and local supply projects, and continuation of demand side management programs. In December 2015, following completion of the Claude "Bud" Lewis Carlsbad Desalination Plant, SDCWA added desalinated sea water to its supply portfolio. The development of new regional and local water supplies in San Diego County will result in decreased reliance on imported water from the Colorado River and Bay-Delta, and thus increase reliance for this region.

8.4.4 Local Water Supplies

The City is doing its part to reduce reliance on imported water by implementing additional local water supply projects and continuing to invest in demand side management programs. The City's main source of local water currently comes from the capture of runoff from rainfall in an extensive surface reservoir system. The City currently produces limited groundwater from the Santee-El Monte Basin and is investigating further production in the Santee-El Monte, as well as other basins where the City has water rights. The City has invested in studies that increase the region's use of recycled water and a potential potable reuse system.

Surface Water

No regulations have been found to influence surface water projects in San Diego. However, local rainfall and imported water are known to change storage and water availability in surface reservoirs. In very dry years, the local surface water from these reservoirs produces about 3,000 AFY, while in very wet years the supply can increase to 50,000 AFY.

Groundwater

The City is currently assessing the development of all of its groundwater resources. The City is taking a cautious approach with future expansion of groundwater. The location of pilot groundwater wells throughout the many basins can be viewed as evidence of the City's intent, ability, and preliminary efforts to develop groundwater as a future water resource.

The City recognizes that the groundwater projects in the San Diego region are limited by a number of factors, including degraded water quality, lack of storage capacity, and availability of groundwater recharge. The Otay Valley and Sweetwater Valley portions of the San Diego Formation are classified as very low priority on the DWR's Basin Priority List due to outdated data currently being used by DWR. The Otay Valley is considered marginal to inferior for potable water production as a result of high TDS levels in the coastal plain. Groundwater in the eastern portion of the Otay Valley Basin could be suitable for potable water production, but would likely require treatment, and is marginal to inferior for irrigation due to high chloride concentrations. Groundwater in the Sweetwater Basin generally exceeds the recommended drinking water limits for TDS, chloride, and sodium content. In addition, the unauthorized release of gasoline from petroleum tank farm and related litigation has put the brackish desalination project at Mission Valley Basin on hold. Therefore, degraded water quality of San Diego's groundwater basins may limit their use as a groundwater source in the near term.

However, the City is committed to protecting its groundwater resources in all basins and in preserving its established Pueblo rights throughout the San Diego River Basin. The timing in bringing these groundwater resources into production will be paramount to their utilization.

Recycled Water

The City's current recycled water is for non-potable uses only. The City does not plan to expand non-potable reuse within the City beyond 13,650 AFY. To maximize utilization of the available recycled water, the City's RWS recommended potable reuse using purified recycled water. The purified water would be stored within City reservoirs and then delivered as potable water. Although potable reuse is allowed in California, there are currently no regulations for potable reuse with reservoir augmentation (final regulations are expected by December 2016). Since the preferred water reuse strategy for Pure Water San Diego is potable reuse via reservoir augmentation, the project would need regulatory clearance before proceeding.

8.5 Cost of Future Water Supplies

In addition to reliability concerns, the increasing cost of imported water is another concern of the City. Imported water is expensive because of the energy required to transport water from its source and the continual need to maintain and improve infrastructure. During times of drought, the cost of imported water continues to rise, typically at a higher pace.

The majority of the City's water is purchased from the SDCWA, which in turn purchases a large portion of that water from MWD. From 2007 to 2013, MWD experienced a 12 percent annual average increase in water rates. Looking to the future, it is expected that imported water costs will continue to increase above rates of inflation. The majority of the cost increase is associated with the cost for the California WaterFix and other programs MWD is expected to implement in order to improve reliability. As a result, SDCWA's untreated water rates are expected to double within the next twenty years or so.

The cost of the City's planned and potential local water supply projects, including the City's Pure Water Program, are expected to be less than the projected cost of SDCWA supplied water.

8.6 Water Quality

All local water supplies are combined and treated at the City's water treatment plants. The City has implemented state-of the-art treatment processes, and drinking water undergoes extensive monitoring and testing. At each of its three water treatment plants, the City has consistently met health-based drinking water standards set by the US EPA and the SWRCB Division of Drinking Water.

Imported water from MWD and SDCWA can have high amounts of salts and minerals, or TDS. While this higher TDS imported water is still within safe drinking water standards, high TDS water can impact the City's recycled water system, residential appliances/devices (e.g., hot water heaters and faucets). Water high in TDS can also degrade some landscaping and crops that are irrigated with it.

As described earlier, many of the local groundwater basins have TDS values that exceed drinking water standards, and therefore must be treated before being used as a potable supply. The water quality of surface water is lower in TDS than imported water. Implementation of the City's Pure Water Program would improve the overall TDS of the City's water supply, because of the application of advanced treatment measures that remove TDS.

SECTION 9

Climate Change

Addressing climate change impacts for the 2015 UWMP is voluntary and not required by DWR. However, since imported water and local surface water is very sensitive to changes in climate, the City determined it would be valuable to include this section in its 2015 UWMP. Furthermore, when considering investments in local water supplies such as potable reuse and groundwater, understanding the potential impacts of climate change on existing City water supplies is important.

INSIDE

9.1 Potential Impacts of Climate Change on Water Reliability

A recent study by the USBR estimates that by the year 2050, all three of the City's supply source origins (San Diego County for local surface water, Colorado River Basin for Colorado River Supplies, and Sierra Nevada Mountain range for Bay-Delta) are likely to experience increases in temperature and could experience declines in rainfall. This combination will subsequently reduce supplies to the City[1]. Although mean annual runoff in the Sacramento River watershed could increase by 2.5 percent, mean annual runoff in the San Joaquin River watershed could decrease by 8.7 percent—mainly as a result of reduced snowpack. The Colorado River Basin, which is already arid, will likely become drier, as mean annual runoff from the Colorado River is expected to decline by 7.4 percent.

El Capitan Reservoir

Not only could climate change reduce total flows, but it can also shift monthly runoff patterns, making them less predictable and storage in reservoirs less reliable. These changes, if realized, could have a significant impact on supply availability for the City of San Diego, especially given that the majority of its water comes from areas that are most sensitive to climate change. In addition, climate change can impact local water demands, as higher temperatures and potentially lower rainfall increases the demand for irrigation and cooling.

Changes in annual runoff resulting from climate change, combined with environmental and regulatory considerations and shifting water demands, could reduce the amount of water that can be exported from the Bay-Delta in Northern California via the SWP and from the Colorado River. In addition, local water demands could be greater and local runoff captured by the City's reservoirs could be lower.

[1]USBR 2011

9.1.1 Water Demand and Local Supply Impacts

A long-term water supply simulation model, developed for the City's 2012 LRWRP, was modified to estimate climate change impacts by incorporating a downscaled General Circulation Models (GCMs). GCMs are global climate models that simulate the response of global climate systems to increasing greenhouse gas concentrations. These responses can then be used to estimate stream flows, reservoir evaporation rates, and water demand adjustment factors. Two climate models, one performed by the Geophysical Fluid Dynamics Laboratory and the other by the Centre National de Recherches Météorologiques (Table 9-1), show the greatest variable range in future weather conditions, and serve to cover the potential uncertainties that are inevitably associated with any predictions. The purpose of using these models is not to predict future climate, but to provide planners with a tool to prepare for certain amounts and types of risk.

Table 9-1 Climate Models for Demand Forecasts

Originating Group	Version	ID
Geophysical Fluid Dynamics Laboratory	CM3	GFDLCM3
Centre National de Recherches Météorologiques	Coupled Global Climate Model Version 5	CNRMCM5

These two models represent high and low forecasts under climate change conditions and can show how climate change may affect San Diego demands, as well as local and imported supplies. In comparing the projected maximum average daily temperatures and precipitation amounts in the two studies, the GFDLCM3 model predicts higher than average temperatures in the summer from 2025 onward, while the CNRMCM5 model predicts more rainfall during the winter throughout the forecast period.

Climate Change Impacts on Local Demand

Figure 9-1 shows estimated water demands and compares three possible conditions for the two climate change models. Figure 9-1a forecasts demand under existing conditions, Figure 9-1b shows demand under the GFDLCM3 model, and Figure 9-1c shows demand under the CNRMCM5 model. The different colored lines represent the baseline forecast in blue, a forecast without conservation in red, and a forecast with conservation in gray. The water demand forecasts in the vertical axis include retail demand, wholesale demand, and non-revenue water.

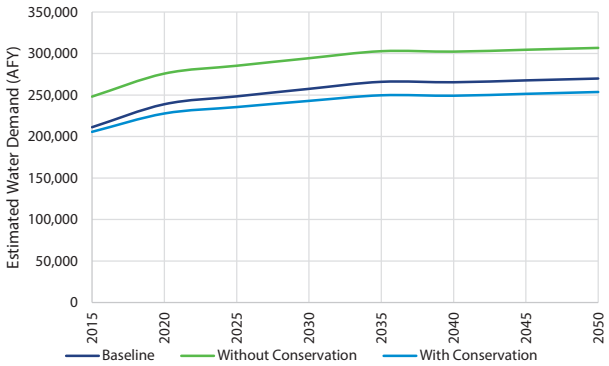

Figure 9-1a Demand Forecast for Normal Weather

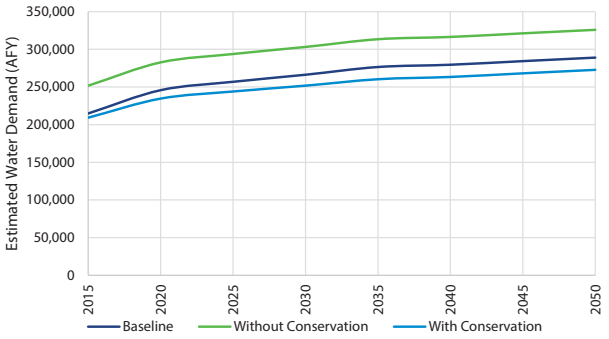

Figure 9-1b Demand Forecast for GFDLCM3

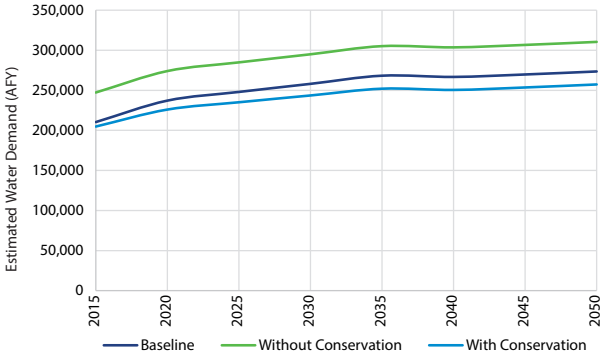

Figure 9-1c Demand Forecast for CNRMCM5

On average, all forecast models for the three scenarios estimate that water demand will increase steadily from 2015 onward. Water demand is expected to be highest without conservation, and lowest with conservation. Estimated water demand increases most strongly in the GFDLCM3 model, which shows that by 2035, demand in all three conditions outstrips the other two scenarios every year. According to the GFDLCM3 model, water demand without conservation is approximately 20 percent higher than it would be with conservation. Water demand without conservation exceeds that in the baseline and conservation conditions because of higher water usage and unsustainable practices.

Climate Change Impacts on Local Supply

The two climate change models can also be used to project the effects of climate change on inflows to and evaporation from local San Diego reservoirs.

Figure 9-2 displays predicted annual reservoir inflows for Sutherland, El Capitan, and San Vicente reservoirs using the GFDLCM3 model; Figure 9-3 shows the inflows for the CNRMCM5 model. The plots illustrate the range of reservoir inflow under two scenarios, with climate change and without climate change. The vertical lines extend through the range of half of the annual reservoir flows (inter-quartile range between 25th and 75th percentile). The central point represents the median.

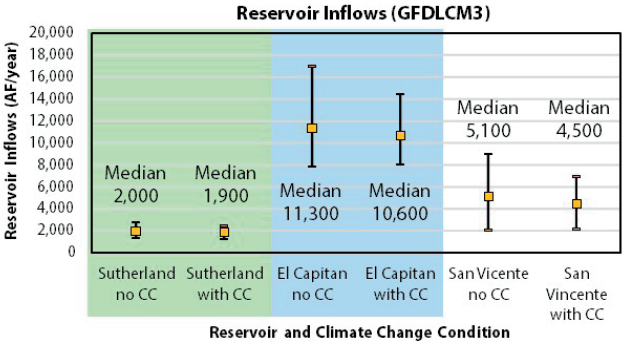

Figure 9-2 GFDLCM3 Reservoir Inflow

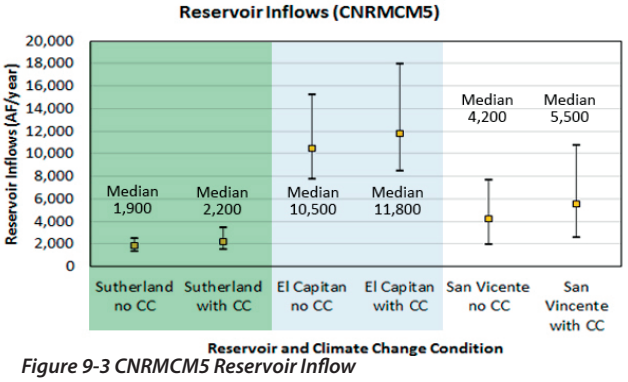

Figure 9-3 CNRMCM5 Reservoir Inflow

For all three reservoirs the GFDLCM3 model projects that on average, climate change will result in reduced inflows. El Capitan Reservoir experiences the largest reservoir inflow and has the largest range of inflow values. El Capitan's median inflow value approaches the lower inflows. This means that El Capitan's inflows without climate change are distributed more toward the lower inflow values. In contrast, Sutherland has the smallest range of values for inflow and experiences the least amount of inflow.

Inflows derived from the CNRMCM5 model (Figure 9-3) with climate change vary more than inflows without climate change. This model anticipates more rainfall and increased inflows for all three reservoirs.

Evaporation projections from the GFDLCM3 model for El Capitan and San Vicente are shown in Figure 9-4. El Capitan Reservoir is likely to experience greater annual evaporation compared with San Vicente, and evaporation as a result of climate change will increase at both locations. Evaporation impacts in the CNRMCM5 model are displayed in Figure 9-5 (on the following page). This model also predicts that evaporation will increase as a result of climate change.

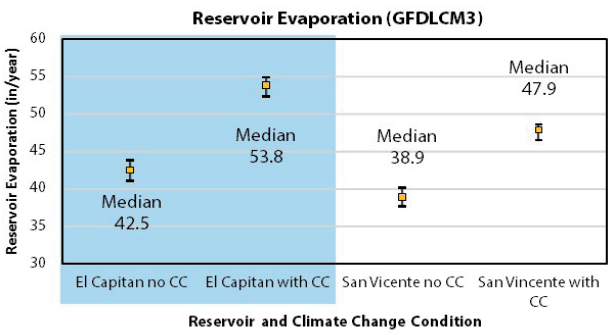

Figure 9-4 GFDLCM3 Reservoir Evaporation

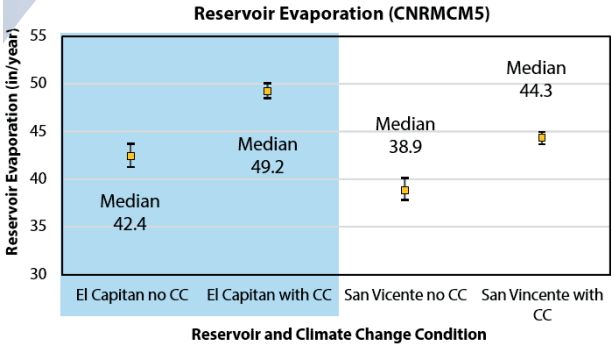

Figure 9-5 CNRMCM5 Reservoir Evaporation

A comparison of the two models shows that CNRMCM5 forecasts a higher variability in flow than does GFDLCM3. The GFDLCM3 model projects that climate change will result in reduced inflows. Additionally, GFDLCM3 predicts slightly more annual evaporation for El Capitan and San Vicente under climate change.

Under the two scenarios, climate change is expected to reduce water supply and increase future water demand; the City will need a strategy to meet a diminished supply combined with a future escalating demand.

9.1.2 Colorado River Aqueduct Impacts

The USBR addresses climate change impacts to the Colorado River in the Colorado River Basin Water Supply and Demand Study[2] (Basin Study). The Basin Study incorporates 112 climate change projections, which were input to the Colorado River Simulation System (CRSS) model to come up with long-term forecast simulations.

Climate Effects

Climate change simulations show that the Colorado River Basin will experience continued warming year-round, with less warming in winter months and higher warming in summer. The upper basin states of Utah, Colorado, Wyoming, and New Mexico will experience larger temperature shifts than will the lower basin states of California, Arizona, and Nevada. However, median temperatures are projected to increase by 1.3 degrees Celsius in 2025, 2.4 degrees Celsius in 2055, and 3.3 degrees Celsius in 2080.

These warmer temperatures will cause more precipitation to fall as rain instead of snow, and the snow will melt or undergo sublimation—converting directly into water vapor—earlier in the year. These changes will diminish the snowpack. An earlier snowmelt means soil will be wetter in the spring at high elevations, and peak stream flows at many locations will shift to May instead of June. These changes will reduce long-term water storage for customers depending on Colorado River supplies.

Evapotranspiration is the sum of evaporation and plant transpiration from the Earth's land and surface-water bodies to the atmosphere. The evapotranspiration process is limited by soil moisture and increases in warmer conditions. Warmer conditions in fall and winter lead to less snowpack and more available soil moisture to increase previously observed ETo values, leading to an overall reduction in water available to supply downstream uses.

Precipitation patterns in the Colorado River Basin are complex due to the influence of oceans, mountains, and atmospheric circulation patterns. Overall, these precipitation patterns will experience a drying trend throughout the basin.

As a result of these interactions between precipitation, temperature, and evapotranspiration, runoff is expected to decrease throughout the basin. The shift in precipitation from snow to rain at higher elevations will increase winter runoff, but this will result in a net loss to the Colorado River. Simulations of a wide range of operational scenarios project that average river flows throughout the basin will decrease below historic volumes. As a consequence, the Colorado River is forecast to become a less reliable supply source.

Colorado River Supply Impacts

The flow of the Colorado River at Lees Ferry, Arizona, indicates natural hydrologic conditions for the basin. These flows have been tracked and recorded for more than a century, giving water planners a history

[2] USBR 2012

of how much water flows down the river. The CRSS study duration of 2011 to 2060 projects that climate change conditions will lead to a mean flow at Lees Ferry of 13.7 MAF, a 6 percent reduction from the historical period 1950 to 1999, which witnessed an average flow of 14.6 MAF, and a 9 percent reduction in the 1906 to 2007 average of 15 MAF.

The 2012 USBR Basin Study examined the susceptibility of the Lees Ferry flow to climate change; the results are shown as Figure 9-6. The percentage change in future simulated mean flow with respect to the 1950 through 1999 historical mean indicates decreases in annual Lees Ferry flow volume between 4 and 14 percent.

Figure 9-6 compares changes in Lees Ferry flows specific to each of the three individual greenhouse gas emissions scenarios used in the USBR Basin Study (Special Report on Emissions Scenarios, or SRES, A2, A1B, and B1) with the ensemble of all three scenarios combined (the orange line titled All Projections). A2 reflects high future emissions and the greatest decrease in flows at Lees Ferry, B1 represents the lowest emissions scenarios and has the smallest change from existing conditions, and A1B predicts medium emissions and falls between the two extremes, yielding similar percentage changes to the ensemble.

All simulations predict streamflow reductions, although differences of less than 2 percent among all four categories shown in Figure 9-6 are witnessed throughout the 2011 to 2060 study forecast period, indicating streamflow may decrease between 6 and 8 percent. Large differences in flow reductions are predicted by the three emissions scenario groups by late century.

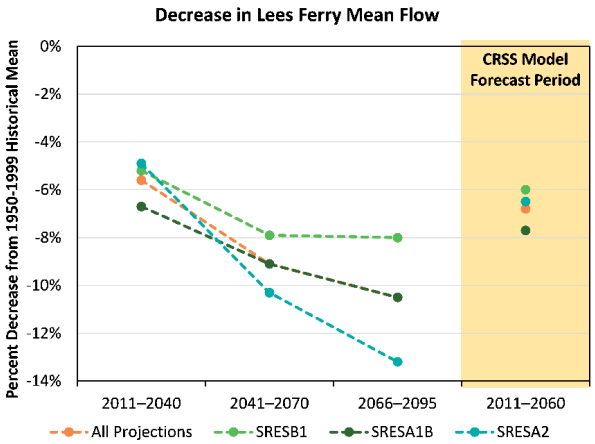

Figure 9-6 Projected Lees Ferry Future Flows (from Basin Study Report B)

9.1.3 State Water Project Impacts

As temperatures increase by approximately 1.5 to 4.5 degrees Celsius and snowmelt occurs earlier, SWP deliveries are susceptible both to changing runoff patterns and rising sea level impacts[3]. Preliminary modeling for the Bay Delta Conservation Plan shows mean annual temperatures increasing by as much as 3 degrees Celsius by mid century, and sea levels rising up to 1.5 feet[4]. The 2006 DWR Climate Change Report indicates that, as in the Colorado basin, precipitation throughout California is expected to become more variable over time, trending toward overall decreases. The Intergovernmental Panel on Climate Change has run multiple climate models for various greenhouse gas emission scenarios, and projects an average rise in sea level between 0.3 and 2.9 feet from 1990 to 2100.

The 2008 USBR Central Valley Operations Criteria and Plan evaluated the sensitivity of SWP and Central Valley Project deliveries to potential climate change and related sea level rise. The USBR presents results from the CalSim II model, which simulates key water resources infrastructure in the California Central Valley and Bay-Delta region, for four different climate change scenarios and one sea level rise assumption. The climate change forecasts range from less warming to more warming, and drier to wetter. Figure 9-7 (on the following page) shows the resulting SWP deliveries (for past hydrologic year types) for the base case, the sea level rise case, and the two extremes of the four climate change scenarios.

[3] Cloern et al., 2011
[4] Martarano 2011

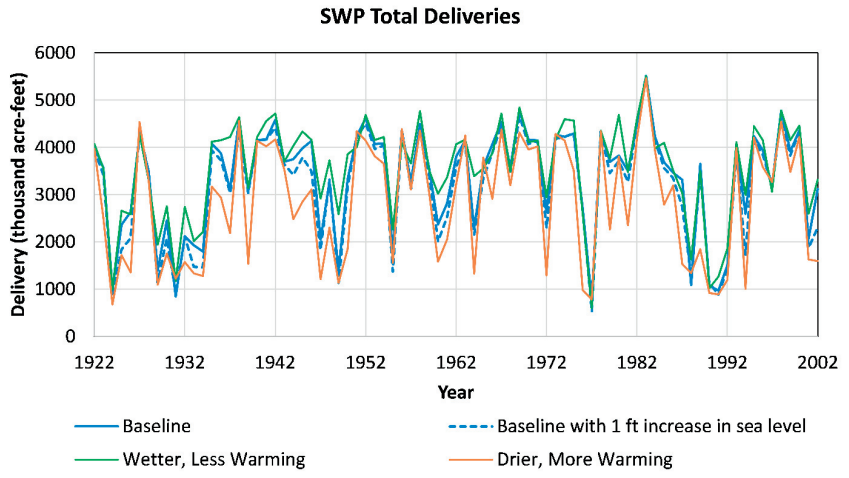

Figure 9-7 SWP Deliverables

The baseline average delivery is 3.4 MAF per year, and with sea level rise this baseline delivery is projected to decrease to 3.2 MAF due to salinity restrictions and reverse flows in the Bay-Delta. The drier with more warming scenario further decreases deliveries to 2.8 MAF, and the wetter, less warming scenario has the largest average at 3.6 MAF. Reduced exports indicate that deliveries to SWP contractors will decrease. Storage levels may not be high enough to make up for these shortages. As precipitation falls more as rain than snow, the winter months will exhibit more runoff than usual. This means that reservoirs will be filled to capacity before spring, when additional runoff from snowmelt is expected. As a result, reservoirs at full capacity may be unable to capture this new snowmelt, and water that could serve customers downstream will trickle away and be lost to the system if agencies do not adapt their operations. Implementation of the California WaterFix could help to mitigate the impacts of climate change on the SWP system, as well as the recent passage of Proposition 1 that sets aside money for additional surface storage.

9.2 Regional Climate Change Adaptation and Mitigation

MWD and SDCWA have established long-term supply and facilities plans for implementing regional projects and water transfers to mitigate and adapt to reduced and less reliable water supplies resulting from climate change. Therefore, the wholesale supply impacts to water imported by the City are expected to be less serious than indicated by the projected reductions in runoff and exports. MWD and SDCWA, including its member agencies, in particular, have made an aggressive effort to diversify the region's water supply portfolio since the early 1990s to maximize water supply reliability.

The City's 2012 LRWRP identified new local water supplies to improve water supply reliability, even under climate change scenarios. Table 9-2 presents the range of new water supply and conservation options.

Pure Water San Diego is a program that would use advanced treatment to purify recycled water for storage in one of several surface reservoirs. This supply would be highly resilient to climate change. Local groundwater could be expanded through desalination and conjunctive use.

In addition to potential local supply projects considered by the City, the SDCWA has implemented a number of regional supply projects to increase supply reliability. The Claude "Bud" Lewis Carlsbad Desalination Plant, which began operating in December 2015, will provide an additional source of local water for SDCWA's service area by producing

Table 9-2 New Supply Options Considered in the 2012 LRWRP

Supply Category	Range of Supply Yield (AFY)
Conservation	6,750 – 14,150
Groundwater	500 – 10,000
Recycled Water for Non-Potable Reuse	2,700 – 5,500
Recycled Water for Potable Reuse	16,800 – 93,000
Rainwater Harvesting	100 – 416
Graywater	2,575
Ocean Desalination	10,000

up to 50 mgd. SDCWA has rights to purchase up to 56,000 AF of desalinated water per year from the plant. SDCWA has initiated measures to address potential reductions in CRA deliveries as well. The QSA, completed in 2003, establishes wheeling and transfer agreements between SDCWA and the IID, increasing regional supplies. SDCWA's ESP has increased surface storage by 152,000 AF for use during emergencies and severe droughts. Finally, SDCWA has a storage account in the Semitropic Groundwater Bank for use during droughts.

Together these local and regional water supply projects and long-range planning programs can mitigate many of the potential impacts of climate change.

9.3 Climate Change Vulnerability Assessment

The 2013 SDIRWM Plan, discussed in Section 1 – Introduction, included a climate change vulnerability assessment for the San Diego region. As a participant in the SDIRWM process, the City contributed information on the vulnerability assessment. The SDIRWM vulnerability assessment is based on responses to specific questions posed by DWR to gauge regional vulnerabilities. The questions are related to water demands, water supply, water quality, sea level rise, flooding, ecosystem and habitat, and hydropower.

The 2013 SDIRWM Plan categorized and prioritized climate change impacts applicable to the region. Table 9-3 summarizes the 2013 IRWM Plan's prioritization of climate change vulnerability issues for the region. The highest priority issue for the region is a decrease in imported supplies. As previously described throughout the 2015 UWMP, both SDCWA and the City are taking steps to reduce reliance on imported water supplies and increase system reliability.

Table 9-3 San Diego IRWM Climate Change Vulnerability Issue Priority Levels

Priority Level	Category and Vulnerability Issue
Very High	Water Supply: Decrease in imported supply
High	Water Supply: Sensitivity due to higher drought potential
	Water Quality: Increased constituent concentrations
	Flooding: Increases in flash flooding and inundation (extreme weather)
	Ecosystem/Habitat: Decrease in available necessary habitat
	Sea Level Rise: Inundation of storm drains and sewer systems
	Ecosystem/Habitat: Decrease in ecosystem services
Medium	Water Demand: Crop demand would increase
	Water Demand: Industrial demand would increase
	Water Supply: Decrease in groundwater supply
	Water Quality: Increase in treatment cost
	Sea Level Rise: Damage to coastal recreation / tourism due to inundation
Low	Water Demand: Limited ability to conserve further
	Water Supply: Lack of groundwater storage to buffer drought
	Water Quality: Increase in eutrophication
	Flooding: Increases in inland flooding
	Ecosystem/Habitat: Increased impacts to coastal species
Very Low	Water Demand: Limited ability to meet summer demand
	Water Supply: Invasive species can reduce available supply
	Water Quality: Decrease in recreational opportunity
	Sea Level Rise: Decrease in land
	Ecosystem/Habitat: Decrease in environmental flows
	Hydropower: Decrease in hydropower potential

The 2015 UWMP Guidebook uses the same IRWM DWR questionnaire to gauge vulnerabilities to climate change. Appendix K contains specific responses to the questionnaire for the City's operations. Responses are based on a review of the IRWM vulnerability assessment and items specifically related to the City's water operations.

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SECTION 10

Energy Intensity Analysis

DWR does not require an energy intensity analysis to be included in the 2015 UWMP cycle. However, understanding the water-energy nexus is important when assessing future water supply and demand-side management options. Therefore, the City determined that a comprehensive analysis of how energy is used for water/wastewater operations should be included in its 2015 UWMP.

INSIDE

10.1 Overview

Energy is required at all stages of urban water supply, from transportation to treatment and distribution. This section analyzes the amount of energy the City consumes in the process of delivering water to its customers.

Energy intensity is defined as the total amount of energy an urban water supplier expends per AF to convey water from the point where the supplier acquires the water to the point of delivery. Some of the benefits of performing an energy intensity analysis include:

- Identifying energy saving opportunities that could reduce the costs of water delivery.
- Calculating energy savings and greenhouse gas (GHG) emission reductions associated with water conservation programs.
- Realizing potential opportunities to receive energy efficiency funding for water conservation programs.
- Informing climate change mitigation strategies.
- Benchmarking energy use at water acquisition and delivery steps, and comparing energy use among similar agencies.

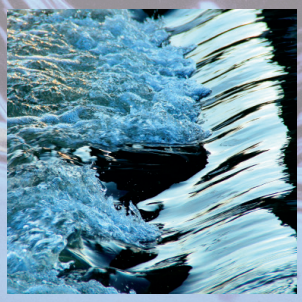
The following sections provide an introduction to the relationship between water and energy, and to water-related energy use in the San Diego region for FY 2015.

10.1.1 Water-Energy Relationship

An analysis of an urban water supplier's energy intensity is a recent addition to the preparation of an UWMP, as defined in the California Water Code (CWC) Section 10631. Under Section 10631.2(a) of the CWC, energy intensity reporting is voluntary and can include any of the following information, depending on the availability of data:

- An estimate of the amount of energy used to extract or divert water supplies.

Groundwater Well



North City Water Reclamation Plant

- An estimate of the amount of energy used to convey water supplies to water treatment plants or distribution systems.
- An estimate of the amount of energy used to treat water supplies.
- An estimate of the amount of energy used to distribute water supplies through its distribution systems.
- An estimate of the amount of energy used for treated water supplies, compared with the amount used for non-treated water supplies.
- An estimate of the amount of energy used to place water into or withdraw from storage.
- Any other energy-related information the urban water supplier deems appropriate.

In Southern California, water supply processes require large amounts of energy, because of the large distances covered between the water's source and its destination. Urban water suppliers face issues related to the economic costs of the energy required for their operations, as well as issues related to the sustainable supply of energy and water. Knowing how much energy is needed to deliver water to customers is important because of its significance for the State's total energy demands, and for its implications regarding GHG emissions and climate goals for the region and State.

Research conducted by the California Energy Commission (CEC) refers to the link between water and energy resources as the water-energy nexus (CEC 2006). The CEC calculated that, statewide, water-related energy consumes 19 percent of the State's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year (CEC 2006). As part of its analysis, the CEC defined the typical water use cycle within the state by identifying sources of water, water supplies, water and wastewater treatment, and end use. Figure 10-1 illustrates this cycle as described by the CEC, showing water sources, conveyance, water and wastewater treatment, and end use.

The following section presents an overview of water supply sources and energy use in the San Diego region. Appendix L contains the completed tables as recommended by DWR.

10.1.2 Water Supplies and Energy Intensities in the San Diego Region

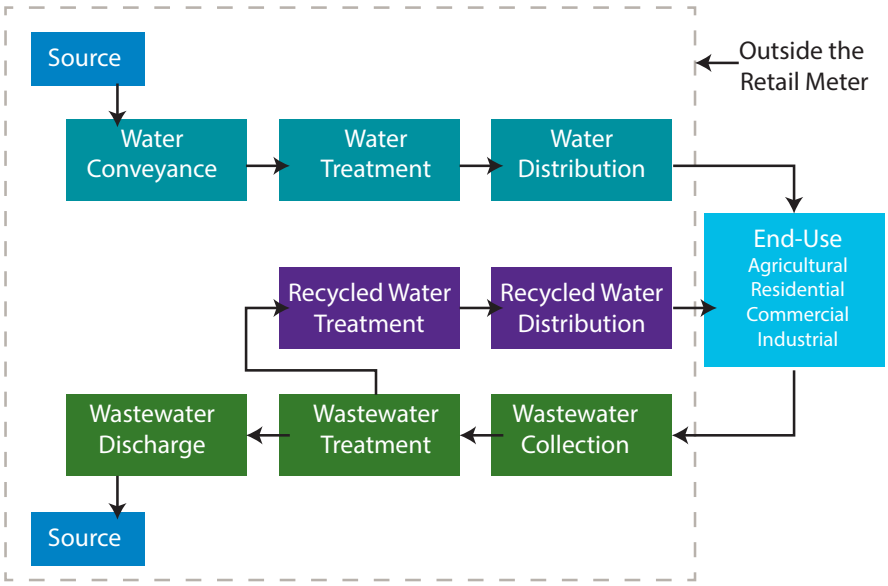


Figure 10-1 Typical Water Use Cycle (Source: CEC 2006)

As described in Section 3 - Description of Existing Water System, the City purchased approximately 86 percent of its water supplies for the period between 2011 and 2015, excluding savings from conservation, from the SDCWA. In turn, this water is derived from a number of sources, including supplies imported from the SWP and the Colorado River, recycled water, groundwater, and surface water. According to a study by the Equinox Center that assessed San Diego County's water sources, each

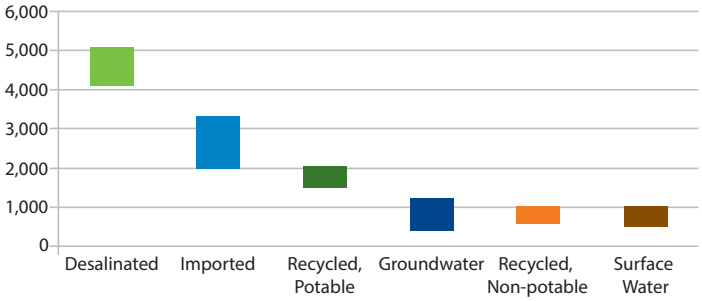


Figure 10-2 Energy Usage by Water Source, 2010 Estimate (kWh per acre-foot)

has a different energy requirement (Equinox 2010). Figure 10-2 shows the estimated energy usage by water source for San Diego County.

Some of the main differences between energy use associated with various water supply sources are the distances the water must be transported from its origins; the amount of pumping necessary to harvest and distribute the water; and the location of primary and satellite treatment plants in relation to the end users, among others (Equinox 2010). Imported water, as shown in Figure 10-2, has one of the highest energy requirements. Equinox's San Diego County report examined the energy use for desalinated seawater, but this was not a source of water in the service area in 2015.

The following sections discuss the methodology used to determine energy use, energy intensity, and GHG emissions, as well as detailed data and analyses related to each water management process. Where possible, energy and GHG emission data are also discussed for each water supply source.

10.2 Methodology

10.2.1 Energy Use

In order to determine energy use related to water supply processes under its operational control, the City collected billing and energy quantity data provided by San Diego Gas & Electric (SDG&E) through its software system. The billing amounts for each City facility were converted to an energy use quantity measured in kilowatt hours (kWh) for electricity and therms for natural gas measured in 1,000 British thermal units (MBTU) . Due to some inaccuracies in the software used by SDG&E to collect and convert the data, there are some inconsistencies in how the energy use data is reported. For example, for some months in the fiscal year, energy use data was not reported for every facility under the City's control. The data reported in this section represents the most comprehensive and accurate available at this time.

Because imported water is not under the direct operational control of the City, the energy intensity analysis (as prescribed by DWR) was not conducted for this water source. However, it should be noted that the City's reduced reliance on imported water conveyance from Northern California would reduce the State's overall GHG emissions.

10.2.2 Energy Intensity

Once energy use data was obtained and separated into the specific water management processes as defined by DWR, included in Appendix L, available data on water supply volumes was used to calculate energy intensities. Data on water volumes was not available at the water management facility level; therefore, the FY 2015 volume for each water supply source was used to approximate volumes for each water management process, as shown in Table 10-1.

Table 10-1 Methodology for Determining Water Volumes

Water Management Process	Applicable Water Supply Sources	Volume (FY 2015)
Extraction	Local Groundwater	500 acre-feet
Storage	Local Surface Water	6,279 acre-feet
Conveyance	Local Groundwater and Local Surface Water	6,779 acre-feet
Treatment	Total water supplies (includes groundwater and local surface water supplies; recycled water not included)	191,623 acre-feet
Distribution	Total water supplies (includes groundwater and local surface water supplies; recycled water not included)	191,623 acre-feet

Table 10-2 Summary of Total Energy Usage for FY 2015

Water Management Process	Electricity (kWh)	Gas (MBTU)
Potable Water		
Extraction	139,678	0
Storage	350,382	1,941
Conveyance	17,925	0
Treatment	4,682,797	0
Distribution	8,190,826	21,756
Wastewater		
Collection/ Conveyance	0	199,781,034
Treatment	0	212,962,082
Discharge/ Distribution	0	0
Recycled Water		
Collection/ Conveyance	0	0
Treatment	3,041	0
Discharge/ Distribution	469,081	0
Total	**13,853,730**	**412,766,813**

The energy use values were then divided by the water supply volumes to obtain energy intensity measured as kilowatt hours per acre-foot (see Tables 10-3 and 10-4).

10.3 Energy Consumption and Intensity

10.3.1 Energy Consumption

Table 10-2 shows the total energy usage, including electricity and gas, for the water management processes within the City's operational control. Figure 10-3 illustrates the differences in total energy use among the water management processes for the entire fiscal year. Distribution consumed the greatest amount of electricity among all the processes, exceeding 8 million kWh, followed by treatment at approximately 4.6 million kWh. Natural gas was only used in the distribution and storage processes. Distribution consumed the greatest amount of electricity among all the processes.

Data for energy use was obtained for every month for FY 2015. Figure 10-4 shows electricity usage over the course of FY 2015. The figure clearly illustrates the greater share of energy consumed by distribution and treatment compared with storage, extraction, and conveyance. Average monthly energy usage for distribution and treatment processes varies between 200,000 kWh and 900,000 kWh (Figure 10-4). Distribution and treatment energy use correspond to water demands. In comparison, storage, extraction, and conveyance processes use between 250 kWh and 42,000 kWh, each of which totals less than 5 percent of the total energy usage.

Figure 10-5 shows the natural gas use over the course of FY2015. Average monthly gas usage for distribution

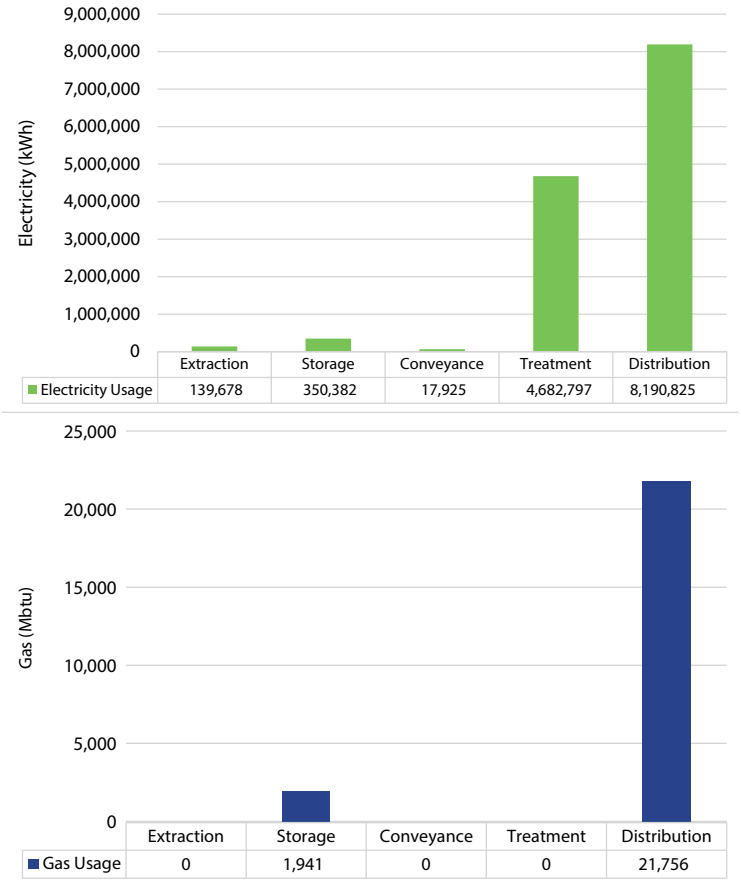


Figure 10-3 Total Electricity and Gas Usage per Water Management Process for Potable Water Supply for FY 2015

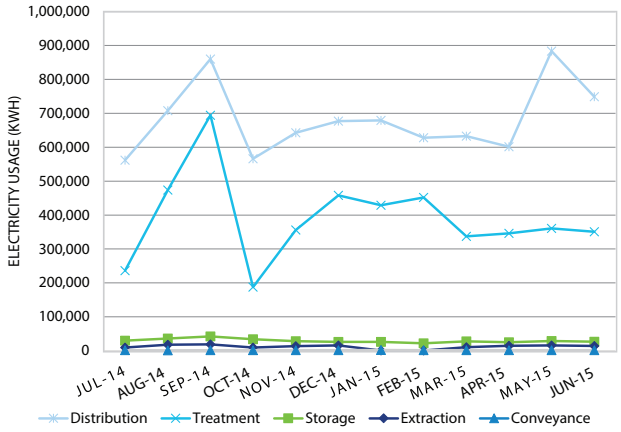


Figure 10-4 Electricity Usage per Month for FY 2015

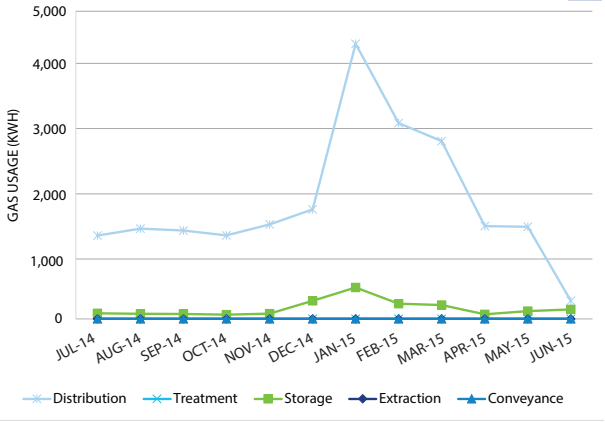


Figure 10-5 Gas Usage per Month for FY 2015

varies between 250 MBTU and 4,200 MBTU (Figure 10-5). The storage process uses between 65 MBTU and 500 MBTU. Total natural gas usage totals less than 0.05 percent of the total potable water energy usage.

10.3.2 Potable Water Energy Intensity

Energy intensity is the amount of energy expended per acre-foot to move water from its source to the point of delivery. Energy intensity is reported based on the volume of water passing through each water management process within the operational control of the City (Table 10-3). MBTU was converted to kWh to determine total energy consumed.

Table 10-3 illustrates that the greater shares of energy are consumed by distribution and treatment, compared with storage, extraction, and conveyance. However, the highest energy intensity is expended by extraction and storage.

10.3.3 Wastewater and Recycled Water Energy Intensity

The City recycles approximately 7 percent of the wastewater collected at the NCWRP and SBWRP. Table 10-4 reports the energy intensities expended by recycled water and wastewater. These are reported separately from potable water, as defined by DWR. MBTU was converted to kWh to determine total energy consumed.

Recycled water is reported separately, as it is approved and used only for non-potable uses, like irrigation and in cooling towers. The energy intensity of

Table 10-3 Energy Intensity for Potable Water Supply Based on Water Supply Process Approach

	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility
Volume of Water Entering Process (AF)	500	6,279	6,779	191,623	191,623	**191,623**
Energy Consumed (kWh)	139,678	350,951	17,925	4,682,797	8,197,202	**13,388,553**
Energy Intensity (kWh/AF)	279.4	55.9	2.6	24.4	42.8	**69.9**

Table 10-4 Energy Intensity for Wastewater and Recycled Water

	Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Wastewater Entering Process (AF)	--	--	--	**179,620**
Wastewater Energy Consumed (kWh)	--	--	--	**120,968,088**
Wastewater Energy Intensity (kWh/AF)	--	--	--	**673.5**
Volume of Recycled Water Entering Process (AF)	0	12,427	12,427	**12,427**
Recycled Water Energy Consumed (kWh)	0	3,041	469,081	**472,122**
Recycled Water Energy Intensity (kWh/AF)	0.0	0.2	37.7	**38.0**

recycled water operations is the amount of energy consumed to convey, treat, and distribute recycled water, compared with the energy required to collect, treat, and discharge the same amount of wastewater effluent.

10.4 Self-Generated Energy Sources and Energy Conservation

10.4.1 Self-Generated Energy

Methane gas is produced as a by-product of the digestion process at the PLWTP. The plant produces enough gas on-site through the wastewater treatment process that it is more than energy self-sufficient. The PLWTP produces double its energy needs through the production of methane gas. The gas is removed from the digesters and is used to power two Caterpillar engines in the plant's gas utilization facility. These two engines supply all of the plant's energy needs, making it energy self-sufficient. The plant sells the excess energy it produces to the local utility company, offsetting the energy costs at wastewater pump stations throughout the city. Excess digester gas is sold to a private company that processes the gas to natural gas standards and sells it to the utility company. The PLWTP also takes advantage of its location on a cliff's edge by operating a hydroelectric plant driven by effluent dropping 90 feet into the PLWTP Ocean Outfall. This additional power is also sold to the local utility company.

The City also produces methane gas at the Metro Biosolids Center at the Miramar Landfill. This gas is then used to power both the Metro Biosolids Center and the NCWRP. The cogeneration facilities located at the Metro Biosolids Center and at NCWRP are both owned by private companies.

Additionally, through an agreement with a private company, the City installed solar panels at the Raw Water Pump Station at Alvarado and Otay WTPs. Both facilities generated approximately 2.5 million kilowatt hours of renewable energy in FY 2014. In addition, the City has a 30 kW solar system installed at MOC 3, which offsets 20 percent of the building's energy need.

The City's wastewater treatment systems produce over 90 percent of the renewable energy used by the City, saving ratepayers approximately $2 million a year in energy costs at the PLWTP alone.

10.4.2 Energy Conservation

The Public Utilities Department has recently invested an average of $400,000 per year in energy conservation projects, upgrading almost all of its emergency generators, department-owned administration buildings, and many of the department's largest pump stations and wastewater treatment/water reclamation plants. Projects have included energy-efficient lighting and controllers, and upgrades to air conditioning systems.

The California Center for Sustainable Energy awarded the City its 2010 Energy All-Star Award for Outstanding Organization. In 2006, the City of San Diego was recognized by the US Environmental Protection Agency (EPA) for using more renewable energy than any other public agency in the United States.

10.5 Greenhouse Gas Emissions

10.5.1 Methodology and Calculations

This analysis estimates carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions expended in delivering water from the source to its point of delivery. The other two pollutant groups commonly evaluated in various GHG reporting protocols, hydrofluorocarbons and perfluorocarbons, are not expected to be emitted in large quantities as a result of the water and recycled water under the City's operational control, and are not discussed further in this section. Table 10-5 (on the following page) shows the GHG emission factors used to convert energy consumption to GHG emissions.

Each GHG contributes to climate change differently, as expressed by its global warming potential (GWP). GHG

Table 10-5 Greenhouse Gas Emission Factors

Source	CO_2	CH_4	N_2O
Electricity	610.82 lbs CO_2/MWhr [1]	28.49 lbs CH_4/GWhr [1]	6.03 lbs N_2O/GWhr [1]
Natural Gas	53.06 kg CO_2/MMBTU [2, 4]	0.001 kg CH_4/MMBTU [3, 4]	0.0001 kg N2O/MMBTU [3, 4]

[1] The Climate Registry, 2015. U.S. Emission Factors by eGRID Subregion for CAMX

[2] The Climate Registry, 2015. U.S. Default Factors for Calculating CO2 Emissions from Fossil Fuel and Biomass Combustion

[3] The Climate Registry, 2015. Default CH4 and N2O Emission Factors by Fuel Type Industrial and Energy Sectors

[4] MMBTU = 1,000,000 BTUs

emissions are discussed in terms of CO_2e emissions, which express, for a given mixture of GHG, the amount of CO_2 that would have the same GWP over a specific timescale. CO_2e is determined by multiplying the mass of each GHG by its GWP. GHG global warming potential (GWP) factors, shown in Table 10-6, were used to convert heat trapped by methane and nitrous oxide to heat trapped by a similar mass of carbon dioxide.

Table 10-6 Global Warming Potential (GWP) Factors for Required Greenhouse Gases

Common Name	Formula	100- year GWP values
Carbon dioxide	CO_2	1
Methane	CH_4	25
Nitrous oxide	N_2O	298

Source: The Climate Registry, 2015. Global Warming Potential Factors for Required Greenhouse Gases Fourth Assessment report (AR4) published in 2007.

10.5.2 Potable Water Supply

Table 10-7 summarizes the GHG emissions associated with the extraction, conveyance, storage, treatment, and distribution of potable water under the City's operational control. GHG emissions associated with potable water use for fiscal year 2015 total 3,725 metric tons carbon dioxide equivalent (CO_2e) per year.

Table 10-7 Summary of FY2015 GHG Emissions for Potable Water Supply ($MTCO_2e$ per year)

Water Management Process	Electricity				Natural Gas				Total CO_2e
	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e	
Extraction	39	0.05	0.11	39	--	--	--	--	39
Conveyance	5	0.01	0.01	5	--	--	--	--	5
Storage	97	0.11	0.29	97	0.1	0.000	0.000	0.1	98
Treatment	1,297	1.51	3.82	1,303	--	--	--	--	1,303
Distribution	2,269	2.65	6.68	2,279	1.2	0.001	0.001	1.2	2,280
Total	**3,707**	**4.33**	**10.91**	**3,723**	**1.3**	**0.001**	**0.001**	**1.3**	**3,725**

Totals may not exactly sum due to rounding.

Table 10-8 Summary of FY 2015 GHG Emissions for Wastewater and Recycled Water Supply (MTCO$_2$e per year)

Water Management Process	Electricity				Natural Gas				Total CO_2e
	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e	
Recycled Water	131	0.15	0.38	132	--	--	--	--	**132**
Wastewater	--	--	--	--	21,900	10.3	12.3	21,923	**21,923**
Grand Total	**131**	**0.15**	**0.38**	**132**	**21,900**	**10.3**	**12.3**	**21,923**	**22,055**

10.5.3 Wastewater and Recycled Water

Table 10-8 summarizes the GHG emissions associated with wastewater and recycled water operations within the City's operational control. GHG emissions associated with wastewater and recycled water for FY 2015 total 22,055 metric tons CO_2e per year.

10.6 Summary

This following observations have been made on the water-energy relationship:

- While imported water sent from Northern California to San Diego is the most energy intensive potable water delivery process, the energy use and greenhouse gas emissions associated with imported water conveyance is not within the City's direct control. It is for this reason that imported water delivery was not evaluated in this section.
- Pure Water, when implemented by the City, would have the most energy intensive potable water delivery process within the control of the City due to the advanced treatment of recycled water. However, this supply is not operational and therefore not included in this section.
- Local groundwater extraction/treatment is currently the most energy intensive potable water delivery process that is within the control of the City.
- Wastewater operations consume approximately 121 million kWh of energy and expend an energy intensity of 673.5 kWh/AF.
- GHG emissions associated with urban water supply processes for fiscal year 2015 total 25,780 metric tons carbon dioxide equivalent (CO_2e) per year (3,725 for potable water and 22,055 for recycled water). Wastewater operations generate 85 percent of the total emissions. The on-site methane gas production offset approximately 0.05 metric tons carbon dioxide equivalent (CO_2e) for FY 2015.

SECTION 11

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Appendix A

Public Hearing Notification and Resolution of Adoption

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THE CITY OF SAN DIEGO

January 11, 2016

John Conley
Community Development
City of Vista
200 Civic Center Drive
Vista, CA 92084

Dear Mr. Conley:

Subject: Notice of the Update of the City of San Diego 2015 Urban Water Management Plan Preparation

This letter is to inform you that the city of San Diego is updating its Urban Water Management Plan (UWMP). California State law requires urban water suppliers to update their UWMPs every five years. The City of San Diego must adopt an updated UWMP by June 15, 2016, and submit the adopted plan to the California Department of Water Resources by July 1, 2016.

The UWMP is required to contain a detailed evaluation of the water supplies necessary to reliably meet demands over at least a 20-year period in both normal and dry years. In accordance with State law, the City of San Diego will distribute a copy of its draft 2015 UWMP to the cities and county within which it provides water supplies for public review at least two weeks prior to holding a tentatively scheduled public hearing May 25. 2016.

Please feel free to contact me in the Public Utilities Department, Long-Range Planning and Water Resources Division at (619) 533-4222, or via email at sbista@sandiego.gov, if you have any questions or would like additional information.

Sincerely,

Seevani Bista
Senior Water Resources Specialist
Long-Range Planning & Water Resources Division

SB/kw

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County of San Diego	Eric Gibson	County Department of Planning and Land Use Mail Station 0650 5201-B Ruffin Road San Diego, CA 92123	858-694-2962 858-694-2555 fax eric.gibson@sdcounty.ca.gov
	Devon Muto	County Department of Planning and Land Use Mail Station 0650 5201-B Ruffin Road San Diego, CA 92123	858-694-3016 858-694-3373 fax devon.muto@sdcounty.ca.gov

City of San Diego 2015 UWMP PUBLIC NOTICE MAILING LIST

Jurisdiction/Agency	Name	Address	Phone/Fax/Email
City of San Marcos	Bart Pinone	City of San Marcos Planning Department 1 Civic Center Drive San Marcos, CA 92069-2949	760-744-1050 x3220 760-591-4135 fax bpinone@san-marcos.net
	Karen Brindley	City of San Marcos Planning Department 1 Civic Center Drive San Marcos, CA 92069-2949	760-744-1050 x3220 760-591-4135 fax kbrindley@san-marcos.net
City of Santee	Mark Brunette	City of Santee Director/Deputy City Manager City of Santee Development Services 10601 Magnolia Avenue Santee, CA 92071-1222	619-258-4100 x158 619-562-9376 fax mbrunette@ci.santee.ca.us
	Melanie Kush	City of Santee Development Services 10601 Magnolia Avenue Santee, CA 92071-1222	619-258-4100 x167 619-562-9376 fax mkush@cityofsanteeca.gov
	Travis Cleveland	City of Santee Development Services 10601 Magnolia Avenue Santee, CA 92071-1222	619-258-4100 x160 619-562-9376 fax tcleveland@cityof snateeca.gov
City of Solana Beach	Tina Christiansen	Solana Beach Community Development 635 S. Highway 101 Solana Beach, CA 92075-2215	858-720-2444 858-720-2448 fax tchristiansen@cosb.org
	Rich Whipple	Solana Beach Community Development 635 S. Highway 101 Solana Beach, CA 92075-2215	858-720-2447 858-720-2443 fax rwhipple@cosb.org
City of Vista	John Conley	Vista Community Development Department 200 Civic Center Drive Vista, CA 92084	760-639-6100 760-639-6101 fax jconley@cityofvista.com
	Patsy Chow	Vista Community Development Department 200 Civic Center Drive Vista, CA 92084	760-639-6100 760-639-6101 fax pchow@cityofvista.com
Otay Water District	Lisa Coburn-Boyd	Environmental Compliance Specialist Otay Water District	619-670-2219 lisa.coburn-boyd@otaywater.gov
San Diego Association of Governments	Charles "Muggs" Stoll Department Director	SANDAG 401 B Street, Suite 800 San Diego, CA 92101 (or Mail Station 980)	619-699-6945 619-699-1905 fax muggs.stoll@sandag.org
San Diego County Water Authority	Dana Friehauf	San Diego County Water Authority 4677 Overland Avenue San Diego, CA 92123	858-522-6749 858-268-7881 fax dfriehauf@sdcwa.org
San Diego LAFCO	Ingrid Hansen, Chief, Governmental Services	San Diego LAFCO 1600 Pacific Highway, Room 452 San Diego, CA 92101	619-531-5400 ingrid.hansen@sdcounty.ca.gov
Santa Fe Irrigation District	Jessica Parks,	Public Information Officer/Management Analyst Santa Fe Irrigation District	858-227-5799 858-756-0450 fax

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The City of SAN DIEGO

NEWS RELEASE

FOR IMMEDIATE RELEASE
April 7, 2016

MEDIA CONTACT: Alma Rife
(619) 533-4589/agrife@sandiego.gov

City Invites Public Input on Draft 2015 Urban Water Management Plan

Plan Addresses Existing and Future Water Needs;
Part of City's Ongoing, Multi-Faceted Water Planning Efforts

The City of San Diego is inviting public review and comment on its Draft 2015 Urban Water Management Plan through May 5, 2016. The Plan serves as a long-range forecast and water resources planning document for the City.

The City is required by the Urban Water Management Planning Act, California Water Code Sections 10610 through 10657, to prepare a plan every five years. The City is required to update and adopt a plan by July 1, 2016 for submittal to the California Department of Water Resources.

The 2015 Plan addresses the City's existing water system and includes a forecast of water demands over the next 5 years. The Plan also includes an evaluation of supplies necessary to meet those demands during normal, single-dry and multiple-dry years to help ensure water supply reliability over the next 25 years.

The Plan is available for public review and can be found on the City of San Diego website at: www.sandiego.gov/water or a copy can be reviewed at the City of San Diego Public Utilities Department office located at 525 B Street, Suite 700, San Diego, CA 92101.

Comments must be must be received no later than 5:00 p.m. Thursday, May 5, 2016 and can be sent to: sbista@sandiego.gov or mailed to:

2015 Urban Water Management Plan - Public Comments
Seevani Bista, Project Manager
City of San Diego Public Utilities
525 B Street, Suite 300
San Diego, CA 92101

A public hearing to adopt the City of San Diego 2015 Urban Water Management Plan is tentatively scheduled for Monday, June 20, 2016, at the City Administration Building, Council Chambers, 12th floor, 202 C Street, San Diego, CA 92101. All comments will be reviewed before the public hearing.

For questions regarding the proposed 2015 Urban Water Management Plan, including making an appointment to review the document at the City, please contact Seevani Bista at (619) 533-4222 or sbista@sandiego.gov.

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THE DAILY TRANSCRIPT

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Linda Irvin
SAN DIEGO CITY CLERK (LEAD ACCT)
202 C STREET MS 2A
SAN DIEGO, CA - 92101-3862

SD#: 2889399

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SAN DIEGO) ss

Notice Type: GPN - GOVT PUBLIC NOTICE

Ad Description:

2015 Urban Water Management Plan

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of THE DAILY TRANSCRIPT, a newspaper published in the English language in the city of SAN DIEGO, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SAN DIEGO, State of California, under date of 05/13/2003, Case No. GIC808715. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

06/06/2016, 06/14/2016

Executed on: 06/14/2016
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

Email

* A 0 0 0 0 0 0 4 1 3 3 0 1 1 *

DATE OF NOTICE: JUNE 6, 2016
NOTICE OF PUBLIC HEARING
MONDAY, JUNE 20, 2016 AT 2:00 PM
2015 URBAN WATER MANAGEMENT PLAN PUBLIC REVIEW

DATE OF HEARING: MONDAY, JUNE 20, 2016
TIME OF HEARING: 2:00 P.M.
LOCATION OF HEARING: Council Chambers, 12th Floor, City Administration Building, 202 C Street, San Diego, California 92101
PROJECT NAME: 2015 URBAN WATER MANAGEMENT PLAN
APPLICANT: City of San Diego Public Utilities
COMMUNITY PLAN AREA: Citywide
COUNCIL DISTRICT: Citywide
CITY PROJECT MANAGER: Seevani Bista
PHONE NUMBER/E-MAIL: (619) 533-4222 / sbista@sandiego.gov

As a property owner, tenant, or person who has requested notice, please be advised that the Council of the City of San Diego, California will conduct a public hearing, as part of a scheduled City Council meeting, on the following project:

Notice is hereby given that the Council of the City of San Diego will consider adoption of the 2015 Urban Water Management Plan (Plan), per California Water Code sections 0610 through 10657. This Plan direct water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands. Urban water suppliers are required to assess current demands and supplies over a 20-year planning horizon and consider various drought scenarios. The City is also required to adopt and submit a Plan in order to be eligible for water management grants or loans administered by the Department of Water Resources (DWR), the State Water Resources Control Board or Delta Stewardship Council [CWC 10631, 5(a)]. As required by DWR, this Plan needs to be adopted by July 1, 2016.

Consideration of the adoption of the Plan will take place at the regular City Council meeting on Monday, June 20, 2016, in the City Administration Building, Council Chamber, 12th floor, 202 C Street, San Diego, CA 92101 at 2 P.M, or as soon thereafter as business allows.

Complete copies of the plan will be available for inspection in the Office of the City Clerk of the City of San Diego, City Administration Building, 202 C Street, 2nd Floor San Diego, CA 92101, by June 14, 2016.

The decision of the City Council is final.

COMMUNICATIONS

This item may begin at any time after the time specified. Any interested person may address the City Council to express support or opposition to this issue. **Time allotted to each speaker is determined by the Chair and, in general, is limited to three (3) minutes;** moreover, collective testimony by those in support or opposition shall be limited to no more than fifteen (15) minutes total per side.

Those unable to attend the hearing may write a letter to the Mayor and City Council, Attention: City Clerk, City Administration Building, 202 "C" Street, San Diego, CA 92101-3862, Mail Station 2A; OR you can reach us by E-mail at: **Hearings1@sandiego.gov or FAX: (619) 533-4045.** All communications will be forwarded to the Mayor and Council.

If you wish to challenge the Council's actions on the above proceedings in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence to the City Council at or prior to the public hearing. All correspondence should be delivered to the City Clerk (at the above address) to be included in the record of the proceedings.

This material is available in alternative formats upon request. To order information in an alternative format, or to arrange for a sign language or oral interpreter for the meeting, please call the City Clerk's office at least 5 working days prior to the meeting at (619) 533-4000 (voice) or (619) 236-7012 (TT).

ELIZABETH MALAND
SAN DIEGO CITY CLERK
6/6, 6/14/16

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6-20-16
#202 SUB-A
(R-2016-713)

RESOLUTION NUMBER R- 310543

DATE OF FINAL PASSAGE JUN 29 2016

A RESOLUTION OF THE COUNCIL OF THE CITY OF SAN DIEGO FINDING THAT THE 2015 URBAN WATER MANAGEMENT PLAN IS CATEGORICALLY EXEMPT FROM THE CALIFORNIA ENVIRONMENTAL QUALITY ACT PURSUANT TO CEQA GUIDELINE SECTION 15262.

WHEREAS, The City of San Diego (City) is required by the Urban Water Management Planning Act (Act) to prepare and adopt an Urban Water Management Plan (UWMP) every five years, and the City is required to adopt and submit to Department of Water Resources (DWR) and UWMP in order to be eligible for water management grants or loans administered by DWR, the State Water Resources Control Board or the Delta Stewardship; and

WHEREAS, this activity is exempt from the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines section 15262, as this activity involves only the funding of feasibility or planning studies for possible future action, which has not been approved, adopted, or funded. NOW, THEREFORE,

BE IT RESOLVED, that the UWMP Agreement is categorically exempt from CEQA pursuant to CEQA Guidelines section 15262.

BE IT FURTHER RESOLVED, that the Council of the City of San Diego has determined that an exception to the exemption as set forth in CEQA Guidelines section 15262 does not apply.

APPROVED: JAN I. GOLDSMITH, City Attorney

By _____
Raymond C. Palmucci
Deputy City Attorney

RCP:mt
June 3, 2016
Or.Dept: Public Utilities
Doc. No.: 1299567

I certify that the foregoing Resolution was passed by the Council of the City of San Diego, at this meeting of JUN 20 2016.

ELIZABETH S. MALAND
City Clerk

By _____
Deputy City Clerk

Approved: 6/29/16 _____
(date) KEVIN L. FAULCONER, Mayor

Vetoed: _____ _____
(date) KEVIN L. FAULCONER, Mayor

Passed by the Council of The City of San Diego on JUN 20 2016, by the following vote:

Councilmembers	Yeas	Nays	Not Present	Recused
Sherri Lightner	☒	☐	☐	☐
Lorie Zapf	☒	☐	☐	☐
Todd Gloria	☒	☐	☐	☐
Myrtle Cole	☒	☐	☐	☐
Mark Kersey	☒	☐	☐	☐
Chris Cate	☒	☐	☐	☐
Scott Sherman	☒	☐	☐	☐
David Alvarez	☒	☐	☐	☐
Marti Emerald	☒	☐	☐	☐

Date of final passage JUN 29 2016.

(Please note: When a resolution is approved by the Mayor, the date of final passage is the date the approved resolution was returned to the Office of the City Clerk.)

AUTHENTICATED BY:

KEVIN L. FAULCONER
Mayor of The City of San Diego, California.

(Seal)

ELIZABETH S. MALAND
City Clerk of The City of San Diego, California.

By _____, Deputy

Office of the City Clerk, San Diego, California

Resolution Number R- 310543

6-20-16
#202 SUB-K

(R-2016-700)

RESOLUTION NUMBER R- 310544

DATE OF FINAL PASSAGE JUN 29 2016

A RESOLUTION OF THE COUNCIL OF THE CITY OF SAN DIEGO TO ADOPT A RESOLUTION TO APPROVE THE 2015 URBAN WATER MANAGEMENT PLAN.

WHEREAS, The City of San Diego (City) is required by the Urban Water Management Planning Act (Act) to prepare and adopt an Urban Water Management Plan (UWMP) every five years, and the City is required to adopt and submit to Department of Water Resources (DWR) and UWMP in order to be eligible for water management grants or loans administered by DWR, the State Water Resources Control Board or the Delta Stewardship; NOW, THEREFORE,

BE IT RESOLVED, by the Council of the City of San Diego, as follows:

1. That the 2015 Urban Water Management Plan, filed in the office of the City Clerk as Document No. RR- 310544, is approved.

APPROVED: JAN I. GOLDSMITH, City Attorney

By _____
Raymond C. Palmucci
Deputy City Attorney

RCP:mt
6/3/2016
Or.Dept:Public Utilities
Doc. No. 1297197

I hereby certify that the foregoing Resolution was passed by the Council of the City of San Diego, at this meeting of JUN 20 2016.

ELIZABETH S. MALAND
City Clerk

By _____
Deputy City Clerk

Approved: 6/29/16
(date)

_____
KEVIN L. FAULCONER, Mayor

Vetoed: _____
(date)

_____
KEVIN L. FAULCONER, Mayor

Passed by the Council of The City of San Diego on JUN 20 2016, by the following vote:

Councilmembers	Yeas	Nays	Not Present	Recused
Sherri Lightner	☑	☐	☐	☐
Lorie Zapf	☑	☐	☐	☐
Todd Gloria	☑	☐	☐	☐
Myrtle Cole	☑	☐	☐	☐
Mark Kersey	☑	☐	☐	☐
Chris Cate	☑	☐	☐	☐
Scott Sherman	☑	☐	☐	☐
David Alvarez	☑	☐	☐	☐
Marti Emerald	☑	☐	☐	☐

Date of final passage JUN 29 2016.

(Please note: When a resolution is approved by the Mayor, the date of final passage is the date the approved resolution was returned to the Office of the City Clerk.)

AUTHENTICATED BY:

KEVIN L. FAULCONER
Mayor of The City of San Diego, California.

(Seal)

ELIZABETH S. MALAND
City Clerk of The City of San Diego, California.

By _____, Deputy

Office of the City Clerk, San Diego, California

Resolution Number R- 310544

Appendix B

Urban Water Management Plan Act

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Chapter 1. General Declaration and Policy

SECTION 10610-10610.4

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

10610.2. (a) The Legislature finds and declares all of the following:

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

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

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

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

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

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

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

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

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

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

Chapter 2. Definitions

SECTION 10611-10617

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

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

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

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

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

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses,

reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

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

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

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

Chapter 3. Urban Water Management Plans

Article 1. General Provisions

SECTION 10620-10621

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

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

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

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

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that

share a common source, water management agencies, and relevant public agencies, to the extent practicable.

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

(f) 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.

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

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before 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.

(c) 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).

(d) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

Article 2. Contents of Plan

SECTION 10630-10634

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

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

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

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

water available to the supplier, all of the following information shall be included in the plan:

(1) 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.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, 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.

(3) 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.

(4) 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.

(c) (1) 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.

(2) 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.

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

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

(A) Single-family residential.

(B) Multifamily.

(C) Commercial.

(D) Industrial.

(E) Institutional and governmental.

(F) Landscape.

(G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

(I) Agricultural.

(J) Distribution system water loss.

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

(3) (A) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

(4) (A) If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:

(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.

(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.

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

(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

(2) For an urban wholesale water supplier, as defined in Section 10608.12, a narrative description of the items in clauses (ii), (iv), (vi), and (vii) of subparagraph (B) of paragraph (1), and a narrative description of its distribution system asset management and wholesale supplier assistance programs.

(g) Include a description of 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 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.

(h) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(i) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivision (f) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(j) An urban water supplier that relies 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).

10631.1. (a) 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.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.2. (a) In addition to the requirements of Section 10631, an urban water management plan may, but is not required to, include any of the following information:

(1) An estimate of the amount of energy used to extract or divert water supplies.

(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.

(3) An estimate of the amount of energy used to treat water supplies.

(4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.

(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.

(6) An estimate of the amount of energy used to place water into or withdraw from storage.

(7) Any other energy-related information the urban water supplier deems appropriate.

(b) The department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has

submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

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

(1) 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 that are applicable to each stage.

(2) 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.

(3) 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.

(4) 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.

(5) 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.

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

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), 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.

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

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

(b) Commencing with the urban water management plan update due July 1, 2016, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

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

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

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

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

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

(e) 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.

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

(g) 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.

10634. 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.

Article 2.5. Water Service Reliability

SECTION 10635

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

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

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

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

Article 3. Adoption and Implementation of Plans

SECTION 10640-10645

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

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

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

After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

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

10644. (a) (1) 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.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) (1) Notwithstanding Section 10231.5 of the Government Code, the department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part.

The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(2) A report to be submitted pursuant to paragraph (1) shall be submitted in compliance with Section 9795 of the Government Code.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

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

Chapter 4. Miscellaneous Provisions

SECTION 10650-10656

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

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

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

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

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

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

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

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

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26

(commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

Appendix C

UWMP Checklist

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UWMP Checklist Arranged by Water Code Section

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location *(Page Number)*
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	**5-3, Appendix J**
10608.20(e)	Retail suppliers shall 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 basis for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5 and App E	**5-1 through 5-3, Appendix J**
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	**5-2 through 5-3, Appendix J**
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	**5-3, Appendix J**
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	**Not Applicable**
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	**2-3, Appendix A**
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	**Not Applicable**
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	**5-3, Appendix J**
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	**2-3, Appendix A**
10620(d)(2)	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.	Plan Preparation	Section 2.5.2	**2-2**

10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	**1-2 through 1-7, 3-7 through 3-14, 4-2 through 4-6, Section 6, Section 7, 8-5, 8-6**
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	**2-3, Appendix A**
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	**2-3**
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	**Section 3**
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	**3-3, 3-4**
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	**3-2, 3-3**
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	**3-2, 3-3**
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	**3-2, 3-3**
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	**4-5, Section 6**
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	**3-9, 3-10, 6-6 through 6-12, 6-19, 8-5, 8-6**
10631(b)(1)	Indicate whether a groundwater management plan has 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.	System Supplies	Section 6.2.2	**6-6 through 6-12**
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	**3-9, 3-10, 6-6 through 6-12**
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	**6-7**

10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	**6-7 through 6-10**
10631(b)(3)	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	System Supplies	Section 6.2.4	**3-9, 6-6 through 6-10**
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	**3-9, 3-10, 6-6 through 6-11**
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	**Section 8, Section 9**
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	**8-2, 8-3**
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	**8-4 through 8-6**
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	**3-5, 4-2, 6-2**
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	**4-1 through 4-6**
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	**4-3, 4-5, Appendix I**
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	**Section 7, Appendix E**
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	**Not applicable**
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	System Supplies	Section 6.8	**6-6 through 6-19**
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	**1-2, 3-9, 3-10, 6-4, 6-5, 6-10, 6-11**

10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	**Appendix E**
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	**2-2**
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	**2-2, 2-3**
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	**4-4, 4-5**
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	**Appendix F (F-3 through F-8), Appendix H**
10632(a)(2)	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.	Water Shortage Contingency Planning	Section 8.9	**Appendix F (F-1, F-2)**
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	**Appendix F (F-14 through F-18)**
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	**Appendix F (F-3 through F-8), Appendix H**
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	**Appendix F (F-9 through F-11), Appendix H**
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	**Appendix F (F-8, F-9), Appendix H**
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban	Water Shortage Contingency Planning	Section 8.6	**Appendix F (F-11**

	water supplier, and proposed measures to overcome those impacts.			**through F-14)**
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	**Appendix H**
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	**Appendix F (F-9)**
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	**2-2, 2-3**
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	**3-11 through 3-14**
10633(b)	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.	System Supplies (Recycled Water)	Section 6.5.2.2	**3-11 through 3-14**
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	**3-11 through 3-14**
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	**6-12 through 6-19. 8-6**
10633(e)	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.	System Supplies (Recycled Water)	Section 6.5.4	**6-14, 6-19**
10633(f)	Describe the actions 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.	System Supplies (Recycled Water)	Section 6.5.5	**1-5, 6-14 through 6-19, 8-6**
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	**1-5, 6-14 through 6-19, 8-6**
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	**6-12, 8-6**
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources	Water Supply Reliability Assessment	Section 7.3	**8-1 through 8-3**

	available to the water supplier with the total projected water use over the next 20 years.			
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	**2-3**
10642	Provide supporting documentation that the water supplier has encouraged 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.	Plan Preparation	Section 2.5.2	**1-3 through 1-6, 2-2, 2-3**
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	**2-3, Appendix A**
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	**2-3, Appendix A**
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	**2-3, Appendix A**
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	**2-3**
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	**2-3**
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	**2-3**
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	**2-3**

Appendix D

Department of Water Resources Compliance Tables

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Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
CA3710020	City of San Diego	279,840	167,112
	TOTAL	279,840	167,112

NOTES: Does not include recycled water meters (628 meters). Volume does not include non revenue water or wholesale water.

Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* *drop down list*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
☑	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables Are in Calendar Years
☑	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
1/7	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES: Agency has minimal wholesale sales.	

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name *(Add additional rows as needed)*
San Diego County Water Authority
NOTES:

Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☐	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with CWC 10631. Completion of the table below is optional. If not completed include a list of the water suppliers that were informed.
	Provide page number for location of the list.
☑	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with CWC 10631. **Complete the table below.**
Water Supplier Name *(Add additional rows as needed)*	
California American Water Company	
City of Del Mar	
Santa Fe Irrigation District	
San Dieguito Water District	
City of Poway	
Olivenhain Municipal Water District	
Otay Water District	
NOTES:	

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	1,329,211	1,404,532	1,472,707	1,540,881	1,609,056	1,642,658
NOTES:						

Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	48,673	49,618	51,621	53,625	55,628	56,031
NOTES: Data only includes a portion of the potable wholesale service area identified as Otay-West (pressure zone 73). Wholesale population data is not available for the Coronado (pressure zone 89), North Island (pressure zone 89), and Del Mar (pressure zone 63) areas. Demand forecasts for these areas where population data is not available are held constant as these areas are built out and demands are not expected to increase.						

Table 4-1 Retail: Demands for Potable and Raw Water - Actual			
Use Type *(Add additional rows as needed)*	2015 Actual		
Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Single Family		Drinking Water	60,573
Multi-Family		Drinking Water	37,799
Other	Includes Commercial, Government, and Industrial	Drinking Water	46,072
Landscape	Irrigation	Drinking Water	22,668
Other	Dust mitigation, cleaning	Drinking Water	0
Losses	Non-revenue water	Drinking Water	12,647
		TOTAL	179,759
NOTES: Commercial, industrial, and government water is combined. Wholesale water is provided in Table 4-1 W. Non-revenue water (NRW) obtained from the City of San Diego FY2015 water audit. The value of 13,421 is weighted by the retail portion of water sold (13,421 x (167,112/177,341)). Note that no future savings are included.			

Table 4-1 Wholesale: Demands for Potable and Raw Water - Actual			
Use Type *(Add additional rows as needed)*	2015 Actual		
Drop down list *May select each use multiple times* *These are the only use types that will be recognized by the WUE data online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Sales to other agencies	Drinking water and raw water combined	Drinking Water	10,229
Losses	Non-revenue water	Drinking Water	774
		TOTAL	11,003

NOTES: Includes combined raw water and drinking water. Drinking water is provided to City of Del Mar and California American Water Company. Raw water is provided to the Santa Fe Irrigation District and San Dieguito Water District. Non-revenue water (NRW) obtained from the City of SD FY2015 water audit. The value of 13,421 is weighted by the wholesale portion of water sold (13,421 x (10,229/177,341)). Note that no future savings are included.

Table 4-2 Retail: Demands for Potable and Raw Water - Projected						
Use Type *(Add additional rows as needed)* ***Drop down list*** *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
		2020	2025	2030	2035	2040-opt
Single Family		62,638	80,762	86,340	87,932	87,180
Multi-Family		56,766	73,191	90,080	95,841	95,786
Other	Includes Commercial, Government, and Industrial	48,936	48,238	47,542	47,755	48,014
Losses	Non-revenue water	14,638	17,582	16,857	17,427	17,386
TOTAL		182,978	219,773	240,818	248,955	248,366

NOTES: Irrigation is not separated as a separate use type, but rather is incorported into above use types.
Non-revenue water is included as the portion of total NRW normalized for the retail volume of total demands. Note that no future savings are included.

Table 4-2 Wholesale: Demands for Potable and Raw Water - Projected						
Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Drop down list *May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool.*		2020	2025	2030	2035	2040 *(opt)*
Sales to other agencies		12,200	14,106	15,453	15,759	15,821
Losses	Non-revenue water	1,061	1,227	1,163	1,186	1,191
TOTAL		13,261	15,333	16,616	16,945	17,012

Notes: Non-revenue water is included as the portion of total NRW normalized for the wholesale volume of total demands. Note that no future savings are included

Table 4-3 Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	179,759	182,978	219,773	240,818	248,955	248,366
Recycled Water Demand* *From Table 6-4*	8,195	13,650	13,650	13,650	13,650	13,650
TOTAL WATER DEMAND	187,954	196,628	233,423	254,468	262,605	262,016
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES:						

Table 4-3 Wholesale: Total Water Demands						
	2015	2020	2025	2030	2035	2040*(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	11,003	13,261	15,333	16,616	16,945	17,012
Recycled Water Demand* *From Table 6-4*	4,232	5,850	5,850	5,850	5,850	5,850
TOTAL WATER DEMAND	15,235	19,111	21,183	22,466	22,795	22,862
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES:						

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
07/2014	12,647
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES: Non-revenue water (NRW) obtained from the City of SD FY2015 water audit. The value of 13,421 is weighted by the retail portion of water sold (13,421 x (167,112/177,341)).	

Table 4-4 Wholesale: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
07/2014	774
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES: Non-revenue water (NRW) obtained from the City of SD FY2015 water audit. The value of 13,421 is weighted by the wholesale portion of water sold (13,421 x (10,229/177,341)).	

Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Table 5-1 Baselines and Targets Summary *Retail Agency or Regional Alliance Only*					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	*1996*	*2005*	*171*	*157*	*142*
5 Year	*2004*	*2008*	*163*		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES:					

Table 5-2: 2015 Compliance

Retail Agency or Regional Alliance Only

Actual 2015 GPCD*	2015 Interim Target GPCD*	Optional Adjustments to 2015 GPCD Enter "0" if no adjustment is made *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
123	157	0	0	0	0	123	123	Yes

**All values are in Gallons per Capita per Day (GPCD)*

NOTES:

Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Add additional rows as needed						
Alluvial Basin	Santee/El Monte: San Vicente GW Production Well	500	500	500	500	500
	TOTAL	500	500	500	500	500
NOTES:						

Table 6-1 Wholesale: Groundwater Volume Pumped						
[X]	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
	TOTAL	0	0	0	0	0
NOTES: Groundwater pumping is included in retail pumping see Table 6-1 R.						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
100	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
100	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Add additional rows as needed						
San Diego Public Utilities Department	Metered	152,564	San Diego Public Utilities Department	Point Loma Wastewater Treatment Plant	Yes	No
San Diego Public Utilities Department	Metered	28,340	San Diego Public Utilities Department	North City Water Reclamation Plant	Yes	No
San Diego Public Utilities Department	Metered	9,409	San Diego Public Utilities Department	South Bay Water Reclamation Plant	Yes	No
Total Wastewater Collected from Service Area in 2015:		190,313				

NOTES: Includes wastewater generated outside of water service area since wastewater service area is larger than the water service area.

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015

☐ No wastewater is treated or disposed of within the UWMP service area.
The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
Point Loma Wastewater Treatment Plant	Pacific Ocean via outfall	Pacific Ocean via outfall		Ocean outfall	Yes		152,564	152,564	0	0
North City Water Reclamation Plant	Sewer	Sewer		Other	Yes	Tertiary	18,094	8,946	7,029	1,006
South Bay Water Reclamation Plant	Pacific Ocean via outfall	Pacific Ocean via outfall		Ocean outfall	Yes	Tertiary	8,962	3,542	1,166	3,226
						Total	179,620	165,052	8,195	4,232

NOTES: North City Water Reclamation Plant treated wastewater not used for recycling is conveyed to Point Loma Wastewater Treatment Plant. Point Loma Wastewater Treatment Plant treatment level is chemically enhanced primary. North City Water Reclamation Plant and South Bay Water Reclamation Plant treatment levels are secondary for non-recycled water and tertiary for recycled water. The discharged treated wastewater volumes for the North City and South Bay Water Reclamation Plants do not represent any sludge volume sent to Point Loma Wastewater Treatment Plant; as a result there is a discrepancy in wastewater collected (Table 6-2 R) and wastewater Treated (Table 6-3 R) at the plants.

Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2015										
☒	Wholesale supplier neither distributes nor provides supplemental treatment to recycled water. The supplier will not complete the table below.									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
						Total	0	0	0	0
NOTES: Wastewater treatment and discharge is included in retail wastewater treatment and discharge see Table 6-3 R.										

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier.
The supplier will not complete the table below.

Name of Agency Producing (Treating) the Recycled Water:	San Diego Public Utilitites Department
Name of Agency Operating the Recycled Water Distribution System:	San Diego Public Utilitites Department
Supplemental Water Added in 2015	None
Source of 2015 Supplemental Water	N/A

Beneficial Use Type	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)								
Golf course irrigation								
Commercial use								
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other *(Provide General Description)*	Landscape irrigation and industrial reuse combined	Tertiary	8,195	13,650	13,650	13,650	13,650	13,650
		Total:	8,195	13,650	13,650	13,650	13,650	13,650

**IPR - Indirect Potable Reuse*

NOTES: Recycled water is not segregated into end user sectors. Sales to other agencies are included on Table 6-4 W.

Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
☐	Recycled water is not directly treated or distributed by the supplier. The supplier will not complete the table below.						
Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 *(opt)*
Add additional rows as needed							
Otay Water District	Tertiary		4,600	4,600	4,600	4,600	4,600
City of Poway	Tertiary		750	750	750	750	750
Olivenhain Municipal Water District	Tertiary		500	500	500	500	500
Combined Wholesale	Tertiary	4,232					
	Total	4,232	5,850	5,850	5,850	5,850	5,850

NOTES: Recycled water sales within the service area included in Table 6-4 R. For 2015 data is for all wholesale sales and is not separated by receiving suppliers.

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual			
☐	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.		
Use Type		**2010 Projection for 2015**	**2015 Actual Use**
Agricultural irrigation			
Landscape irrigation (excludes golf courses)			
Golf course irrigation			
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	Landscape irrigation and industrial reuse combined	9,253	8,195
	Total	9,253	8,195
NOTES: Wholesale is included in Table 6-5 W.			

Table 6-5 Wholesale: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual		
☐	Recycled water was not used or distributed by the supplier in 2010, nor projected for use or distribution in 2015. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2010 Projection for 2015	2015 actual use
Add additional rows as needed		
Combined Wholesale	7,697	4,232
Total	7,697	4,232

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
Pages 6-14 to 6-17	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Add additional rows as needed			
City of San Diego Pure Water - Phase 1a at North City WRP	Potable reuse	2025	16,800
City of San Diego Pure Water - Phase 1b at North City WRP	Potable reuse	2030	16,800
City of San Diego Pure Water - Phase 2 future site in Central Area	Potable reuse	2035	42,598
City of San Diego Pure Water - Phase 3 at South Bay WRP	Potable reuse	2035	16,800
Potential Recycled Water Sales	Recycled Water Sales	unknown	5,313
		Total	98,311
NOTES: Future recycled water use listed in this table are not firm supplies, but rather potential projects.			

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
6-11 to 6-12 6-18 to 6-19	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
San Diego Formation	No		Groundwater production for non-potable irrigation and potable use	2030	Average Year	1,600
Mission Valley Basin	No		Brackish groundwater recovery	2030	Average Year	1,680
San Pasqual Valley Basin	No		Brackish groundwater recovery	2040	Average Year	1,619
Rainwater Harvesting	No		Harvesting of rainwater via centralized and decentralized options	2035	Average Year	416
Graywater	No		Graywater systems installed at 50,000 residential dwellings	2035	Average Year	2,575
NOTES: All projects are potential projects and are not firm supplies. Projects are not segregated by wholesale and retail.						

Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Agency
	Drop Down Menu	*If Yes, Agency Name*				
Add additional rows as needed						
NOTES: Potential projects are included in Table 6-7 R. Projects are not segregated by wholesale and retail.						

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Add additional rows as needed				
Surface water		6,279	Drinking Water	6,279
Groundwater	Includes both raw water and drinking water	500	Drinking Water	500
Recycled Water	Retail service area only	8,195	Recycled Water	8,195
Purchased or Imported Water	From SDCWA (includes both raw water and drinking water)	172,980	Drinking Water	172,980
	Total	187,954		187,954

NOTES: Includes supplies for retail only. It is assumed wholesale sales are derived from raw and potable imported water purchases and are accounted in Table 6-8W. Purchased or imported water supply is total retail consumption, 179,759 AF (Table 4-1 R), minus surface water and groundwater, plus non revenue retail water plus non-revenue water of 12,647 AF (Table 4-1 R).

Table 6-8 Wholesale: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Add additional rows as needed				
Recycled Water	Sales to other agencies	4,232	Recycled Water	4,232
Surface water	Sales to other agencies includes both raw and potable water	11,003	Drinking Water	11,003
Purchased or Imported Water	Sales to other agencies includes both raw and potable water	0	Drinking Water	0
	Total	15,235		15,235

NOTES: Wholesale potable and raw water sales are aggregated with retail water sources. For purposes of this analysis only it is assumed the potable and raw water sales are derived from imported water purchases, thus imported water purchases in Table 6-8 R are reduced by wholesale raw and wholesale potable water sales. Purchased or imported water supply in this table is total potable consumption, 10,299 AF (Table 4-1 W), plus non-revenue water of 774 AF (Table 4-1 W).

Table 6-9 Retail: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report To the Extent Practicable*									
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		**2020**		**2025**		**2030**		**2035**		**2040** *(opt)*	
		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed											
Surface water		22,900	22,900	22,800	22,800	22,700	22,700	22,600	22,600	22,500	22,500
Groundwater	Includes both raw water and drinking water	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100	3,100
Recycled Water	Retail service area only	13,650	13,650	13,650	13,650	13,650	13,650	13,650	13,650	13,650	13,650
Purchased or Imported Water	From SDCWA (includes both raw water and drinking water)	156,978	156,978	193,873	193,873	215,019	215,019	223,255	223,255	222,766	222,766
	Total	196,628	196,628	233,423	233,423	254,469	254,469	262,605	262,605	262,016	262,016

NOTES: For purposes of this analysis only it is assumed the potable and raw water sales are derived from imported water purchases, thus imported water purchases are reduced by wholesale raw and potable water sales here and acccounted for in Table 6-9 W.
Recycled water is assumed to not mitigate potable demands.
The purchase/imported component includes NRW weighted by retail uses.

Table 6-9 Wholesale: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report To the Extent Practicable*									
		2020		**2025**		**2030**		**2035**		**2040** *(opt)*	
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed											
Recycled Water	Sales to other agencies	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
Purchased or Imported Water	Potable and raw water sales to other agencies	13,261	13,261	15,333	15,333	16,616	16,616	16,945	16,945	17,012	17,012
	Total	19,111	19,111	21,183	21,183	22,466	22,466	22,795	22,795	22,862	22,862

includes losses

NOTES: For purposes of this analysis only it is assumed the potable and raw water sales are derived from imported water purchases.
Recycled water is assumed to not mitigate potable demands. Non-revenue water is included as the portion of total NRW normalized for the wholesale volume of total demands.

Table 7-1 Retail: Basis of Water Year Data			
Year Type	**Base Year** *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	**Available Supplies if Year Type Repeats**	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☐ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available	**% of Average Supply**
Average Year	1978		100%
Single-Dry Year	1990		106%
Multiple-Dry Years 1st Year	1990		106%
Multiple-Dry Years 2nd Year	1991		100%
Multiple-Dry Years 3rd Year	1992		104%
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			

Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

NOTES:

Table 7-1 Wholesale: Basis of Water Year Data			
Year Type	**Base Year** *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	**Available Supplies if Year Type Repeats**	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☐ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available	**% of Average Supply**
Average Year	1978		100%
Single-Dry Year	1990		105%
Multiple-Dry Years 1st Year	1990		105%
Multiple-Dry Years 2nd Year	1991		100%
Multiple-Dry Years 3rd Year	1992		103%
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			
Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table. Suppliers may create an additional worksheet for the additional tables.			
NOTES:			

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	196,628	233,423	254,469	262,605	262,016
Demand totals *(autofill from Table 4-3)*	196,628	233,423	254,468	262,605	262,016
Difference	0	0	0	0	0

NOTES: Includes supplies for retail only, wholesale demands and supplies are included in Table 7-2 W. Imported water purchases will be decreased as needed in order for supplies not to exceed demands.
Calculations here include a demand factor of 1 as shown in Table 7-1.
Future savings are included and assumed to be associated with retail uses only.

Table 7-2 Wholesale: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	19,111	21,183	22,466	22,795	22,862
Demand totals *(autofill fm Table 4-3)*	19,111	21,183	22,466	22,795	22,862
Difference	0	0	0	0	0
NOTES: Calculations here include a demand factor of 1 as shown in Table 7-1. Includes supplies for wholesale only; inclusive of non-potable supplies and demands. Imported water purchases will be decreased as needed in order for supplies not to exceed demands.					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	199,037	240,554	263,471	272,608	272,175
Demand totals	199,037	240,554	263,471	272,608	272,175
Difference	0	0	0	0	0

NOTES: Conservation savings included. Demand factor of 1.065 incorporated. Local surface water supplies are multiplied by a supply factor of 0.73.

Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	19,973	22,180	23,546	23,897	23,968
Demand totals	19,973	22,180	23,546	23,897	23,968
Difference	0	0	0	0	0

NOTES: Demand factor of 1.065 incorporated. Includes supplies for wholesale only; inclusive of non-potable supplies and demands.

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	199,037	240,554	263,471	272,608	272,175
	Demand totals	199,037	240,554	263,471	272,608	272,175
	Difference	0	0	0	0	0
Second year	Supply totals	187,374	226,279	247,754	256,316	255,911
	Demand totals	187,374	226,279	247,754	256,316	255,911
	Difference	0	0	0	0	0
Third year	Supply totals	194,859	235,441	257,841	266,772	266,349
	Demand totals	194,859	235,441	257,841	266,772	266,349
	Difference	0	0	0	0	0
Fourth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

NOTES: These values are based on normal year demands multiplied by the 1990 hydrologic demand factor of 1.065, the 1991 factor of 0.998, and the 1992 factor of 1.041. Local surface water supplies are multiplied by the corresponding supply factors of 0.73, 0.71, and 0.83. Conservation savings are included.

Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	19,973	22,180	23,546	23,897	23,968
	Demand totals	19,973	22,180	23,546	23,897	23,968
	Difference	0	0	0	0	0
Second year	Supply totals	19,084	21,153	22,433	22,761	22,828
	Demand totals	19,084	21,153	22,433	22,761	22,828
	Difference	0	0	0	0	0
Third year	Supply totals	19,655	21,812	23,147	23,490	23,559
	Demand totals	19,655	21,812	23,147	23,490	23,559
	Difference	0	0	0	0	0
Fourth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

NOTES: These values are based on normal year demands multiplied by the 1990 hydrologic demand factor of 1.065, the 1991 factor of 0.998, and the 1992 factor of 1.041. Includes supplies for wholesale only; inclusive of non-potable supplies and demands.

Table 8-1 Retail Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
Permanent Water Waste Prohibitions	0%	Permanent and in force at all times
Drought Response Level 1	10%	Drought Watch Condition - Reasonable probability of a supply shortage and when demands need to be reduced up to 10%
Drought Response Level 2	20%	Drought Alert Condition - When demands need to be reduced up to 20%
Drought Response Level 3	40%	Drought Critical Condition - When demands need to be reduced by 40%
Drought Response Level 4	>40%, including 50%	Drought Emergency Condition - When demands need to be reduced by greater than 40%, including a 50% reduction
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		
NOTES:		

Table 8-1 Wholesale Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Supply Reduction[1]	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
Permanent Water Waste Prohibitions	0%	Permanent and in force at all times
Drought Response Level 1	10%	Drought Watch Condition - Reasonable probability of a supply shortage and when demands need to be reduced up to 10%
Drought Response Level 2	20%	Drought Alert Condition - When demands need to be reduced up to 20%
Drought Response Level 3	40%	Drought Critical Condition - When demands need to be reduced by 40%
Drought Response Level 4	>40%, including 50%	Drought Emergency Condition - When demands need to be reduced by greater than 40%, including a 50% reduction
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		
NOTES:		

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
Permanent Water Waste Prohibitions	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
Permanent Water Waste Prohibitions	Landscape - Limit landscape irrigation to specific times	Before 10 am and after 6 pm	Yes
Permanent Water Waste Prohibitions	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		Yes
Permanent Water Waste Prohibitions	Other - Prohibit use of potable water for washing hard surfaces	Unless power washer or hose with shutoff nozzles used.	Yes
Permanent Water Waste Prohibitions	Other water feature or swimming pool restriction	No overfilling of swimming pools and spas.	Yes
Permanent Water Waste Prohibitions	Other water feature or swimming pool restriction	No use of non-recirculating ornamental fountains or cascading fountains.	Yes
Permanent Water Waste Prohibitions	Other	Vehicles may only be washed in a commercial car wash using a recirculation system or may also be washed using a hose with an automatic shutoff nozzle or hand-held container.	Yes
Permanent Water Waste Prohibitions	Other - Require automatic shut of hoses	For car washing and washing hard surfaces.	Yes
Permanent Water Waste Prohibitions	CII - Other CII restriction or prohibition	No single pass-through cooling systems and non-recirculating systems in commercial laundries	Yes
Permanent Water Waste Prohibitions	CII - Restaurants may only serve water upon request		Yes
Permanent Water Waste Prohibitions	CII - Lodging establishment must offer opt out of linen service		Yes
Drought Response Level 1	Landscape - Limit landscape irrigation to specific times	Three assigned days per week.	Yes

Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
Drought Response Level 1	Landscape - Other landscape restriction or prohibition	Areas with no irrigation system must use a hand-held hose with a shutoff nozzle, hand-held container, or a garden hose with a sprinkler timer	Yes
Drought Response Level 1	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing of automobiles, vehicles, airplanes, and other mobile equipment permitted only before 10 am and after 6 pm with a hand-held container or a hand-held hose with shutoff nozzle. Washing at car wash facilities can occur at anytime. Car wash facilities not using partially recirculated water will be subject to volume limits. Boats and boat engines are permitted to be washed down after use. Mobile equipment washings are exempt from these regulations where the health, safety, and welfare of the public are contingent upon frequent vehicle washings.	Yes
Drought Response Level 1	Other - Prohibit use of potable water for construction and dust control	Except where not feasible.	Yes
Drought Response Level 1	Other	Water from fire hydrants is limited to firefighting.	Yes
Drought Response Level 1	Other	Construction operations receiving water from a fire hydrant meter or water truck will not use water beyond that required for normal construction activities. Construction projects requiring water for new landscaping materials shall adhere to the designated irrigation hours of before 10:00 a.m. and after 6:00 p.m.	Yes
Drought Response Level 1	Landscape - Other landscape restriction or prohibition	Irrigation is prohibited during a rain event.	Yes

Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
Drought Response Level 2	Landscape - Other landscape restriction or prohibition	Landscape irrigation limited to 5 minutes per watering station. Not applicable to systems using water efficient devices, including drip/micro-irrigation systems and stream rotor sprinklers.	Yes
Drought Response Level 2	Landscape - Limit landscape irrigation to specific days	Two assigned days per week. Not applicable to systems using water efficient devices, including drip/micro-irrigation systems and stream rotor sprinklers.	Yes
Drought Response Level 2	Landscape - Limit landscape irrigation to specific days	Landscaped irrigation of areas not covered by sprinklers is limited to two assigned days per week using a hand-held container, hand-held hose with shutoff nozzle, or low volume non-spray irrigation, such as a soaker hose.	Yes
Drought Response Level 2	Water Features - Restrict water use for decorative water features, such as fountains	Operation of ornamental fountains is prohibited, except when needed for maintenance.	Yes
Drought Response Level 2	Landscape - Limit landscape irrigation to specific times	Irrigating potted plants, non-commercial vegetable gardens, and fruit trees may take place on any day, but only before 10:00 am or after 6:00 pm	Yes
Drought Response Level 3	Landscape - Limit landscape irrigation to specific days	Landscape irrigation limited to two assigned days per week or no more than 18 minutes per day with impact rotors, rotating nozzles, or micro-spray heads.	Yes
Drought Response Level 3	Water Features - Restrict water use for decorative water features, such as fountains	Refilling ornamental lakes or ponds is prohibited, except to the extent necessary to sustain plants or animals that were present in the water feature before a drought response level was declared. Operation of cascading and recreational fountains prohibited, except to extent needed for maintenance.	Yes

Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
Drought Response Level 3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Washing vehicles is prohibited, except at commercial car washes that recirculate water, or by using high pressure/low volume wash systems	Yes
Drought Response Level 4	Landscape - Prohibit all landscape irrigation	Except crops and landscape products of commercial growers and nurseries. Does not apply to maintenance of landscaping for fire protection, maintenance of shrubs and trees watered no more than 2 assigned using specific irrigation methods, maintenance of rare or protected plants or plants required by rare animals, and maintenance of landscaping at specific locations (parks, schools, etc.).	Yes
Drought Response Level 4	Other water feature or swimming pool restriction	No filling of pools or spas.	Yes
NOTES: Restrictions are cumulatively progressing with each stage. Appendix H contains full text of restrictions and prohibitions on end uses.			

Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*
Add additional rows as needed		
Drought Response Level 3	Moratorium or Net Zero Demand Increase on New Connections	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Drought Response Level 4	Other	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Drought Response Level 2 and 3	Implement or Modify Drought Rate Structure or Surcharge	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Drought Response Level 2 and ongoing	Expand Public Information Campaign	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Improve Customer Billing	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Increase Frequency of Meter Reading	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Offer Water Use Surveys	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Provide Rebates on Plumbing Fixtures and Devices	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Provide Rebates for Landscape Irrigation Efficiency	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Provide Rebates for Turf Replacement	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Decrease Line Flushing	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Reduce System Water Loss	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
Ongoing at all times	Increase Water Waste Patrols	See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.
NOTES: See Table F-2, Consumption Reduction Methods, in UWMP Appendix F.		

Table 8-4 Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	181,567	176,118	188,491

NOTES: Since no shortages are assumed to occur, supply is set equal to demand, which is ((retail demand + retail NRW) x (demand factor)) + recycled retail demand. 2016 corresponds to hydrology year 1990, 2017 to 1991, and 2018 to 1992. Recycled demand is extrapolated from existing in 2015 to forecast in 2020. Conservation savings do not come into effect until 2020 so are not included in these values.

Table 8-4 Wholesale: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	19,346	18,650	19,428
NOTES: Since no shortages are assumed to occur, supply is set equal to demand, which is ((wholesale demand + wholesale NRW)x(demand factor)) + wholesale recycled supply. 2016 corresponds to hydrology year 1990, 2017 to 1991, and 2018 to 1992			

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Carlsbad	☑	☑
Chula Vista	☑	☑
Coronado	☑	☑
El Cajon	☑	☑
Encinitas	☑	☑
Escondido	☑	☑
Imperial Beach	☑	☑
La Mesa	☑	☑
Lemon Grove	☑	☑
National City	☑	☑
Oceanside	☑	☑
Poway	☑	☑
Rancho Santa Fe	☑	☑
San Diego	☑	☑
San Diego Association of Governments	☑	☑
San Diego Local Agency Formation Commission (LAFCO)	☑	☑
San Marcos	☑	☑
Santee	☑	☑
Solana Beach	☑	☑
Vista	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Diego County	☑	☑
NOTES:	☐	☐

Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☑	Supplier has notified more than 10 cities or counties in accordance with CWC 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
See Table 10-1 R	Provide the page or location of this list in the UWMP.	
☐	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Del Mar	☑	☑
Coronado (California Water Co.)	☑	☑
North Island	☑	☑
Otay Mesa East (California Water Co.)	☑	☑
Otay Mesa West (California Water Co.)	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
	☐	☐
	☐	☐
NOTES:		

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Appendix E

California Urban Water Conservation Council Biennial Report

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CUWCC BMP Retail Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

82 City of San Diego - Retailer

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name:	Luis Generoso
Title:	Water Resources Manager
Email:	lgeneroso@sandiego.gov

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.		http://docs.sandiego.gov/municode/MuniCodeChapter06/Ch06Art07Division38.pdf	
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			NA
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			NA
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			NA
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			NA
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			NA

At Least As effective As Yes

NA

Exemption No

BMP 1.1 Operation Practices **ON TRACK**

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control **ON TRACK**

82 City of San Diego - Retailer

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
Copy1_of_AWWA___Free_Water_Audit_Software___CUWCC_Submission.xls	
AWWA Water Audit Validity Score?	64
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
7737	11771248	9287852	0	False	0	0

At Least As effective As No

Section above not functional. App Losses/conn/day: 18.66
*Real Losses/conn/day: 33.99
*Real Losses/main/day: N/A
*Real Losses/conn/day/psi: .4
*UARL: 6212.38 AF
*CARL: 10,672.03 AF
*ILI: 1.72 SUPPLIED: 200,208 AF UNITS: Acre Feet

Exemption No

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

NOT ON TRACK

82 City of San Diego - Retailer

Numbered Unmetered Accounts	Yes
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes
Feasibility Study provided to CUWCC?	Yes

Date: 12/16/2013

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters	Yes
At Least As effective As	No
Exemption	No

Comments:

Meter Readings/Year: SF: 1,330,452; MF: 338,448; COM 169,164; IND 1,872; IRR 51,828; Other Const 7,440; Institution 104,388; Other Cal-AM 72; Other Outside 456

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

On Track

82 City of San Diego - Retailer

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Comodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Increasing Block	Yes	121786603	52881043
Multi-Family	Uniform	Yes	69708743	12648559
Commercial	Uniform	Yes	79841365	9805059
Dedicated Irrigation	Uniform	Yes	50443841	4637037
			321780552	**79971698**

Calculate: V / (V + M) **80 %**

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: No

Customer Class	Rate Type	Conserving Rate?
Single-Family	Other	No

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

82 **City of San Diego - Retailer** **Retail**

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Metropolitan Water District of SC,San Diego County Water Authority

The name of agency, contact name and email address if not CUWCC Group 1 members

Home Depot; local nurseries

Did at least one contact take place during each quater of the reporting year? Yes

Public Outreach Program List	Number
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	20
Newsletter articles on conservation	10
Website	80000
General water conservation information	17
Landscape water conservation media campaigns	3
Total	**80050**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	Number
Articles or stories resulting from outreach	4
News releases	10
Articles or stories resulting from outreach	4
News releases	10
Total	**28**

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Estimated towards public info	343000
Total Amount:	**343000**

Public Outreah Additional Programs
Water Awareness Month
Annual Water Conservation Poster Contest
Water Conservation Film Contest

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Public Outreah Additional Programs
Water Conservation Calendars
Earth Fair

Description of all other Public Outreach programs

plant events

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

82 City of San Diego - Retailer **Retail**

Does your agency implement School Education programs? No

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

San Diego County Water Authority

Materials meet state education framework requirements? Yes

Miss Smarty Plants and Splash Labs and talking points to teachers for poster contest

Materials distributed to K-6? Yes

Coloring books, water conservation tips and books.

Materials distributed to 7-12 students? Yes (Info Only)

Annual high school film contest information and water conservation tips

Annual budget for school education program: 28000.00

Description of all other water supplier education programs

Comments:

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2014

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Baseline GPCD: 165.12

GPCD in 2014 136.88

GPCD Target for 2018: 135.40

Biennial GPCD Compliance Table

ON TRACK

		Target		Highest Acceptable Bound	
Year	Report	% Base	GPCD	% Base	GPCD
2010	1	96.4%	**159.20**	100%	**165.10**
2012	2	92.8%	**153.20**	96.4%	**159.20**
2014	3	89.2%	**147.30**	92.8%	**153.20**
2016	4	85.6%	**141.30**	89.2%	**147.30**
2018	5	82.0%	**135.40**	82.0%	**135.40**

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Appendix F

Water Shortage Contingency Plan

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Appendix F

Water Shortage Contingency Plan

Due to increasing strain caused by California's ongoing drought, the City must be prepared for potential constraints on its imported water supply. This section examines the City's contingency plans if it had to declare a water emergency or enact more stringent restrictions on water use.

The City encourages its residents to use water wisely at all times, and the San Diego Municipal Code formalizes the City's Water Shortage Contingency Plan in Chapter 6, Article 7, Division 38. These Emergency Water Regulations (shown in their entirety in Appendix G) specify water use restrictions that are in effect at all times (Water Waste Prohibitions under §67.3803), and authorize the City to determine and declare water shortages and water shortage emergencies in its service area. The regulations also specify four levels of drought condition that include a graduated scale of water use restrictions (§67.3805-08) that take effect in each level. During the current drought, the Emergency Water Regulations have served as an effective tool in reducing water use.

On July 1, 2015, the City declared a Drought Response Level 2—Drought Alert Condition to comply with a State mandate requiring the City of San Diego to reduce its water usage by 16 percent. The Emergency Water Regulations were amended by the City on June 29, 2015, to satisfy the SWRCB's Emergency Conservation Regulations that took effect on May 18, 2015. The City will continue to review its Emergency Water Regulations in light of the SWRCB's Emergency Conservation Regulations, and will address any deficiencies as information becomes available. In the meantime, before formalizing any future amendments to the Emergency Water Regulations, any additional conservation requirements imposed by the SWRCB will be available on the City's Mandatory Water Use Restrictions webpage at: http://www.sandiego.gov/water/conservation/drought/prohibitions.shtml.

The Act requires agencies to incorporate a water shortage contingency analysis based on two scenarios: 1) an extended drought and 2) a water emergency, such as a catastrophic event that disrupts the availability of supplies. In addition, the Act requires an estimate of the minimum supply available for the next three years based on the driest three consecutive years on record. This section discusses the City's compliance with the Act, as outlined in Section 10632 (a) (1) through (9) of the California Water Code, and steps taken by the SDCWA and MWD to address an extended drought and water emergency.

F.1 Estimate of Minimum Supply for Next Three Years

The Act requires that an agency provide an estimate of the water supply available during the next three years, 2016 through 2018, based on a repeat of the three driest consecutive years on record. Table F-1 provides this projection, which is based on the historic hydrologic period of 1990 to 1992.

Table F-1 Three-Year Estimated Minimum Water Supply

	Actual Supply (AFY)	Projected Supply AFY Followed by Repeat of Driest Three Consecutive Years FY 1990 to 1992		
	2015	2016	2017	2018
San Diego County Water Authority	173,754	172,340	164,527	173,256
Local Surface Water	16,508	12,937	13,514	16,845
Groundwater	500	500	500	500
Recycled Water	8,195	9,286	10,377	11,468
Total	**198,957**	**195,063**	**188,918**	**202,069**

1. Excludes wholesale recycled water that City provides outside of its service area.

During such severe drought periods, the City's regional water wholesaler, SDCWA, activates its Water Shortage and Drought Response Plan, which it did in 2014 in response to the current drought. The plan identifies four water supply conditions and progressive steps that SDCWA can take during shortages to minimize water supply impacts. These are:

1) Normal—Water supplies match demand with some water stored in reservoirs for future use.

2) Voluntary Supply Management (Stage 1)—MWD withdraws water from storage to meet current-year demands. SDCWA adjusts its operations to maximize water stored and encourages voluntary conservation.

3) Supply Enhancement (Stage 2)—MWD reduces deliveries, and SDCWA removes water from storage and seeks temporary water transfers to boost supplies. Member agencies may be required to increase conservation.

4) Mandatory Cutbacks (Stage 3)—MWD and SDCWA reduce deliveries to member agencies. Extraordinary conservation becomes mandatory for residential, commercial, and institutional customers.

On May 14, 2015, in response to supply cutbacks from MWD and the SWRCB's mandatory reductions in potable water use, SDCWA's Board of Directors adopted a set of measures to help local water agencies meet the State's water use reduction targets. These are summarized as follows:

1) Declare a Stage 3, Mandatory Cutbacks, of the Water Shortage and implement its Drought Response Plan.

2) Enact an ordinance including the following:

   a. Approve member agency municipal and industrial supply allocations for Fiscal Year 2016;

b. Approve member agency Transitional Special Agricultural Water Rate supply allocation for FY 2016 (agricultural users who participate in the program receive less water during water shortages or emergencies in exchange for an exemption for paying storage and other charges);

c. Require member agencies to limit outdoor irrigation of ornamental landscapes and turf using potable water to no more than two days per week.

3) Direct staff to investigate the potential of a regional demand offset plan for drought periods in coordination with its member agencies.

MWD, SDCWA's main water supplier, has developed a Water Surplus and Drought Management Plan (WSDM Plan) to address water shortages. It has also developed a Water Supply Allocation Plan (WSAP) that establishes a formula for calculating allocations to member agencies if MWD cannot meet firm demands in a given year. This Water Supply Allocation Plan provides a needs-based allocation strategy based on priorities for the use of MWD's water supplies to achieve reliability, and is used in conjunction with the Water Surplus and Drought Management Plan. The allocation formula was developed by MWD with substantial input from its member agencies. The Water Surplus and Drought Management Plan lists actions that the MWD could take to augment its water supplies before implementing the Water Supply Allocation Plan. Refer to Section 7 for more detail about how MWD addresses water shortages during drought conditions.

F.2 Permanent Water Waste Prohibitions and Stages of Action

The City's Emergency Water Regulations prohibit water waste and specify four stages of action that the City can undertake in response to water supply shortages. These graduated stages of action specify water conservation measures that the City can implement in response to shortages in water supply, as expressed by percentages. The Emergency Water Regulation measures combine prohibitions on end uses with methods to reduce consumption. The State DWR defines prohibitions on end uses as measures that address areas that are the responsibility of end users, such as a broken sprinkler or leaking faucet. Consumption reduction methods are actions invoked by a water agency to reduce consumption, such as expanding public information campaigns and offering water use surveys. The majority of measures in the Emergency Water Regulations are prohibitions on end uses. However, the regulations include four consumption reduction methods. In addition, the City has implemented many consumption reduction methods not included in the Emergency Water Regulations, which are discussed in Section F.4, Consumption Reduction Methods.

The applicability of the Emergency Water Regulations is described in §67.3804 of the San Diego Municipal Code. In general, the Emergency Water Regulations do not apply to special supply programs, such as the SDCWA Special Agricultural Rate Programs. The regulations also do not apply, in general, to water drawn from private wells, reclaimed water, water from graywater systems, areas serviced by the Park and Recreation Department, or industrial manufacturing, processing, or research and development.

The Mayor[1] can, when necessary, recommend one of four Drought Response Levels to the City Council, which has the authority to declare the appropriate conservation level necessary to ensure sufficient supplies will be available to meet anticipated demands. The City Council can also terminate a Drought Response Level, based on the Mayor's recommendation. The Emergency Water Regulations (§67.3809) provide the process for notifying and declaring Drought Response Levels. The City's Public Utilities Department will monitor the projected supply and demand during the water shortage and recommend to the Mayor the extent of conservation required. The implementation of conservation measures, as described in this subsection, addresses reductions in water supplies in four stages, ranging from 0 percent to more than 40 percent.

Permanent Water Waste Prohibitions (0 percent reduction in consumer demand)

Permanent Water Waste prohibitions are in effect at all times in the SDPUD's water service area. These prohibited uses, defined in §67.3803 of the City's Emergency Water Regulations, are intended to promote water conservation as a permanent way of life in San Diego, even during years of normal or above normal precipitation. All permanent water waste prohibitions target end uses. The following is an abbreviated list of restrictions; the entire list of restrictions is provided in Appendix G, Emergency Water Regulations:

- No water may leave a customer's property by drainage due to excessive irrigation and/or uncorrected leaks.
- Users must repair or stop all water leaks upon discovery, or within 72 hours of notification by the City.
- No washing down of sidewalks, driveways, parking areas, tennis courts, or other paved areas without using a power washer or a hose with a shutoff nozzle.
- No overfilling of swimming pools and spas.
- No use of non-recirculating ornamental fountains or cascading fountains.
- Vehicles may be washed only in a commercial car wash, or using a hose with an automatic shutoff nozzle or hand-held container.
- No single pass-through cooling systems and no non-recirculating systems are allowed in all conveyer car wash and commercial laundry systems.
- Restaurants and other food establishments shall only serve and refill water upon request.
- Guests in hotels and motels shall be provided the option of not laundering towels and linens daily.

[1] While the Drought Response is often conducted by the City Manager, the City changed from a City Manager form of government to strong Mayor form of government in 2006. While the policy language uses "City Manager", this document will refer to the Mayor.

- Irrigation of potted plants, non-commercial vegetable gardens and fruit trees, residential and commercial landscapes (including golf courses, parks, school grounds, and recreation fields) is limited to the hours before 10:00 am and after 6:00 p.m.

- Irrigation may occur at any time as required by a landscape permit for erosion control; the establishment, repair, or renovation of public use fields for schools and parks; landscape establishment following a disaster; the renovation or repair of an irrigation system with an operator present; or for nursery and commercial growers using a hand-held hose equipped with a positive shutoff device, a hand-held container, or drip or micro-irrigation distribution systems. Irrigation of nursery propagation beds is permitted at any time.

Drought Response Level 1—Drought Watch Condition (consumer demand reduction of up to 10 percent is required)

The City implements a Drought Response Level 1—Drought Watch Condition when there is reasonable probability of a supply shortage, and when demand needs to be reduced by up to 10 percent to ensure there will be sufficient supplies to meet demands. To reduce consumption during a Drought Watch Condition and all higher levels of conditions, the City will increase its public education and outreach efforts to build awareness of voluntary water conservation practices and all permanent water waste prohibitions. An abbreviated list of voluntary water conservation practices under a Drought Watch Condition appears below. The complete list is provided in Appendix G, Emergency Water Regulations.

- Landscape irrigation is limited to no more than three assigned days per week on a schedule posted by the Mayor. This does not apply to commercial growers or nurseries, nor to the irrigation of golf course greens and tees.

- Areas with no irrigation system must use a hand-held hose with a shutoff nozzle, hand-held container, or a garden hose sprinkler system on a timer.

- Washing of automobiles, vehicles, airplanes, and other mobile equipment is permitted only before 10:00 a.m. or after 6:00 p.m. with a hand-held container or a hand-held hose with shutoff nozzle. Washing is permitted at any time at commercial car washes. Car washes that do not use partially recirculated water will be subject to volume limits designated by a resolution of the City Council. Boats and boat engines are permitted to be washed down after use. Mobile equipment washings are exempt from these regulations where the health, safety, and welfare of the public are contingent upon frequent vehicle washings.

- Use of recycled or non-potable water, when available, is required for construction purposes.

- Water from fire hydrants is limited to firefighting.

- Construction operations receiving water from a fire hydrant meter or water truck will not use water beyond that required for normal construction activities. Construction projects requiring water for new landscaping materials shall adhere to the designated irrigation hours of before 10:00 a.m. and after 6:00 p.m.

- Irrigation is prohibited during and within 48 hours of a rain event.

Drought Response Level 2—Drought Alert Condition (consumer demand reduction of up to 20 percent is required)

A Drought Response Level 2—Drought Alert Condition is implemented when demand must be reduced up to 20 percent to ensure sufficient supplies. During a Drought Alert Condition, a new set of mandatory water conservation practices takes effect, in addition to all Permanent Water Waste Prohibitions and Level 1 Drought Watch Condition conservation practices. An abbreviated list of the new mandatory conservation practices under a Drought Alert Condition appears below; the complete list is provided in Appendix G, Emergency Water Regulations.

- Landscape irrigation using sprinklers is limited to no more than five minutes per watering station during two assigned days per week, on a schedule established by the Mayor. The five-minute limit per watering station does not apply to landscape irrigation systems using water efficient devices, including drip/micro-irrigation systems and stream rotor sprinklers.
- Landscaped irrigation of areas not covered by sprinklers is limited to two assigned days per week using a hand-held container, hand-held hose with shutoff nozzle, or low volume non-spray irrigation, such as a soaker hose.
- Operation of ornamental fountains is prohibited, except when needed for maintenance.
- Irrigating potted plants, non-commercial vegetable gardens, and fruit trees may take place on any day, but only before 10:00 a.m. or after 6:00 p.m.
- Irrigation may occur at any day and time as required by a landscape permit; for erosion control; for the establishment, repair, or renovation of public use fields for schools and parks; or for landscape establishment following a disaster.

During a Drought Alert Condition, the Mayor may recommend and implement a water allocation per account as an additional tool to reduce consumption, and establish a schedule of surcharges or penalties for exceeding the water allocation. These actions are subject to passage of a resolution by the City Council. Water conservation measures required under the Drought Watch and Alert conditions could be suspended by resolution of the City Council, if a water allocation is in effect.

Drought Response Level 3—Drought Critical Condition (consumer demand reduction of up to 40 percent is required)

A Drought Response Level 3—Drought Critical Condition is implemented when demand must be reduced up to 40 percent to ensure sufficient supplies. During a Drought Critical Condition, a new set of mandatory water conservation practices takes effect, in addition to all Permanent Water Waste Prohibitions and additional restriction practices that became mandatory under Level 1 and Level 2. The Drought Critical Condition's mandatory conservation practices apply to industrial manufacturing, processing, or research and development, which are exempt, under certain conditions, from the Drought Watch and Drought Alert conditions. An abbreviated list of the

mandatory water conservation practices required under a Drought Critical Condition appears below, and the complete list is provided in Appendix G, Emergency Water Regulations.

- Landscape irrigation is limited to two assigned days per week and to no more than five minutes per watering station, or no more than 18 minutes per day with impact rotors, rotating nozzles, or micro-spray heads. This condition does not apply to commercial growers or nurseries, or to the irrigation of golf course greens.
- Refilling ornamental lakes or ponds is prohibited, except to the extent necessary to sustain plants or animals that were present in the water feature before a drought response level was declared.
- Washing vehicles is prohibited, except at commercial car washes that recirculate water, or by using high pressure/low volume wash systems.
- Operation of cascading and recreational fountains is prohibited, except to the extent needed for maintenance.

As in a Drought Alert Condition, the Mayor may recommend and implement a water allocation per account and a schedule of surcharges or penalties for exceeding the allocation, subject to approval by the City Council, as part of the City's effort to reduce consumption. The City Council may suspend water conservation measures required under the Drought Watch, Alert, and Critical Condition if a water allocation is in effect.

As an additional method to reduce consumption during this stage, new potable water services, temporary or permanent water meters, and statements of immediate availability to serve will be allowed only under certain conditions. Developments with approved tentative maps and related entitlements will have their maps and related entitlements extended for the period of time the Drought Critical Condition is in effect, but not to exceed 5 years, unless an applicant proceeds with the development by meeting specific conditions for new potable water services. These are outlined in §67.3807(c) (1-4) of the Emergency Water Regulations. Additionally, consideration of annexations to the service area will be suspended.

<u>Drought Response Level 4—Drought Emergency Condition (consumer demand reduction greater than 40 percent is required)</u>

A Drought Response Level 4—Drought Emergency Condition is implemented when a water shortage emergency requires that demand be reduced by more than 40 percent to ensure sufficient supplies. During a Drought Emergency a new set of mandatory conservation measures takes effect, in addition to all Permanent Water Waste Prohibitions. Mandatory conservation practices imposed under a Level 1 Drought Watch, Level 2 Drought Alert, and Level 3 Drought Critical Condition remain in effect. An abbreviated list of water conservation practices required under a Drought Emergency Condition appears below, and the complete list is provided in Appendix G, Emergency Water Regulations.

- Stop all landscape irrigation, except crops and landscape products of commercial growers and nurseries. This does not apply to:

- Maintenance of trees and shrubs watered no more than two assigned days per week and by using a hand-held container, hand-held hose with an automatic shutoff nozzle, or low-volume non-spray irrigation.
- Maintenance of existing landscaping for fire protection.
- Maintenance of plant materials identified to be rare or protected by City Council policy, or essential for the well-being of rare animals.
- Maintenance of landscaping within active parks and playing fields, day care centers, school grounds, cemeteries, and golf course greens, with maximum irrigation of two days per week.

- Stop filling or refilling residential pools and spas.

In addition, no new commitments or agreements for water service will be entered into for customers or agencies located outside of the City during this stage.

F.3 Penalties, Charges, and Other Enforcement of Prohibitions

Wasting water is illegal at all times, even when no drought response levels are in effect, and the Emergency Water Regulations prohibit all water waste. The regulations define violations of both the permanent water conservation measures and mandatory conservation measures for Drought Response Levels 1 through 3. Violations are subject to criminal, civil, and administrative penalties and remedies, which are defined in Chapter 1 of the San Diego Municipal Code. Under a Drought Response Level 1—Drought Watch Condition, conservation measures are voluntary, so there are no penalties for non-compliance.

The City may penalize those who continue to willfully waste water by using an escalating series of remedies, up to discontinuing water service or installing flow-restricting devices. Remedies in order of issuance are:

- Warning letter.
- Notice of Violation.
- Administrative Citations with penalties of $100, $250, $500, and up to $1,000.
- Referral to the City Attorney for civil or criminal prosecution.
- Water service restricted or shut off.

Water waste violators will receive a Notice of Violation if a water waste complaint is confirmed. A Notice of Violation does not carry a monetary penalty. If a water waste complaint is not confirmed by City staff, a warning letter is issued instead. Warnings are followed by a site visit from a City code enforcement office to verify if the issue has been resolved. If the problem has not been corrected, the code enforcement officer can issue an Administrative Citation. Each violation is treated on a per property basis, and not a per incident basis. For example, if a property owner has received Notice of Violation for a broken sprinkler head, the next observed violation on the

property can result in an Administrative Citation, even if it's for a different fixture. If the problem persists, the case may be referred to the City Attorney and the offender's water service may be restricted or shut off.

Terminating a customer's water service is not taken lightly and would occur only when other enforcement measures have not been effective. The City will consider the following factors as part of a decision regarding appropriate remedies:

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

F.4 Consumption Reduction Methods

The City employs numerous methods to reduce water customers' consumption, both during drought conditions and on an ongoing basis. Some of the methods are detailed in the Emergency Water Regulations, while others go beyond the regulations. Except for the consumption reduction methods required by the four drought response levels detailed in Section F.2, the ongoing methods are not tied to any specific levels of action in the Emergency Water Regulations. As specific drought response levels are implemented, the City will closely monitor projected available supply and demand. Depending on these projections, the methods presented in Table F-2 would either be implemented or expanded to achieve a desired reduction in water use.

F.5 Determining Water Shortage Reductions

The City monitors how effective each stage of action or drought response level is through the use of meters. The City meters both water supplies entering the distribution system, and water consumed by individual customers. The City can compare this meter data with usage in prior months and during non-drought years to determine if it is achieving specific percentage goals for water consumption associated with the drought response levels. If the goals are not being met, the City can implement additional consumption reduction methods. The City is also required to report total monthly production to the SWRCB in compliance with Governor Brown's Executive Order B-29-15 and more recently B-36-15, as described in Subsection F.1.

Table F-2 Consumption Reduction Methods

Consumption Reduction Method	Listed in Emergency Water Regulations	Description
Expand Public Information Campaign	Yes, Level 2–Drought Alert Condition and ongoing	During drought periods the City has expanded its public outreach and education campaign, *San Diegans Waste No Water,* while campaigns by the San Diego County Water Authority, *When in Drought,* and the State, *Californians Don't Waste, also intensified*. See Section 7 and Subsection 9.1 for additional information.
Improve Customer Billing	No, ongoing	City single-family residential water bill provides data showing usage for the current billing period as compared to last year for each billing period and it also shows average single family residential use in the area. For non-single-family residential bills, the usage during the current billing period is shown in gallons per day and in hundred cubic feet, and shows usage compared to last year's use and the percentage change.
Increase Frequency of Meter Reading	No, ongoing	The City is testing Advanced Metering Infrastructure (AMI) at 11,000 meters, including at 1,000 single-family residences. AMI meters use radio based technology to read meters, eliminating the need to manually read them and providing real-time data to customers and better tools to conserve water. The Department will be rolling out this technology Citywide over the next several years. A submetering ordinance requires submeters to be installed in every new multi-unit building with at least three units. This will allow tenants to be billed on their water use, thereby providing a financial incentive to conserve water.
Offer Water Use Surveys	No, ongoing	Water use surveys are offered for residential customers inside and outside their home, and for commercial landscapes. Water-wise business surveys are offered for commercial, industrial, and institutional users. Staffing for the surveys programs was increased in 2015 in response to the drought. See Section 7 for additional details.
Provide Rebates or Giveaways of Plumbing Fixtures and Devices	No, ongoing	Through MWD, the City offers rebates on various water conserving devices. See Section 7 for additional details.
Provide Rebates for Landscape Irrigation Efficiency and water wise landscape incentives	No, ongoing	Rebates for landscape irrigation efficiency devices and grass replacement are offered on an ongoing basis. In 2015 funding was increased for grass replacement.
Decrease Line Flushing	No, ongoing	The City actively seeks to minimize the amount of water used for line flushing and has evaluated options to reuse and/or decrease the amount of water required for flushing. However, at this time there is no cost effective alternative to flushing. SDPUD works closely with the Public Works Department to track, reduce, and limit the amount of water necessary to meet water quality requirements in new lines. Public Works has implemented a tracking form used by contractors to meter flushing. This information is being gathered to accurately determine if appropriate or excessive water is being used for flushing. The information may ultimately be used to revise contract documents and specifications related to flushing, to reduce waste.

Consumption Reduction Method	Listed in Emergency Water Regulations	Description
Reduce System Water Loss	No, ongoing	The City is conducting water system audits on a yearly basis using the American Water Works Association's (AWWA) Water Audit Software, as discussed in Subsection 4.3.2. Additionally, the City has a goal of replacing more than 30 miles of water mains per year to reduce losses.
Increase Water Waste Patrols	No, ongoing	In response to the recent drought, the City is enforcing mandatory reduction measures by using staff from the Public Utilities and the Transportation & Stormwater Departments. When customers continue to waste water after being informed not to do so, the City's Code Enforcement Section steps in. Additionally, the City has a Waste No Water app available for iPhones and Android operating systems, allowing users to take a photo of a problem or concern and link the address using the app's GPS. This information is then conveyed to SDPUD Water Conservation staff for investigation and response. Additional information regarding the app is available in Section 7.
Moratorium or Net Zero Demand Increase on New Connections	Yes, Levels 3 and 4 – Drought Critical and Emergency Conditions	The Level 3 Drought Critical Condition prohibits new potable water services, temporary or permanent water meters, and statements of immediate availability to serve except under certain conditions. See Subsection 9.1 and the Emergency Water Regulations for additional details. The Level 4 Drought Emergency Condition prohibits new commitments or agreements for water service for customers or agencies located outside the City limits. See Subsection 9.1 and the Emergency Water Regulations for additional details.
Implement or Modify Drought Rate Structure or Surcharge	Yes, Levels 2, 3, and 4 – Drought Alert and Critical Conditions	The Mayor may recommend and, upon approval of the City Council, implement a water allocation per customer, and a schedule of surcharges and penalties for exceeding the allocation. See subsection 9.1 and the Emergency Water Regulation for additional details.

F.6 Revenue and Expenditure Impacts

When customers reduce their water consumption in response to prolonged water shortages or emergency situations, revenues for the City's Water Enterprise Fund (Fund) decline as a result. However, a portion of the Fund's expenditures are fixed regardless of how much water customers use. To remedy this imbalance of revenues versus expenditures, the City may have to increase rates and/or reduce or defer capital improvements. This is necessary to meet contractual requirements of bond holders related to outstanding debt, as the City must maintain a minimum debt service coverage ratio. Maintaining targeted debt service ratios is critical to obtaining future funding for capital projects needed to improve water system reliability and mitigate against future droughts and emergencies. In 2015 the City completed a Cost of Service Update for the City's Water Enterprise Fund to determine necessary rate changes.

F.6.1 Water Rate Structure

The City's current water rate structure, adopted on November 17, 2015, with an effective date of January 1, 2016, accounts for consumption reductions, among other variables, in meeting the Governor's mandate of a 16 percent reduction for the City from June 2015 to Feb 2016. The rate structure includes increases on January 1, 2016, and then annually on July 1 for the ensuing four

fiscal years through 2020. The Cost of Service Update indicates that revenues will be sufficient throughout the rate increase period to recover 100 percent of the total cost of service, accounting for the Governor's mandated 16 percent reduction. As adopted, the rate structure will assist the City in generating sufficient revenues to operate, manage, and maintain its facilities and services, even during State-mandated water use restrictions.

The City's rate structure uses a tiered conservation structure for single-family residential customers, as discussed in Subsection F.2. The structure uses four consumption-based tiers with progressively higher commodity charges at each tier to pay for the increased costs related to peak demands. Assets like storage facilities, treatment plants, pump stations, and pipelines have to be built to not only handle average daily demand, but to handle peak hour demands plus fire suppression flow. The single-family residential class typically exhibits the highest peaking factor among the user classes, therefore have been singled out with the tiered structure. Those customers who use more water create the need for the larger, more expensive, facilities, thus pay for higher priced water. The tiered structure has also been proven to encourage conservation.

The commodity charge portion of the rate structure also includes a pass-through adjustment that applies to all water users. As previously discussed in this UWMP, the City purchases the majority of its water from the SDCWA. In turn, SDCWA purchases a large portion of it supplies from MWD. Scarcities in statewide and regional water supplies have raised the cost of imported water while reducing availability. The rate increases of the 2016 Rate Case approved by Council contain the City's best estimate of what the future impacts of the SDCWA's rate increases will be for calendar years 2017 through 2019, ranging from 2.5 percent to 3 percent per year, as detailed in the Cost of Service Update. If the annual SDCWA rate increase to the City exceeds, or is less than the assumed increases in the Cost of Service Update, then the City will pass only the actual SDCWA rate increase through to its customers, up to a maximum of 7 percent for each of these years. This is known as the Pass-Through Adjustment. If the impact of any of the SDCWA increases is more than 7 percent, the City will not impose any increase higher than 7 percent to its customers, barring extraordinary circumstances.

F.6.2 Use of Financial Reserves

The City does not anticipate tapping any reserves to maintain operations during a drought or emergency. The current rate structure accounts for the State's mandatory 16 percent demand reduction and incorporates pass-through adjustments associated with future increases in water purchases from SDCWA. However, if revenue shortfalls were to occur, the City could consider the options of deferring operation and maintenance and capital program projects, using emergency storage water, or drawing from one or more of the available reserve funds. Any reallocation of capital project funding to meet short-term emergency needs would be restricted by bond covenants that require bond proceeds to be used exclusively for capital projects.

There are currently three applicable reserve funds that could serve in the event of a revenue loss resulting from reduced water demands under the existing 16 percent reduction:

- Secondary Purchase Reserve. Intended to be equal to 6 percent of the annual water purchase budget, this fund is earmarked as an emergency reserve for the purchase of water

in the event of drought or other emergency that suddenly disrupts the normal supply. City Council action is required to appropriate these reserves.

- Operating Reserve. Intended to be used in the event of a catastrophe that prevents the utility from operating in its normal course of business, this fund is restricted to be used in emergency situations due to loss of revenue and must be replenished no later than the subsequent fiscal year. The Chief Operating Officer and/or Chief Financial Officer has the authority to approve using this reserve.

- Rate Stabilization Reserve. Intended to maintain legal covenant debt service ratios in accordance with bond agreements, this fund is limited to the operation and maintenance of the water system to maintain a required legal covenant ratio. If the reserve is drawn down to support the system's legal covenant, it will be replenished at the earliest opportunity. Use of the Rate Stabilization Reserve is based upon the recommendation of Public Utilities Department and approval of the Chief Financial Officer. Under the adopted rate structure, $32 million will be transferred out of the reserve in FY 2016 to support the Water Utility Operating Fund's required obligation to meet the legal covenanted debt service coverage ratios. This allows the reserve to minimize rate increases.

Without the use of these reserves or emergency storage water, it could be necessary to increase rates if deliveries fall significantly during periods of significant reductions. The use of reserves would ultimately require rate increases because the reserves would need to be replenished, but the increases could be spread over multiple years. 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 operation and maintenance costs and defer capital projects, the availability of emergency storage water, the timing of additional debt issuances, and the possibility of a downgrade in the debt rating.

F.6.3 Summary of Measures to Mitigate Revenue and Expenditure Impacts During Shortages

The City has many ways to mitigate the effects of prolonged water shortages or emergencies on revenues and expenditures, as previously discussed. The City does not anticipate using any of these measures, as the City Council enacted a rate increase for the five years beginning on January 1, 2016. The City does not anticipate further rate increases in excess of those adopted in November 2015, because the rate increases incorporate reduced revenues associated with the current mandatory 16 percent reduction in consumption, and contain pass-through adjustments, as discussed in Section F.6.1. If necessary, however, rates could be revised with City Council approval via the Proposition 218 noticing and Public Hearing process. Table F-3 summarizes the measures discussed in this section.

Table F-3 Summary of Measures to Mitigate Revenue and Expenditure Impacts

Name of Measure	Summary of Effects
Use of emergency water storage and other local water resources during times of shortage	Makes water available to avoid revenue losses resulting from decreased sales, and expenditure increases caused by purchasing imported water. Protects against potential higher cost or surcharges on imported water during shortages.
Use of Secondary Purchase Reserve	Allows the purchase of water during a sudden disruption of supply during drought or other emergency.
Use of Operating Reserve	Provides for unanticipated needs when normal water supply is disrupted by a catastrophic event.
Use of Rate Stabilization Reserve	Provides a source of funds to mitigate future rate increases by maintaining legal covenanted rates.
Reductions in expenditures through possible deferrals	Reduces current operational expenditures to compensate for reduction in water sales revenue or increased expenditures. Delays operations & maintenance and capital improvements.
Council approved rate increase	Provides additional revenues when water sales decline or expenditures increase. Replenishes reserve funds used to offset effects of shortages.

F.7 Catastrophic Supply Interruption Planning

A catastrophic supply interruption occurs when a disaster suddenly disrupts all or a large portion of the water available to meet the region's needs. The UWMP Act requires agencies to identify actions they will take if there is a catastrophic supply interruption, specifically including interruptions from a power outage, earthquake, or other non-drought related emergency. MWD, SDCWA, and the City have developed plans for catastrophic supply interruptions that include a regional power outage, earthquake, or other disaster. The City additionally maintains several emergency connections to and from neighboring water agencies, to provide mutual aid during times of catastrophic supply interruptions. These agencies include the Santa Fe Irrigation District, Poway Municipal Water District, Otay Water District, Cal-Am, and the Sweetwater Authority.

F.7.1 MWD Catastrophic Supply Interruption Planning

MWD has developed emergency storage requirements and plans based on a 100 percent reduction in imported supplies from all aqueducts serving its service area, for a period of six months. MWD has made significant investments in emergency storage to provide water to its member agencies during emergencies. If a catastrophe were to occur, non-firm (non-contractual) service deliveries would be suspended and firm (contractual) supplies to member agencies would be cut back by 25 percent from normal-year demands. Water would be drawn from a combination of MWD's surface reservoirs and groundwater basins, as well as its emergency water storage and other available storage projects. Emergency supplies are designed to be delivered via gravity, except in limited circumstances. MWD's water treatment plants have backup generators to continue treating water in the event of a power outage. MWD also has the ability to deploy mobile generators to key locations, as needed.

MWD's Water Surplus and Drought Management Plan (WSDM Plan) and Water Supply Allocation Plan (WSAP) will guide the allocation of supplies and resources during a catastrophic supply interruption. MWD and its member agencies worked together to develop the WSDM Plan. The WSDM Plan establishes broad water resource management strategies to ensure MWD's ability to meet full service demands at all times. It also contains principles for supply allocation if the need should ever arise. The WSDM Plan splits MWD's resource actions into two major categories: Surplus Actions and Shortage Actions. The Shortage Actions are split into three subcategories: Shortage, Severe Shortage, and Extreme Shortage.

A catastrophic supply interruption would fall under an Extreme Shortage. Under an Extreme Shortage MWD would allocate supplies to its member agencies in accordance with the WSAP. If shortage allocations are required, MWD will rely on the calculations established in the WSAP. The plan allocates shortages equitably among its member agencies based on need, with adjustments for growth, local investments, changes in supply conditions, demand hardening (increasing water use efficiency such that additional conservation is more difficult to obtain), and water conservation plans.

F.7.2 SDCWA Catastrophic Supply Interruption Planning

SDCWA's catastrophic supply interruption planning consists of an Integrated Contingency Plan (ICP) and an Emergency Storage Project (ESP).

F.7.2.1 SDCWA Integrated Contingency Plan

The SDCWA's ICP outlines how staff would respond to an emergency that causes severe damage to SDCWA's water distribution system or hinders the authority's 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 ICP and/or the Emergency Operations Center (EOC). SDCWA's ICP includes the following:

- Authorities, policies, and procedures associated with emergency response activities.
- EOC activities, including EOC activation and deactivation guidelines.
- Multiagency and multijurisdictional coordination, particularly between SDCWA, its member agencies, and MWD, in accordance with Standardized Emergency Management Systems and National Incident Management System guidelines.
- Incident Command System management and organization and emergency staffing required to assist in mitigating any significant emergency or disaster.
- Mutual aid agreements and covenants that outline terms and conditions under which mutual aid assistance will be provided.
- Hazard specific action plans and Incident Command System position checklists.

The SDCWA's ICP provides a step-by-step approach with procedural tools such as resource and information lists, personnel rosters, listings of established policies and procedures, and reference materials. SDCWA provides input to the Unified San Diego County Emergency Services Organization's "Operational Area Emergency Plan", which serves to supports SDCWA's ICP.

F.7.2.2 SDCWA Emergency Storage Program

The SDCWA's Emergency Storage Program (ESP) is a system of reservoirs, pipelines, pump stations, and other conveyance facilities that are designed to provide water to the region during a prolonged regional supply interruption. The recently completed project has added 90,100 AF of water storage capacity to provide for six months of supplies in the San Diego region, through at least 2030, for use during an emergency. Emergency water storage was added at Hodges Reservoir, which is owned by the City, and at the Olivenhain and San Vicente reservoirs. The regional water pipeline system was expanded to allow water distribution throughout the region in the event of an emergency. SDCWA sized the ESP based on the authority's assumption of providing a 75 percent service level to all member agencies during an outage, while fully implementing best management practices for water conservation. SDCWA's Board of Directors has the ability to authorize use of ESP supplies in an emergency or prolonged drought situation when imported water and local supplies would not meet 75 percent of the member agencies' municipal and industrial demands.

The SDCWA's January 2013 Emergency Water Delivery Plans include the following steps that show the methodology for calculating the allocation of ESP supplies to member agencies in a prolonged drought or outage situation without imported supplies:

- Estimate the water storage and conveyance facility infrastructure that would be in place at the time of the emergency event in order to estimate the duration of the emergency (i.e., time needed to repair damaged pipelines and/or infrastructure).
- Determine each member agency's net demand during the emergency period by adding municipal and industrial water demands and agricultural water demands, and then subtracting recycled water supplies.
- Determine each member agency's usable local supplies during the emergency period (local supplies include surface water and groundwater).
- Determine local supplies that could be transferred within the City of San Diego service areas, and between member agencies.
- Determine the amount of Carlsbad Desalination Plant supplies available for delivery to member agencies.
- Determine the amount of MWD supplies available for delivery to member agencies.
- Allocate delivery of ESP supplies in Olivenhain, Lake Hodges, and San Vicente Reservoirs to member agencies to achieve an initial service of 75 percent, considering other available supplies described above and taking into account delivery facilities.
- Determine member agency reductions due to the influence of SDCWA's Transitional Special Agricultural Water Rate (TSAWR) program. The reductions rate for the program for TSAWR customers is twice the rate imposed on SDCWA municipal and industrial customers, up to a 90 percent reduction. Reductions in deliveries would be reallocated to commercial and industrial customers.

- Determine increases in member agency deliveries due to redistribution of emergency water not delivered to member agencies as a result of TSAWR program.
- Determine net SDCWA deliveries to member agencies from all water sources available to SDCWA, consisting of Carlsbad Desalination Plant supplies, imported water supplies from MWD, and ESP reservoir supplies.

Emergency Storage Program Project Components

The Lake Hodges Pipeline and Pump Station project connected the City's Hodges Reservoir to Olivenhain Reservoir, which is owned by the SDCWA and Olivenhain Municipal Water District. Major components include a ten-foot diameter pipeline connecting the lake and reservoir, a pump station to pump water back and forth between the facilities, electrical turbines to generate hydroelectric power, an electrical switchyard to provide electricity to the pump station and send electricity generated by the turbines to the local electrical grid, and an inlet-outlet below the water surface connecting to the pump station. This connection allows water to be pumped back and forth between Hodges Reservoir and Olivenhain Reservoir. From Olivenhain Reservoir, water can be distributed throughout the region via SDCWA's delivery system. This project also assists in keeping Hodges Reservoir at a more constant level in dry seasons by capturing runoff during rainy seasons and preventing spills over the dam. The project gives the City access to an additional 40,000 AF of storage for delivery into the northern part of its distribution system. With the project agreements, the City has access to 20,000 AF of water in Hodges Reservoir that it could not previously access, in addition to 20,000 AF in Olivenhain Reservoir.

The San Vicente Pipeline and Pump Station and Dam Raise projects included construction of pipelines and pumping facilities, and raising the San Vicente Dam. The San Vicente Dam Raise component of the ESP raised the dam by 117 feet, from 220 feet to 337 feet, increasing the storage capacity by 152,000 AF, to 242,000 AF from 90,000 AF. Activated during emergencies, the pumping facilities can move up to 300 million gallons of water per day from the reservoir to SDCWA's water delivery system. Water is pumped through the pipelines to a 3 million-gallon surge tank. The surge tank protects the pipeline and other pipelines from extreme pressure fluctuations in the event of sudden pump or valve failures in the system. From the surge tank water flows through the pipeline by gravity to SDCWA's Second Aqueduct, where it can be delivered to agencies in the southern half of the county during emergencies. Nearly half of the City's average daily water use can be met through this project.

In 2019 the final component of the ESP, consisting of a pump station and conveyance facilities, is scheduled for completion in 2019. The facilities will convey treated water from SDCWA's treatment plant to the northern portions of SDCWA's service area.

F.7.3 City of San Diego Emergency Storage of Water Policy

The City receives its major water supply sources through aqueducts, canals, and pumping plants owned by MWD and the SDCWA. The City maintains an accessible emergency water supply that could provide an uninterrupted supply of water to the City's water treatment facilities, should the supply of imported water be interrupted. The management of reservoirs is guided by the City of San Diego Council Policy 400-04 (Appendix G), dated December 27, 1973, which outlines the City's Emergency Water Storage Policy. The policy mandates that the City store sufficient

untreated water in active, available storage to meet six-tenths of the normal annual (7.2 months) City and its contractees water demand requirements, exclusive of conservation. Active available storage is that portion of water that is above the lowest usable outlet of each reservoir. This policy applies to 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 SDCWA or 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's Lake Skinner reservoir.

The emergency storage requirement changes from month to month, and is based on the upcoming seven months' water demands. This results in a seasonally fluctuating emergency storage requirement, generally peaking in April and reaching its minimum in October. This seasonally fluctuating requirement makes a portion of the required emergency storage capacity available for impounding or seasonal storage.

Appendix G

Emergency Storage of Water, City Council Policy 400-04

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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

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Appendix H

Emergency Water Regulations (Water Shortage Contingency Plan)

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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:

Cascading Fountain means a water feature with a flow which does not eject water up into the air.

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.

Ornamental Fountain means a water feature with an external forced flow or stream of water against gravity that is not used for recreational purposes or to support aquatic life.

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).

Rain Event means a period during or within 48 hours after measurable precipitation of 1/8 of an inch or more recorded at the nearest reporting weather station for the *customer*.

Recreational Fountain means any recreational structure, other than swimming pools or spa pools, which is open to the general public or which may be open to the general public, and uses re-circulated water in which people come into contact. This includes, but is not limited to, zero depth water features, interactive fountains, water slides, waterfalls, or combinations of such water features. Water features not intended for human contact, such as *ornamental fountains*, are not included.

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.)
(Amended 6-29-2015 by O-20517 N.S.; effective 6-29-2015.)

§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) *Customers* shall repair or stop all water leaks upon discovery or within seventy-two hours of notification by the City of San Diego.

(c) A *customer* shall not wash down sidewalks, driveways, parking areas, tennis courts or other paved areas without using a power washer or a hose with a shutoff nozzle. Washing any paved areas is only allowed to alleviate immediate safety or sanitation hazards. Wash water shall be collected and prevented from leaving the property and entering the municipal separate storm sewer system pursuant to Chapter 4, Article 3, Division 3 of this Code.

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

(e) A *customer* shall not use non-recirculating *ornamental fountains* or *cascading fountains*.

(f) Vehicle washing shall 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 water service connections shall be prohibited after the effective date of this section. Non-recirculating systems in all conveyer car wash and commercial laundry systems shall be prohibited after the effective date of this section.

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

(i) Guests in hotels, motels, and other commercial lodging establishments shall 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. 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.)
(Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)
(Amended 6-29-2015 by O-20517 N.S.; effective 6-29-2015.)

§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, *drought,* 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 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.]

(g) This Division does not apply to areas serviced by the Park and Recreation Department, including public rights-of-way, and street trees, or areas with significant public benefit requiring enhanced irrigation schedules, such as public parks. Irrigation of the areas serviced by the Park and Recreation Department shall be operated and maintained according to a schedule determined by the City Manager, consistent with section 67.3801.

(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.)
(Amended 6-29-2015 by O-20517 N.S.; effective 6-29-2015.)

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

(5) 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.

(6) 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.

(7) Irrigation is prohibited 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.)
(Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)
(Amended 6-29-2015 by O-20517 N.S.; effective 6-29-2015.)

§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 all landscape irrigation using sprinklers to no more than five minutes per watering station during the two assigned *days* per week on a schedule established and posted by the City Manager. 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)(1) shall be watered no more than two 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) Stop operating *ornamental fountains* except to the extent needed for maintenance.

(4) *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.

(5) 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, 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, may be suspended by resolution of the City Council 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.)
(Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)
(Amended 6-29-2015 by O-20517 N.S.; effective 6-29-2015.)

§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 five minutes per watering station during the two assigned *days* 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. *Customers* with irrigation systems that use non-standard spray heads, such as impact rotors, rotating nozzles or micro-spray heads shall limit irrigation to no more than 18 minutes per *day* total on assigned watering *days*.

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

(4) Stop operating *cascading fountains* and *recreational fountains* except to the extent needed for maintenance.

(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 may be suspended by resolution of the City Council 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.)
(Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)
(Amended 6-29-2015 by O-20517 N.S.; effective 6-29-2015.)

§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) Stop filling or refilling residential pools and spas.

(3) 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.) (Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)

§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.)

Appendix I

Fiscal Year 2015 American Waterworks Association's Water Audit

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AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of San Diego - Public Utilities
Reporting Year: 2015 7/2014 - 6/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	7	177,293.397	acre-ft/yr	5	-1.00%		acre-ft/yr
Water imported:	7	20,971.500	acre-ft/yr	5	0.00%		acre-ft/yr
Water exported:	7	18,661.289	acre-ft/yr	3	0.00%		acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 181,394.450 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	8	167,874.695	acre-ft/yr			
Billed unmetered:	9	98.818	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	8	146.936	acre-ft/yr		146.936	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 168,120.448 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 13,274.002 acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		453.486	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	5	4,481.255	acre-ft/yr	2.60%	acre-ft/yr
Systematic data handling errors:		419.687	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 5,354.428 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 7,919.575 acre-ft/yr

WATER LOSSES: 13,274.002 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 13,420.938 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	3,293.0	miles
Number of active AND inactive service connections:	7	284,637	
Service connection density:		86	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 6 93.0 psi

COST DATA

Total annual cost of operating water system:	6	$480,563,755	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$4.52	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	9	$1,143.00	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Total annual cost of operating water system

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: City of San Diego - Public Utilities
Reporting Year: 2015 | 7/2014 - 6/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

	Apparent Losses:	5,354.428	acre-ft/yr
+	Real Losses:	7,919.575	acre-ft/yr
=	Water Losses:	13,274.002	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	6,305.35	acre-ft/yr
	Annual cost of Apparent Losses:	$10,542,397	
	Annual cost of Real Losses:	$9,052,074	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	7.4%	
	Non-revenue water as percent by cost of operating system:	4.1%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	16.79	gallons/connection/day
	Real Losses per service connection per day:	24.84	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.27	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	7,919.57	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.26	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Appendix J

Department of Water Resources SB X7-7 (20x2020) Tables

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SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	226150	Acre Feet
	2008 total volume of delivered recycled water	10489	Acre Feet
	2008 recycled water as a percent of total deliveries	4.64%	Percent
	Number of years in baseline period[1]	10	Years
	Year beginning baseline period range	1996	
	Year ending baseline period range[2]	**2005**	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[3]	**2008**	

[1] *If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.*

[2] *The ending year must be between December 31, 2004 and December 31, 2010.*

[3] *The ending year must be between December 31, 2007 and December 31, 2010.*

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: Service Area Population		
Year		**Population**
10 to 15 Year Baseline Population		
Year 1	1996	881,119
Year 2	1997	1,122,784
Year 3	1998	1,143,362
Year 4	1999	1,157,759
Year 5	2000	1,169,843
Year 6	2001	1,179,015
Year 7	2002	1,192,637
Year 8	2003	1,207,261
Year 9	2004	1,217,481
Year 10	2005	1,227,114
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2004	1,217,481
Year 2	2005	1,227,114
Year 3	2006	1,236,521
Year 4	2007	1,243,005
Year 5	2008	1,247,563
2015 Compliance Year Population		
2015		1,304,114
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *								
	Baseline Year *Fm SB X7-7 Table 3*	**Volume Into Distribution System** *Fm SB X7-7 Table(s) 4-A*	**Deductions**					**Annual Gross Water Use**
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *Fm SB X7-7 Table 4-B*	Water Delivered for Agricultural Use	Process Water *Fm SB X7-7 Table(s) 4-D*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1996	216066			0		0	216,066
Year 2	1997	222977			0		0	222,977
Year 3	1998	206495			0		0	206,495
Year 4	1999	215400			0		0	215,400
Year 5	2000	230973			0		0	230,973
Year 6	2001	216312			0		0	216,312
Year 7	2002	219610			0		0	219,610
Year 8	2003	211059			0		0	211,059
Year 9	2004	229162			0		0	229,162
Year 10	2005	217780			0		0	217,780
Year 11	0	0			0		0	0
Year 12	0	0			0		0	0
Year 13	0	0			0		0	0
Year 14	0	0			0		0	0
Year 15	0	0			0		0	0
10 - 15 year baseline average gross water use								**218,583**
5 Year Baseline - Gross Water Use								
Year 1	2004	229,162			0		0	229,162
Year 2	2005	217,780			0		0	217,780
Year 3	2006	224,197			0		0	224,197
Year 4	2007	229,940			0		0	229,940
Year 5	2008	226,150			0		0	226,150
5 year baseline average gross water use								**225,446**
2015 Compliance Year - Gross Water Use								
2015		180,177			0		0	180,177
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES:								

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	Groundwater, surface water, and imported water. Excludes recycled water.
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1996	**216066**		216,066
Year 2	1997	**222977**		222,977
Year 3	1998	**206495**		206,495
Year 4	1999	**215400**		215,400
Year 5	2000	**230973**		230,973
Year 6	2001	**216312**		216,312
Year 7	2002	**219610**		219,610
Year 8	2003	**211059**		211,059
Year 9	2004	**229162**		229,162
Year 10	2005	**217780**		217,780
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	**229162**		229,162
Year 2	2005	**217780**		217,780
Year 3	2006	**224197**		224,197
Year 4	2007	**229940**		229,940
Year 5	2008	**226150**		226,150
2015 Compliance Year - Water into Distribution System				
2015		**180,177**		180,177

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1996	881,119	216,066	219
Year 2	1997	1,122,784	222,977	177
Year 3	1998	1,143,362	206,495	161
Year 4	1999	1,157,759	215,400	166
Year 5	2000	1,169,843	230,973	176
Year 6	2001	1,179,015	216,312	164
Year 7	2002	1,192,637	219,610	164
Year 8	2003	1,207,261	211,059	156
Year 9	2004	1,217,481	229,162	168
Year 10	2005	1,227,114	217,780	158
Year 11	0	0	0	
Year 12	0	0	0	
Year 13	0	0	0	
Year 14	0	0	0	
Year 15	0	0	0	
10-15 Year Average Baseline GPCD				**171**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	1,217,481	229,162	168
Year 2	2005	1,227,114	217,780	158
Year 3	2006	1,236,521	224,197	162
Year 4	2007	1,243,005	229,940	165
Year 5	2008	1,247,563	226,150	162
5 Year Average Baseline GPCD				**163**
2015 Compliance Year GPCD				
2015		1,304,114	180,177	123
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	171
5 Year Baseline GPCD	163
2015 Compliance Year GPCD	123
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☐	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☑	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☐		San Francisco Bay	131	124
☐		San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☑	100.00%	South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**142**
NOTES:				

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target*	Calculated 2020 Target *Fm Appropriate Target Table*	Confirmed 2020 Target
163	155	142	142
** Maximum 2020 Target is 95% of the 5 Year Baseline GPCD*			
NOTES:			

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	2015 Interim Target GPCD
142	171	157
NOTES:		

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)*					2015 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015?
		Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD		
123	157	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	0	123.3417165	123.3417165	YES
NOTES:								

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Appendix K

Climate Change Vulnerability Assessment

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Vulnerability Question	Answer	Justification	Vulnerability Issue
Water Demand			
Are there major industries that require cooling/process water in your planning region?	Yes	Electronics and aerospace manufacturing, energy generation, research development, pharmaceutical. Biotech and energy growing. Room for efficiency improvements	Increase in industrial demand
Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?	Yes	Primary crops include avocados, nurseries and citrus which can be climate sensitive, but agricultural land use is expected to decrease. Rise in smaller agricultural/urban farms/residential gardens, and increased crop diversity. Decrease in larger agricultural users.	Increase in agricultural crop water demand per acre; small food production use of permaculture could decrease per acre use
Do groundwater supplies in your region lack resiliency after drought events?	Yes	Two primary groundwater basins, Mission Valley Aquifer and the San Diego Formation Aquifer. Both aquifers have not been studied for resiliency after drought events due to water quality issues. The Mission Valley Aquifer has a large potential for storage capacity. Streamflow infiltration from the San Diego River is the dominant source of recharge. Water quality in this aquifer is poor and has high levels of Methyl Tertiary Butyl Ether (MTBE) from underground storage tanks (UST) in the watershed. Currently Kinder Morgan operates a 0.5 MGD groundwater treatment plant to remove MTBE's from the aquifer. The San Diego Formation is part of a thick wedge of sediment that was deposited along the coast in the San Diego Bay area in southwestern San Diego County. The San Diego Formation Basin is largely unstudied. However, investigations by other entities suggest the sustainable yield may be limited to 10,000 acre feet per year (AFY) with useable storage volume estimated between 270,000 and 360,000 acre feet. The San Diego Formation is brackish and requires reverse osmosis treatment. Currently the Sweetwater Authority operates a Groundwater Desalination Facility utilizing water from the San Diego Formation.	Lack of groundwater storage to buffer drought
Are water use curtailment measures effective in your region?	Yes	Today, programs initiated by the City of San Diego's Water Conservation Section account for water savings of more than 32.2 million gallons per day (mgd) or 36,166 AF per year. Depending on conditions, this savings can be as much as 20 percent of raw water purchases annually. The savings have been achieved by creating a water conservation ethic, adopting programs, policies and ordinances designed to promote water conservation practices, and implementing on-going public information and education program. The City has implemented a campaign to reduce water usage per Governor Brown's mandatory water restrictions "San Diegian's Waste No Water, All Ways Always"	Perceived limited ability to conserve further
Does water use vary by more than 50% seasonally in parts of your region?	Yes	The City has three service areas; Miramar, Alvarado and Otay water use in these areas are heavier in the summer months and lighter in the winter months with the Miramar and Otay service areas exceeding a 50% seasonal increase from winter to summer.	Limited ability to meet summer demand
Are some in-stream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?	No	Most streams are intermittent; however, movement of water between Sutherland and San Vicente Reservoirs as well as Barrett and Lower Otay Reservoirs via streams have in-stream requirements to protect species during certain times of the year which impacts when water can be moved	Habitat demand would be impacted
Water Supply			
Does a portion of the water supply in your region come from snowmelt?	Yes	Imported supplies (State Water Project, Colorado River) come from snowmelt.	Decrease in imported supply
Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?	Yes	Approximately 85% of the City's supplies are imported.	Decrease in imported supply
Would your region have difficulty in storing carryover supply	No	No, the City has sufficient storage capacity	Decrease in reliability

surpluses from year to year?			
Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?	No	The City has not relied upon the coastal aquifers. The San Diego Formation has brackish groundwater near the coast which limits the use of coastal aquifers.	Decrease in groundwater supply
Has your region faced a drought in the past during which it failed to meet local water demands?	Yes	Drought management plans had to be put into effect. It should be noted that the City has never failed to meet its customers' demands once drought measures were put into place. Development of additional supplies may reduce the Region's vulnerability to this issue.	Sensitivity due to higher drought potential
Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?	Yes	One invasive species located in the San Diego region is the giant reed (Arundo Donax) which is a non-native invasive vegetation species that dominates riparian areas. Increased sedimentation and narrowing of channels are some of the effects caused by the root system of Arundo. The Quagga mussel is a recent invasive species to the region that directly impacts the region's water supply operations. There are many other invasive species that appear in the region's coastal and marine waters as well as near vegetation	Invasive species can reduce supply availability
Water Quality			
Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire susceptible vegetation nearby which could pose a water quality concern from increased erosion?	Yes	Wildfires are a common occurrence in the area, and often cause increased erosion in the Region's watersheds. In addition, wildfires are a threat to the water in the region due to the fact that drinking water is becoming contaminated with ash from the frequently occurring wildfires	Increased erosion and sedimentation as well as degradation of water quality.
Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?	Yes	Several water bodies are 303(d) listed for water quality issues related to eutrophication including Lake Hodges, Famosa Slough, Mission Bay at the mouths of Rose Creek and Tecolote Creek, lower San Diego River, and the Tijuana River.	Increased eutrophication
Are seasonal low flows decreasing for some water bodies in your region? If so, are the reduced low flows limiting the water bodies' assimilative capacity?	Yes	At times during the year, the only flow in some streams is irrigation overflow, which in turn increases the concentration of constituents.	Increased constituent concentration
Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?	Yes	At times recreation use in some reservoirs is impacted, and beach closures occur. Wildlife habitat and freshwater habitat issues as well.	Decrease in recreational opportunity
Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?	Yes	Total dissolved solids (TDS), turbidity and nutrient levels in reservoirs may increase during storm events, impacting water treatment, particularly after fires. Oils and feces show up in reservoirs as well. There are four primary sewer sheds within the region that are conveyed to a treatment facility.	Increase in treatment needs and cost
Sea Level Rise			
Has coastal erosion already been observed in your region?	Yes	Coastal erosion occurs at unstable bluffs along the coast,(Sunset Cliffs)	Decrease in land due to erosion
Do tidal gauges along the coastal parts of your region show an increase over the past several decades?	Yes	San Diego Bay Adaptation shows increasing levels	Damage to coastal recreation/tourism due to inundation
Is there land subsidence in the coastal areas of your region?	No	None noted	
Are there coastal structures, such as levees or breakwaters, in your region?	Yes	Examples include Mission Bay, San Diego Harbor	
Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation) at less than six feet above mean sea level in your region?	Yes	Widespread, coastal communities and downtown.	
Are there climate-sensitive low-lying coastal habitats in your region?	Yes	Habitat type - salt marsh	Damage to ecosystems/habitats

Are there areas in your region that currently flood during extreme high tides or storm surges?	Yes	Mission Valley flooded from San Diego River during high tidal events. Urban Disadvantaged Communities often suffer from floods during extreme high tides or storm surges due to inadequately-sized drains, pollution, or dumping. (p 17,18)	Storm drains and sewer systems will be inundated
Flooding			
Does critical infrastructure in your region lie within the 200-year floodplain?	Yes	There is low-lying water and wastewater infrastructure. Pump stations.	Increases in inland flooding
Does aging critical flood protection infrastructure exist in your region?	Yes	San Diego River Flood Improvement project. San Diego River Improvement Project (SDRIP) at Mission Valley.	
Have flood control facilities (such as impoundment structures) been insufficient in the past?	Yes	Flooding (and flash flooding in particular) has been a danger in certain areas of the Region due to overflowing drainage channels, low lying areas with poor drainage, and debris build-up in basins. Some areas identified by the County include localized areas in Mission Valley, and Point Loma	
Are wildfires a concern in parts of your region?	Yes	Wildfires are a common occurrence in the Region. Rural parts of the region are becoming more vulnerable to wildfires. As a result of climate change, wildfires are occurring more frequently as well as more intense, leaving the entire region prone to wildfires. With an increase in wildfires, there is a decrease in vegetation, which ultimately leads to an increasing risk of flooding due to the fact that there is no vegetation left to stop the runoff	Increase in flash flooding
Does part of your region lie within the Sacramento-San Joaquin Drainage District?	No	Not Applicable	Not Applicable
Ecosystem and Habitat			
Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?	Yes	Erosion and sedimentation issues in Penasquitos Canyon	Increased impacts to coastal species
Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?	Yes	Brackish lagoons exist along the coast including Los Penasquitos Lagoon, and Mission Bay.	
Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?	Yes	Estuaries, coastal dunes, wetlands, marshes and exposed beaches exist along the entire coast of the region. Historically, coastal storms have caused erosion.	
Do climate-sensitive fauna or flora populations live in `your region?	Yes	Numerous species dependent upon the Mediterranean climate live in the Region	Decreases in ecosystem services
Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?	Yes	A number of endangered and threatened species exist in the Region. There are many endangered species present in region 11, arguably more than any other land in the United States. With the amount of endangered species increasing, the region is already preparing to accommodate this distribution of species by developing additional "Multiple Species Conservation Programs" as well as "Multiple Habitat Conservation Programs".	Decrease in available, necessary habitat
Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?	Yes	Beach tourism, reservoir recreation, river trails	Decrease in available, necessary habitat
Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?	Yes	Multiple Species Habitat Conservation Plans (MSHCPs) working on ensuring corridors but some need to be created	

Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change?	No	No, the Region is not within any of the ten listed habitats.	Not Applicable
Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?	Yes	Some rivers and streams have quantified flow requirements but are primarily related to water rights. There is a bacteria Total Maximum Daily Load (TMDL) that covers almost every water body in region. Nutrient TMDLs on lots of water bodies	Decrease in environmental flows
Hydropower			
Is hydropower a source of electricity in your region?	Yes	Approximately 10% of electricity provided by San Diego Gas and Electric (SDG&E) is hydropower. SDCWA also produces hydroelectric power at its Rancho Peñasquitos in-line hydro generation facility which provides energy and ultimately sells the produced energy to SDG&E where it is then distributed to its customers.	Decrease in hydropower potential
Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?	Yes	Energy demand is expected to increase in the future with population increase and development. Additional hydropower was recently created at Lake Hodges/Olivenhain Reservoir, and an additional project is possible at the San Vicente Dam.	Decrease in hydropower potential

Appendix L

Department of Water Resources Energy Analysis Tables

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Urban Water Supplier: *City of San Diego*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Retail Potable Deliveries

DWR Table O-1A: Voluntary Energy Intensity - Water Supply Process Approach

Enter Start Date for Reporting Period 7/1/2014

End Date 6/30/2015

	Urban Water Supplier Operational Control							
	Water Management Process						Non-Consequential Hydropower (if applicable)	
	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (AF)	*500*	*6279*	*6779*	*191623*	*191623*	*191623*	*0*	*191623*
Energy Consumed (kWh)	*139678*	*350951*	*17925*	*4682797*	*8197202*	*13388553*	*0*	*13388553*
Energy Intensity (kWh/AF)	*279.4*	*55.9*	*2.6*	*24.4*	*42.8*	*69.9*	*0.0*	*69.9*

Quantity of Self-Generated Renewable Energy

N/A kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data

Data Quality Narrative:

Energy consumption reported in Table O-1A is based on SDG&E's energy purchases (electricity and natural gas) for FY 2015. Natural gas consumption is converted to kWh.

Narrative:

Extract and divert volume = local groundwater supplies; storage volume= local surface water supplies; conveyance = local groundwater+ local surface water supplies; treatment and distribution accounts for all water supplies

Urban Water Supplier: *City of San Diego*

DWR Table O-2: Voluntary Energy Intensity - Wastewater & Recycled Water					
Enter Start Date for Reporting Period	7/1/2014	**Urban Water Supplier Operational Control**			
End Date	6/30/2015	**Water Management Process**			
		Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Wastewater Entering Process (AF)		*0*	*179620*	*0*	*179620*
Wastewater Energy Consumed (kWh)		*0*	*120968088*	*0*	*120968088*
Wastewater Energy Intensity (kWh/AF)		*0.0*	*673.5*	*0.0*	*673.5*
Volume of Recycled Water Entering Process (AF)		*0*	*12427*	*12427*	*12427*
Recycled Water Energy Consumed (kWh)		*0*	*3041*	*469081*	*472122*
Recycled Water Energy Intensity (kWh/AF)		*0.0*	*0.2*	*37.7*	*38.0*

Quantity of Self-Generated Renewable Energy related to recycled water and wastewater operations

240.3 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data

Data Quality Narrative:

Energy consumed = SDG&E's energy purchases (electricity and natural gas) for FY 2015. Natural gas consumption is converted to kWh.

Narrative:

Self-generated renewable energy is the total methane gas produced during the wastewater treatment process in FY 2015.

The gas produced is reused in the wastewater treatment facility and therefore offsets a portion of the energy reported in DWR Table O-2.

Appendix M

Staff Participants

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City of San Diego 2015 Urban Water Management Plan Participants

For questions pertaining to the 2015 Urban Water Management Plan please contact Seevani Bista, Project Manager at (619) 533-4222, SBista@sandiego.gov.

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